

Biological Assessment

Table of Contents

	<i>Page</i>
Chapter 1 – Area Location and Description	1
Chapter 2 – Description of Federal Action	19
Chapter 3 – Description of the Action Area	21
Chapter 4 – Description of Species and Effects	22
Terrestrial	24
Aquatic	44
Plants	74
Literature Cited	
Appendix A – Fish Distribution Maps	
Appendix B – Plant Potential Habitat Maps	
Appendix C – Plant Species Summaries	
Appendix D – Matrices of Diagnostic Pathways and Habitat Indicators	

List of Tables and Figures

Table 1-1:	Summary of Existing Management Direction for the HCNRA
Table 1-2:	Threatened, Endangered, or Candidate Species Listed for the HCNRA
Table 2-1:	Baseline Condition (Current) Compared to Selected Alternative (E-modified)
Table 4-1:	Summary of Effects Determination by Species
Table 4-2:	Summary of Snake River Powerboat Use and Visitors to Kirkwood Historic Ranch
Table 4-3:	Lynx Analysis Units in the HCNRA
Table 4-4:	Site Locations of Documented MacFarlane's four-o'clock
Table 4-5:	Acres of MacFarlane's four-o'clock Potential Habitat by Probability Class
Table 4-6:	Acres of Spalding's catchfly Potential Habitat by Probability Class
Table 4-7:	Determination of Effects to MacFarlane's four-o'clock from Administrative Facilities
Table 4-8:	Miles of Road in MacFarlane's four-o'clock Potential Habitat
Table 4-9:	Weed Sites in MacFarlane's four-o'clock Potential Habitat
Table 4-10:	Acres of MacFarlane's four-o'clock Potential Habitat in Pittsburg Allotment
Table 4-11:	Acres of MacFarlane's four-o'clock Potential Habitat in Active Allotments
Table 4-12:	Determination of Effects to MacFarlane's four-o'clock from Livestock Allotments
Table 4-13:	Acres of MacFarlane's four-o'clock Potential Habitat in Administrative Horse Pasture
Table 4-14:	Determination of Effects to Spalding's catchfly from Administrative Facilities
Table 4-15:	Miles of Road in Spalding's catchfly Potential Habitat
Table 4-16:	Acres of snow-play Areas in Spalding's catchfly Potential Habitat
Table 4-17:	Acres of Spalding's catchfly Potential Habitat in Weed Sites
Table 4-18:	Acres of Spalding's catchfly Potential Habitat in Active Allotments
Table 4-19:	Determination of Effects to Spalding's catchfly from Livestock Allotments
Table 4-20:	Acres of Spalding's catchfly Potential Habitat in Administrative Horse Pastures
Table 4-21:	Miles of River with Ute ladies' tresses Potential Habitat in Active Allotments
Table 4-22:	Vacant Allotments with Potential Habitat for Ute ladies' tresses
Table 4-23:	Determination of Effects to Ute ladies' tresses from Livestock Allotments
Table 4-24:	Recovery Plan Tasks for MacFarlane's four-o'clock
Figure 1-1:	Hells Canyon National Recreation Area Vicinity Map
Figure 1-2:	Hells Canyon National Recreation Area Map of Management Areas
Figure 1-3:	Hells Canyon National Recreation Area Inventoried Roadless Areas

CHAPTER 1

Area Location and Description

Introduction

As part of the NEPA decision-making process, Forest Service programs or activities are reviewed to determine how they may affect any U.S. Fish and Wildlife Service (USFWS) or National Oceanic Atmospheric Administration (NOAA-Fisheries) threatened, endangered or proposed species. The Biological Assessment (BA) is used to determine the effects of the Forest Service action on federally-listed species in accordance with legal requirements set forth under Section 7 of the *Endangered Species Act of 1973* as amended (19 USC 1536(c)).

The BA process ensures that Forest Service actions do not result in the loss of species viability or hasten the federal listing of any species and provides a process for full consideration of listed species in the final decision. The review incorporates concerns for species throughout the planning process, reduces negative impacts to species, and enhances opportunities for mitigation. The BA is the means of conducting the review and of documenting the findings (FSM 2672.41).

The intensity of the BA should be commensurate with the risk associated with the project and the susceptibility of the species involved. Documentation for BA's may range from short paragraphs to very complex documents (FSM 2672.43). The effects analysis is designed to be very detailed and complete for listed species.

When Congress established the Hells Canyon National Recreation Area (HCNRA) on December 31, 1975 by the *Hells Canyon National Recreation Area Act*, also referred to as PL 94-199 (Public Law), the development of a comprehensive management plan was one of the requirements created. The Chief of the Forest Service approved the *HCNRA Comprehensive Management Plan* (CMP) (United States Department of Agriculture [USDA] 1982 as amended) on April 30, 1982, and it was amended by subsequent appeal decisions in 1983 and 1984. In 1990, the CMP was incorporated without modification into the Wallowa-Whitman National Forest (WWNF) *Land and Resource Management Plan (Forest Plan)* (USDA 1990). The *Forest Plan* has also been subsequently amended (refer to **Table 1-1: Summary of Existing Management Direction for the HCNRA** in this chapter). The CMP is an integrated part of the *Forest Plan* and subject to the procedures for modifying management direction found in the *National Forest Management Act of 1976* (NFMA) regulations (36 *Code of Federal Regulations* 219) (CFR).

In December 1993, the Forest Supervisor of the WWNF initiated a process to assess the need for adjusting the CMP due to changes in conditions or demands from the public (36 CFR 219.10). More than 20 years have passed since the first CMP was approved and more than 10 years since the Forest Plan incorporated the CMP. Concerns had been raised through monitoring and evaluation processes, and there were indications of changing social values, use patterns, and resource conditions. Laws and regulations had also changed.

Based upon the assessment of the need for adjustment, the Forest Supervisor proposed to amend the *Forest Plan* to change management direction for the HCNRA where necessary. Some management direction would not change. Any changes in management direction will reflect the intent of the *HCNRA Act*, *Public and Private Land Use Regulations* (*Public and Private LURs*) (36 CFR 292, USDA 1994); Forest Service directives; changing social values; agency emphasis on ecosystem sustainability; new information and research findings; and results from monitoring and evaluation.

This amendment process follows the implementing regulations of the NFMA of 1976 (36 CFR 2119.10 (e) and (f)), *Forest Service Manual* 1922.51 and 1922.52, and *Forest Service Handbook* 1909.12, Chapter 5.32. This environmental impact statement (EIS) documents the planning process, as required by the *National*

Environmental Policy Act (NEPA) and in accordance with Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of the NEPA (40 CFR, Parts 1500-1508).

The record of decision (ROD) for this EIS will document the final decision and determine the NFMA level of significance for amending the *Forest Plan*. The amendment process is being conducted under the 1982 planning regulations (47 Federal Register [FR] 43026, September 30, 1982) as amended (48 FR 29122, June 24, 1983 and 48 FR 40383, September 7, 1983). A new planning rule was adopted in November 2000. All amendments and revisions to land and resource management plans must be prepared pursuant to the new rules unless they were initiated before November 9, 2000 and a notice of availability of the draft EIS was released prior to May 9, 2001 (66 FR 01-12384, May 15, 2001). This CMP amendment process was initiated in 1993 and the revised draft EIS (RDEIS) was available for public review in March 2000. The amendment process will continue to be managed pursuant to the 1982 planning regulations. A new CMP will be prepared to replace the existing CMP. Implementation of the decision is anticipated during the summer of 2003.

When Congress established the HCNRA, the boundary included portions of the Nez Perce, Payette and Wallowa-Whitman National Forests in Regions 1, 4, and 6, respectively. The Chief of the Forest Service decided that the area would be managed as one administrative unit in Region 6 by the Forest Supervisor of the Wallowa-Whitman National Forest. The WWNF is responsible for establishing programmatic direction for the management of the HCNRA and completing consultation in accordance with the *Endangered Species Act* for programmatic decisions.

Program management and coordination of information, appeals, emerging issues and concerns related to the management of the HCNRA are shared between the three forests, the HCNRA and the neighboring ranger districts. A coordination agreement between the Wallowa-Whitman, Nez Perce and Payette National Forest specifies which ranger district is responsible for administering various activities in the HCNRA. Ongoing and proposed site-specific activities to implement the management direction for the HCNRA are discussed between the Forest Supervisors and staff on a regular basis to ensure adequate communication about responsibilities for administration of current management direction. Consultation for ongoing and proposed site-specific projects is the responsibility of each of forests depending on the activities they administer.

The selected alternative, Alternative E-modified, from the Final EIS for the CMP is the federal action that will amend the current management direction. The decision to select Alternative E-modified will provide programmatic direction for the future management of the HCNRA and will be documented in the ROD. A new management plan will be prepared that encompasses the combination of current and new direction for all of the HCNRA including the portions of the Nez Perce and Payette National Forests that occur within the HCNRA.

The *Forest Plan* was previously consulted on in 1996 for various salmon species, in 1998 for steelhead and bull trout, and in 2000 for Canada lynx. These formal consultations resulted in Biological Opinions and terms and conditions for the *Forest Plan*. All ongoing and proposed projects are in compliance with these biological opinions, associated terms and conditions, *Canada lynx Conservation Assessment and Strategy* (Ruediger et al 2000), *Recovery Plan for the Pacific bald eagle* (USDI 1986), and *Recovery Plan for MacFarlane's four-o'clock* (USDI 2000).

This BA provides a level of documentation appropriate for the programmatic decision to amend the *Forest Plan* and determination of effects to listed terrestrial, aquatic and plant species. In addition to the programmatic level of consultation for the decision to amend the *Forest Plan*, this BA also provides consultation for the effects of ongoing activities to listed plant species. The analysis of effects of ongoing activities to listed plants provides the environmental baseline for comparison of the effects of the programmatic decision for the selected Alternative E-modified. The previous *Forest Plan* and Section 7 watershed BAs and consultations provide the environmental baseline for terrestrial and aquatic species. Some of the information from the FEIS and appendices and the previous consultations are summarized or referenced where appropriate to aid the review process. Refer to the **Literature Cited** section of this document for a list of prior consultation documents.

The *Forest Plan* fish consultations set the stage for future project-specific consultations. They provide guidance for analyzing site-specific projects within the context of biological assessments for the Section 7 watersheds pursuant to the *Endangered Species Act*. These multi-species biological assessments encompass all ongoing and proposed activities within the Section 7 watersheds and would continue to be interagency in scope and be re-examined every two years.

All future site-specific actions as a result of this amendment to the *Forest Plan* will undergo appropriate site-specific analysis under NEPA and site-specific consultation under the *Endangered Species Act* for listed species prior to the project decision.

Refer to **Table 1-2: Threatened, Endangered, or Candidate Species Listed for the HCNRA** at the end of this chapter for a complete list of the species considered in this BA. No proposed species are currently listed for consideration in the HCNRA. A detailed analysis of effects for sensitive species is contained in the Chapter 3 of the FEIS and the *Biological Evaluation for Sensitive Species* (USDA 2002).

Area Location and Description

The HCNRA is located in west central Idaho and the northeast corner of Oregon on portions of the Wallowa-Whitman, Nez Perce, and Payette National Forests. The entire HCNRA is administered by the WWNF. There are 652,488 acres within the HCNRA boundary, approximately 28 percent of the land under the administration of the WWNF, including approximately 33,000 acres of privately owned land. Approximately 117,073 acres of the Nez Perce and 24,000 acres of the Payette National Forests occurs in the HCNRA.

It lies within Baker and Wallowa Counties in Oregon, and Adams, Idaho and Nez Perce Counties in Idaho and near the border of Asotin County in Washington. Baker County comprises 4 percent of the HCNRA, Wallowa County 74 percent, Adams four percent, Idaho County 18 percent, and Nez Perce County less than one percent. Principal nearby communities in Oregon include Imnaha, Joseph, Enterprise, Halfway and Richland. Baker City and La Grande are also nearby. In Idaho, principal nearby communities include Riggins, Grangeville and Lewiston. The Boise/Caldwell/Nampa area is also near the HCNRA. Asotin and Clarkston in Washington are also nearby. See **Figure 1-1** for a map of the vicinity.

The principal physical feature of the HCNRA is Hells Canyon. Measuring 7,993 feet deep from mountain peaks to the river and, at places, 10 miles from rim to rim, it forms the deepest river canyon in North America. The HCNRA comprises an exceptional richness, diversity, and productivity of vegetation that combines with unique geology (uplands, benchlands, canyonlands, and mountains) to support a diversity of fish and wildlife. Where developed areas exist, they are rustic in nature and are often associated with homesteads or old mining sites.

The economy of the surrounding area has historically been based on wood products and ranching. However, in recent years tourism and recreation-related activities have grown and become increasingly important to the local economy.

Figure 1-1.
Hells Canyon National Recreation Area
Vicinity Map

Purpose and Need

The need for the proposed action is derived from several actions and findings. Using the authority delegated to the Forest Supervisor through 36 CFR 219.10 and *Forest Service Manual*, Chapter 1950, "Environmental Policy and Procedures," a CMP adjustment strategy was established. The monitoring and evaluation report consolidated information for 1984 through 1993 and identified items needing change (USDA 1994). Based on these actions and findings, the team responsible for conducting the planning recommended an adjustment to the CMP through an amendment to the *Forest Plan*. The adjustments in management direction in the proposed action are described in terms of goals, objectives, standards, guidelines, monitoring and evaluation, and management area direction.

Specifically, the purpose of the action is to amend the existing programmatic direction within the *Forest Plan* as amended and the CMP. Management goals, objectives, standards, and guidelines; management area direction; and monitoring and evaluation would be aligned with the intent to achieve the objectives of the *HCNRA Act* (PL 94-199), which established the HCNRA, the Hells Canyon Wilderness, and the Rapid and Snake Wild and Scenic Rivers; with the *Oregon Wilderness Act* of 1984 (PL 98-328); the *Omnibus Oregon Wild and Scenic Rivers Act* (PL 100-552); *Private and Public LURs* (36 CFR 292); *Forest Plan* content regulations (36 CFR 219.11); and *Forest Service Manual*, Chapter 1920.

The need for action is based on: 1) the results of Forest Service monitoring and evaluation reports (USDA 1994); 2) the standards set forth in the *Private and Public LURs* approved in 1994 (36 CFR 292) for the use of motorized and mechanical equipment; the protection and preservation of cultural and paleontological resources; mining; private land use; timber harvesting; and grazing activities; 3) the potential need to set clearly defined desired conditions for Wilderness settings; and 4) new scientific information from the Interior Columbia Basin Ecosystem Management Project (ICBEMP).

If action is not taken to amend the programmatic management direction in the existing *Forest Plan* and the existing CMP, objectives set forth in Section 7 of the *HCNRA Act* may not be met:

Sec. 7. Except as otherwise provided in sections 2 and 3 of this Act, and subject to the provisions of section 10 of this Act, the Secretary shall administer the recreation area in accordance with the laws, rules, and regulations applicable to the national forests for public outdoor recreation in a manner compatible with the following objectives:

- (1) the maintenance and protection of the free flowing nature of the rivers within the recreation area;
- (2) conservation of scenic, wilderness, cultural, scientific, and other values contributing to the public benefit;
- (3) preservation, especially in the area generally known as Hells Canyon, of all features and peculiarities believed to be biologically unique including, but not limited to, rare and endemic plant species, rare combinations of aquatic, terrestrial, and atmospheric habitats, and the rare combinations of outstanding and diverse ecosystems and parts of ecosystems associated therewith;
- (4) protection and maintenance of fish and wildlife habitat;
- (5) protection of archeological and paleontologic sites and interpretation of these sites for the public benefit and knowledge insofar as it is compatible with protection;
- (6) preservation and restoration of historic sites associated with and typifying the economic and social history of the region and the American West; and
- (7) such management, utilization, and disposal of natural resources on federally owned lands, including, but not limited to, timber harvesting by selective cutting, mining and grazing and the continuation of such existing uses and developments as are compatible with the provisions of the Act.

For example, desired recreation settings and opportunities may not be met. Desired user levels and facilities that protect and maintain fisheries and wildlife habitat may not be met. Desired vegetative conditions within Wild and Scenic river corridors may not be met. Desired landscape character, scenic integrity objectives, and ecological landscape integrity objectives may not be met. Resource impacts and visitor conflicts in the Wilderness would not be reduced. There would be a higher potential for damage to heritage resources, and limited opportunities for

interpretation. Scientific research efforts may not be effective toward strengthening the management of the HCNRA.

In addition, desired conditions for biologically unique resources, particularly rare and endemic plants, may not be met. Unless existing direction is modified to provide long-term guidance including the role of fire, desired vegetation conditions may not be achieved and ecosystem integrity may be jeopardized. Riparian, aquatic habitat, water quality, and wildlife habitat conditions may not be managed to meet desired conditions. Use of geologic and mineral resources may lead to conflicts in management direction. Reasonable access to private lands may not be provided within the HCNRA. Federal trust responsibilities with the Nez Perce Tribe may not be met.

The overall purpose and need of this project is to examine and update specific areas with the management direction, as needed, for the HCNRA. The specific resource issues needing updated direction are: recreation settings, experiences, and opportunities, including Wilderness and scenery; access and facilities; forested vegetation, grasslands, and forest understory; vacant allotments disposition and satisfactory range conditions; heritage resources; federal trust responsibilities; soils; Wild and Scenic Rivers; biologically unique species, habitats, and ecosystems; fire; riparian/aquatic habitat and water quality; wildlife habitat; scientific research; geologic resources; minerals; and land management and special uses.

Decision Framework

The Wallowa-Whitman Forest Supervisor will make decisions on changes in management direction needed for the specific areas described above to best meet resource and recreation user needs. The following section lists in detail the decisions to be made for each topic. Appendix C of the FEIS provides detailed management direction to help the reader understand the current direction and what would be new direction under the alternatives. Refer to Appendix C, Table C-1 of the FEIS for a complete listing of new goals, objectives, standards and guidelines.

Recreation Settings, Experiences, and Opportunities

- Establish levels of social encounters, visitor management, visitor impacts, and management strategies for Wilderness and nonwilderness.
- Determine levels and types of upland outfitter and guide services, including for aviation and within the Imnaha Wild and Scenic River corridor. Establish direction for future consideration of outfitter and guide proposals and use levels for Wilderness and nonwilderness.
- Additional direction for the Hells Canyon Wilderness is described in the following sections as needed: Access and Facilities; Forested Vegetation, Grasslands and Forest Understory; Vacant Allotments Disposition and Satisfactory Range Conditions; Heritage Resources; Federal Trust Responsibilities; Soils; Wild and Scenic Rivers; Biologically Unique Species, Habitats and Ecosystems; Fire; Riparian/Aquatic Habitat and Water Quality; Wildlife Habitat; Scientific Research; Geologic Resources; Minerals; and Land Management and Special Uses.
- Determine sense of place through scenery landscape-character themes and desired scenic and ecological landscape integrity ratings for Wilderness and nonwilderness.

Access and Facilities

- Determine the levels of road access, road construction and reconstruction, and decommissioning of roads, with applicable traffic service levels and maintenance objectives.
- Determine the Forest Service's recommendation for the level of scenic-byway designation for Forest Road 3955.

- Determine the levels of trail construction, access to the Memaloose and Lord Flat backcountry airstrips, and over-snow vehicle travel, including the areas.
- Determine the levels and types of development and maintenance for facilities in Wilderness and nonwilderness settings.

Forested Vegetation, Grasslands, and Forest Understory

- Identify desired forested and grassland vegetative conditions within nonwilderness and the natural vegetative conditions in Wilderness.
- Refine the vegetative practices allowable to achieve the desired vegetative conditions for structural and seral classes.

Vacant Allotments Disposition and Satisfactory Range Conditions

- Define standards for satisfactory range conditions as required by the *Public LURs*, within which livestock grazing would be authorized for Wilderness and nonwilderness.
- Define desired grassland vegetative conditions relative to HRV for ecological status.
- Define fall, winter, and spring forage utilization standards.
- Resolve vacant grazing allotment status and establish administrative horse pastures.
- Establish management direction for water-use management and cultivated areas.
- Establish management direction for interactions between recreation use and livestock grazing.
- Establish direction for protection and management of biological soil crusts.
- Clarify direction for management of noxious weeds. Improve direction and emphasis for prevention and restoration activities within the HCNRA. Improve direction for management of noxious weeds within the Hells Canyon Wilderness and nonwilderness.

Heritage Resources

- Establish direction for developing a heritage resource management plan for Wilderness and nonwilderness.
- In the nonwilderness portion of the HCNRA, determine the levels of protection and interpretation for heritage resources.
- Within the Wilderness, determine the significance of heritage resources and, if needed, levels of protection and preservation.

Federal Trust Responsibilities

- Establish direction for coordinating and consulting with the Nez Perce Tribe for treaty rights and tribal interests, including managing and restoring habitat to support harvestable populations of culturally significant vegetative species.

Soils

- Develop a soil-stability rating commensurate with the range forage condition of fair with an upward trend and/or a mid-seral status rating with an upward trend for Wilderness and nonwilderness.
- Clarify management direction for the protection of soil resources in nonwilderness areas.

Wild and Scenic Rivers

- Identify the outstandingly remarkable values for the **Wild Rapid River**.
- Determine the programmatic direction necessary to protect and enhance the values for which the **Rapid River** was designated.
- Provide management direction relative to the application of Section 7 of the *WSR Act* for the **Rapid River**.
- Determine what, if any, additional standards and guidelines for desired vegetative conditions and recreation management emphasis within established settings, apply in the **Imnaha Wild and Scenic River** corridor.
- Determine the level and type of on-shore and in-river outfitter and guide services for the **Imnaha Wild and Scenic River**.
- Determine the programmatic direction necessary to protect and enhance **Snake River** values, with the exception of on-river recreation capacity and related decisions and management direction resulting from the *Wild and Scenic Snake River Recreation Management Plan* (USDA 1999) and the *Wild and Scenic Snake River Outfitter Environmental Assessment* (USDA 1996). Facets of this decision include determining direction for desired vegetative conditions, heritage resources, maintenance levels for in-corridor roads and trails, and party size in the Snake River corridor.
- Provide management direction relative to the application of Section 7 of the *WSR Act* for the **Snake River**.

Biologically Unique Species, Habitats, and Ecosystems

- Define species, habitats, and ecosystems that contribute to the biological uniqueness of the HCNRA.
- Provide management direction for biologically unique species, habitats, and ecosystems within Wilderness and nonwilderness.

Fire and Air Quality

- Provide management direction recognizing the historical and future roles of fire for nonwilderness and direction for restoration of the natural role of fire in Wilderness; expand use of prescribed fire in MA 8 (Wild and Scenic Rivers); and provide direction for fire suppression.

Riparian/Aquatic Habitat and Water Quality

- Establish direction for riparian/aquatic habitat and water-quality evaluation, restoration, and management objectives to meet the *Wallowa County/Nez Perce Tribe Salmon Plan* (Wallowa County 1999).

Wildlife Habitat

- Establish direction for meeting wildlife habitat needs and open-road densities for preserving and protecting natural wildlife habitat and populations.

Scientific Research

- Establish direction for managing research opportunities within Wilderness and nonwilderness to meet the information needs associated with management of the HCNRA and to ensure adequate transfer of information.

Geologic Resources

- Establish direction for management of paleontological and unique geologic resources for Wilderness and nonwilderness.

Minerals

- Establish direction for management of minerals consistent with 36 CFR 292.47 (*Public LURs*).

Land Management and Special Uses

- Establish direction for landownership consistent with 36 CFR 292, Subpart E (*Private LURs*) and a process for permitting private land access within Wilderness and nonwilderness

Monitoring and Evaluation

- Establish a program to evaluate compliance in achieving the goals and objectives of the *Forest Plan* and meeting the intent of the enabling legislation.

Summary of Existing Management Direction for the HCNRA

Legislative Direction

The principal legislation that guides management of the HCNRA is the *HCNRA Act of 1975*. Section 1 (a) of the *HCNRA Act* explicitly states that the HCNRA was created to assure that this area would be preserved for this and future generations, and that the recreational and ecological values and public enjoyment of the area are thereby enhanced. Section 7 of the *HCNRA Act* states that the recreation area will be administered for public outdoor recreation in a manner compatible with seven objectives. Section 8 directs the development of a comprehensive management plan to provide for a broad range of land uses and recreation opportunities. Section 10 directs that rules and regulations will be promulgated for public and private lands. Section 13 addresses the recognized traditional and valid uses of the recreation area. Refer to Appendix A of the FEIS for the *HCNRA Act, Private and Public Land Use Regulations*, the *Wilderness Act*, the *WSR Act* and the *Treaty of 1855* with the Nez Perce Tribe.

Forest Plan Direction for HCNRA

When Congress established the HCNRA, the boundary included portions of the Nez Perce, Payette and Wallowa-Whitman National Forests in Regions 1, 4, and 6, respectively. The Chief of the Forest Service decided that the area would be managed as one administrative unit in Region 6 by the Forest Supervisor of the Wallowa-Whitman National Forest. The WWNF is responsible for establishing programmatic direction for the management of the HCNRA and completing consultation in accordance with the *Endangered Species Act* for programmatic decisions.

The *Forest Plan* (USDA 1990) for the WWNF, as amended, provides guidance through its established goals, objectives, desired future conditions, forest-wide standards and guidelines, and specific management area (MA) direction. The *Forest Plan* incorporates the 1982 CMP, subsequent *Forest Plan* amendments, and terms and conditions related to consultation in accordance with the *Endangered Species Act* to provide existing management direction for the HCNRA.

Table 1-1 lists the compilation of existing direction applied to management of activities in the HCNRA to meet the intent of the *HCNRA Act*. All activities in the HCNRA are managed in compliance with this direction. Some is interim direction (e.g. *Eastside Screens*, PACFISH, and INFISH) and will be reconsidered during the *Forest Plan* revision. These previous decisions will not be reconsidered in this EIS unless specifically addressed in the proposed action or if scoping and/or the analysis process identify new issues not resolved in previous decisions. Refer to **Chapter 2** for a description of the proposed action and the alternatives considered in detail in response to scoping.

Table 1-1: Summary of Existing Management Direction for the HCNRA

Date	Scope	Reference Abbreviation	Title
May 1981	HCNRA	N/A	Rescinded record of decision for the Hells Canyon National Recreation Area comprehensive management plan (USDA 1981). Signed by Chief R. Max Peterson, adopted Alternative C as the management plan. ROD was withdrawn for reconsideration due to 21 appeals filed and replaced by new ROD April 1982.
April 1982	HCNRA	CMP	Hells Canyon National Recreation Area comprehensive management plan (USDA 1982, as amended by appeal decisions in 1983 and 1984). Signed by Chief R. Max Peterson, adopted Alternative C with modifications and clarifications to levels of power and float boating on the Snake River, allowances for continued use of existing transmission lines and identification of appropriate future corridors, modifications to Dispersed Recreation/Native Vegetation management area (MA 9) to allow necessary actions to protect timber and other vegetation on private and public lands, allowances for continued motorized use of Kirkwood Road to the Kirkwood Historic Ranch, maintenance of livestock grazing on Idaho portion of the HCNRA, and establishment of permit system in the Wilderness and limits party size to 8 people and 16 head of stock.
April 1983	HCNRA	CMP	Assistant Secretary Crowell's appeal decision on Hells Canyon National Recreation Area comprehensive management plan for Snake River boating (USDA 1983). Decision on five appeals related to Snake River boating rendered by John B. Crowell, Assistant Secretary, U.S. Department of Agriculture, Natural Resources and Environment. Decision changes Alternative C by establishing a use season from the Friday prior to Memorial Day to September 15, does not limit on number of daily trips by powerboats, does not impose equipment or experience standards for private powerboat operators, establishes a campsite reservation system, and increases float party size from 25 to 30 people.
June 1983	HCNRA	CMP	Assistant Secretary Crowell's implementation decision on Hells Canyon National Recreation Area comprehensive management plan for Big Bar airfield (USDA 1983). Implements the portion of the management plan that allows aircraft landings in the Snake Wild River corridor at Big Bar. Defers decision on other appeals to April 1984 decision.
December 1983	HCNRA	CMP	HCNRA CMP revised Snake River recreation management to incorporate 1982 and 1983 decisions described previously.
April 1984	HCNRA	CMP	Assistant Secretary Crowell's appeal decision on Hells Canyon National Recreation Area comprehensive management plan for remaining appeals (USDA 1984). Decision on appeals rendered by John B. Crowell, Assistant Secretary, U.S. Department of Agriculture, Natural Resources and Environment. Sustains 1982 ROD with modifications permitting silvicultural treatments in Dispersed Recreation/Timber Management area (MA 11), changes flood plain definitions and standards for private land use regulations, and establishes provisions for revising or amending the plan.
June 1987	HCNRA	CMP	Timber management direction within the HCNRA forage allocation. Forest Supervisor concurrence with April 1987 process definition that considered original intent. "Manage timber stands ... as old growth." Activity must be for an old growth purpose, or, beyond question, of benefit to recreation, scenic, or wildlife values. Individual

Date	Scope	Reference Abbreviation	Title
			stands must pass the test rather than broad areas of the forage allocation.
December 1988	Region 6	Veg EIS	Managing competing and unwanted vegetation (USDA 1988). Establishes policy and direction for subsequent site-specific environmental analysis and requirements that apply to all vegetation management activities in the Pacific Northwest Region.
August 1989	W-W National Forest	Tepee EIS	Tepee Butte recovery project (USDA 1989). Prescribes fire recovery efforts directed toward vegetation management, recreation and visual resource enhancement, and wildlife habitat improvement.
April 1990	W-W National Forest	Forest Plan	Wallowa-Whitman National Forest land and resource management plan (USDA 1990). The <i>Forest Plan</i> establishes general management direction for 10-15 years and replaces all previous resource management plans with the exception of the HCNRA Comprehensive Management Plan, which is incorporated by reference into the <i>Forest Plan</i> without modification.
March 1991	W-W National Forest	AMP Schedule	Forest plan amendment #1: Allotment management planning schedule (USDA 1991). Replaces an old schedule and makes changes in the plan document to bring it in line with the Record of Decision.
March 1992	Region 6	Veg EIS Am.	Amendment to 1988 Managing competing and unwanted vegetation (USDA 1992). This amendment removes gender-specific mitigation measures, adds new mitigation measures to avert potential risks to human health.
April 1992	W-W National Forest	INWMP Plan	Forest plan amendment #4: Integrated noxious weed management plan (INWMP) (USDA 1992). Changes standards and guidelines to provide a process for implementing a long-term integrated weed management program for the WWNF.
August 1992	W-W National Forest	Snake LAC	Forest plan amendment # 5: Limits of acceptable change recreation management plan for Snake River (USDA 1992). Incorporates a definition of valid motorized and nonmotorized river craft, incorporates a definition of invalid types of motorized and nonmotorized river craft, includes a review process for validity of new and different types of water craft, and allocates the Cache Creek area (purchased in June 1991) to Management Area 9 (Dispersed Recreation/Natural Vegetation): 6,549 acres and Management Area 16 (Administrative and Recreation Sites): 7 acres.
January 1993	W-W National Forest	Imnaha WSR Plan	Forest plan amendment #6: Imnaha Wild and Scenic River management plan (USDA 1993). Amends the Forest Plan to incorporate management direction for the Imnaha Wild and Scenic River.
February 1994	W-W National Forest	Prescribed Fire Plan	Forest plan amendment #9: Prescribed natural fire in Hells Canyon National Recreation Area (USDA 1994). Adds implementing direction to the Forest Plan for the use of prescribed fire within Wilderness.
May 1994	Region 6	Eastside Screens	Regional Forester's amendment #1/Forest plan amendment #14: Interim management direction establishing riparian, ecosystem, and wildlife standards for timber sales on eastside forests (USDA 1994). Continuation of interim management direction establishing riparian, ecosystem, and wildlife standards for timber sales on nine eastside forests in the Pacific Northwest Region.
June 1994	Nez Perce, Payette & W-W National Forests	PACFISH LOC	Letter of concurrence on interim standards and guidelines for managing anadromous fish-producing areas in eastern Oregon and Washington, Idaho and portions of California (USDI 1994). Consultation for bald eagle, grizzly bear, gray wolf, and MacFarlane's four-o'clock.
June 1994	Nez Perce, Payette & W-W National Forests	Private LURs	Private land use regulations (USDA 1994). Establishes standards applicable to all private property within the boundaries of the HCNRA, including that within the boundaries of the Rapid, Snake, and Imnaha Wild and Scenic Rivers and the Hells Canyon Wilderness and serves to inform landowners of uses compatible with the HCNRA Act.
July 1994	Nez Perce, Payette & W-W National Forests	Public LURs	Public land use regulations (USDA 1994). Establishes standards and guidelines for the protection and preservation of historic, archaeological, and paleontological resources; the use of motorized equipment; the use of motorized and nonmotorized river craft; and the management, utilization, and disposal of natural resources by timber harvesting, mining, and grazing on National Forest System lands within the HCNRA.
October 1994	W-W National Forest	Snake River Plan	Forest plan amendment #12: Wild and Scenic Snake River recreation management plan (USDA 1994). Establishes direction for the Wild and Scenic Snake River corridor. Modified by appeal decisions for outfitter and guides (USDA 1996). New management plan was issued in 1999 (USDA 1999).
January 1995	Nez Perce, Payette & W-W National Forests	PACFISH BO	Biological opinion for implementation of interim strategies for managing anadromous fish-producing areas in eastern Oregon and Washington, Idaho, and portions of California (USDC 1995). Consultation for Snake River spring/summer chinook, Snake River fall chinook, Snake River sockeye salmon.
February 1995	Region 6	PACFISH	Regional Forester's amendment #3: Interim strategies for managing anadromous fish-producing watersheds in eastern Oregon and Washington, Idaho, and portions of California (USDA and USDI 1995). Management direction for slowing the degradation and beginning the restoration of aquatic and riparian ecosystems for anadromous fish.

Date	Scope	Reference Abbreviation	Title
March 1995	Nez Perce, Payette & W-W National Forests	Salmon BO	Biological opinion for salmon on land and resource management plans for the Boise, Challis, Nez Perce, Payette, Salmon, Sawtooth, Umatilla, and Wallowa-Whitman National Forests (USDC 1995). Consultation for Snake River spring/summer chinook, Snake River fall chinook, and Snake River sockeye salmon.
June 1995	Region 6	Eastside Screens	Regional Forester's amendment #2: Revised interim standards for timber sales on eastside forests (USDA 1995). Replaces Regional Forester amendment #1 (USDA 1994). Revision and clarification of vegetative structural stages and wildlife standards in the Interim management direction establishing riparian, ecosystem, and wildlife standards for timber sales on Eastside forests (USDA 1994).
July 1995	Region 1, 4, 6	INFISH	Regional Forester's amendment #4: Inland native fish strategy (USDA 1995).
August 1995	W-W National Forest	Sheep Decision	Proposal to terminate domestic sheep grazing on portions of the Hells Canyon National Recreation Area (USDA 1995). Decision eliminates domestic sheep grazing in three grazing allotments in order to protect bighorn sheep herds from contact with domestic sheep and eliminate the risk of transfer of diseases from domestic to wild sheep.
November 1995	W-W National Forest	Fuelwood Program	Forest fuelwood program (USDA 1995). Provides direction for the forest fuelwood program that considers the values of standing and downed dead wood materials to the forest ecosystem and the public and provides consistency in management of the program.
February 1996	W-W National Forest	Overlook II	Hells Canyon overlook II (USDA 1996). Authorizes the improvement of three existing trailheads and the closure of 73 miles of primitive roads near the west rim of Hells Canyon.
September 1996	W-W National Forest	SNAKE RIVER PLAN	Forest plan amendment #20: Wild and Scenic Snake River outfitters (USDA 1996). Provides direction to proceed with implementation of proposed outfitter and guide use allocations and operational limitations. A new plan, Wild and Scenic Snake River recreation management plan (USDA 1999) was issued in 1999 to replace the plan issued in 1994.
October 1996	Nez Perce, Payette & W-W National Forests	PACFISH BO (extended)	Letter extending the 1995 Biological opinion on interim standards and guidelines for managing anadromous fish-producing areas in Eastern Oregon and Washington, Idaho, and portions of California (USDC 1996). Consultation for Snake River spring/summer chinook, Snake River fall chinook, Snake River sockeye salmon.
June 1998	Nez Perce, Payette & W-W National Forests	Steelhead BO	Biological opinion for effects of continued implementation of Forest Service land and resource management plans (USDC 1998) affecting listed steelhead, salmon, and designated critical habitat in the Upper Columbia River and Snake River basins. Consultation for Snake River steelhead, Upper Columbia steelhead, Snake River spring/summer chinook, and Snake River fall chinook.
August 1998	Nez Perce, Payette & W-W National Forests	Bull trout BO	Biological opinion for the effects to bull trout from the continued implementation of land and resource management plans and resource management plans as amended by PACFISH and INFISH (USDI 1998). Consultation on Columbia River bull trout, Klamath River bull trout.
October 2000	Nez Perce, Payette & W-W National Forests	Lynx BO	Biological opinion on the effects of the national forest land and resource management plans on Canada lynx in the contiguous United States (USDI 2000) in accordance with Section 7 of the Endangered Species Act. Consultation on Canada lynx.

Management Areas

Management areas have similar objectives and common management prescriptions. The *Forest Plan* provides multiple use direction for managing these specific areas. The following briefly describes each management area. Refer to the *Forest Plan*, pages 4-63 through 4-98 for additional discussion. See **Figure 1-2** below for a map of management areas.

Management Area 4 – Wilderness: The management intent of these areas is to preserve the wilderness qualities. These areas will be managed in accordance with the *Wilderness Act of 1964*, the *HCNRA Act* (establishing the Hells Canyon Wilderness), the *Oregon Wilderness Act of 1984*, and the *Forest Service Manual*, Chapter 2320.

The intent of the *Wilderness Act* is to preserve and protect the natural condition and characteristics of designated lands and to provide for current and future public enjoyment of these areas and their wilderness character. These areas are to remain essentially unaltered and undisturbed by man, with natural ecological processes (including the natural role of fire) permitted to function with a minimum of human interference (**approximately 220,000 acres**).

Management Area 7 – Imnaha and Rapid Wild and Scenic Rivers: Management in this area is intended to protect and enhance the special values of those rivers or river segments (meaning the river plus its associated corridor) which are part of the National Wild and Scenic Rivers System. Management of lands will not diminish the rivers free flow, water quality, and outstandingly remarkable values (**approximately 35,474 acres**).

Management Area 8 – Wild and Scenic Snake River: This area includes the 67.5-mile Wild and Scenic River corridor along the Snake River. The primary management emphasis is to protect and enhance the values for which the river was designated Wild and Scenic under the *WSR Act* (**approximately 14,535 acres**).

Management Area 9 – Dispersed Recreation and Native Vegetation: In these areas, all activities will be managed to provide many opportunities for dispersed recreation and to enhance native vegetation. It is envisioned that these areas will eventually be almost entirely occupied by native plant species. Rangelands will be managed to maintain satisfactory range condition that will be achieved and maintained primarily by nonstructural means. These areas provide a mix of primitive, semi-primitive nonmotorized, and semi-primitive motorized recreation opportunities (**approximately 161,078 acres**).

Management Area 10 – Forage Emphasis: This management area lies within the grasslands interwoven with timbered stringers in the HCNRA. The grassland portions of these areas will be managed to provide maximum forage production with rangeland maintained in satisfactory condition (desired ecological status) and structural improvements being rustic in nature. Timbered portions will provide old-growth habitat at approximately current levels. These areas provide both semi-primitive motorized and semi-primitive nonmotorized opportunities (**approximately 123,029 acres**).

Management Area 11 – Dispersed Recreation and Timber Management: These areas combine dispersed recreation with timber management on the more productive sites within the HCNRA. The management objective is to provide a variety of tree species, a diversity of healthy timber stands, and ample dispersed recreation opportunities. These areas provide both semi-primitive motorized and semi-primitive nonmotorized opportunities (**approximately 70,706 acres**). Timber volume removal from the HCNRA is classified as unregulated and does not contribute to the WWNF allowable sale quantity (*Public LURS*, USDA 1994).

Management Area 12 – Research Natural Areas: The objectives for establishing Research Natural Areas are to preserve examples of all significant natural ecosystems for comparison with those influenced by humans, to provide educational and research areas for ecological and environmental studies, and to preserve gene pools for typical and rare and endangered plants and animals (**approximately 11,640 acres**).

Management Area 16 – Administrative And Recreation Sites: These areas include sites such as fire lookouts, permitted ranch headquarters, campgrounds, and other areas which are occupied by facilities for administration, public recreation, or features of cultural significance.

Management Area 17 – Power Transportation Facility Retention: These areas are presently used for the transport of electricity. Through proper design and management, optimum use will be made of those lands allocated to power facilities. To the extent possible, use will be made compatible with other uses of the forest including consideration of scenery management objectives.

Inventoried Roadless Areas: This environmental impact statement covers all inventoried roadless areas (IRA) in the Hells Canyon National Recreation Area. Inventoried roadless areas were identified in the *Forest Plan* and are also listed in the set of inventoried roadless area maps, contained in the *Forest Service Roadless Area Conservation, Final Environmental Impact Statement, Volume 2*, (USDA 2000). These maps are located at the Forest Service National headquarters in Washington, D.C. There are thirteen IRAs that lie wholly or partially within the HCNRA. They total 44 percent of the HCNRA. See **Figure 1-3** for a map of roadless areas (**approximately 290,158 acres**).

**Figure 1-2:
Hells Canyon National Recreation Area
Map of Management Areas**

**Figure 1-3:
Hells Canyon National Recreation Area
Inventoried Roadless Areas**

Coordination with the Nez Perce and Payette National Forests

HCNRA exists within portions of the Nez Perce and Payette National Forests on the east side of the Snake River. The Nez Perce National Forest (USDA 1987) and the Payette National Forest (USDA 1988) *Land and Resource Management Plans* provide direction to administer those portions of the HCNRA according to the *Forest Plan* as amended (USDA 1990), including the 1982 CMP and the terms and conditions dictated by consultation under the *Endangered Species Act*.

Program management and coordination of information, appeals, emerging issues and concerns related to the management of the HCNRA is shared between the Wallowa-Whitman, Nez Perce, and Payette National Forests; the HCNRA and the ranger districts. A coordination agreement between the three forests specifies which ranger district is responsible for administering various activities in the HCNRA. Ongoing and proposed site-specific activities to implement the management direction for the HCNRA are coordinated between the Forest Supervisors and staff on a regular basis to ensure adequate communication about responsibilities for administration of existing management direction.

The Curren Hill Allotment (sheep and goats), adjacent to the southeast boundary of the HCNRA, is administered by the Payette National Forest. When a new permit was issued in the 1998 for this allotment, the boundary of the allotment was adjusted to exclude the portion that occurred in the HCNRA boundary. The west boundary of the Curren Hill allotment follows the HCNRA boundary from the Payette/Nez Perce National Forest boundary at the north, south to its intersection with the Black Lake Trail (#5188), then east along the trail to Rapid River, then south to Twin Lakes Creek, then southeast to the ridge dividing Rapid River and Boulder Creek drainages. In the RDEIS, the acres of the Curren Hill Allotment within the HCNRA were included in the total active allotment acres in the HCNRA. A correction has been made to include these acres as part of the total vacant allotment acres for the FEIS.

The Boise, Payette, and Sawtooth National Forests are currently in the process of jointly revising their forest plans in one environmental impact statement. A draft EIS was released in October 2000. A final EIS and record of decision are pending.

Endangered Species Act Consultation

Under Section 7 of the *Endangered Species Act* and related *Secretarial Order 3206* (USDI/USDC 1997), federal activities that may have an effect on threatened and endangered species are subject to consultation with the U.S. Fish and Wildlife Service (USFWS) or National Oceanic and Atmospheric Administration (NOAA-Fisheries). Consultation on the *Forest Plan* including the 1982 CMP and *Forest Plan* amendments was previously completed in 1996 for various salmon species, in 1998 for steelhead and bull trout, and in 2000 for Canada lynx. These formal consultations resulted in biological opinions and terms and conditions for the *Forest Plan*. All ongoing and proposed projects would continue to be managed in compliance with these biological opinions and associated terms and conditions and related strategies including *Canada Lynx Conservation Assessment and Strategy* (Ruediger et al 2000), *Recovery Plan for the Pacific Bald Eagle* (USDI 1986), and *Recovery Plan for MacFarlane's Four O'clock* (USDI 2000).

The biological assessment (BA) (USDA 2002) for the preferred alternative in this FEIS provides a level of documentation appropriate for the programmatic decision to amend the *Forest Plan* and determination of effects to listed terrestrial, aquatic and plant species. In addition to the programmatic level of consultation for the decision to amend the *Forest Plan*, the BA also provides consultation for the effects of ongoing activities to listed plant species. The analysis of effects of ongoing activities to listed plants provides the environmental baseline for comparison of the effects of the programmatic decision. The previous consultations on the *Forest Plan* and Section 7 watershed BAs provide the environmental baseline for terrestrial and aquatic species. Refer to the **Literature Cited** section of this document for a list of consultation documents.

The direction provided in the preferred alternative will implement approved recovery plans or strategies for listed species if the action is determined to potentially affect a listed species. Recovery plans are technical scientific documents that identify specific actions to conserve and recover a particular species, and describe methods to implement these actions. They are formulated and carried out by a recovery team, which is usually composed of biological experts from tribes; federal, state and local agencies; and in some cases the private sector. The

recovery plan is a key focus of the Secretary of Interior's efforts to conserve and recover listed species under the *Endangered Species Act* as amended.

The *Forest Plan* fish consultations set the stage for future project-specific consultations. They provide guidance for analyzing site-specific projects within the context of biological assessments for the Section 7 watersheds pursuant to the *Endangered Species Act*. These multi-species biological assessments encompass all ongoing and proposed activities within the Section 7 watersheds and would continue to be interagency in scope and be re-examined every two years.

The Wallowa-Whitman, Nez Perce, and Payette National Forests will continue to coordinate consultations for ongoing and future site-specific activities with the USFWS or NOAA-Fisheries. Consultation is the responsibility of each forest depending on the activities it administers in the HCNRA. Consultation for future site-specific projects from implementation of the new programmatic direction for the HCNRA will be initiated before the project decisions are made. Potential impacts will be assessed in subsequent site-specific consultations and decision-making processes.

List of Species Considered

This BA analyzes the potential effects from programmatic direction through implementation of Alternative E-modified, the selected alternative, from the FEIS. This change in direction will apply for the next 10-15 years or as amended during other programmatic level decisions and related consultations.

Table 1-2 lists the 17 threatened, endangered or candidate species from the USFWS and NOAA-Fisheries that are either documented or could occur in the project area. There are currently no proposed species. Candidate species are those for which sufficient information on biological vulnerability and threats to support a proposal to list them as endangered or threatened. Although candidate species are not federally listed, they are considered here because of the potential for listing in the near future so that if they do become listed, then consultation in regard to the HCNRA CMP will be complete.

Table 1-2: Threatened, Endangered, or Candidate Species Listed for the HCNRA

Species	Federal Status	Species Present	Habitat Present
Terrestrial			
Northern bald eagle (<i>Haliaeetus leucocephalus</i>)	Threatened	yes	yes
Canada lynx (<i>Lynx canadensis</i>)	Threatened	unknown	yes
Gray wolf (<i>Canis lupus</i>)	Endangered	unknown	yes
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	Candidate	no	not likely
Aquatic			
Bliss Rapids snail (<i>Taylorconcha serpenticola</i>)	Threatened	yes	yes
Bull trout-Columbia Basin (<i>Salvelinus confluentus</i>)	Threatened	yes	yes
Fall chinook salmon-Snake River (<i>Oncorhynchus tshawytscha</i>)	Threatened	yes	Critical Habitat Designated
Sockeye salmon-Snake River (<i>Oncorhynchus nerka</i>)	Threatened	yes	Critical Habitat Designated
Spring/summer chinook salmon-Snake River (<i>Oncorhynchus tshawytscha</i>)	Threatened	yes	Critical Habitat Designated
Steelhead-Snake River Basin (<i>Oncorhynchus mykiss</i>)	Threatened	yes	yes
Columbia spotted frog (<i>Rana luteiventris</i>)	Candidate	unknown	yes
Species	Federal Status	Species Present	Habitat Present

Plants			
Howell's spectacular thelypody (<i>Thelypodium howellii</i> ssp. <i>spectabilis</i>)	Threatened	no	not probable
MacFarlane's four-o'clock (<i>Mirabilis macfarlanei</i>)	Threatened	documented	yes
Spalding's catchfly (<i>Silene spaldingii</i>)	Threatened	not documented	probable
Ute ladies' tresses (<i>Spiranthes diluvialis</i>)	Threatened	not documented	probable
Water howellia (<i>Howellia aquatilis</i>)	Threatened	not documented	probable
Slender moonwort (<i>Botrychium lineare</i>)	Candidate	not documented	probable

CHAPTER 2

Description of Federal Action

Introduction

The FEIS proposes new management direction for the HCNRA. The alternatives propose potential management goals, objectives, standards and guidelines. Chapter 2 of the FEIS describes the proposed action, Alternative B, and its four alternatives, including Alternative A, which represents no action. The alternatives (A, B, E-modified, W and N) present different approaches to meeting the changes in direction identified in Chapter 1. The alternatives provide a mix of activities and implementation schedules centered on particular respective themes.

The proposed action, Alternative B, was the proposal the Forest Service carried forward to the public during the scoping process in order to generate issues. Additional alternatives were then designed to address the identified issues. Alternative E was the preferred alternative identified in the *Revised Draft Environmental Impact Statement* (RDEIS) released in March 2000 (USDA 2000). No additional alternatives were developed for this Final Environmental Impact Statement (FEIS). Alternative E from the RDEIS was modified for the FEIS based on public comment; the purpose and need for change; and the significant issues.

Selected Alternative

The selected alternative for the change in programmatic management direction is Alternative E-modified. Ongoing activities would be subject to continuation under the new standards and guidelines. Because this is a programmatic planning document, no specific projects would be implemented as a direct outcome of this planning process. Further site-specific NEPA analysis and consultation would be conducted for future projects referred to in the FEIS.

Alternative E-modified, the selected alternative, was designed to address the significant issues surrounding the proposed action and to achieve the purpose and need for action and the goals, objectives, and standards and guidelines presented in the proposed action.

Alternative E-modified is a continuation of the management direction in the current *Forest Plan*, including all amendments and consultations made so far as described in **Chapter 1** of this document, but with specific changes designed to address the need for change. Alternative E-modified would manage recreation opportunities and experiences by emphasizing the maintenance or enhancement of the rustic and dispersed character of the HCNRA. Increases in recreation use would be managed through implementation of visitor management strategies. Management of outfitter and guide use would be managed to evaluate the need for new or expanded uses. Vegetation management would emphasize moving toward the historic range of variability (HRV) as the goal for forested vegetation and using HRV as a reference point for grassland vegetation to achieve the potential natural community. HRV would be maintained or restored through management practices in harmony with natural processes and functions.

For a summary of Alternative E-modified for each of the resource topics under the **Decision Framework** section, refer to Chapter 2 of the FEIS. The compilation of this information is intended to provide the reader with an overview or description of each alternative. Appendix C of the FEIS provides the full description of goals, objectives, standards and guidelines plus additional detailed direction for managing recreation, facilities, vegetation and fire. Appendix F of the FEIS presents the detailed monitoring and evaluation strategy for Alternative E-modified.

Analysis Assumptions

The implementation of new goals, objectives, standards, guidelines in the selected alternative in combination with the current *Forest Plan* direction as amended, and Forest Service directives and policy direction would improve the viability and health of listed species and habitats in the HCNRA.

Implementation of the inventory and monitoring in the selected alternative is critical to ensure long-term viability of species and communities in the planning area. Adherence to Forest Service policy and directives regarding the consultation process would provide protection from unacceptable negative impacts due to future projects in the area.

Maintaining healthy ecosystems maintains species viability. Very little demographic, or biological information is available for the majority of biologically unique species and communities that may be found in the HCNRA. In addition, little is known about long-term trends for particular plant species. No attempt has been made here to assign upward or downward trends to species. A major assumption for this analysis is that if natural processes and communities are maintained across the planning area, then habitat suitability and long-term viability of populations and species will also be maintained.

New standards and guidelines for access and travel management have been included in the selected alternative. Roads not needed for future management may be closed or decommissioned which would reduce long-term impacts associated with open roads. Site-specific surveys would be completed before any road closures are implemented. Dispersed camping with motor vehicles would only be allowed at designated sites or areas accessed on designated roads or trails. Implementation of the new CMP for the HCNRA will include inventories for rare and endemic plants of current dispersed campsites throughout the HCNRA.

Alternative E-modified would allow grazing to continue on 316,988 acres in the HCNRA: 292,521 acres for cattle, 18,083 acres for grazing of Forest Service horses, and 6,384 acres for sheep.

The selected alternative predicts a total of 65,010 acres of grassland and 50,710 acres of forest will burn by wildland fire use (WFO) for resource benefits in the next decade. Another 11,035 acres of grassland and 7,645 acres of forest will burn by wildfire. This assumes about 48,505 acres of prescribed burning in grasslands and 19,495 acres in forests would also occur. Site-specific analysis would be completed before prescribed fire plans are implemented. The following table summarizes ongoing activities and programmatic changes in potential effects.

Table 2-1: Baseline Condition (Current) compared to Selected Alternative (E-modified)

Activity	Baseline Condition (Alternative A)	Selected Alternative (E-modified)
Standards and guidelines for TEP plants	No specific direction	New standards and guidelines
Currently active cattle allotments	292,521 acres	292,521 acres
Acres currently active sheep allotments	6,384 acres	6,384 acres
Closed allotments	54,900 acres	300,682 acres
Vacant allotment potentially restocked w/sheep	132,607 acres	0 acres
Vacant allotment potentially restocked w/cattle	134,899 acres	3,641 acres
Total potential acres permitted grazing	566,411 acres	320,629 acres
Administrative horse pasture	Included in vacant acres	18,083 acres
Designated open roads	533 miles	356 miles
Dispersed camping allowed	Within 300 feet corridor on each side of open roads	Dispersed camping in designated sites or areas only from designated roads
Potential forested vegetation treatment	26,600 acres	17,700 acres
Potential grassland WFO	4,450 acres	65,010 acres
Potential grassland prescribed fire	22,250 acres	48,505 acres
Potential grassland wildfire	27,795 acres	11,035 acres
Potential forested WFO	3,050 acres	50,710 acres
Potential forested prescribed fire	12,750 acres	19,495 acres
Potential forested wildfire	16,985 acres	7,645 acres

CHAPTER 3

Description of the Action Area

Introduction

The planning area addressed is the HCNRA that includes National Forest System (NFS) lands in both Oregon and Idaho. As described in **Chapter 1**, all activities within the HCNRA are managed under direction provided by the 1982 CMP and the *Forest Plan* as amended. Activities occurring within the HCNRA that are administered by the Nez Perce and Payette National Forests are also managed under this direction.

Prior consultations for terrestrial, aquatic and plant species have occurred for several ongoing activities and programmatic changes in direction. The *Forest Plan* was previously consulted on in 1996 for various salmon species, in 1998 for steelhead and bull trout, and in 2000 for Canada lynx. These formal consultations resulted in Biological Opinions and terms and conditions for the *Forest Plan*. All ongoing and proposed projects are intended to be in compliance with these biological opinions, associated terms and conditions, *Canada lynx Conservation Assessment and Strategy* (Ruediger et al 2000), *Recovery Plan for the Pacific bald eagle* (USDI 1986), and *Recovery Plan for MacFarlane's four-o'clock* (USDI 2000). Refer to **Table 1-1: Summary of Management Direction for the HCNRA** for a complete list.

The following section addresses the species listed in **Table 1-2 of Chapter 1** in order by terrestrial, aquatic and plant species. This BA provides a level of documentation appropriate for the programmatic decision to amend the *Forest Plan* and determination of effects to listed terrestrial, aquatic and plant species. In addition to the programmatic level of consultation for the decision to amend the *Forest Plan*, this BA also provides consultation for the effects of ongoing activities to listed plant species. Informal consultation for programmatic direction and effects to MacFarlane's four-o'clock has occurred for the *Integrated Noxious Weed Management Plan* (USDA 1992), the *Wild and Scenic Snake River Recreation Management Plan* (USDA 1999), the *Imnaha Wild and Scenic River Management Plan* (USDA 1993), and the HCNRA *Prescribed Natural Fire Plan* (USDA 1994). This information was incorporated into the determination of effects for plants. The analysis of effects of ongoing activities to listed plants provides the environmental baseline for comparison of the effects of the programmatic decision for the selected Alternative E-modified.

The previous *Forest Plan* and Section 7 watershed BAs and consultations provide the environmental baseline for terrestrial and aquatic species. Some of the information from the FEIS and appendices and the previous consultations are summarized or referenced where appropriate to aid the review process. Refer to Chapter 3 of sections of the FEIS for Wildlife Habitat, Riparian Habitat/Aquatic Habitat and Water Quality, and Biologically Unique Species, Habitats and Ecosystems for a complete description of the affected environment. Refer to the **Literature Cited** section of this document for a list of prior consultation documents.

The *Forest Plan* fish consultations set the stage for future project-specific consultations. They provide guidance for analyzing site-specific projects within the context of biological assessments for the Section 7 watersheds pursuant to the *Endangered Species Act*. These multi-species biological assessments encompass all ongoing and proposed activities within the Section 7 watersheds and would continue to be interagency in scope and be re-examined every two years.

All future site-specific actions as a result of this amendment to the *Forest Plan* will undergo appropriate site-specific analysis under NEPA and site-specific consultation under the *Endangered Species Act* for listed species prior to the project decision.

CHAPTER 4

Description of Species and Effects

Introduction

The description of species and effects is organized in the following sections by terrestrial, aquatic and plant species. Table 4-1 summarizes the effects determination for each species.

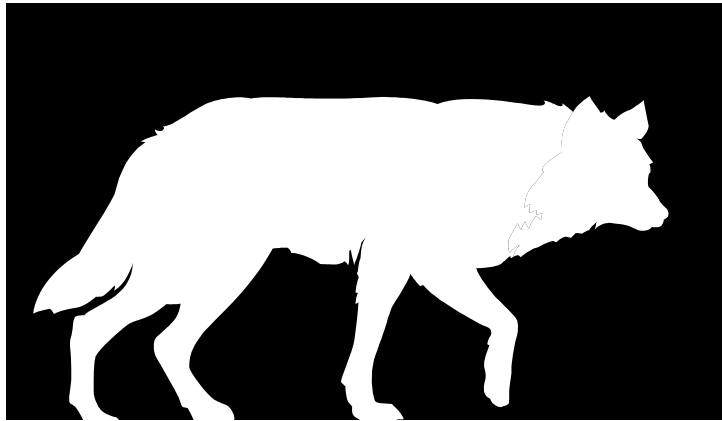
Table 4-1: Summary of Effects Determination by Species

Species	Federal Status	Species Present	Habitat Present	Forest Plan Consultation	Amendment Determination
Northern bald eagle (<i>Haliaeetus leucocephalus</i>)	Threatened	Yes	Yes	Yes	NLAA
Canada lynx (<i>Lynx canadensis</i>)	Threatened	unknown	Yes	Yes	NLAA
Gray wolf (<i>Canis lupus</i>)	Endangered	unknown	Yes	No	NLAA
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	Candidate	No	No	No	NLAA
Bliss Rapids snail (<i>Taylorconcha serpicicola</i>)	Threatened	Yes	Yes	No	NLAA
Bull trout-Columbia Basin (<i>Salvelinus confluentus</i>)	Threatened	Yes	Yes	Yes	NLAA
Fall chinook salmon-Snake River (<i>Oncorhynchus tshawytscha</i>)	Threatened	Yes	Critical Habitat Designated	Yes	NLAA
Sockeye salmon-Snake River (<i>Oncorhynchus nerka</i>)	Threatened	Yes	Critical Habitat Designated	Yes	NLAA
Spring/summer chinook salmon-Snake River (<i>Oncorhynchus tshawytscha</i>)	Threatened	Yes	Critical Habitat Designated	Yes	NLAA
Steelhead-Snake River Basin (<i>Oncorhynchus mykiss</i>)	Threatened	Yes	Yes	Yes	NLAA
Columbia spotted frog (<i>Rana luteiventris</i>)	Candidate	unknown	Yes	No	NLAA
Howell's spectacular thelypody (<i>Thelypodium howellii</i> ssp. <i>spectabilis</i>)	Threatened	No	not probable	No	NE
MacFarlane's four-o'clock (<i>Mirabilis macfarlanei</i>)	Threatened	documented	Yes	No	NLAA ¹ NLAA ²
Spalding's catchfly (<i>Silene spaldingii</i>)	Threatened	not documented	probable	No	NLAA ¹ NLAA ²
Ute ladies' tresses (<i>Spiranthes diluvialis</i>)	Threatened	not documented	probable	No	NLAA ¹ NLAA ²
Water howellia (<i>Howellia aquatilis</i>)	Threatened	not documented	probable	No	NLAA ¹ NLAA ²
Slender moonwort (<i>Botrychium lineare</i>)	Candidate	not documented	probable	No	NLAA ¹ NLAA ²

¹ Ongoing activities

² Programmatic direction from the selected alternative

Terrestrial Species



Analysis of Programmatic Direction

This section provides a description of the status, species distribution, life history and habitat requirements, populations and habitat conditions for the northern bald eagle, Canada lynx, gray wolf and yellow-billed cuckoo.

The analysis of the programmatic direction from the selected alternative includes a description of the direct and indirect effects, cumulative and aggregate effects, monitoring and mitigation, conclusion and determination of effects for each species.

New projects proposals would be subject to Section 7 *Endangered Species Act* consultation process. This would ensure that surveys are conducted and mitigations are developed to protect any listed populations in the project areas. If populations of other listed, proposed, or candidate species are found, consultation with the USFWS will be re-initiated.

Selected Alternative E-modified

The selected alternative includes goals, objectives, standards, and guidelines for threatened, endangered and proposed (TEP) wildlife species, which includes direction to survey for TEP wildlife species in the HCNRA. Implementation of this direction would improve management and the long-term viability of the TEP wildlife species in the planning area. Ongoing monitoring of listed species would continue.

Refer to the summary of Alternative A (current direction) and Alternative E-modified in Chapter 2 of the FEIS and the full text of the goals, objectives, standards and guidelines in the FEIS, Appendix C, Table C-1 for Wildlife Habitat for an understanding of the programmatic change in direction. Refer also to the complete list of all goals, objectives, standards and guidelines for Alternative A (current direction) and Alternative E-modified that also would apply to protection of listed wildlife species.

Northern bald eagle (*Haliaeetus leucocephalus*)

Status and Species Distribution

The status and distribution of bald eagle populations in the decades before World War II are poorly understood. Declines probably began in some populations in the 19th century; other declines were probably not underway until the 1940s. Between 1947 and 1970, reproduction in most populations declined drastically (USDI 1986). In the late 1960s and early 1970s, it was determined that dichlorophenyl-dichloroethylene (DDE), the principal breakdown product of DDT, an agricultural pesticide, accumulated in the fatty tissues of adult female eagles. It impaired calcium release necessary for egg-shell formation, thus inducing thin-shelled eggs that are not viable, leading to reproductive failure. On December 31, 1972, DDT was banned from use in the United States. The bald eagle was originally listed as endangered in the lower 48 states on February 14, 1978. Their status was upgraded to threatened in most of the lower 48 states on August 12, 1995, because of progress in recovery. In the Pacific Northwest, the decline of salmon runs in the Snake and Columbia rivers and illegal shooting also caused populations to decline.

A recovery plan for the Pacific population of the bald eagle was completed in 1986 (USDI 1986). The plan identifies the following de-listing goals which are necessary to obtain a self-sustaining population of bald eagles: 1) a minimum of 800 nesting pairs with an average reproductive rate of one fledged young per pair and an average success rate per occupied site of not less than 65 percent over a five-year period, 2) attainment of breeding population goals should be met in at least 80 percent of the management zones, 3) wintering populations should be stable or increasing.

The Pacific recovery area was divided into zones, where the HCNRA is part of the Snake River zone. Recovery goals for the Snake River zone are to: 1) locate, monitor, and protect nesting, roosting, and feeding areas, 2) develop nest site plans for nesting and roost areas, 3) monitor productivity, 4) prevent significant habitat disturbance and direct human interference at nest sites and feeding areas, and 5) re-establish six breeding pairs

of nesting bald eagles. The six breeding pairs includes all lands in the zone in Idaho, Washington, and Oregon. Bald eagle habitat on the HCNRA continues to be protected and managed in accordance with this recovery plan (Wld-S2, Wld-S3, Rip/Aqu-S1, Rip/Aqu-S2).

Life History and Habitat Requirements

Bald eagles first breed at five to six years of age. Egg laying can start as early as February and continue until April. Both sexes incubate one to three eggs for 31 to 35 days. Eggs hatch from March to May, and the nestling period lasts 11 to 14 weeks. Some breeding birds remain near nesting territories throughout the winter months. Important prey species include mainly fish, but can include ground squirrels, waterfowl, and big-game carrion.

The bald eagle historically ranged throughout North America except extreme northern Alaska and Canada and southern Mexico. Current range in the lower 48 states includes five recovery populations: Chesapeake Bay, Pacific, Southeastern, Northern States, and Southwestern. In 1963, a National Audubon Society survey reported only 417 active nests in the lower 48 states. In 1994, about 4,450 occupied breeding areas were reported. There has been a 47 percent increase since 1990 in the number of occupied breeding territories.

In general, bald eagles need an adequate prey base in close proximity to large suitable nest trees. Nest sites in forested areas show a strong preference to multi-layered, mature forest stands, and eagles show strong fidelity to a nest site. Eagles usually nest in mature conifers with gnarled limbs that provide ideal platforms for nests. Ponderosa pine, Douglas fir, and black cottonwood are preferred nest trees in the Pacific recovery area. The size and shape of a defended breeding territory varies widely (1.6 to 13 square miles) depending upon the terrain, vegetation, food availability, and population density of an area.

During the critical incubation (March) and brooding (late April/early May) phases, human disturbance can result in nest failure with the risk reduced as the nesting cycle progresses towards fledgling at the end of July. Some habituation of eagles to human activity has been observed, varying according to type and proximity to the bald eagle. Individual birds vary widely in their response to human disturbance.

Specific wintering habitat needs vary by site; however, the following components appear important for wintering populations: an abundant food supply, suitable foraging habitat with adequate perch trees, and protected areas where the birds can roost at night. Fish and carrion provide the most common dietary constituent of winter bald eagles.

Threats to the bald eagle throughout its range are primarily from shooting or poisoning; however, these threats have reduced significantly since the 1970s. Habitat loss and disturbance are moderate threats.

Populations and Habitat Conditions

The WWNF provides nesting, foraging, and roosting habitat for bald eagles. Major rivers and reservoirs on the Forest provide the best habitat. Known active nests are located on Unity and Phillips Reservoirs, located approximately 60 miles southwest of Hells Canyon. There are also two recent active nests located on private land in the Enterprise, Oregon municipal watershed along the Wallowa River. Continued surveys indicate there are no known bald eagle nests within HCNRA. The Snake River corridor is considered marginal potential nesting habitat due to a low forage potential (lack of salmon) and lack of large trees nearby (mostly rangeland). Potential nesting habitat also exists along the Oregon side of Hells Canyon Reservoir and is considered fair nesting habitat (F.B. Issacs direct communication undated).

A new nest was found in 1999 along the Hells Canyon Reservoir outside of the HCNRA in Idaho (Payette National Forest). A pair of eagles occupied the nest for the last four years. The presence of this nest lowers the probability of a pair establishing a nest in the HCNRA along Hells Canyon Reservoir (competition for a limited food base). In 2000, a new nest was found on the Oregon side of Oxbow reservoir on BLM lands. This pair of bald eagles has successfully nested for the last three years. In summary, there are two breeding pairs of eagles in the Snake River zone, neither of which is in HCNRA.

The Snake River Wild and Scenic river corridor serves as a bald eagle winter foraging area. This habitat provides a variety of food including fish, waterfowl, carrion, and ground squirrels. The majority of the river corridor is

ungulate winter range. Few waterfowl winter in the free-flowing section of the Snake River. Craig Johnson, BLM biologist (direct communication), rates the foraging quality within the analysis area as "fair to low fair." Food availability on the river may be insufficient.

Roost sites have never been found within HCNRA. The closest roost site is located 25 miles southeast of the Hells Canyon Dam, which is well outside the HCNRA.

Bald eagle habitat along the Snake River has not been altered much. Two recreational facilities, Pittsburg Landing and Hells Canyon Launch, have been developed within the corridor. Together, they cover 11 acres. Cutting of live or dead trees, which may alter roost habitat, is prohibited except where necessary for visitor safety.

Each year since 1979, monitoring for bald eagles has been completed in Oregon (which includes HCNRA) by the Forest Service, BLM, various volunteers, and Oregon Eagle Foundation. The general trend for nest sites located in Oregon has continued on a steady increase and now exceeds the recovery goal. Winter bald eagle counts along the Snake River, Oxbow Reservoir and Hells Canyon Reservoir (zone 14) have shown a general increase also. Winter eagle counts have increased from 43 in 1979 to 95 in 2000 (Issacs 2002). The bald eagle is currently being considered for de-listing by USFWS.

Direct and Indirect Effects

The major potential impact for bald eagles in HCNRA is human disturbance by jet boats in winter roost trees along the Snake River. Fishing and boating may reduce the foraging time of bald eagles. Some habituation to those activities can occur, but overall, reduced feeding time along winter foraging sites can result in decreased reproductive fitness.

Currently, there is very little boating on Hells Canyon Reservoir during the winter months. A low impact to bald eagles is expected for the proposed alternative.

Along the Snake River, there is boating associated with hunting and fishing during the winter months. The primary recreation within the corridor is jet boat use. Very few hikers or floaters use the river during the winter months (Roy Lombardo, direct communication). The number of jet boats on the river varies by month, weather, and fishing conditions. The amount of jet boat use is monitored year long by the HCNRA district. The use data pertinent for bald eagles is from November through March (secondary season) and is displayed in the following table.

Table 4-2: Summary of Snake River Powerboat Use and Visitors to Kirkwood Historic Ranch

Private powerboat use (November to March)									
Year	1993	1994	1995	1996	1997	1998	1999	2000	2001
# Trips	1,448	1,663	1,540	1,369	1,294	1,517	1,613	1,493	1,547
# Trips/Day	10	11	10	9	9	10	11	10	10
Visitors to Kirkwood (November to March)									
# People	381	302	736	505	217	873	563	689	624

Both of these figures are good indicators of jet boat use during the winter months in HCNRA. They indicate the number of private powerboats has remained nearly the same over the last nine years. The number of visitors to Kirkwood, which is a good indicator of total jet boat use, has been variable from year to year and generally shows a modest increase over the same time period. The point at which eagles will no longer use the Snake River (threshold level) due to recreational use is unknown (Issacs, direct communication). The WWNF established a threshold level where monitoring shows an increase for two consecutive years of more than 26 private boat launches per day in the section below Sheep Creek and 13 per day in the section above Sheep Creek. This threshold was developed from a review of literature and assistance from Issacs (direct communication) and was agreed to in the previously concurred informal consultation for the *Wild and Scenic Snake River Recreation Management Plan* (USDA 1999). The number of trips per day listed above are for both the lower and upper river sections.

Approximately 70 percent of the use by bald eagles on the Snake River is in the upper section, from Sheep Creek to Hells Canyon Dam, where jet boat use averages about two boats per day in the highest use periods. Eagle use is highest in the upper section due to higher fish mortality coming through the turbines at Hells Canyon Dam. Currently, we are well below both threshold levels above and below Sheep Creek. The number of recreationist

using the river is predicted to increase 16 percent over the next 10 years (1.6% per year). If that happens, use levels will still be well below the threshold levels described above.

Observations of bald eagles responding to powerboats on the river is variable. Individual bald eagles remain with passes within 50 feet of the perch. Some eagles flush and leave the corridor, others flush and move to another perch, and others remain when the powerboat passes. Field observations by Craig Johnson (direct communication indicates that "most of the eagles remain on their perches when a jet boat passes, and part of the remainder flush and move to another perch. Very few leave the corridor or flush more than a quarter of a mile." Monitoring has shown that many birds have habituated to this boating activity.

Bald eagle counts on the Snake River from the mouth of the Grande Ronde River to Temperance Creek have averaged 8.4 birds per year during the last 20 years. Bald eagle counts are consistently lower on the Snake River compared to adjacent areas. For example, the following is an average of counts for one day in January 1989 to 1991:

- Clearwater River - 27 eagles
- Salmon River - 21 eagles
- Grande Ronde River - 54 eagles
- Snake River - 8 eagles
- Snake Reservoirs - 145 eagles

Often the large trees that are preferred for use by eagles are those that respond favorably to periodic burns, especially cool ground fires (e.g. ponderosa pine, Douglas-fir). Re-introduction of fire into bald eagles habitat is not likely in the next 15 years since lightning-caused grass fires have been frequent in the last twenty years. If they occur, they will likely benefit the species by maintaining the few large ponderosa pine and enhancing their growth scattered along the Snake River. This is a long-term benefit.

The potential forested vegetation treatment acres do not overlap in potential or existing bald eagle winter roost or potential nesting habitat. Therefore, forested vegetation treatment will not affect bald eagles or their habitat in HCNRA.

The selected alternative, Alternative E-modified, will implement PACFISH and INFISH riparian management objectives, as well as riparian habitat conservation standards (Rip/Aqu-S1, Rip/Aqu-S2). Although most riparian areas are in satisfactory condition relative to livestock impacts, implementation of these additional objectives will lead to further improvements in stream bank erosion and improved watershed conditions. In localized areas, there will be less sediment delivery and more aquatic macroinvertebrate production, which indirectly provides better conditions for fish and eagles. Grazing of cattle in winter would have very little effect on bald eagle. Livestock that die in winter along the Snake River are available as carrion for bald eagles. A livestock permittee managing their livestock could potentially disturb a bald eagle from feeding on a dead cow. This is expected to be a rare occasion.

Cumulative and Aggregate Effects

Baseline conditions that have affected bald eagle habitat in HCNRA in the past are from the hydropower dams, human disturbance from jet boats, and past wildfires.

The Hells Canyon Complex consists of three hydropower dams near the project area (Hells Canyon, Oxbow, and Brownlee). These dams were built in the 1960s and 1970s and have altered river flow amounts and timing, sediment delivery, water temperature, fish and invertebrate production, and waterfowl use. The total effect from these dams is not understood well. The cumulative effect from the remainder of the hydropower dams on the Snake and Columbia River has magnified the effects from the three local dams. The reduced numbers of salmon and steelhead to HCNRA is the most important effect to bald eagles. Positive affects from these dams are sometimes available to bald eagle from fish dying when they pass through the turbines. It is assumed for this analysis that the dams will continue to function as they have over the next 15 years and will continue to have negative and positive effects on bald eagles.

Jet boat use started in the early 1960s, but did not get popular until the late 1970s. Use steadily increased until the early 1990s when the *Wild and Scenic Snake River Recreation Management Plan* (USDA 1999) limited jet boat use in the summer month. Winter use of jet boats has never been as popular and has not increased significantly over the last decade (see above direct effects). We don't expect the total use of jet boats in winter to increase significantly in the next 20 years. Therefore, the human disturbance effect to bald eagles would not significantly increase.

In HCNRA, large fires have burned approximately 252,600 perimeter acres over the last 20 years. Some of the grassland fires have burned over the same ground twice. Burned acres in bald eagle habitat has totaled about 22,200 acres. With this frequency of wildfire, prescribe burning in bald eagle habitat should not be necessary in the next 15 years. Wildfire will probably continue, and may have very small short-term insignificant effects in bald eagle habitat. The loss of the majority of ground squirrels following a wildfire could occur and reduce their potential as a prey source for eagles during the first winter. A reduction in ground squirrels immediately after a wildfire will depend on the intensity of the fire.

The aggregate effects from prescribed fire, wildfire, livestock grazing, and recreational use has not and should not (in the next 15 years) have a significant impact on bald eagle habitat or use. Long-term eagle habitat would likely improve from the proposed alternative with the standards for riparian buffers. Implementation of PACFISH and INFISH management standards for livestock grazing will improve riparian conditions and hence, indirectly improve habitat conditions for bald eagles. Due to the very limited amount of state and private lands within bald eagle habitat, there are no effects of these activities that are reasonably certain to occur within the HCNRA that will adversely affect bald eagles or their habitat.

The operation of the hydropower dams and their effects on bald eagles is not part of this CMP analysis. They will be addressed during the FERC re-licensing process. What we have proposed in the FEIS in combination with the operations of these dams, should not lead to a reduction in habitat use or eagle numbers using HCNRA.

Monitoring and Mitigation

1. Continue to monitor jet boat use levels thru self-issue permits along the Snake River corridor from November through March each year (ongoing by recreation specialist). If jet boat use were found to meet or exceed the threshold level described, then we would determine if a negative impact to bald eagles is occurring. A negative impact would trigger re-initiation of consultation and may decrease jet boat use.
2. Monitor bald eagle use of potential nest sites (which are along the entire Snake River corridor and Hells Canyon Reservoir) at least once during the nesting season. (ongoing from biologists from BLM, Idaho Power, and the Payette and Wallowa-Whitman Forests).
3. Continue to monitor mid-winter bald eagle use of roost and feeding habitat along the Snake River corridor (ongoing by BLM biologist). These surveys are conducted on established routes throughout the Columbia River Recovery Zone at the same time by many biologists and volunteers.
4. Cutting of live or dead trees within one-fourth mile of the Snake River, which may alter roost habitat, is prohibited except where necessary for visitor safety (previously concurred under informal consultation for the *Wild and Scenic Snake River Recreation Management Plan* (USDA 1999)).

Conclusion

1. Implementation of the selected alternative will not result in destruction of habitat or the modification and timing of fish production, waterfowl, or big-game carrion.
2. Human disturbance during winter from powerboats is a possible effect to bald eagles. Current powerboat use is well below the level described in the *Wild and Scenic Snake River Recreation Management Plan* (USDA 1999).
3. Re-introduction of prescribed fire into bald eagle habitat will benefit the species by helping to maintain the few large ponderosa pine trees along the river.

4. Implementation of PACFISH and INFISH management standards for livestock grazing will improve riparian conditions and, hence, indirectly improve bald eagle habitat.
5. Snag habitat will be managed at the 100 percent population level (Eastside screens), thereby maintaining the availability of perches and/or nest trees at near natural conditions.
6. The potential forested vegetation treatment acres do not overlap in potential or existing bald eagle habitat. Therefore, these treatments will not affect bald eagles or their habitat in HCNRA.
7. The aggregate effects from prescribed fire, wildfire, livestock grazing, and recreational use has not and should not (in the next 15 years) have a significant impact on bald eagle habitat or use.
8. There are no effects from future state and private activities that are reasonably certain to occur within the HCNRA that will adversely affect bald eagles or their habitat.
9. Bald eagle habitat on the HCNRA is protected and managed in accordance with the recovery plan (FEIS, Appendix C, Table C-1, Wld-S2, Wld-S3, Rip/Aqu-S1, Rip/Aqu-S2).

Forest Plan Consultation

Based on the above stated reasons, there is no need to re-initiate consultation on the *Forest Plan* because changes are within the context of the most recent *Forest Plan* consultation for Northern bald eagle.

Determination of Effects

Based on the above stated reasons, a determination of **may effect, not likely to adversely affect the species or critical habitat** is anticipated for the selected alternative. A **may effect, not likely to adversely affect** determination was previously concurred with by USFWS on June 29, 1994 for the *Wild and Scenic Snake River Recreation Management Plan* (USDA 1999).

Canada lynx (Lynx canadensis)

Status and Species Distribution

The Final Rule to list the lynx as threatened for the lower 48 states was published in the Federal Register (Vol. 65, No. 58) on March 24, 2000, with the listing effective on April 24, 2000.

In response to the emerging awareness of the uncertain status of lynx populations and habitat in the lower 48 states and the onset of the listing process, an interagency lynx coordination effort was initiated in March 1998. Three products important to the conservation of lynx on federally managed lands have been produced through this effort: 1) Lynx Science Report, *Ecology and Conservation of Lynx in the United States* (Ruggiero et al 1999), 2) the *Canada Lynx Conservation Assessment and Strategy* (LCAS) (Ruediger et al 2000), and 3) the *Canada Lynx Conservation Agreement* (CA) (Bureau of Land Management and U.S. Fish and Wildlife Service 2000).

The Science Report prepared by an international team of experts in lynx biology is a compendium and interpretation of current scientific knowledge about the lynx. This document serves as the scientific foundation for the various lynx activities of the cooperating federal agencies.

The LCAS builds upon this scientific base and identifies the risks to the species that may occur as a result of federal land management. It recommends conservation measures that could be taken to remove or minimize the identified risks. It was developed to provide a consistent and effective approach to conservation of lynx and their habitats. Since the implementation of the LCAS, we are no longer under the requirements of the Conservation Agreement. This CMP amends the *Forest Plan* to fully incorporate the LCAS on the HCNRA (FEIS, Appendix C, Table C-1, Wld-S2).

Lynx populations in the boreal forest of Canada and Alaska are doing very well. Viable populations in the United States are located in North Central Washington, western Montana, and Maine (Science Report). Populations in Washington and Montana are about 350 to 400 air miles north of HCNRA. Lynx have recently been confirmed in western Wyoming, Northern Idaho, Wisconsin, and Michigan, but their status is yet to be determined.

Life History and Habitat Requirements

Like most cats, lynx are mainly nocturnal, being most active at sunrise and sunset. When inactive, they typically occupy a den in a hollow tree, under a stump, or in thick brush. When prey is scarce, their home range increases and individuals may become nomadic. Home range is usually between 24 to 48 square kilometers. The range of males is larger than that of females. Population density is usually less than 10 animals per 100 square kilometer, depending on prey availability. In the northern boreal forest, lynx populations seem closely related to the 10-year population cycle of snowshoe hare. There is generally a two-year lag of the lynx population behind the snowshoe hare cycle. Individuals are usually solitary.

Lynx breed from March through May in their northern range, and gestation lasts 62 to 74 days. A female produces one litter of three to four young every one to two years. Young stay with the mother until next mating season or longer. Prey scarcity may suppress breeding.

Snowshoe hares are the primary prey of lynx, comprising 35 to 97 percent of the diet throughout the range of the lynx (Ruggerio et al 1994). Other prey species include red squirrel, grouse, flying squirrel, ground squirrel, porcupine, beaver, voles, shrews, and fish. During the cycle when hares become scarce, the proportion and importance of other prey species, especially red squirrel, increases in the diet.

Lynx are typically associated with large continuous tracts of boreal or coniferous forest in Alaska and Canada. They are also found in isolated higher-elevation spruce, sub-alpine fir, and lodgepole pine forests in the western United States (Koehler and Brittell 1990, Ruediger et al 2000). Habitat selection is associated with the habitat requirements of its primary prey, the snowshoe hare (Quinn and Parker 1987). In general, mixed-conifer stands are often preferred by hares for cover with openings of shrubs for feeding. Lodgepole pine is often a major component of this habitat, especially within the early to mid-successional stages. Ruggerio et al (1994) suggest there is a general pattern of decreasing habitat suitability for lynx with decreasing latitude in the Rocky Mountains. Historic fire patterns played a large role in maintaining the habitat components for both snowshoe hare and lynx. Stand-replacing fires maintained a landscape mosaic that provided ideal snowshoe hare and lynx habitat.

Deep snow and extreme cold are often associated with lynx habitat. This species remains and thrives under these conditions due to its physical adaptations to low temperatures, deep snow, and ability to successfully exploit the snowshoe hare (Koehler 1990, Ruediger et al 2000). Other important habitat needs for lynx include mature forest for denning and resting and thickets for feeding (Koehler 1990). Primary denning areas are often in large hollow logs, beneath windfall or upturned roots, or in brush piles in dense thickets.

Populations and Habitat Conditions

Bounties paid for trapping lynx were recorded in county court records in the early 1900s. A search for these old records was conducted in 2000. A few records were found and indicate some historical abundance of lynx. Records from Union County indicate 81 lynx were brought in for bounty from 1909 to 1922. Wallowa County records show 17 bounties from 1901 to 1953. No records could ever be located for Baker County. These few records indicate that lynx may have been more abundant in the early 1900s than previously thought. Biologists from the Oregon Department of Fish and Wildlife (ODFW) feel lynx have been eliminated from Oregon. A government predator control agent killed the last confirmed lynx in 1964 in the HCNRA near Fence Creek (Imnaha River). Occasional sightings of lynx have been reported since 1964 on the WWNF, but none have been confirmed. Winter track survey routes for detecting lynx were intensively conducted from 1992 to 1994. The WWNF found one set of tracks on the Baker Ranger District that may have been lynx, but were never verified. In the summers from 1999 to 2001, the WWNF has conducted extensive lynx hair pad surveys for lynx on every district. All hair collected has been found to be negative for lynx. Findings from all of these surveys conclude that lynx are probably no longer present but may occasionally travel through the WWNF.

Lynx habitat on the WWNF was remapped on September 17, 2001 according to new procedures (USDA 2000). Minor changes to these maps were made from field verifications and were updated on May 8, 2000. All mapping of lynx habitat has been completed in conjunction with the USFWS. Primary vegetation that may contribute to lynx habitat is subalpine fir plant association that is generally between 5,500 and 7,400 feet elevation on the

Wallowa-Whitman National Forest. Moist grand-fir where it intermixes with subalpine fir plant associations constitutes secondary vegetation that may also contribute to lynx habitat. The Eagle Cap Wilderness and Seven Devils area of the Hells Canyon Wilderness are believed to be core lynx habitat. The HCNRA could potentially serve as travel corridor habitat between the Wallowa's and the Rocky Mountains in Idaho. Connectivity habitat was included between all significant lynx habitat on the WWNF during the mapping process. Lynx Analysis Units (LAU) have been identified for all lynx habitat on the WWNF. The following table summarizes the acres of nonhabitat, primary forage, secondary forage, denning, and unsuitable condition for the LAUs in HCNRA. These numbers are considered baseline conditions for lynx habitat.

Table 4-3: Lynx Analysis Units in the HCNRA

Lynx Analysis Units	Primary Forage	%	Marginal Forage	%	Denning	%	Unsuitable	%	Total
Upper Imnaha	1,920	10	832	5	12,805	68	3,218	17	18,775
Lower Imnaha	500	3	467	3	11,097	62	5,960	32	18,024
Snake/Pittsburg	92	3	178	7	2,368	90	12	0	2,650
Snake/Hat Point	2,560	11	48	0	16,003	72	3,685	17	22,296
Rapid River	453	7	0	0	6,149	93	0	0	6,602
Pine Creek	486	27	321	18	682	39	277	16	1,766
Big Sheep	342	10	0	0	2,240	64	896	26	3,478
Total	6,353	9	1,846	3	51,344	70	14,048	18	73,591

Out of the 652,488 acres of HCNRA, only about 73,591 acres (11%) are potential lynx habitat. Most of this habitat is in three main LAUs: Snake/Hat Point, Upper Imnaha, and Lower Imnaha. All three areas are small in relation to lynx home ranges. Hence, most of the HCNRA is probably more valuable as connecting habitat between the Wallowa Mountains and Rocky Mountains in Idaho.

The total lynx habitat in Rapid River, Pine Creek, and Big Sheep LAUs is small, because most of the lynx habitat is on adjacent districts. There are adjacent LAUs also on the Payette and Nez Perce National Forests. All lynx habitats adjacent to HCNRA will be managed in accordance with the LCAS.

The table is intended to summarize conditions on the HCNRA. It is unrealistic to estimate the changes in these baseline conditions from timber harvest since this document is only programmatic and we do not know where or when any harvest would take place. Future site specific environmental analysis will be consulted on before any harvest will occur.

The majority of lynx habitat in unsuitable condition has been created by wildfire. Only the Lower Imnaha LAU is currently above the 30 percent unsuitable condition threshold outlined in the LCAS. Most of these acres have young, densely stocked trees and will grow into primary forage within five years.

The Snake/Hat Point LAU has about 72 percent denning habitat and only about 11 percent forage. Stand replacement fire could improve lynx habitat by converting denning habitat to forage. All LAUs have large amounts of denning habitat except Pine Creek.

Direct and Indirect Effects

Potential factors affecting lynx from the selected alternative include: 1) fire suppression which can improve denning habitat or reduce foraging habitat; 2) prescribed fire which can improve forage habitat and remove or create some forest structure; 3) forested vegetation treatment which may create forage or unsuitable habitat, reduce structure, or fragment forests; 4) roads which may result in animal displacement, disturbance, or a barrier to movement; 5) dispersed winter recreation use which compacts snow providing a competitive edge to other predators.

Fire Management and Forested Vegetation Treatment

Denning habitat is used for parturition and rearing of young. The common component of denning habitat appears to be large amounts of coarse woody debris (LCAS). This structure must be at least 10 percent of the LAU, available throughout the home range, and in or adjacent to foraging habitat. Harvesting timber and the use of fire

can directly affect the quality and quantity of available lynx denning habitat. Removal of coarse woody debris by harvesting or fire may displace lynx or affect the survival of lynx kittens if present.

The primary prey of lynx is snowshoe hare. Within subalpine fir plant associations, dense horizontal cover just above snow level in winter is critical for snowshoe hares. Snowshoe hares favor young successional stages and stand structures. Through succession, these stands grow out of prime foraging habitat in about 20 years. It is important to periodically create new foraging habitat. Forested vegetation treatments and fire can modify vegetation structure and mosaics of forested landscapes, and thereby affecting the habitat of lynx prey. Precommercial thinning of young dense stands could adversely affect lynx by reducing foraging habitat.

The LCAS lists fire exclusion as the most limiting habitat factor for lynx prey species. Wildland fire and insects have historically played the dominant role in maintaining a mosaic of forest structural stages in lynx habitat. Fire suppression disrupts the natural fire frequency and reduces forage habitat. Over the last 16 years, large fires have burned across approximately 295,000 acres of the HCNRA (some of which has burned twice over the same acres). This is about 33 percent of HCNRA, and is a direct result of the past fire suppression and recent direction to allow fire to play a more natural role in the ecological function of the HCNRA. Most of these acres have been in grassland habitat. Only a small part of these acres have been in lynx habitat. Existing conditions for each LAU clearly indicates an abundance of denning habitat and lack of forage. Careful use of more fire in subalpine plant associations would benefit potential lynx habitat.

The selected alternative continues this direction to maintain and promote natural fire processes and to use prescribed fire to restore ecosystem health. This direction is not the “let it burn” policy, but includes direction to reduce the prevalence of uncharacteristically large fires. The use of prescribed burning usually results in a smaller amount of unwanted large stand replacement fires. Prescribed fires retain or create much more habitat structure than large stand replacement fires. The selected alternative clearly promotes a balance between letting all fires burn and suppressing all fires. During the first year or two, use of prescribed fire may decrease foraging habitat. In the long term, this will improve lynx foraging habitat. Vegetation management activities will limit disturbance within each LAU to no more than 30 percent unsuitable habitat. This direction is in full compliance with the conservation measures (LCAS) to restore the use of fire to move toward landscape patterns consistent with historical succession and disturbance regimes (FEIS, Appendix C, Table C-1, Fire-O1, Fire-O2, Fire-S1, Wld-S2).

Forested vegetation treatments and fire can create forage, accelerate unsuitable forage habitat, remove denning habitat, or fragment lynx habitat. Precommercial thinning in currently suitable forage habitat has a direct negative effect on snowshoe hare habitat at least in the short term. Precommercial thinning in suitable forage habitat will not occur in HCNRA. Timber management can be used in conjunction with fire as a disturbance process to create and maintain snowshoe hare habitat. The purpose of precommercial thinning and commercial thinning in the HCNRA is to improve stand vigor and health. The purpose of single-tree selection harvest is to perpetuate uneven-aged stands composed of intermingled trees of differing ages, species, and sizes.

The maximum potential acres of forested vegetation areas treated for the HCNRA during the next 10 years is 17,700 acres from a combination of precommercial thinning, mechanical treatment and underburning, single-tree selection, and commercial thinning. This is only two percent of the HCNRA. Of the 17,700 acres only about three percent is in lynx habitat (540 acres). Single-tree selection harvest would retain the majority of forest structure, which would improve forage conditions for lynx.

Timber harvest direction in HCNRA is in compliance with the conservation measures in the LCAS because of the following: No timber harvest will occur in lynx habitat if unsuitable habitat exceeds 30 percent of the LAU. Management actions will not change more than 15 percent of lynx habitat within a LAU to an unsuitable condition within a 10-year period. Salvage harvest will not occur if at least 10 percent of the LAU is not denning habitat that is evenly distributed. This alternative will maintain the 100 percent snag level (Eastside screens) and provide for adequate cover and travel corridors by implementation of the 60 percent hiding cover requirement (FEIS, Appendix C, Table C-1, Wld-S7). Retention of cover will be emphasized on ridges, saddles, and riparian areas during site-specific project planning. Implementation of the direction in this FEIS will not reduce existing habitat conditions for lynx.

Access Management and Recreation Use

Most investigations indicate that lynx do not alter their behavior to avoid human activities (Ruggiero et al 1999). The exception may be activities that may cause abandonment of a den site, possibly affecting kitten survival. Summer recreation presents a low risk of adverse effects (except near den sites) due to the low susceptibility of lynx to displacement by humans. Large developed sites, may alter habitats, fragment the landscape, or encourage snow compaction in lynx habitat. Alternative E-modified does not propose any additional developed sites in lynx habitat.

Roads constructed for forest management or recreational purposes may or may not increase disturbance to lynx and increase opportunities for accidental deaths and trapping (Ruggiero et al 1999). More research on this subject is needed. Road closures may or may not be important (Ruggerio et al 1999). The selected alternative will close about 177 miles of roads permanently and about 27 miles of roads seasonally (over current conditions). These road closures may reduce human disturbance to lynx and their prey. Alternative E-modified directs managers to retain over 70 percent of the HCNRA in wilderness or roadless status, and not build any new roads. This will provide several large blocks of lynx habitat with minimal exposure to humans. All of the 61 subwatersheds in HCNRA will be below two miles of open roads per square mile (FEIS, Appendix C, Table C-1, Wld-S7).

Snowmobile, cross-country skiing, and snowshoeing use in winter and its associated snow compaction, has the potential to increase human disturbance to lynx and increase competition by other predators. The normal spatial segregation of lynx and coyotes during winter may break down where snow compaction occurs. The selected alternative will continue limiting general use of snowmobiles in the HCNRA by restricting their use to specific play areas and routes (FEIS, Appendix C, Table C-1, Acc-S10, S11, S12, G10, G11 and S13). These snowmobile play areas comprise less than seven percent of the total HCNRA acreage. Thus, at least 93 percent of the HCNRA does not have snowmobile use. In those play areas snowmobiles have the potential to displace lynx, if present. The selected alternative will not have any increase in groomed or designated over the snow routes and snowmobile play areas. For all of the above reasons, the selected alternative is in full compliance with the conservation measures (LCAS) for winter recreation and roads.

Livestock Grazing

Snowshoe hare densities and over-winter survival appear to be positively correlated with understory density (Ruggiero et al 1999). Livestock may compete with snowshoe hares for forage resources. Browsing and grazing by livestock and big game may have a direct effect on snowshoe hare habitat by reducing understory density. This is particularly true in high elevation aspen and riparian willow areas.

About 20 percent of the lynx habitat in the HCNRA will be available for grazing by livestock. There may be direct impacts to lynx habitat (if utilization standards are exceeded) on those acres by removing vegetation used by lynx prey for hiding cover and forage. Livestock grazing may degrade aspen and high elevation riparian willow plant communities. The selected alternative will manage grazing to ensure aspen and riparian willow long-term viability are maintained at or above mid-seral ecological status to provide cover and forage for prey species (FEIS, Appendix C, Table C-1, Gra-S2). This standard may require fencing to protect lynx habitat. Livestock use in openings created by fire in lynx habitat will be delayed until an interdisciplinary team reviews the site-specific situation and determines when livestock activities may resume in burned areas (FEIS, Appendix C, Table C-1, Gra-G4, Fire-G4). Livestock grazing will not exceed the 60 percent maximum utilization standards (FEIS, Appendix C, Table C-1, Gra-S6). Adherence to all of the above standards will insure livestock grazing will be in compliance with the conservation measures (LCAS), (FEIS, Appendix C, Table C-1, Wld-S2).

Trapping, Predator Control, Shooting

Over-trapping of lynx may have occurred in the early 1900s and contributed to elimination of the species in Oregon. Incidental or illegal mortality of lynx (if present) may occur today from trapping, predator control, and hunting/poaching activities. Closure of roads will likely reduce human activities. The permanent and seasonal road closures outlined in the selected alternative will reduce the risk from trapping and shooting.

Cumulative and Aggregate Effects

The historical backgrounds as described in the cumulative and aggregate effects section for wolves (forested vegetation treatments, fire, livestock grazing, and human disturbance) are similar for lynx. The aggregate effects are also similar, except for the following: 1) There has been very little timber harvest in sub-alpine fir plant associations, and 2) fire suppression has increased denning habitat and decreased forage habitat from historical levels. The selected alternative recommends restoring fire back into sub-alpine habitats to near historic levels. Wildland fire use for resource benefits would greatly improve the potential for use by lynx.

The aggregate effects from forested vegetation treatments, fire, livestock grazing, human disturbance, and trapping and shooting would not impact the potential for lynx to re-colonize in HCNRA. A long-term benefit from less human disturbance will occur from road closures, but will be offset from a projected increase of recreational use of 16 percent over the next decade (1.6% annually). There are no cumulative effects of future state and private activities that are reasonably certain to occur within the HCNRA that will adversely affect lynx or their habitat.

Monitoring and Mitigation

1. Within the snowmobile play areas, monitor the potential use of the area by lynx (ongoing, twice per year by district biologist). Also, monitor the level of snowmobile use violations outside designated play areas.
2. Monitor aspen and riparian willow communities in lynx habitat for long-term sprouting and viability (ongoing yearly by range conservationist). Fence if necessary.
3. Follow all conservation measures outlined in the LCAS and standards in this FEIS when implementing site-specific projects (FEIS, Appendix C, Table C-1, Wld-S7).

Conclusion

The selected alternative in the FEIS is in full compliance with the conservation measures (LCAS) in the following ways:

1. Lynx have not been recently found on the WWNF, despite six years of snow track and hair pad surveys.
2. Maintain and promote natural fire processes and use prescribe fire to restore ecosystem health. Use of prescribe fire will not reduce suitable habitat for lynx.
3. Forested vegetation treatments will consist of selective cutting only in lynx habitat, therefore maintaining most forest structure. No precommercial thinning will occur in lynx habitat. No timber harvest will occur if unsuitable habitat exceeds 30 percent of the LAU. Denning habitat will be maintained in at least 10 percent of the LAU. The 100 percent snag level and 60 percent hiding cover requirement will provide adequate cover and travel corridors.
4. Lynx habitat has been mapped according to the guidelines in LCAS. Connectivity habitat between core habitat has been provided. Existing baseline will not be reduced, unless large stand replacement fires occur in much of the lynx habitat.
5. Reducing total road density to less than 2.0 miles per square mile will probably have long-term benefits to lynx.
6. Adherence to all livestock grazing standards will insure grazing is in compliance with the LCAS. Aspen and riparian willow areas will be maintained in a mid-seral or higher ecological status.
7. The aggregate effects from management activities described in the selected alternative would improve the potential for lynx to re-colonize HCNRA.
8. There are no cumulative effects of future state and private activities that are reasonably certain to occur within the HCNRA that will adversely affect lynx or their habitat.
9. The selected alternative will improve the overall management protection of lynx habitat. In the long-term, as lynx occupy the HCNRA, this alternative is expected to contribute positively to the recovery of lynx.

Forest Plan Consultation

Based on the above stated reasons, there is no need to re-initiate consultation on the *Forest Plan* because changes are within the context of the most recent *Forest Plan* consultation for Canada lynx.

Determination of Effects

Following all conservation measures in the LCAS and the standards in this FEIS is not expected to lead to an adverse affect on lynx or their habitat. Based on the above stated reasons, a determination of **may effect, not likely to adversely affect the species or habitat** is anticipated for the selected alternative.

Gray wolf (Canis lupus)

Status and Species Distribution

Gray wolf populations were eliminated from the western United States by the 1930s. Subsequently, wolves from Canada occasionally dispersed south into Montana and Idaho, but failed to survive long enough to reproduce. Public attitudes toward predators changed and wolves received legal protection with the passage of the *Endangered Species Act* in 1973. Wolves began to successfully re-colonize northwestern Montana and northern Idaho in the early 1980s. By 1995, six packs lived entirely in northwestern Montana. In 1995 and 1996, 66 wolves from northern Alberta were re-introduced to Yellowstone National Park and central Idaho. The Rocky Mountain wolf population today comprises three recovery areas: Northern Idaho and Montana, Greater Yellowstone, and Central Idaho. HCNRA on the Idaho side is included in Central Idaho.

Wolves in the three recovery areas are managed under different guidelines, depending upon their designated status under the *Endangered Species Act*. Northern Idaho and Montana wolves are classified as endangered. Greater Yellowstone and Central Idaho wolves are classified as nonessential experimental populations and managed with more flexible options than the endangered population. Most importantly, consultation with USFWS is not necessary unless the activity will jeopardize the continued existence of the species. Any wolves found in Oregon would be classified as endangered. The wolf population in the northern Rocky Mountains of Montana, Idaho, and Wyoming continues to grow. The status of wolves on August 15, 2002 was reported to be:

- Northwestern Montana: 23 groups with two or more wolves, 12 denned.
- Central Idaho: 23 groups with two or more wolves, 10 denned.
- Greater Yellowstone: 24 groups with two or more wolves, 18 denned.

The recovery objective is 10 breeding pairs for at least three consecutive years. Year 2002 is the first year of the three-year count down toward de-listing.

Life History and Habitat Requirements

Gray wolves have extensive home ranges and specific habitat requirements for denning, rearing young, and foraging. Dens are usually located on moderately steep slopes with southerly aspects within close proximity to surface water. Rendezvous sites, used for resting and gathering, are complexes of meadows that have adjacent hillside timber with nearby surface water (Kaminski and Hansen 1984). Both dens and rendezvous sites are often characterized by having nearby forested cover, remote from human disturbance (Paradiso and Nowak 1982, USDI 1994).

Wolves prey primarily on ungulates such as elk and deer. Their alternate prey base typically consists of smaller mammals and birds, such as, beaver, ground squirrels, rabbits, and grouse (Thiel 1978). Calving and fawning areas are important, as wolves often selectively prey upon newborn ungulates. Inadequate or deteriorated ungulate winter range can limit big-game populations. It is not uncommon to observe wolves "mousing" in grassy meadows much like coyotes and red fox.

Wolves seem to require areas with low human population, low potential for human interactions, high prey densities, and secluded denning and rendezvous sites (USDI 1994). These requirements restrict them to fairly large tracts of roadless country. They commonly hunt in packs that often consist of one family group of variable numbers, but up to 20 on rare occasions. There is a highly organized social structure in packs. The alpha male is dominant over all others in the pack, while the alpha female is dominant over other females, and a dominance hierarchy exists among the subordinate members of the pack. The social structure results from strong bonding between the pups and the parents. All members of the pack help care for and feed the pups. The social structure leads to cooperation during hunting and capturing prey. Wolf packs are territorial, marking their territory by urinating and defecating. Howling helps advertise their presence and location. The pups, after emerging from the natal den site are usually moved to a rendezvous site. Gradually, as pups grow they are included in hunts and taught to hunt by adults. Wolf home ranges can be several hundred square miles. At about age two, the pups will disperse to new areas to start their own territories.

Wolves breed between January and March. Normally, four to 10 pups are raised, with an average of six to seven. Gestation lasts about 63 days. Young are born in late April or early May. Pups are weaned in about 50 days. The den in which the pups are born is usually in a secluded, sheltered location, and it is often used for more than one year.

Populations and Habitat Conditions

Historically gray wolves were found over most of North America, but intensive and systematic shooting and trapping, elimination of native ungulates, conversion of wildland into agricultural lands, and extensive predator control by humans decimated their populations by the early 1900s. The natural history of wolves and their ecological role was poorly understood during the period of their eradication. As with other large predators, wolves were considered a nuisance and threat to humans. Wolves were once found throughout Oregon and Idaho. Today, they are restricted to forested areas and mountainous country in central and Northern Idaho.

Due to the successful program in Idaho, a few wolves are now dispersing into Oregon. A young radio collared female wolf (B-45) from Idaho crossed the Snake River into Oregon in March 1999, causing great interest among the public and wildlife management agencies. She was recaptured and returned to Idaho where she has established a territory north of McCall. Another radio-collared wolf from Idaho was killed on the freeway just south of Baker City, Oregon in June 2000. A wolf without a collar was shot about 30 miles southwest of Pendleton in the fall of 2000.

From 1999 to the present, about 22 different wolf sightings were reported to either the Forest Service or ODFW. None of these sightings have been verified and are scattered across the WWNF. Currently, there are no known wolf populations on the WWNF.

Based on the Northern Rocky Mountain Wolf Recovery Plan (USDI 1987), three key wolf habitat components are necessary: 1) year-round prey base of ungulates and alternative prey, 2) secluded denning and rendezvous sites, and 3) open spaces with minimal exposure to humans. The HCNRA provides large ungulate populations and large wilderness for sufficient wolf habitat requirements. Within the near future, a wolf pack will probably become established. The presence of high prey populations and large tracts of roadless areas provide a good indication of where wolves are likely to re-colonize. Probable areas meeting these criteria are the entire Hells Canyon Wilderness and the Lord Flat area.

Direct and Indirect Effects

Effects to the gray wolf can be summarized as: 1) activities that influence prey populations, such as forested vegetation treatment, fire, and livestock grazing; and 2) roads and trails that result in human disturbance.

Forested Vegetation Treatment

The majority of forested vegetation treatment acres in the selected alternative would occur through some type of thinning of densely stocked stand. This would occur in potential wolf summer habitat. The timber harvest activity would have a short-term impact from human disturbance during logging operations. The long-term indirect effect

is an increase in forage for both small and big game. This is considered a benefit to wolves for approximately 20 years. However, since roads near forested vegetation treatment areas usually remain open, wolves will probably not directly realize this benefit during summer. Increased prey populations due to improved forage conditions may benefit wolves on winter range.

Fire Management

The majority of fire will take place in forest communities (wolf summer range) in HCNRA. If it is a stand replacement fire, it will have a short-term decline in big-game use in the first two to three years. Thereafter for approximately 20 years, it will increase in big-game forage, and potential wolf use. A thinning type of fire would benefit the wolf prey base for approximately the first 20 years.

The habitat variable that most limits ungulate densities is winter range availability and condition. Forage productivity on winter range is highest where natural disturbances, particularly fire management, occur at normal intervals, about every 8-10 years. The selected alternative will maintain natural fire processes and promote prescribed fires to maintain natural disturbance regimes. This will result in increased winter range forage quality and production over unburned areas. Conditions for big-game productivity will be enhanced, assuming noxious weeds will not significantly increase.

The selected alternative will provide similar levels of alternative prey base, such as rabbits and squirrels. Prescribed burning will enhance most small mammal populations by increasing the quality and quantity of forage. For these reasons, fire management direction in the selected alternative is compatible with wolf recovery and will not result in long-term adverse affects on wolves or their habitat.

Livestock Grazing

While prey availability is the variable that perhaps best explains where wolves are most likely to re-colonize, grazing best explains where those re-colonization attempts are successful. Almost all successful wolf packs in central Idaho occur in areas where grazing is very limited or nonexistent.

Livestock grazing has the potential to compete for forage with big game, which could reduce prey potential. Grazing can increase noxious weeds, therefore indirectly reducing big-game carrying capacity. Grazing and its related human activities can also cause wolf depredation from predator control and illegal human-caused mortality.

The selected alternative retains livestock grazing in the HCNRA. However, only about 50 percent of the total acres will be grazed. Almost all of the vacant allotments will be closed. The selected alternative directs managers to maintain upland rangelands in mid-seral ecological status or higher; restore riparian communities to proper functioning condition; control noxious weeds; and continue investments on grazing improvements and changes in grazing systems. For these reasons, wolves may successfully re-colonize areas that are grazed in HCNRA, but the likelihood that dispersing wolves are able to establish new packs will be much less in grazed areas than ungrazed areas.

Other Factors Influencing Prey Availability

Populations of deer and elk will continue to be managed to meet current population management objectives. The state wildlife departments in Oregon and Idaho carefully make yearly adjustments on the number of big game that can be harvested by hunters. Bighorn sheep re-introductions into HCNRA will add to the numbers of ungulates available to wolves.

Access Management and Recreation Use

An important wolf requirement is to have open spaces, denning, and rendezvous sites with minimal exposure to humans. The Northern Rocky Mountain Wolf Recovery Plan (USDI 1987) lists human disturbance (including

roads), near den sites and rendezvous areas as potential threats to successful denning. Roads also displace big game away from roaded areas.

The selected alternative will have about 177 miles of roads closed permanently over current conditions and about 27 miles of roads closed seasonally. These road closures will reduce human disturbance to ungulates, therefore retaining big-game use in more areas. This will open up more acres to hunting by wolves, if they occupy the HCNRA. The selected alternative directs managers to retain over 70 percent of the HCNRA in wilderness or roadless status, and not build any new roads. This will provide several large blocks of wolf habitat with minimal exposure to humans.

The direction for road management in the selected alternative will result in short-term, project-level adverse effects during road closures. Long-term effects to wolves would be beneficial. Adverse impacts on wolf denning/rendezvous areas are less likely to occur under the selected alternative due to roads being closed.

About 88 percent of the HCNRA is accessed by trail. The extensive trail system features 925 miles of trail with 231 in Idaho and 694 in Oregon. Use of these trails is mainly in spring, summer, and fall. The selected alternative maintains this current trail system. Visitor use is expected to increase about 16 percent during the next 10 years (1.6 percent annually). The potential for human disturbance to wolves exists from the trail system. Currently we do not know what effect the trail system would have on wolves if and when they come to HCNRA.

Existing recreation and administrative facilities consists of backcountry airstrips, ranches and cabins, developed recreation sites, power lines, fire lookouts, and administrative buildings. The selected alternative maintains these facilities at current levels. The potential for human disturbance to big game and wolves exists from these facilities, but is not known.

Cumulative and Aggregate Effects

Forested Vegetation Treatment

Before 1950, timber harvest in HCNRA was generally limited to individual tree removal of large diameter ponderosa pine, Douglas-fir, and western larch. Clearcutting was introduced in the Gumboot Butte area in the late 1950s, followed by shelterwood and seed tree logging in the Nesbit Butte and Blackhorse Creek areas. Roads were constructed to provide access. Clearcutting also occurred on the Idaho side of the Snake River Canyon prior to 1975. In the 1960s and 1970s logging continued in most of the gentle terrain. Extensive roads were built to salvage timber damaged by wind storms, snow breakage, insects, and fire. About 23,000 acres were harvested prior to 1975.

After the HCNRA was created in 1975, harvest has been primarily by selective cutting and salvage. It is estimated that about 31,472 acres has been harvested since 1975. Total harvest for HCNRA has been approximately 54,500 acres or 20 percent of the total forested area. In these areas, potential use of big game and wolves has been reduced due to roads and human disturbance.

The selected alternative proposes to harvest 17,700 acres or less than six percent of the total forested acres. This is primarily by precommercial thinning, single-tree selection, and commercial thinning. Since no new roads will be built in HCNRA during the planning period, harvest will be limited to areas near past harvest. This additional harvesting of six percent of the HCNRA may further reduce the potential use by big game and wolves. The addition of improved forage conditions will somewhat mitigate this effect.

Fire Management

For thousands of years, wildfire has helped shape and perpetuate the vegetation and wildlife of the HCNRA. From the late 1800s, grazing and fire exclusion has altered the annual number of fires, fire intensity, and acres burned. Fire exclusion has created a build up of fuels in both grasslands and forest. In HCNRA, large fires have burned approximately 252,600 acres since 1986. Some of the grassland fires have burned over the same ground twice. Many of these fires have been at higher intensity and over larger areas than historically.

The selected alternative predicts a total of 65,010 acres of grassland and 50,710 acres of forest will burn by wildland fire use for resource benefits in the next decade. Another 11,035 acres of grassland and 7,645 acres of forest will burn by wildfire. This assumes about 48,505 acres of prescribed burning in grasslands and 19,495 acres in forests would also occur. All these acres represent a return to natural fire processes. Conditions for wolves and their prey will be enhanced in the long term by increasing the quantity and quality of forage. This assumes that noxious weeds will not be increased significantly by fire. There is normally a one to two year reduction in forage quantity after a fire. However, there is also a tremendous release of nutrients, an increase in forage quality, and an increase in big game use following fire.

Livestock Grazing

Grazing has taken place in the HCNRA for thousands of years; first by American Indian horses and second by European livestock. Most of the bench country in the canyon was homesteaded and small ranches dotted the landscape in the late 1800s. Grazing was very intensive with high numbers of livestock for long periods of the year. In 1905, it was reported that over 300,000 domestic sheep grazed Wallowa County, most of which grazed some portion of the year on NFS lands (Wallowa County Chieftain). By 1920, historical photos indicate the range was in very poor condition, especially near these homesteads. From 1920 to the present, historical photos indicate in some areas there has been a gradual improvement of range condition as livestock numbers have decreased, grazing systems have been applied, and range improvements have been developed. Still, some limited areas (such as old homesteads) remain in poor condition because of persistent noxious weed invaders.

Current rangeland inventory indicates that between 76 and 90 percent of the active allotments are in mid to late ecological status. The percent of the HCNRA remaining active over the next decade will be about 51 percent. The selected alternative maintains active livestock grazing allotments at their current grazing levels. The effects to wolf prey from maintaining current grazing levels will continue at the same level as the last decade. There will be no change in aggregate effects from the selected alternative.

Access Management and Recreation Use

Currently there are about 533 miles of open road and 925 miles of trails in the HCNRA. The selected alternative will permanently close 177 miles of road and about 27 miles of roads seasonally. No new roads will be built. The current trail system will be maintained with no new trails. Existing recreation facilities will be maintained at current levels. The aggregate effects from these decisions will have a lower human disturbance effect for wolves and their prey from current conditions.

The aggregate effects from forested vegetation treatment, fire, livestock grazing, and human disturbance outlined in the selected alternative would not impact the potential for wolves to re-colonize in HCNRA. A long-term benefit from less human disturbance will occur from road closures for both wolves and their prey. There are no effects of future state and private activities that are reasonably certain to occur within the HCNRA that will adversely affect wolves or their habitat.

Monitoring and Mitigation

1. Continue to summarize wolf-sighting reports (ongoing by forest biologist yearly). Investigate each sighting (that appears to have good potential for a wolf) in the field, if possible.
2. Continue to monitor ODFW and Idaho Department of Fish and Game (IDFG) big-game population data across the HCNRA to determine if the wolf prey base is being maintained (ongoing by forest biologist yearly).
3. Develop a den site plan in conjunction with other state and federal agencies if a wolf pack is identified (when needed, within one year of discovery). When a wolf pair is found to establish a new territory, this will trigger the need to re-initiate consultation on all activities.
4. Close 177 miles of road permanently and 27 miles seasonally (FEIS, Appendix C, Table C-1, Acc-S1, Acc-S6, Acc-G2, Wld-S7)
5. Close sheep grazing in currently vacant allotments and the majority of vacant cattle allotments (FEIS, Appendix C, Table C-1, Gra-S7).

Conclusion

1. Timber and fire management direction is compatible with wolf recovery and will not result in long-term adverse affects on wolves or their habitat. The selected alternative provides conditions likely to support high densities of ungulates. Promotion of a natural fire regime will enhance both small and large prey populations.
2. About one-half of the HCNRA will not have livestock grazing. These areas will likely provide the best areas for successful re-colonization of wolves.
3. Road closures may result in a long-term benefit to wolves from less disturbance and less displacement of ungulates.
4. Several large blocks of wolf habitat will be provided with minimal exposure to humans.
5. The beneficial effects of road closures and prescribed burning is expected to contribute to the recovery of this species in the next ten years.
6. The aggregate effects from forested vegetation treatment, fire, livestock grazing, and human disturbance outlined in the selected alternative would not impact the potential for wolves to re-colonize in HCNRA.
7. There are no cumulative effects from future state and private activities that are reasonably certain to occur within the HCNRA that will adversely affect wolves or their habitat.
8. No populations currently occupy the WWNF. No denning or rendezvous sites have been identified. There is an abundance of prey and its availability is not a limiting factor. Most Forest Service management activities for nonbreeding populations are compatible with wolf protection and recovery (4/26/99 Forest letter to USFWS). If and when wolves are found breeding in HCNRA, we will analyze our effects and complete consultation requirements on those affected site-specific projects.

Determination of Effects

Based on the above stated reasons, a determination of **may effect, not likely to adversely affect the species or habitat** is anticipated for the selected alternative.

Yellow-billed cuckoo (*Coccyzus americanus*)

Status and Species Distribution

Listed as sensitive on the Regional Forester's sensitive species list in Region 6 and as a candidate for listing by USFWS.

Life History and Habitat Requirements

The yellow-billed cuckoo is a long slender bird with, gray-brown back, and white underparts. It has red-brown feathers on the wings and a long black tail with large white spots at the tips of the undertail feathers. Its long curved bill is yellow. This cuckoo loves to eat caterpillars, but will eat other insects, some fruits, and occasionally small lizards and frogs.

Yellow-billed cuckoos are most abundant in riparian willow and cottonwood bottoms greater than 37 acres in size adjacent to large rivers (Csuti et al 2001). It builds a nest in willow shrubs or a small tree adjacent to these willows four to 10 feet off the ground. Females usually incubate two to six eggs for about 14 days. Both parents tend the young. Occupied nests have been recorded from June 1st to August 2nd.

Population and Habitat Conditions

The yellow-billed cuckoo breeds from British Columbia south to Lower California and inland to Colorado and Texas. It winters in the southern United States and southward to Central America. It is rare in Oregon and Idaho,

with almost all of its sightings in western Oregon and southern Idaho along the Columbia and Snake rivers in large, willow bottoms (Gabrielson and Jewett 1970). Sightings are only in the summer. The species is declining in parts of its range due to deterioration of riparian habitat.

Only twenty-two sightings have ever been reported in eastern Oregon (Gabrielson and Jewett 1970, Csuti et al 2001, Oregon Natural Heritage Database 2002). Most of these sightings are in large riparian areas in Lake, Harney, and Malheur counties. Only three of these reports are near the Wallowa-Whitman National Forest; one in Baker City in July 1975, another in La Grande in August 1980, and the last in the town of Imnaha in August 1980. ODFW has surveyed for this species in Wallowa and Union Counties, but has never found any (Vic Coggins, direct communication). No sightings have been reported in HCNRA or the Wallowa-Whitman National Forest.

Conclusion

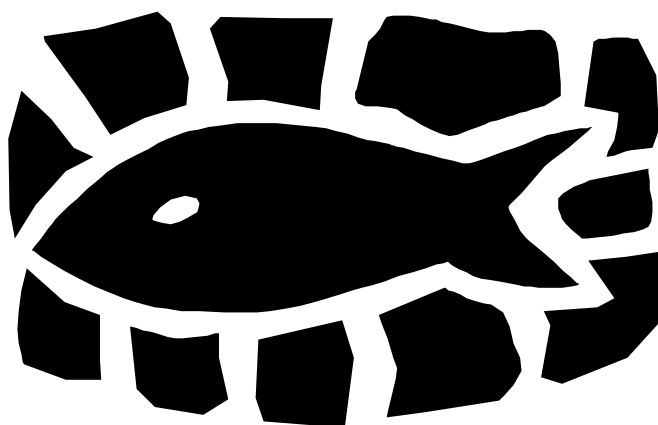
Habitat conditions for this species are not available in HCNRA. The occurrence of cuckoos in HCNRA is highly unlikely because it is outside its typical range. However, one could fly through the HCNRA. No adverse affects from activities of the selected alternative are anticipated.

Determination of Effects

Based on the above reasons, a determination of **may effect, not likely to adversely affect** the species or habitat is anticipated for the selected alternative.

This page left intentionally blank.

Aquatic Species



Analysis of Programmatic Direction

This section provides a description of the status, species distribution, life history and habitat requirements, condition and trend of populations, and habitat conditions for Bliss Rapids snail, bull trout, fall chinook salmon, sockeye salmon, spring/summer chinook salmon, steelhead, and the Columbia spotted frog. The analysis of the programmatic direction from the selected alternative includes a description of the direct and indirect effects, cumulative effects, aggregate effects, summary, monitoring and mitigation, and conclusion with a determination of effects for each species.

New projects proposals would be subject to Section 7 *Endangered Species Act* consultation process. This would ensure that surveys are conducted and mitigations are developed to protect any listed populations in the project areas. If populations of other listed, proposed, or candidate species are found, consultation with the USFWS will be re-initiated.

Selected Alternative E-modified

The selected alternative includes goals, objectives, standards, and guidelines for threatened, endangered and proposed (TEP) aquatic species in the HCNRA. Implementation of this direction would improve management and the long-term viability of the TEP aquatic species in the planning area. Ongoing monitoring of listed species would continue.

Refer to the summary of Alternative A (current direction) and Alternative E-modified in Chapter 2 of the FEIS and the full text of the goals, objectives, standards and guidelines in the FEIS, Appendix C, Table C-1 for Riparian/Aquatic Habitat and Water Quality for an understanding of the programmatic change in direction. Refer also to the complete list of all goals, objectives, standards and guidelines for Alternative A (current direction) and Alternative E-modified that also would apply to protection of listed aquatic species.

Bliss Rapids snail (Taylorconcha serpenticola)

Status

The USFWS determined threatened status for the Bliss Rapids snail (an undescribed monotypic genus in the family *Hydrobiidae*) (50 CFR Part 17, Federal Register, Volume 57, 59244 12/14/92). Critical habitat was not designated for this species. The USFWS believes that federal involvement in the areas where these snails persist can be identified without the designation of critical habitat. Some populations are in localized springs and over-collecting by malacologists or vandalism could occur if their whereabouts were widely known. Protection of these species' habitat will be addressed through the recovery process and through the consultation process specified under Section 7 of the *Endangered Species Act*.

This snail taxa has declined over all but a small fraction of their historical range. Species is currently restricted to a few isolated free-flowing reaches or spring alcove habitats in the middle Snake River characterized by cold, well-oxygenated, unpolluted water.

Species Distribution

Bliss Rapids snail (Family *Hydrobiidae* n. ssp.) is part of the native mollusc fauna of the middle Snake River that characteristically requires cold, fast water or lotic habitats. These five species are part of the freshwater mollusc fauna of the middle Snake River comprising 37 native species including 22 taxa of snails in eight families and 15 clam species in three families (Frest 1991). The "middle" Snake River is defined as extending from C.J. Strike Reservoir (river mile 517.6) upstream to Milner Dam (river mile 639.1). With few exceptions, extant populations of the taxa are confined to this reach; although prior to river development and impoundment these and other native molluscs "extended beyond these artificial and manmade boundaries" (Frest et al 1991). The largest known

concentration of Bliss Rapids snails occurs at The Nature Conservancy's (Conservancy) Thousand Springs Preserve (Preserve) with an adult population estimated in the "low millions" (Frest and Johannes 1992). Based on the fossil record, the snail is endemic, originating in the area within Pliocene Lake Idaho and its Pleistocene successors (Taylor 1966). In general, the fossil record shows a larger past than current distribution, with past populations considered continuous throughout their range.

Prior to 1987, the Bliss Rapids snail was known primarily from the mainstem Snake River boulder bars above King Hill (approximately river mile 546) to lower Salmon Falls Dam (river mile 573) and upstream in Box Canyon Springs (river mile 588). Taylor (1982) believed that "prior to dam construction there was probably a single population throughout this range, and plausibly upstream as well." Subsequent mollusc surveys by Frest (1991), Pentec (1991) and Taylor (1987) found new subpopulations of the Bliss Rapids snail in the mainstem Snake River and adjacent spring habitats. Pentec (1991) extended the present known range of the species upstream approximately 162 miles when it found specimens in spring habitats above American Falls at river mile 749.8. Based on live collections, the species currently exists as discontinuously distributed populations over 204 river miles within its historic range. These populations are primarily concentrated in the Hagerman reach in tailwaters of Bliss and Lower Salmon Dams and several unpolluted springs (i.e., Thousand Springs, Minnie Miller Springs, Banbury Springs, Niagara Springs, and Box Canyon Springs).

In 2000 the Bliss Rapids snail was found within the HCNRA by Idaho Power Company contract biologists while conducting studies for Hells Canyon Complex relicensing efforts. The snail was found in composite samples taken near Pine Bar at approximately between RM 220-225 (Diane Cazier direct communication 2002). The snail's persistence in this stretch of the river is in doubt as suction dredge sampling has not been repeated and the snail was not found in association with a spring but rather large substrate. It is possible the snail may have been displaced downstream following high water events in 1997.

Life History and Habitat Requirements

The Bliss Rapids snail is a "living fossil; a relict from ancient lakes." The Bliss Rapids snail and Idaho springsnail are survivors of the late Pliocene (Blancan) Lake Idaho, which covered much of southern Idaho (Taylor 1988). The species also share similar life history characteristics related to longevity. With the possible exception of Snake River Physa and Utah valvata, the species are considered annual species with an average longevity of one year. Bliss Rapids snail and Banbury Springs lanx experience a die off of older adults during the late winter-early spring season following reproduction, although for the Bliss Rapids snail the die off is less pronounced in large-spring colonies (Frest and Johannes 1992).

The Bliss Rapids snail (Family *Hydrobiidae*, n. ssp.) was first collected live and recognized as a new taxon in 1959 (Taylor 1982), but has not yet been described in the literature. This snail is 2.0-2.5mm (0.8-0.10 in) long, with three whorls, and is roughly ovoid in shape. There are two color variants or morphs in the Bliss Rapids snail, the colorless or "pale" form and the orange-red or "orange" form. The pale morph is slightly smaller with rounded whorls with more melanin pigment on the body (Frest and Johannes 1992). This snail occurs on stable, cobble-boulder substratum only in flowing waters in the free-flowing reaches of mainstem Snake River and also in a few spring alcove habitats in the Hagerman Valley. The species does not burrow in sediments and normally avoids surfaces with attached plants. Known river populations (or colonies) of the Bliss Rapids snail occurs only in areas associated with spring influences or rapids edge environments and tend to flank shorelines. They are found at varying depths if dissolved oxygen and temperature requirements persist and are found in shallow (<1cm (.4 in)) permanent cold springs (Frest and Johannes 1992). The species is considered moderately photophobic and resides on the lateral sides and undersides of rocks during daylight (Bowler 1990). The snail will migrate to graze on aufwuchs (or perolithon) on the uppermost surfaces of rocks nocturnally. The species can be locally quite abundant, and it is especially abundant on smooth rock surfaces with common encrusting red algae.

Reproduction in the Bliss Rapids snail varies according to habitat; occurring October-February in mainstem Snake River colonies and February-May in large-spring colonies. Egg laying occurs within two months of reproduction and eggs appear to hatch within one month. Adult snails exhibit a strong seasonal die off after reproduction. Turnover appears more pronounced in mainstem river colonies, possibly due to environmental stress (Frest and Johannes 1992).

Condition and Trend of Populations

The lotic fauna of the middle Snake River have been declining for several years due to fragmentation of remaining free-flowing habitats and deteriorating water quality. Hydroelectric development throughout the Snake River has directly impacted the species through inundation of lotic habitats, isolating segmented populations, and impacting suitable shallow water shoreline habitat from project-caused flow fluctuations. Water quality continues to degrade in the middle Snake River from increased water use and withdrawal, aggravated by recent drought induced low flows. This 121 mile (195 kilometer) stretch of the Snake River is impacted by agricultural return flows; runoff from between 500 and 600 dairies and feedlots; effluent from over 140 private, state, and Federal fish culture facilities; and point source (e.g. municipal sewage) discharge (IDHW 1991). These factors contribute to increased nutrient loads and concentrations that in turn adversely impact the lotic species. Nutrient loading contributes to dense blooms of free-living and attached filamentous algae, which the species cannot utilize. The algae will often cover rock surfaces, effectively displacing suitable snail habitats and food resources. Stream sediments also become anoxic as high biochemical oxygen demand during the aquatic growing season and seasonal algae die offs occur.

Habitat Conditions

Ecologically, this species requires cold, clean, well-oxygenated flowing water of low turbidity. The species prefer gravel to boulder size substratum. It has an affinity to habitat usually associated with spring or spring-like river habitats. For example, the Bliss Rapids snail can be found in both small, shallow spring or large, deep spring outflows. In the mainstem river, they are found in areas of the river not subject to daily or seasonal fluctuations. It does not tolerate whitewater areas with rapid flow.

The free-flowing, cool water environments required by these species have been impacted by and are vulnerable to continued adverse habitat modification and deteriorating water quality from one or more of the following: hydroelectric development, peak-loading effects from existing hydroelectric project operations, water withdrawal and diversions, water pollution, and inadequate regulatory mechanisms.

Mainstem populations or colonies of Bliss Rapids snails may also be vulnerable to habitat competition from an exotic snail (*Potamopyrgus antipodarum*). With the exception of several spring habitats at a privately owned preserve in the Thousand Springs area, remaining pristine spring and spring stream complexes in the middle Snake River preferred by the Bliss Rapids snail is not protected from all potential threats described above. This rule implements the protection and recovery provisions afforded by the *Endangered Species Act* for these aquatic snails.

Implications to survival of the species is that annual species with localized distribution and small populations become vulnerable to extirpation from stochastic and/or catastrophic changes in environmental events.

The remaining free-flowing river and spring/spring outflow habitats for these species has been fragmented between several impounded reaches of the Snake River in southern Idaho. Past diversion of large spring outflows for hydroelectric and agricultural purposes have destroyed habitat for Bliss Rapids snail at Box Canyon (Taylor 1985) and Thousand Springs. Another more recent threat is the discovery of the New Zealand mudsnail (*Potamopyrgus antipodarum*) in the middle Snake River. The eurytopic mudsnail is experiencing explosive growth in the river and shows a wide range of tolerance for water fluctuations, velocity, temperature and turbidity. The species seems to prefer warmer, polluted waters over pristine cold spring environments. At present, it is not abundant in habitats preferred by the Bliss Rapids snail.

The Bliss Rapids snail would benefit from stabilized, nonfluctuating water levels, because of this the USFWS concluded in the listing that nearly all of the remaining populations of the snail are at risk.

Risks include winter cattle grazing and recreational access may also be impacting spring habitats of the Bliss Rapids snail on the Shoshone Bannock Reservation. Although access is controlled, waterfowl hunters, and to some extent fishermen, utilize these spring areas throughout the fall and early winter, trampling by cattle and people will likely produce minimal impacts to spring habitats. The snail has not been identified in areas that would likely receive such impacts within the HCNRA. If determined to be persistent within the HCNRA measures would be taken for proposed and on-going actions to protect the snail and its habitat.

Impounding remaining free-flowing reaches would be devastating to four-of the five species. Impoundment would inundate existing habitat, reduce vital shallow shoreline habitats in tailwater areas due to operating flow

fluctuations, elevate water temperatures, reduce dissolved oxygen levels in sediments, modify the rivers ability to assimilate point and nonpoint source pollution, and further fragment remaining populations.

The Bliss Rapids snail is the most widespread of the five listed taxa, with new live populations recently reported above American Falls reservoir in springflow habitats. It is most abundant in several cold springs in the Hagerman Reach, and enjoys some degree of protection in several unpolluted springs on The Nature Conservancy's Preserve at Thousand Springs. The number of extant populations, including those on the Preserve, provides greater flexibility in recovery and reduces the likelihood that the Bliss Rapids snail will go extinct in the immediate future. However, remaining mainstem populations are variously threatened. Because of the limited threats facing the Preserve colonies of Bliss Rapids snails and the likelihood that limited additional populations may be found in spring habitats, this species is not now in immediate danger of extinction throughout all or a significant portion of its range.

Bull trout (Salvelinus confluentus)

Status

This species occurs in the Snake River portion of the HCNRA both above and below Hells Canyon Dam and within the Rapid River watershed of the Salmon River Basin. The USFWS listed the Klamath River and the Columbia River distinct population segments (DPS) of the bull trout as threatened (Federal Register Vol. 63, No. 111, 31647). To date, critical habitat has not been designated for bull trout. The USFWS published a proposal on June 13, 1997 to list the Klamath and Columbia River Basin DPS of bull trout (*Salvelinus confluentus*) under the *Endangered Species Act*. The species was listed as threatened on June 10, 1998. The effective date for listing was July 10, 1998.

The State of Idaho developed a Bull Trout Conservation Plan, with the stated mission being to maintain and/or restore complex interacting groups of bull trout populations throughout their native range in Idaho (State of Idaho 1996). The Clearwater Basin Bull Trout Technical Advisory Team prepared a bull trout problem assessment document for the HCNRA (State of Idaho 1998), this document was prepared to support the State of Idaho Bull Trout Conservation Plan and to provide support documentation and planning information for Watershed Advisory Groups (WAGs). The WWNF has been working cooperatively with USFWS, IDFG, ODFW, BOR, and Idaho Power biologists since 1999 in the development of bull trout restoration strategies as part of two recovery unit teams (RUTs) within the HCNRA. The Snake River/Imnaha Recovery Unit includes streams containing bull trout below Hell's Canyon Dam (eg. Imnaha River, Big Sheep Creek, etc). The Hell's Canyon Recovery Unit encompasses bull trout streams above Hell's Canyon Dam (eg. Sheep and Deep Creeks in Idaho, and Pine Creek in Oregon).

Species Distribution

The historic range of bull trout included most of the Columbia River Basin. Their current range occupies about 44 percent of the estimated historic range, with the core of the remaining bull trout distribution being in the Central Idaho Mountains, which includes the Snake River basin (Quigley and Arbelbide 1997).

In Idaho, Granite Creek, Sheep Creek, and Rapid River are the only tributary streams within the HCNRA providing spawning and early rearing for bull trout. Both resident and fluvial life history forms of bull trout may be present in these drainages. The population strength, or densities of bull trout in these drainages are low. A fluvial fish population is one where populations spawn in tributary streams where the young rear for one to four years before they migrate to larger rivers where they live for two to six years before returning to their natal streams to spawn. Larger tributary streams may be potentially be used for subadult/adult wintering and rearing. The Snake River is used by bull trout for migration corridor, wintering, and for adult/subadult rearing. Refer to Appendix A, for a map of bull trout distribution within the HCNRA.

In Oregon, four subpopulations are known to exist in the Imnaha Subbasin: Imnaha River above the falls, Imnaha River below the falls, Big Sheep Creek (including Lick Creek, Mud Springs Creek, and McCully Creek), and Little Sheep Creek (Ratcliff and Howell 1992). The migratory form is present, providing connectivity between other

spawning and rearing groups except where the Wallowa Valley Improvement District canal has prevented connectivity or where natural barriers exist.

Resident populations in McCully, Ferguson, Canal, and Redmont Creeks have been isolated from fluvial interaction by an irrigation canal. These populations exist in the streams above the canal, and are connected to each other by the canal during the irrigation season (April 1 to October 15). They are all less than 2,000 individuals in size. The McCully Creek population is estimated at over 800 individuals. The resident population in Big Sheep Creek exists above the diversion to the irrigation canal. This population is found in both the North and South Forks of Big Sheep Creek, and is less than 2,000 individuals in size.

Life History and Habitat Requirements

Bull trout exhibit two distinct life history forms, resident and migratory. Resident populations generally spend their entire lives in headwater streams. Migratory bull trout rear in tributary streams for several years before either migrating into larger river systems (fluvial) or lakes (adfluvial). These life histories are viewed as alternative strategies that contribute to the persistence of populations in variable environments. Migratory fish are believed to be critical for both genetic exchange between local populations and population rebuilding/re-colonization, due to their much higher fecundity. Both forms are believed to exist together in some areas. Migratory fish may dominate populations where corridors and subadult rearing areas are in good condition (Quigley and Arbelbide 1997). Resident fish are much smaller than migratory forms of bull trout (State of Idaho 1996). Bull trout are fall spawners, with peak spawning occurring from late August through mid-September.

Bull trout appear to have more specific habitat requirements than other salmonids (State of Idaho 1996). Strong bull trout populations require high stream channel complexity, including instream wood and substrate with open interstitial spaces (Idaho 1996). Temperature is a critical habitat requirement for bull trout, with their distribution generally associated with the coldest stream reaches within basins. The lower limit of bull trout distributions in the Interior Columbia River (Quigley and Arbelbide 1997) corresponded to a mean annual air temperature of about 4° C. Temperatures above about 15° C (59° F) are thought to limit bull trout distribution (State of Idaho 1996). Additionally, channel stability, winter high flows, summer low flows, substrate, cover, temperature, and the presence of migration corridors appear to influence bull trout distribution and abundance (State of Idaho 1996).

Condition and Trend of Populations

Across the historical range of this species, some outlying populations are currently extinct, including those in northern California. Many populations in small watersheds in Oregon and Nevada are remnant. The largest contiguous populations are associated with the mountains of northern Idaho, Montana, and Alberta, although the Alberta population is not located within the Upper Columbia basin. Bull trout are much less widely distributed in their historical range than other salmonids (Quigley and Arbelbide 1997).

Migratory life histories have been lost or limited throughout the range of this species. There is evidence of declining trends in some populations (Goetz 1994, Pratt and Huston 1993, Rieman and McIntyre 1993, 1995), and extirpations of local populations are reportedly widespread.

Current numbers of resident and fluvial bull trout in the HCNRA are at low levels and overall trend appears to be stable or downward. Very few or no bull trout are typically detected in monitoring stations in Granite Creek or Sheep Creek. Granite Creek and Sheep Creek are the only tributary streams with a spawning population of bull trout. Fluvial bull trout populations are thought to have experienced a great decline from historic levels although the data to describe the extent of this reduction is not available. Other accessible Snake River tributaries may be used by subadult/adult bull trout for rearing when stream conditions are suitable and such use is considered very low.

Habitat Conditions

There are four key factors that are believed to represent the greatest influence on bull trout populations: 1) harvest of adults, 2) watershed disruption, 3) introduced species, and 4) isolation and fragmentation of populations (Quigley and Arbelbide 1997).

The harvest of adult bull trout includes authorized angling, incidental harvest, and poaching. Legal harvest of bull trout has been eliminated by state management agencies throughout most of its range. Incidental harvest has been identified as a potential problem in association with expanding lake trout fisheries. Poaching is viewed as an important cause of mortality, especially inaccessible streams that support large migratory fish (Quigley and Arbelbide 1997).

Watershed disruption is recognized as a factor in the decline of bull trout. Changes in sediment delivery, aggradations and scour, wood loading, riparian canopy and shading (or other factors that influence stream temperature), and the hydrologic regime are all likely to affect populations. Significant long-term changes in any of these characteristic or processes represent important risks for many remaining bull trout populations (Quigley and Arbelbide 1997).

Introduced species are viewed as a third factor influencing bull trout, by depressing or replacing bull trout populations. Brook trout are seen as an especially important problem. Introduced species may pose greater risks to native species where habitat disturbance has occurred (Quigley and Arbelbide 1997).

Isolation and fragmentation are other factors likely to influence the status of bull trout. Historically bull trout populations were well connected throughout the Columbia River basin. Evidence from population monitoring dispersal capabilities may be particularly important to bull trout, as suggested from metapopulation theory (Quigley and Arbelbide 1997). Isolation of populations in shrinking habitat will probably lead to increased rates of extirpation not proportional to the simple loss of habitat area. Even with no further habitat loss, extirpations may be likely for many isolated populations. Long-term conservation of bull trout may well depend on maintenance or restoration of networks of high quality habitats, and of migratory corridors that connect these areas.

Fall chinook salmon (Oncorhynchus tshawytscha)

Status

The Snake River fall chinook salmon is under the jurisdiction of NOAA-Fisheries and is listed under the *Endangered Species Act*. The species occurs in the HCNRA and uses the Snake River for migration, spawning, and rearing. The Snake River fall chinook salmon was listed as threatened on May 22, 1992 (Federal Register, Vol. 57, 14653). Critical habitat was designated for the Snake River fall chinook salmon on December 28, 1993, and became effective January 27, 1994 (Federal Register, Vol. 58, 68543). The listed Ecologically Significant Units (ESU) includes all natural populations of fall-run chinook salmon in the mainstem Snake River to Hells Canyon Dam and any of the following subbasins: Tucannon River, Grande Ronde River, Imnaha River, Salmon River, and Clearwater River.

Species Distribution

The Snake River is used by fall chinook salmon for spawning, rearing, and as a migration corridor for juveniles and adults and is designated critical habitat. Fall chinook salmon use the Imnaha River for spawning and rearing. A fair amount of fall chinook salmon use the Snake River for spawning and rearing. Refer to Appendix A for a map of fall chinook salmon distribution in the HCNRA. Snake River aerial fall chinook salmon redd surveys conducted from 1986 to 1999 have documented spawning activity and redds. Fall chinook salmon spawn in deep water and not all redds may be observed from aerial surveys which may account for 50 percent of the spawning activity.

The potential for deep-water spawning of fall chinook salmon has been recognized for many years (e.g., Chapman 1943, Burner 1951). However, most data of fall chinook salmon redds came from observations in small rivers and streams, and deepwater redd attributes were only inferred (Smith 1973, Raleigh et al 1986, Healey

1991). Groves and Chandler (1999) used remote video searches of habitat too deep to be surveyed from the air confirmed that deep water spawning is common within the Snake River, accounting for 20–50 percent of spawning, and can influence the limits and distribution of habitat-use criteria. Groves and Chandler (1999) support those of Chapman et al (1986) and Swan (1989), who indicated that as much as 80 percent of spawning within the Columbia River may occur at depths too deep to be viewed by typical above-water techniques.

Fall chinook salmon use the mainstem Snake and the lower five miles of the Imnaha River systems for spawning, rearing, and migration. Aerial fall chinook redd surveys conducted from 1986 to 1999 have documented 7 to 273 redds annually. Historically, fall chinook salmon may have spawned up to the town of Imnaha on the Imnaha River (Nez Perce Tribe et al 1990). It is unknown whether the fall chinook in the Imnaha River is a separate stock from Snake River fall chinook. From 1991 through 1999 underwater video cameras were used for surveys and the combined counts from video cameras and aerial surveys ranged from 46 to 373. These counts include the mainstem Snake River upriver from the confluence of the Clearwater River to Hells Canyon Dam. Fall chinook salmon are deep water spawners and not all redds may be observed from aerial surveys, but using underwater video cameras facilitates locating deep water redds. Refer to Appendix A, for a map of chinook salmon distribution within the HCNRA.

Life History and Habitat Requirements

Fall chinook salmon begin entering the Columbia River in August and continue through October, with the peak occurring in early September. Returning adults generally spent three to four years in the ocean. Adults generally arrive in the Snake River in October, with fish potentially present from September through December. Spawning occurs from mid October through early December, with peak spawning activity occurring during November. Fry emerge from April through May. They rear in the mainstem Snake River before emigrating during June through August as subyearlings.

Temperature may influence suitability of spawning habitat. The primary evolutionary factor determining time of spawning may be the number of temperature units required for successful incubation of embryos (Heggberget 1988). Suitable spawning areas for fall chinook salmon may have been restricted to mainstem reaches that accumulated at least 960 temperature units (centigrade) from November 15 (spawning) to late April to early May. Temperature units are determined by the average temperature for a day which is above 0° C. Fry that emerge later than mid-May may not be large enough to begin their downstream migration as age-0 fish. Temperatures are adequate for incubation and timely outmigration in the Snake River for fall Chinook salmon.

Spawning habitat used by fall chinook salmon was studied in the mainstem Snake River by Groves and Chandler (1999). Enhanced survey capabilities using remote underwater videography, allowed researchers to accurately describe spawning habitat used by fall chinook salmon in the Snake River, below Hells Canyon Dam, which has a stable flow regime (Groves and Chandler 1999). Depth measured at 205 fall chinook salmon redds ranged from 0.2 - 6.5 m. Mean water column velocity at 145 redds ranged from 0.4 - 2.1 meters/second, and substrate water level water velocity at 164 redds ranged from 0.1 - 2.0 meters/second. Substrate size classifications from 112 redds indicated that areas having particle sizes from 2.5 - 15.0 cm, and that are relatively homogenous, are used by spawning fall chinook salmon. Spawning generally began as water temperatures dropped below 16.0° C, and concluded as temperatures approached 5.0° C.

After emergence, fry concentrate in shallow, slow water near river banks that provide cover. These areas are often associated with a narrow band of riparian vegetation (i.e., coyote willow) along the margins of the mainstem river.

Condition and Trend of Populations

Returning wild fall chinook salmon counts at Lower Granite Dam from 1975 through 1980 averaged 600 fish per year (Waples et al 1991). From 1985 to 1993 an average of 387 naturally produced fall chinook salmon reached Lower Granite Dam (USDC 1995). However, the Nez Perce Tribe started the operation of two fall chinook satellite facilities on the Snake River (1997). One facility is located at Pittsburg Landing (river mile 214.5) and the other is located downriver from the Grande Ronde River (river mile 163.4). The fall chinook facility located in the Lower HCNRA is located on the Washington side of the Snake River approximately 0.9 mile upriver from Captain

John Creek. Increased returns of fall chinook salmon to the Snake River are expected to result from these efforts. The facility operations include the acclimatization and release of one-year smolts (from Lyons Ferry hatchery).

Fall chinook salmon spawning use in the HCNRA has a fair return of adult fish that return to this river system and trends are expected to continue for the subbasin. Fall chinook salmon use of the Snake River and Clearwater River have experienced upward trends in recent years. During 1999 the Snake River and Clearwater River had the highest redd counts recorded during the monitoring period of 1986 through 1999. Fall chinook satellite facilities located on the Snake River will support returns of fish to the subbasin.

Habitat Conditions

Factors which have caused the decline of fall chinook salmon in the Snake River basin include: 1) habitat degradation; 2) hydropower development; 3) hatcheries; 4) harvest; and 5) predation. Other factors that reduce egg-to-fry survival include: redd disturbance and excavation, bottom scour, and microbial infestation. The Snake River has experienced increased river based recreational use during fall chinook migration, spawning, and rearing periods. There are approximately 368 documented, dispersed recreation sites within the HCNRA, 200 of which, are outside of designated wilderness areas. Jet boat use and steelhead fishing is a popular recreational activity during the fall. The primary period when adverse impacts may occur is during spawning and incubation periods. These impacts may include disturbance or mortality to spawning fish and physical harm to redds and incubating eggs. Redds at highest risk are shallow water redds, however, maintenance of Snake River flows from Hells Canyon Dams and the depth of spawning reduces threats.

No legal fishing season exists for fall chinook salmon. However, steelhead fishing during the fall is a popular activity and the potential for catch and release mortality or illegal harvest of fall chinook salmon does exist. The catch and release of fall chinook salmon has been documented on the Snake River, however, the probability of such this is considered uncommon. The ODFW and IDFG are responsible for establishment of fishing seasons, and NOAA-Fisheries is responsible for consultation and obtaining Section 10 permits for incidental take associated with such seasons.

Within the HCNRA the primary potential threats to fall chinook salmon are disturbance to spawning fish and redds and land uses which adversely affect water quality (i.e., sediment, temperature) or toxic spills (i.e., fuels, chemicals), which may have direct and indirect effects to the mainstem Snake River. Increased sediment deposition in the mainstem Snake River substrate may limit spawning and rearing success. Although it appears that mainstem cobble embeddedness, fines by depth, and surface fines are at acceptable levels (USDI 2000). Water temperatures occurring during incubation does not restrict fall chinook salmon production in the Snake River. Snake River basin spawning areas for fall chinook salmon may be restricted to mainstem reaches that accumulated at least 960 temperature units from November 15 (spawning) to early May (i.e., Snake River and lower Clearwater River). Fry that emerge later than mid-May may not be large enough to begin their downstream migration as age-0 fish. Increased Snake River recreational activity has the potential to impact spawning fish and/or impact redds and/or eggs.

Sockeye Salmon (Oncorhynchus nerka)

Status

On November 22, 1991, the NOAA-Fisheries listed Snake River sockeye salmon (*Oncorhynchus nerka*) as an endangered species under the *Endangered Species Act*. Critical habitat for Snake River sockeye salmon was designated on January 27, 1994.

Prior to construction of Brownlee, Oxbow, and Hells Canyon Dams between 1957 and 1967 large numbers of sockeye salmon migrated up the Snake River. Historically, no sockeye salmon spawning or rearing occurred in the subbasin. The largest single sockeye spawning area was the headwaters of the Payette River (upriver from Hells Canyon Dam), where 75,000 were taken one year by a single fishing operation in Big Payette Lake (USDC 1995). Currently sockeye salmon do not use the HCNRA for spawning, or rearing. Adult sockeye salmon will migrate up the Snake River (Lower HCNRA) to the mouth of the Salmon River and then continue the upriver migration to the headwater areas of the upper Salmon River basin (Redfish Lake).

Sockeye salmon habitat within the HCNRA has been documented in the Snake River downstream from the confluence of the Salmon and Snake Rivers. Sockeye salmon have traditionally used these areas only as a migration corridor primarily during July and August. The lower portion of the Snake River is also used for outmigration of juvenile sockeye salmon.

Species Distribution

SNAKE RIVER sockeye salmon do not use the mainstem Snake River above the Salmon River confluence for spawning and rearing. Adults use the Snake River as a migration corridor to the Salmon River only during July and August. Juveniles outmigrate through the Snake River corridor during the spring high flow event.

Juvenile and adult sockeye migration has been monitored by hydroelectric dam counts. IDFG, ODFW, USFWS, and Washington Department of Fisheries have indicated that the Snake River Watershed is used only as a migration corridor for sockeye salmon. Sockeye life history characteristics, habitat requirements, and fish observation studies were used to justify the nonexistence of rearing and spawning habitat in the Snake River Watershed. Refer to Appendix A for a map of the migration corridor for sockeye salmon.

Condition and Trend of Populations

Current run sizes in the Snake River Watershed need the interaction of variable environmental conditions, such as oceanic productivity and weather patterns, and a variety of management activities. Four major management activities that have contributed to the decline of sockeye salmon are hydroelectric development and operation, fish harvest, fish hatchery influences on disease and genetic fitness, and fish habitat conditions (Leonard 1993).

The historical run size of sockeye from the Snake River was estimated at approximately 150,000 fish. Much of the original rearing habitat has been cut off from access; hence, potential production under existing conditions is greatly reduced. The only remaining spawning and rearing area for Snake River sockeye is Redfish Lake, located in the Stanley Basin in Idaho. Potential production at Redfish Lake has been estimated at 1,500 spawning adults. If access were provided, four additional lakes in the basin could potentially provide spawning and rearing habitat. Current estimates of potential for escapement to the remaining Stanley Basin is about 6,000.

The return of sockeye destined to Redfish Lake has been less than 1,000 fish since 1970 and less than 100 since 1981. Based on counts past Ice Harbor Dam, escapement averaged less than 20 fish from 1985 to 1988. Only two fish returned in 1989 and none in 1990. However, in 1991, eight sockeye passed Lower Granite Dam and four returned to Redfish Lake (U.S. Army Corps of Engineers 1992).

Habitat Conditions

Within the HCNRA the primary potential threats to sockeye salmon are disturbance to migration and land uses which adversely affect water quality (i.e., sediment, temperature) or toxic spills (i.e., fuels, chemicals), which may have direct and indirect effects to the mainstem Snake River. Increased sediment deposition in the mainstem Snake River substrate may limit migration success.

Spring/summer chinook salmon (Oncorhynchus tshawytscha)

Status

The Snake River spring/summer chinook salmon is under the jurisdiction of NOAA-Fisheries and is listed under the *Endangered Species Act*. This species occurs in the HCNRA. The Snake River spring/summer chinook salmon was listed as threatened on May 22, 1992 (Federal Register, Vol. 57, 14653). Critical habitat was designated for the Snake River spring/summer chinook salmon on December 28, 1993, and became effective January 27, 1994 (Federal Register, Vol. 58, 68543). All perennial streams within the HCNRA are included as critical habitat defined by NOAA-Fisheries for spring/summer chinook salmon.

Species Distribution

Stream-type chinook salmon were historically widely distributed, occupying about 46 percent of the Columbia River basin and occurring nearly everywhere except the Northern Great Basin, Upper Clark Fork, Snake River headwaters, and Upper Snake River above Shoshone Falls. Current distribution has been significantly reduced, and subwatersheds known or predicted to support strong spawning and rearing populations represent 0.2 percent of the historical range and 0.8 percent of the current range.

Wild populations unaltered by hatchery stocks are rare and present in five percent of the historic range and 15 percent of the existing range of stream-type chinook salmon. The mainstem Snake River is used for upstream and downstream migration and a limited amount juvenile rearing. Migrating adult salmon may use the Snake River for staging prior to migrating to natal streams to spawn. Accessible tributary streams are used for spawning and/or juvenile rearing when stream conditions are suitable.

In Idaho Granite Creek and Sheep Creek are the only tributary streams that are currently used for spawning and rearing. An adult chinook salmon was reported in Getta Creek during September 1990 and such occurrence was probably by a stray. Juvenile chinook salmon rearing may occur at the mouth or lower reach of accessible tributary streams when stream conditions are suitable. The Snake River has elevated summer water temperatures that are sub-optimal for rearing. Tributary streams may provide cool water refugia for juvenile rearing. Often these tributary streams may have low water barriers but are accessible during high spring flows (i.e., May and June). The larger tributary streams that maybe used by juvenile chinook salmon for rearing. Low numbers of rearing juvenile chinook salmon may be found in the lower reaches of these streams. Other smaller accessible tributaries might potentially be used when stream conditions are suitable.

In Oregon within the HCNRA, major spawning areas for spring and summer chinook salmon occur along the mainstem of the Imnaha River from Freezeout Creek to the area known as the Blue Hole. Rearing areas used by juvenile fish include the Imnaha River and its major tributaries: Cow Creek, Grouse Creek, Lightning Creek, Horse Creek, Crazyman Creek, Gumboot Creek, and the South Fork of the main Imnaha River.

Currently, a total of 36 miles of spring/summer spawning habitat exists in the Imnaha River Watershed (refer to Appendix A for a map). Spring/summer chinook salmon spawn in the Imnaha River, (32 mile section from the confluence with Freezeout Creek to the confluence with South Fork Imnaha River), and South Fork Imnaha River (two mile section from the confluence with Imnaha River to the confluence with Soldier Creek). These spawning areas are based on Region 6 Stream Surveys in 1991, 1992, and on areas checked by ODFW each year for redd counts. ODFW has conducted spawning ground counts on Imnaha River for spring/summer chinook salmon from 1949 to the present year.

Historically, spring/summer chinook salmon spawned five miles further downstream on the Imnaha River (Freezeout Creek to Keeler Creek). Other than the above exception, water flow, current redd counts, and habitat

surveys (conducted by ODFW and the Forest Service), indicate that the current spawning grounds include a majority of the potential historic spawning grounds. Presently, a total of 89 miles of spring/ summer rearing habitat exists in the Imnaha River Watershed. Rearing habitat for spring/summer chinook salmon occurs in the Imnaha River (76 mile section from its confluence with the Snake River to South Fork Imnaha River), South Fork Imnaha River (five mile section from the confluence with the Imnaha River to one stream mile above its confluence with Cliff Creek), Horse Creek (two mile section above its confluence with Imnaha River), Crazyman, Lightning, Grouse, Summit, Dry, and Cow Creeks (one mile sections above their confluence with Imnaha River). These areas are based on snorkel counts and habitat surveys conducted by ODFW and the Forest Service. Refer to Appendix A for a map of chinook salmon distribution in the HCNRA.

Life History and Habitat Requirements

Life histories of chinook salmon are highly variable, both among and within populations, enabling salmon to adapt to a wide range of physical circumstances (Thorpe 1994). Complex habitats with a high degree of connectivity permit the development and expression of diverse life histories. Spring chinook salmon migrate primarily as age 1+ juvenile. Adult spring chinook salmon destined for the Snake River and its tributaries enter the Columbia River in early spring, pass Bonneville Dam and reach the Snake River by late April. They arrive at staging areas from late May to early July, and spawn from August to mid-September (State of Idaho 1992). Spring chinook salmon generally cross Bonneville Dam from March through May. Adult ages range from three to six years, with ages four and five dominating the Grande Ronde and Snake rivers, respectively. Fry emerge from February to April, rear through the summer in the natal stream, and then migrate downstream into a mainstem river or large tributary to over winter, depending on habitat conditions in the natal stream. Smolts pass Lower Granite Dam from late April through June on their seaward migration (Chapman et al 1991).

Habitat requirements of chinook salmon vary by season and life stage, and the fish occupy a diverse range of habitats. Distribution and abundance of chinook salmon may be influenced by cover type and abundance, water temperature, substrate size and quality, channel morphology, and stream size.

Cover is essential for adult chinook salmon prior to spawning, especially for early migrants which remain in tributaries for several months prior to spawning. Temperature may influence the suitability of spawning habitat. The primary evolutionary factor determining the time of spawning may be the number of temperature units required for successful incubation. Survival and emergence success of chinook salmon embryos is also influenced by fine sediment and flow (Chapman 1988). Other factors that reduce egg-to-fry survival include redd disturbance, bottom scour, and microbial infection (Beauchamp et al 1983, Healey 1991).

After emergence, fry concentrate in shallow, slow water near stream margins with cover (Hillman et al 1987). As fry grow, they occupy deeper pools with submerged cover during the day and shallower inshore habitat at night. Suspended sediment may result in damaged gills, reduced feeding, avoidance of sedimented areas, reduced reactive distance, suppressed production, and increased mortality (Reiser and Bjornn 1979). Fine sediment deposition can also reduce habitat capacity.

Accessible tributary streams may be used by juvenile spring/summer chinook for rearing when stream conditions are suitable. These streams may provide cool water refugia and better rearing habitat for juvenile chinook salmon because of elevated summer temperatures in the mainstem Snake River. The tributaries also may provide improved instream cover for rearing juveniles. Many tributaries in the subbasin are steep gradient A channels and do not provide preferred chinook spawning and rearing habitat.

Key habitat factors for juvenile rearing include streamflow, pool morphology, cover, and water temperature (Steward and Bjornn 1990). Chinook salmon parr tend to select specific rearing habitats that segregate them, both temporally and spatially, from other native salmonids (Everest and Chapman 1972). They also tend to be most abundant in low gradient, meandering stream channels. Juvenile salmon often occupy different habitats in winter than in summer with two overwintering strategies, which include migration and concealment cover beneath cobble or rubble substrate or beneath undercut banks (Hillman et al 1987).

Condition and Trend of Populations

The distribution and abundance of chinook salmon in the Columbia River have declined substantially from historic levels as a result of passage mortality at dams, habitat degradation, loss of access to historical habitat, overharvest, and interactions with hatchery-reared and nonnative fishes. Historic runs of chinook salmon in the Columbia River were immense; estimates of annual run sizes prior to 1850 range from 3.4 to 6.4 million fish (NWPPC 1986). About 12,452 km of historical range in the United States and Canada is no longer accessible to chinook salmon. Chinook salmon are extinct in many areas of their historic range including the Upper Klamath, Hood, Klickitat, Umatilla, and Walla Walla River basins and the Metolius River above the Pelton and Round Butte dams. Chinook salmon are extinct in the Entiat River and much of the Yakima River subbasin.

Most chinook salmon stocks in the remaining accessible range are severely depressed and at risk. The depressed state of most salmon stocks is well documented. In the Snake River, an estimated 1,882 naturally-produced stream-type chinook salmon reached Lower Granite Dam in 1994 (USDC 1995), compared with an estimated production of 1.5 million fish in the late 1880s. Current numbers of naturally spawning spring/summer chinook salmon in the HCNRA are at all time lows, and the overall population trend is downward. Granite Creek and Sheep Creek are the only tributary streams that are used by spring/summer chinook salmon for spawning. Current use of Granite Creek and Sheep Creek by spring/summer chinook salmon is at very low levels and does not have a stable return of adults. Larger tributaries may provide habitat for juvenile rearing in the lower reach or mouth area when stream conditions are suitable.

Factors believed to contribute to the decline of spring/summer chinook salmon in the Upper Columbia River basin include: 1) habitat degradation; 2) hydropower development; 3) hatcheries; 4) harvest; and 5) predation.

Habitat degradation has influenced the status of chinook salmon. Livestock grazing, road construction, timber harvest, and irrigation diversion have all affected habitat. Reduced stream habitat complexity has been one of the most pervasive cumulative effects of forest management practices and may have altered fish communities (Bisson et al 1992). Forest management practices, including timber harvest activities, have reduced salmon habitat quality, reduced habitat complexity, increased sedimentation, and eliminated sources of woody debris needed for healthy salmon habitat. The integrity of salmon ecosystems is linked to the condition of riparian and upland areas and their influence on water temperature, sediment, the aquatic food base, and number and quality of pools.

Construction and operation of mainstem dams on the Columbia and Snake River are considered a major cause of the decline of anadromous fish (CBFW A 1990). Similar to steelhead, adult chinook salmon are delayed during upstream migrations and smolts may be killed by turbines or become disoriented or injured, making them more susceptible to predation. They may also be delayed in the large impoundments behind dams. Development and operation of hydropower facilities in the basin have reduced salmon and steelhead production by about eight million fish, including four million from blocked access to habitat above Chief Joseph and Hells Canyon dams, and four million from ongoing passage problems at other facilities (NWPPC 1986).

Hatcheries have been used extensively in attempts to compensate for losses, primarily from hydroelectric projects. Salmon of hatchery origin comprise about 80 percent of the Columbia River salmon run (Lichatowich and Mobrand 1995). Problems associated with hatchery production include genetic introgression from nonnative stocks and loss of fitness, reduced wild spawning escapement from the collection of broodstock, ecological interactions between hatchery and wild fish, mixed hatchery and wild stock fisheries, and transmission of diseases (Bevan et al 1994). Most of the healthy anadromous salmonid stocks identified by Huntington et al (1994) have either had no fish culture activities in the home watershed or have been exposed to little risk from stock transfers or interactions with hatchery fish.

Harvest of adult or subadult salmon has contributed to the decline of spring chinook salmon in the Columbia River basin since the late 1800s (Fulton 1970). Historically ocean and river harvest rates exceeded 80 percent (Bevan et al 1994). Thompson (1951) reported that as a result of excessive harvest, by 1919 the characteristics of the Columbia River chinook salmon run had changed. Formerly large portions of the run were reduced, thus making smaller portions of the run more important to the fishery. Declining runs of wild chinook salmon are still harvested in mixed stock commercial and tribal fisheries. Harvest of wild chinook salmon has been curtailed in most states.

Predation is one of the major causes of mortality to fry and fingerling chinook salmon (Healey 1991). Introduced species may prey upon and compete with native fishes. Many mid and lower reaches of the Columbia River are dominated by introduced species (Li et al 1987). Pike minnow (northern squawfish), a native predator, have

become well adapted to the habitat created by the dams (Beamesderfer and Rieman 1991). It has been estimated that 15 to 20 million juvenile salmonids in the Snake and lower Columbia rivers annually succumb to pike minnow predation (Collis et al 1995).

Spring/summer chinook salmon declines are primarily attributed to downriver effects, which include hydropower development, harvest, predation, and competition. Spring/summer chinook salmon utilizing the HCNRA for migration, spawning, and rearing are primarily threatened by habitat degradation. Other threats identified to a lesser extent include hatcheries, harvest, predation, and competition. Granite Creek and Sheep Creek occur in wilderness areas and are protected from most land uses. A trail system occurs in these drainages and recreation use ranges from low to moderate.

Recent and historic flood events, landslides, and debris torrents have resulted in stream specific habitat degradation. Habitat degradation from these events may be attributed to human-caused land uses (e.g. roads, timber harvest, livestock grazing, and mining). For example, a major rain on snow flood event occurred during January 1997. Portions of forest road 39 that were built within the floodplain of Gumbo Creek (Imnaha River tributary) were washed out due to that flood event.

Habitat Conditions

The primary land uses affecting spring/summer chinook salmon habitat include road construction, timber harvest, development in riparian areas and flood plains, agriculture, livestock grazing, and recreation. The tributaries at highest risk from adverse land uses are ones that are primarily in nonfederal ownership and these drainages primarily provide rearing habitat for a limited number of juvenile chinook salmon. High flow flood events have resulted in severe channel scouring of some tributaries.

Steelhead trout (*Oncorhynchus mykiss*)

Status

The steelhead trout is under the jurisdiction of NOAA-Fisheries and is listed under the *Endangered Species Act*. The species occurs throughout the HCNRA. Steelhead trout in the Snake River basin have been listed under the *Endangered Species Act* with an effective listing date of October 17, 1997 (Federal Register, August 18, 1997, Vol. 62, 43937). In February 1999, critical habitat was proposed for steelhead (Federal Register, February 5, 1999, Vol. 64, No. 24). Critical habitat was designated for Snake River steelhead trout on February 16, 2000 (Federal Register, Vol. 65, No. 32, 7764). On April 30, 2002, the U.S. District Court for the District of Columbia approved a NOAA-Fisheries consent decree withdrawing the February 2000 critical habitat designation in response to litigation challenging the process by which NOAA-Fisheries established critical habitat. It is noted that, the decision to designate critical habitat for steelhead was vacated. Management standards for this species have not changed however, due to the overlap of designated critical habitat for chinook salmon.

Species Distribution

Steelhead inhabit a wide range of diverse habitats, rearing, overwintering, and migrating through streams ranging from steep, low-order tributaries up to mainstem rivers. Habitat requirements of steelhead vary by season and life stage (Bjornn and Reiser 1991). Steelhead distribution and abundance may be influenced by water temperature, stream size, flow, channel morphology, riparian vegetation, cover type and abundance, and substrate size and quality (Everest 1973, Li et al 1994, Reiser and Bjornn 1979).

Like other anadromous fish, the status and distribution of steelhead are determined by a large number of factors operating at multiple scales in both space and time. Ocean and passage conditions, harvest, and the use of hatchery fish have undoubtedly played a major role in the condition of the remaining populations. Sorting out the role of habitat change and land management effects of the decline of this species will likely result only through specific analysis capable of finer resolution and control of confounding effects.

The historical range of steelhead was the eastern Pacific Ocean and freshwaters west of the Rocky Mountains, extending from northwest Mexico to the Alaska Peninsula (Scott and Crossman 1973). In the Columbia River basin, steelhead were present in most streams, both perennial and intermittent, that were accessible to anadromous fish including all accessible tributaries to the Snake River downstream from Shoshone Falls (Parkhurst 1950). Steelhead formerly ascended the Snake River and spawned in reaches of Salmon Falls Creek, Nevada, more than 1,450 km from the ocean. About 16,935 km of stream were accessible to steelhead in the Columbia River basin, including Canada. Steelhead occupied about 50 percent of the subwatersheds in the Interior Columbia River basin, including all ecological units except the Northern Great Basin, Upper Clark Fork River, Upper Snake River, and Snake River Headwaters. Historical runs of steelhead were large, providing a significant portion of the commercial catch in the late 1800s.

Steelhead are currently the most widely distributed anadromous salmonid in the Snake River Basin, although they are extinct in large portions of their historical range. The current known distribution includes 46 percent of their historical range. About 12,452 km of historical range is no longer accessible in the Columbia River basin in the United States and Canada (NWPPC 1986).

Within the HCNRA steelhead use occurs in most of the accessible streams when stream conditions are suitable. Refer to Appendix A for a map of steelhead trout distribution in the HCNRA. Steelhead trout use the mainstem Snake River for upstream and downstream passage. A limited amount of rearing may occur in the Snake River. Adult steelhead trout will also winter in the Snake River. Most accessible tributaries are used by steelhead for spawning and rearing. The larger Idaho streams used for spawning and rearing include Divide Creek, Wolf Creek, Getta Creek, Kirkwood Creek, Sheep Creek, and Granite Creek. Granite Creek and Sheep Creek have the highest potential for steelhead production within the subbasin. Additional Idaho tributaries being used by steelhead trout include Dry Creek, Highrange Creek, Big Canyon Creek, West Creek, Kurry Creek, Klopton Creek, Corral Creek, Kirby Creek, Kirkwood Creek, Sheep Creek, Bernard Creek, Three Creek, Granite Creek, and Deep Creek.

The larger Oregon streams being used for spawning and rearing include Somers Creek, Temperance Creek, and Saddle Creek. Other Oregon tributaries being used by steelhead trout include Deep Creek, Cougar Creek, Salt Creek, Sand Creek, Rush Creek, Sluice Creek, Battle Creek, Stud Creek, and Hells Canyon Creek.

Life History and Habitat Requirements

Steelhead, the anadromous form of rainbow (redband) trout, are distributed within the Upper Columbia River basin as two genetically distinct subspecies, coastal and inland. Each subspecies has two major forms, winter and summer although coastal steelhead are predominately winter-run and inland steelhead are summer-run. Winter fish enter freshwater three to four months prior to spawning, and summer run steelhead enter freshwater nine to ten months prior to spawning. Only summer steelhead occur in the Snake River basin. Summer run steelhead are described as either A run or B run, based on the time of passage over Bonneville Dam. Steelhead passing Bonneville Dam before August 25 are called A run steelhead. These fish are predominately one-ocean stock, which originate in the Snake and Salmon river drainages. Steelhead passing Bonneville Dam after August 25 are called B run steelhead. The B run are predominately two-ocean fish which originated in the Clearwater River drainage. There is some overlap in timing and range of the two stocks.

Nonanadromous rainbow (redband) trout in the Upper Columbia River basin have been further divided into two groups, one group which evolved in sympatry with steelhead and the other allopatric, or those which evolved outside the historical range of steelhead. Sympatric rainbow trout are considered a nonanadromous form, historically derived or associated with steelhead and have been termed residuals. Both anadromous and nonanadromous forms exist in sympatry in most populations, and morphologically, juveniles of both forms are indistinguishable.

Steelhead are the anadromous form of rainbow (redband) trout, migrating to the ocean and back to natal streams for spawning and early rearing. Within the anadromous life history strategy, considerable divergence exist both among and within populations concerning migration, early rearing, and ocean rearing timing, which allows steelhead to adapt to a wider range of physical circumstances (Thorpe 1994). Mature adult summer-run steelhead ascend the Columbia River from May through October, and winter-run fish from November through April (Fulton 1970). Most steelhead remain in salt water for one to four years, with both age and length at

maturity at least partially dependent on length of ocean residence (Withler 1966, Mallet 1974). Fecundity is positively related to fish length and may be genetically and environmentally influenced (Mullan et al 1992). Sex ratios are usually about 1:1, but male residualism may affect it (Mullan et al 1992).

Life stages are closely linked to habitat characteristics. Steelhead spawn in sorted gravels in both mainstem rivers and tributaries. Incubation success is influenced by fine sediment, temperature, and flow (Chapman 1988). After emergence, fry typically move into shallow and low velocity channel margins (Everest and Chapman 1972). As fish become larger, preferred habitat change and fry use areas with deeper water, a wider range of velocities, and larger substrate. Focal point velocity, distance from the substrate, and maximum velocity are all correlated significantly with fish size (Everest and Chapman 1972).

Both summer and winter steelhead spawn from March to June, typically on a rising hydrograph and prior to peak streamflow (Thurrow 1987). A dominant male usually pairs with a female, although several other males, most notable precocial small males (< or = 200mm), may fertilize eggs. Spawning of precocial males may be particularly important when adult escapements are low.

Incubation and emergence are temperature dependent and variable (Thurrow 1987). Emergence is generally complete by mid-July even in the highest elevation streams. Parr rear in freshwater for varying periods ranging from two to three or more years depending on water temperature and growth rates (Mullan et al 1992). Immediately prior to migration to the ocean, parr imprint on their natal streams. The parr-smolt transformation typically occurs from April to mid-June and is associated with developmental changes in osmotic and ionic regulatory mechanisms. The smolting process is influenced by photoperiod and is a function of fish size (Hoar 1976). When confined above barriers or in cold systems where growth is slow, steelhead may residualize to a nonanadromous form (Mullan et al 1992).

Condition and Trend of Populations

Despite their relatively broad distribution, very few healthy steelhead populations exist (Quigley and Arbelbide 1997). Recent status evaluations suggest many steelhead stocks are depressed. A recent multi-agency review show that total escapement of salmon and steelhead to the various Columbia River regions has been in decline since 1986 (Anderson et al 1996). Existing steelhead stocks consist of four main types: wild, natural (nonindigenous progeny spawning naturally), hatchery, and mixes of natural and hatchery fish. Production of wild anadromous fish in the Columbia River basin has declined about 95 percent from historical levels (Huntington et al 1994). Most existing steelhead production is supported by hatchery and natural fish as a result of large-scale hatchery mitigation production programs. Wild, indigenous fish, unaltered by hatchery stocks, are rare and present in only 10 percent of the historical range and 25 percent of the existing range. Remaining wild stocks are concentrated in the Salmon and Selway (Clearwater basin) rivers in central Idaho and the John Day River in Oregon. Although few wild stocks were classified as strong, the only subwatersheds classified as strong were those sustaining wild stocks. Current numbers of naturally spawning steelhead trout in the HCNRA are at all time lows, and overall trend is downward. Adult steelhead trout were commonly observed in larger tributaries during the 1970s through 1980s, but now such observations have significantly declined.

Habitat Conditions

Six factors believed to contribute to the decline of steelhead trout in the Upper Columbia River basin include: 1) predation and competition, 2) blocked access to historical habitat, 3) passage mortality, 4) habitat degradation, 5) hatcheries and 6) harvest (Quigley and Arbelbide 1997).

Impacts related to predation and competition are associated with the 55+ introduced species which occur within the current range of steelhead. Because introduced species did not co-evolve with steelhead, there has been no opportunity for adaptation to ameliorate competition (Fausch 1988) or predation. Hobbs and Huemke (1992) suggest that nonnatives may pose a greater risk to native species where habitat has been disturbed. Dams in particular have created habitat that is suitable for a variety of nonnative predators and potential competitors. Native predators such as pike minnow may also be influenced by anthropogenic habitat alterations.

An estimated 12,452 km of steelhead habitat are no longer accessible to anadromous fish in the Columbia River basin in the United States and Canada (NWPPC 1986). Although undocumented, the historical range likely supported diverse and locally adapted populations. Extinctions have resulted in lower diversity and lower total abundance of steelhead. Cumulative habitat changes that eliminate or isolate segments of populations may increase both demographic and environmental stochasticity, thereby increasing the risk of extirpation or extinction of remaining populations.

Construction and maintenance of mainstem dams on the Snake and Columbia rivers are considered the major cause of decline of anadromous fish. Hydroelectric development changed Columbia and Snake River migration routes from mostly free-flowing in 1938, to a series of dams and impoundments by 1975. Reservoirs reduce flows in most years by about 50 percent during smolt migration (Raymond 1979). Steelhead must navigate up to nine mainstem dams. At each dam, adult steelhead are delayed during upstream migrations. Smolts migrating downstream may be killed by turbines, become disoriented, or injured, making them more vulnerable to predation, or they may be delayed in the large impoundments behind dams (State of Idaho 1990).

More than 95 percent of healthy anadromous stocks were judged by biologists to be threatened by some degree of habitat degradation. Fish habitat quality in most watersheds has declined. During the past 50 years, numbers of pools have decreased and fine sediment has increased in selected Northwest watersheds (McIntosh et al 1994).

Hatcheries have been widely used in attempts to mitigate losses of steelhead caused by construction and operation of dams. Hatcheries may affect wild steelhead populations through genetic introgression and loss of fitness, creation of mixed stock fisheries related to harvest, competition for food and space, and changes in the abundance of disease organisms (Reisenbichler 1977). Studies of the interaction between wild and hatchery fish illustrate that survival of progeny from hatchery or hatchery/wild hybrid parentage is less than that for progeny of wild pairings (Chilcote et al 1986). Byrne et al (1992) suggested that supplementation of native stocks with hatchery stocks have typically resulted in replacement, not enhancement, of native steelhead. Introductions of large numbers of hatchery-reared parr may also cause localized decreases in the density of wild juvenile steelhead (Pollard and Bjornn 1973).

Steelhead stocks have historically provided harvest opportunities for tribal, commercial, and sport fisheries. Wild steelhead populations have declined as numbers of hatchery steelhead have increased, creating harvest management problems. Hatchery steelhead that are surplus to egg-taking needs can be harvested, in contrast to declining runs of wild steelhead that cannot. Although harvest of wild stocks has been reduced, declining runs of wild steelhead are still harvested in tribal fisheries, and steelhead are killed during commercial salmon fishing on the Columbia River and coastal marine waters, and in high seas driftnet fisheries (Chapman et al 1994).

Recreational fishing of wild juvenile fish occurs in the mainstem Snake River and larger tributaries with public access (i.e., Granite Creek and Sheep Creek). Some tributaries have restricted public access and receive very light recreational fishing.

Recreational fishing for hatchery steelhead trout is a very popular activity on the mainstem Snake River during the fall, winter, and spring. No harvest of wild adult steelhead (>20 inches) is authorized and captured fish must be released unharmed. Catch and release of wild adult steelhead may result in some incidental mortality from mishandling of fish and some poaching probably occurs.

Recent and historic flood events, landslides, and debris torrents have resulted in stream specific habitat degradation. Habitat degradation from these events may be attributed to man caused land uses (e.g. roads, timber harvest, livestock grazing, and mining).

Information on population and distribution of steelhead trout in the subbasin is lacking for some tributary streams. Location of partial/full fish passage barriers is not known in some tributary streams.

Columbia spotted frog (*Rana luteiventris*)

Status

The Columbia spotted frog has been a candidate species listing since December 14, 1992 (Federal Register, Volume 57, 59257).

Species Distribution

The range of the Columbia spotted frog extends from the extreme southwestern Yukon, through the Alaska panhandle and most of British Columbia. It extends southeast, through eastern Washington, Idaho, western Montana, eastern Oregon, and northwestern Wyoming (Corkran and Thoms 1996). The Columbia spotted frog included in this analysis belongs to the Great Basin population. This population is loosely defined as occurring south and west of the Snake River and south of the Columbia River. Columbia spotted frogs found in Idaho are not considered part of the Great Basin population. Suitable habitat is present for this species within Oregon portions of the HCNRA.

In Oregon, the Columbia spotted frog is found in parts of the Cascade mountains and throughout areas of eastern Oregon (Nussbaum et al 1983, Leonard et al 1993). Columbia spotted frogs are highly aquatic, inhabiting marshes and marshy edges of ponds, streams, and lakes (Munger 1997). In dry habitats, these frogs also use deep pools within the main portions of watercourses. They usually occur in slow moving waters with abundant emergent vegetation and a thick layer of dead and decaying vegetation on the bottom. Thick algal growth in overflow pools and backwaters of eastern Oregon creeks are used in the same way (Nussbaum et al 1983). The HCNRA contains habitat that could support this species although their occurrence in the HCNRA is not well documented.

Life History and Habitat Requirements

Columbia spotted frogs are active in lowland habitats from February through October and hibernate in muddy bottoms near breeding sites in winter. They are known to use cut banks, beaver dams, and pond bottoms as hibernacula (Munger 1997). Courtship and breeding takes place in warm, shallow margins of ponds or rivers or in temporary pools. Breeding occurs between February and March at lower elevations, but may occur as late as May or June at higher elevations (Leonard et al 1993).

Female Columbia spotted frogs deposit their eggs on or immediately next to other egg masses (McAllister et al 1993). The rounded masses are not attached to vegetation, but rest on the bottom in shallow water (Nussbaum et al 1983). Eggs are laid in water that is usually less than 12 in deep and are usually half-exposed to direct air. Columbia spotted frogs use the same locations for egg-laying in successive years (Nussbaum 1983, Leonard et al 1993).

Adult Columbia spotted frogs are opportunistic feeders and feed primarily on invertebrates (Nussbaum et al 1983). Larval frogs feed on aquatic algae and vascular plants, and scavenged plant and animal materials (Morris and Tanner 1969).

Habitat Conditions

Mortality of frog populations are associated with natural factors such as predation, winterkill, and disease. Human impacts include altering habitat, introducing nonnative fishes and other aquatic vertebrates, and introducing toxic chemicals into aquatic systems (Nussbaum et al 1983, Leonard et al 1993, Corkran and Thoms 1996). Some management practices, such as fire suppression and fish stocking, may have negative impacts on amphibians (Fellers and Drost 1992). Activities that increase water level fluctuations are detrimental, since egg masses of the Columbia spotted frog are usually laid in the shallow margins of water bodies, where they are susceptible to freezing or desiccation (McAllister and Leonard 1997).

Direct and Indirect Effects – Aquatic Species

A specific analysis of the potential direct and indirect effects that the implementation of the selected alternative may have on Bliss Rapids snail, bull trout, fall chinook, sockeye salmon, spring/summer chinook, steelhead, and Columbia spotted frog and water quality has been completed in the FEIS. This analysis used the best available scientific information and site-specific professional judgment to determine potential effects. Since the selected alternative makes no changes in current PACFISH, INFISH, or other fish and water protection guidance currently incorporated in the *Forest Plan* the direct and indirect effects analyzed with this BA would have a low risk of causing any adverse effects on water quality or fish species. Additional discussion is available in FEIS, Chapter 3, Environmental Consequences on Riparian/Aquatic Habitat and Water Quality.

The implementation of the selected Alternative E-modified will have no direct effect on listed or candidate aquatic species (fish, amphibians, invertebrates) or their designated or nondesignated critical habitat. At the *Forest Plan* level, as amended by the selected alternative, specific determination of effects cannot be made for any resource activity, due to the lack of specificity in the programmatic document. For example, a land allocation that allows timber management within the selected alternative allows for vegetation treatments to be considered within that allocation. However, the decision as to whether or not to go forward with a specific timber sale is made after a site-specific project analysis and consultation with regulatory agencies.

The selected alternative will guide all future actions in the HCNRA and therefore will have an indirect effect on associated aquatic species. The impact of the action is expected to improve existing conditions but some site specific actions may still have a may effect, not likely to adversely affect determination due to their very nature (i.e., timber harvest, prescribed fire, grazing, and recreation all have the potential to affect water quality and aquatic habitat).

The changes in management activities from the current CMP to the selected alternative are listed by standard and guidelines in Appendix C, Table C-1, of the FEIS. The currently improving trend for habitat projected in the Section 7 watershed BAs is expected to remain the same for most activities and may slightly improve for others when the selected alternative is implemented.

Baseline Condition

Habitat matrices were developed during previous watershed ESA consultations to rate aquatic habitat within the various HCNRA watersheds (USDC and USDI 1998). These matrices utilized various habitat indicators for criteria by which to assign a rank of properly functioning, at risk, or not properly functioning. Tables illustrating the Environmental Baseline for Habitat Indicators for a particular watershed were derived from these matrices. Matrices and baseline tables for individual watersheds are found in (Appendix D) and in their respective BAs.

Baseline condition ratings assigned to the watersheds comprising the HCNRA vary, as expected, by watershed due to various levels and types of human-caused influence from watershed to watershed. Providing an overall (composite) baseline condition rating for all watersheds within the HCNRA is thus, difficult.

In summary, the current conditions within the Snake River tributaries, Imnaha River, Rapid River, upper Sheep Creek (Forest Services reaches), and Pine Creek subwatersheds seem to be “Properly Functioning” for all ESA listed fish species. Reaches considered to have conditions of “Functioning At Risk” would include the Sheep Creek subwatershed (lower private stream reaches) and the mainstem Snake River. Reasons for “At Risk”

ratings in the Sheep Creek subwatershed include alteration of riparian reserves, large woody material (LWM) removal, channel modifications (riprapped banks, dredged channels, flow barbs, and filled overflow channels), sediment production, and water diversions. Habitat/water quality problems in the mainstem Snake River result from upstream sources such as hydroelectric operations and agricultural pollutants.

The “At Risk” reaches, in most cases, are the legacy of past management practices that have caused various modifications to aquatic habitats and riparian areas. With application of adaptive management practices over time, and implementation of PACFISH standards and guides, these reaches have been tending toward improved and properly functioning conditions. It is widely understood that, since conditions were altered over decades of using management practices different than today, it will take decades or longer for these areas to get back to something resembling Proper Functioning condition.

General Effects

Natural disturbance events, such as wildfire, landslides, windstorms, floods, and drought-have a "pulse" type effect on aquatic systems and associated resources. Despite the short-term disturbances to these systems and resources, these events create the diversity and dynamics for healthy and fully functioning habitats. When these systems are resilient and within the historic range of variability (HRV), they can absorb these effects and recover in short periods of time. However, when aquatic resources have been chronically impacted by ongoing management activities, these pulse events can have substantially greater and longer-term effects.

The effects analysis is focused on evaluating Forest Service activities as they relate to the water, riparian, and aquatic resources. Natural events are not addressed here, except where events are directly influenced by Forest Service activities, such as uncharacteristic wildfire.

General effects to the riparian and aquatic associated resources are described for:

- Forested Vegetation Treatment
- Livestock grazing
- Road-related disturbance
- Recreation Use
- Fire management

The following narrative summaries provide an overview of expected indirect effects by activity:

Forested Vegetation Treatment

Treatment of forested vegetation and other associated forest management practices, along with fire suppression, have changed disturbance regimes and vegetation patterns. In some areas these practices have reduced the amount of soil organic matter, increased the potential for large uncharacteristic wildfire, and increased the risk to soil erosion, flooding, and landslides above normal frequency and distribution.

Timber harvest activities (felling, yarding, skidding, landing construction) can also accelerate erosion. Accelerated surface erosion and increased levels of sedimentation can over time decrease from initial disturbance, but often remain above natural levels for many years. The mechanical processes involved in timber harvest, in conjunction with natural conditions, influence the level of disruption or disturbance within watersheds. The potential effects tend to increase when activities occur on inherently sensitive terrain with steep slopes composed of highly erodible soils that are subject to high climatic stresses. Vulnerable watersheds generally have high slope gradients, high levels of potential soil erodibility, and potential for landslide activity. Soil and site disturbance that occur from timber harvest activities are often responsible for increased rates of erosion and sedimentation, and modification and disruption of water quality, riparian and aquatic habitats. Physical changes can affect runoff events, bank stability, sediment supply, large woody debris retention, and stream temperature. As deposition of fine sediment in salmonid spawning habitat increases, mortality of embryos, alevins, and fry rises.

Current timber harvest and road construction practices have substantially lessened potential effects as compared to practices undertaken in the 1950s through 1970s. Megahan et al (1992) demonstrated a potential reduction in

sediment yields using present day best management practices (BMPs) by amounts ranging from 45 to 95 percent. The National Council for Air and Stream Improvement (1999) concluded that, once applied, BMPs are effective at reducing management impacts, often to a level such that impacts cannot be detected. This conclusion was based on recent reviews of relevant research and state nonpoint source control programs over the past 20 years. Given application of current knowledge and environmental constraints, much of the past sedimentation, and many other adverse watershed effects associated with logging and road construction could have been avoided. Many of these adverse effects are typically avoided or mitigated today.

Before 1950, timber harvest in HCNRA was generally limited to individual tree removal of large diameter ponderosa pine, Douglas-fir, and western larch. Clearcutting was introduced in the Gumboot Butte area in the late 1950s, followed by shelterwood and seed tree logging in the Nesbit Butte and Blackhorse Creek areas. Roads were constructed to provide access. Clearcutting also occurred on the Idaho side of the Snake River Canyon prior to 1975. In the 1960s and 1970s logging continued in most of the gentle terrain. Extensive roads were built to salvage timber damaged by wind storms, snow breakage, insects, and fire. About 23,000 acres was harvested prior to 1975.

After the HCNRA was created in 1975, harvest has been primarily by selective cutting and salvage. It is estimated that about 31,472 acres has been harvested since 1975. Total harvest for HCNRA has been approximately 54,500 acres or 20 percent of the total forested area. In these areas, potential threats to aquatic/riparian species has been reduced due to establishment of RHCAs and reduced roading.

The maximum potential acres of forested vegetation areas treated for the HCNRA during the next 10 years is 17,700 acres from a combination of precommercial thinning, mechanical treatment and underburning, single-tree selection, and commercial thinning. This is only two percent of the HCNRA. Single-tree selection harvest would have a short term effect on forest structure, but would retain the majority of forest structure. In the long term, it may promote vegetation diversity in the understory. Since no new roads will be built in HCNRA during the planning period, harvest will be limited to areas near past harvest.

Even with improved practices, however, timber harvest activities still have the potential to have short-term effects on watershed processes and associated fish habitat. Conversely, harvest activities that are designed to move or maintain forest vegetation within desired conditions would reduce longer-term risks associated with uncharacteristic wildfires. Potential effects to soil, water, riparian, and aquatic resources from management of forested stands would vary. The selected alternative would maintain stream riparian conservation areas (RHCAs) and restrictions on potential landslide-prone areas.

It is the expectation of the CMP that application of PACFISH/INFISH standards and guidelines will remove or minimize potential adverse effects to aquatic and riparian species and their habitats from future forest vegetation treatments (Specifically the use of PACFISH standard TM-1 and RF-1 through 6). Further measures to minimize effects to riparian/aquatic resources are included in supplemental standards and guidelines found in the FEIS (Appendix C) and include Rip/Aqu-S1 thru S6, G1 and G2, and TES-04. Changes in forest practices and implementation of PACFISH/INFISH standards and guides have done much to improve the baseline condition in the HCNRA since 1995. It is anticipated that future site-specific activities (by design) will provide long-term beneficial effects from improved soil and vegetative conditions thus moving watershed habitat towards (or maintaining) conditions that are properly functioning.

The nature of the CMP is to identify goals and objectives for HCNRA management, functioning as a framework for future decisions for individual actions or groups of actions. Generally, the CMP does not cause specific actions to happen, but does identify sideboards within which future actions may be developed or implemented. As such, the effects of the decision are indirect, occurring in the future and resulting after subsequent analysis, decisions, and consultation.

Livestock Grazing

The effects of livestock grazing on soil, water, riparian, and aquatic resources are related, in part, to the biophysical attributes of the area. These include the subwatersheds vulnerability, climate, and vegetation. Unstable stream conditions occur naturally but are often amplified by livestock grazing. Overgrazing by livestock can lead to a reduction of soil structure, soil compaction, and damage or loss of vegetative cover. Hydric plant species with deep soil-holding root structures if excessively grazed can be replaced with less desirable

shallow-rooted plants to where streambanks become less stable and more inclined for erosion. Also recruitment of young willows, cottonwoods, and other desirable riparian plant species may be reduced from direct livestock grazing. Fire intervals on rangeland dominated by exotic annual grasses, cheat grass, and medusa head are more frequent, resulting in bare soil and greater susceptibility to erosive events. All of these processes contribute to an increase in surface runoff. Resulting increases in surface erosion lead to a loss of stored soil nutrients and loss of vegetative productivity and associated soil stability. The degree of soil erosion associated with livestock grazing is related to slope gradient, aspect, inherent vulnerability, vegetative condition, and accessibility to livestock.

Riparian areas maintain stream structure and function through processes such as water filtration, bank stabilization, water storage, stream channel shape and temperature. Because of the availability of water, forage and thermal cover, livestock often overgraze riparian areas. This overgrazing can alter stream-side vegetation and diminish vegetative productivity. Grazing can lead to an increase in sedimentation through increased surface erosion, decrease in effective vegetative ground cover and root binding strength, streambank instability and stream channel incision. The results can lead to pool filling, decrease in spawning and rearing habitat, and reduction in fry emergence. Additionally, livestock often cross streams or drink from shallow stream sections where fish spawning occurs, and their hooves can mechanically destroy sensitive incubating eggs within redds.

Well-designed and implemented grazing programs can move rangelands functioning at risk toward HRV, to where native plant communities occur in natural mosaic patterns and have relatively uninterrupted disturbance regimes. This can provide favorable conditions for hydrologic functions and watershed processes (USDA 2000), as well as for associated aquatic organisms. In recent years, several range allotment management plans (AMPS) have been reviewed and changed due to *Endangered Species Act*, related consultation, PACFISH/INFISH, and issues related to the *Clean Water Act*. These changes have resulted in improved soil, water, riparian, and aquatic conditions.

Grazing has taken place in the HCNRA for thousands of years; first by American Indian horses and second by European livestock. Most of the bench country in the canyon was homesteaded and small ranches dotted the landscape in the late 1800s. Grazing was very intensive with high numbers of livestock for long periods of the year. In 1905, it was reported that over 300,000 domestic sheep grazed Wallowa County, most of which grazed some portion of the year on NFS lands. By 1920, historical photos indicate the range was in very poor condition, especially near these homesteads. From 1920 to the present, historical photos indicate in some areas there has been a gradual improvement of range condition as livestock numbers have decreased, grazing systems have been applied, and range improvements have been developed. Still, some limited areas (such as old homesteads) remain in poor condition because of persistent noxious weed invaders.

Current rangeland inventory indicates that over 90 percent of the active allotments are in fair and good condition. The percent of the HCNRA remaining active grazing allotments over the next decade will be about 51 percent. The selected alternative maintains active livestock grazing allotments at their current grazing levels. Application of PACFISH/INFISH standards and guidelines will be used to minimize potential effects to aquatic/riparian species and their habitats (Refer to PACFISH TM-1, RF-1 through 6). Refer to Appendix A for maps of fish distribution overlaid with active and vacant range allotments.

It is the expectation of the CMP that application of PACFISH/INFISH standards and guidelines will remove or minimize potential adverse effects to aquatic/riparian species and their habitats from livestock grazing (Specifically the use of PACFISH standard GM 1 through 3). Further measures to minimize effects to riparian and aquatic resources are included in supplemental standards and guidelines found in the FEIS (Appendix C) and include Rip/Aqu S1 thru S6 and G1, TES S1, and RNA S3. Changes in range management practices and implementation of PACFISH/INFISH standards and guides have done much to improve the baseline condition in the HCNRA since 1995. It is anticipated that future site-specific activities (by design) will provide long-term beneficial effects from improved soil and vegetative conditions thus moving watershed habitat towards (or maintaining) conditions that are properly functioning.

The nature of the CMP is to identify goals and objectives for HCNRA management, functioning as a framework for future decisions for individual actions or groups of actions. Generally, the CMP does not cause specific actions to happen, but does identify sideboards within which future actions may be developed or implemented. As such, the effects of the decision are indirect, occurring in the future and resulting after subsequent analysis, decisions, and consultation.

Road-related Disturbance

Road-related disturbances are often associated with timber harvest. Disturbances can result from construction, reconstruction, maintenance, and decommissioning. Abandoned roads often result in chronic sedimentation or, in some instances, may wash out or fail altogether, resulting in a massive surge of sediment. In addition to causing sedimentation, road development can remove streamside vegetation, compact soils, and encroach stream channels. Poorly installed stream crossings can increase sedimentation and restrict fish migration. Rieman and Clayton (1997) identify that road-related disturbances far overshadow disturbances associated with fire and logging activities. Furniss et al (1991) identify loss of water quality, altered hydrologic conditions, increased frequency of landslides, and loss of fish habitat associated with road-related disturbance. Roads can also increase public access, which has the potential for increased fishing pressure and poaching problems. Bull trout are especially vulnerable to increased road densities. Quigley and Arbelbide (1997) found that remaining bull trout populations are found mostly in the more pristine, less roaded areas. Roads, however, can allow access for needed watershed and fish habitat restoration work.

Road construction and any related potential impacts to soil, water, riparian, and aquatic resources would not vary substantially by alternative; therefore, they will not be directly compared between alternatives in this analysis. Total net miles of roads would actually decrease for all alternatives. Road densities were also used for defining current condition and restoration requirements for each subwatershed.

Currently there are about 533 miles of open road and 925 miles of trails in the HCNRA. The selected alternative will permanently close 177 miles of road and about 27 miles of roads seasonally. No new roads will be built.

It is the expectation of the CMP that application of PACFISH/INFISH standards and guidelines will remove or minimize potential adverse effects to aquatic/riparian species and their habitats from future road-related activities (Specifically the use of PACFISH standard RF 1-6). Further measures to minimize effects to aquatic resources are included in supplemental standards and guidelines found in the FEIS (Appendix C) and include Rip/Aqu-S1 thru S6 and G1, Acc-G2a, S8 and G9, and TES-04. Changes in road management practices and implementation of PACFISH/INFISH standards and guides have done much to improve the baseline condition in the HCNRA since 1995. It is anticipated that future site-specific activities (by design) will provide long-term beneficial effects from improved soil and vegetative conditions thus moving watershed habitat towards (or maintaining) conditions that are properly functioning.

The nature of the CMP is to identify goals and objectives for HCNRA management, functioning as a framework for future decisions for individual actions or groups of actions. Generally, the CMP does not cause specific actions to happen, but does identify sideboards within which future actions may be developed or implemented. As such, the effects of the decision are indirect, occurring in the future and resulting after subsequent analysis, decisions, and consultation.

Recreation Use

Sedimentation can also occur from recreational activities, but usually is more localized than timber harvesting and livestock grazing. Developed and dispersed camping can frequently result in streambank disturbances, soil compaction, and vegetation removal. Driving and parking vehicles along streambanks, and foot traffic are common practices by recreationists that contribute to these concerns.

Fishing pressure, including incidental taking of TES fish species such as bull trout, can reduce local fish populations. Harassment of spawning fish from streamside recreationists or float boaters can also be a problem. Potential impacts from recreation-related activities to soil, water, riparian, and aquatic resources is more a function of social demand than it is of opportunity. The CMP would determine distribution of recreation pressure and usage, not intensity of use, although subwatersheds within the HCNRA having the most road miles accessible to the public would probably emphasize more motorized-related recreation.

The current trail system will be maintained with no significant net increase in the number of trails with Alternative E-modified. Existing recreation facilities will receive maintenance commensurate with level of activity and funding. The effects from this decision will result in lower human disturbance to aquatic/riparian species from current conditions.

It is the expectation of the CMP that application of PACFISH/INFISH standards and guidelines will remove or minimize potential adverse effects to aquatic/riparian species and their habitats from future recreation activities (specifically the use of PACFISH standard RM 1-3). Further measures to minimize effects to riparian and aquatic resources are included in supplemental standards and guidelines found in the FEIS (Appendix C) and include Acc-S1, Acc-S4, and Acc-G4. Changes in recreation management practices and implementation of PACFISH/INFISH standards and guides have done much to improve the baseline condition in the HCNRA since 1995. It is anticipated that future site-specific activities (by design) will provide long-term beneficial effects from improved soil and vegetative conditions thus moving watershed habitat towards (or maintaining) conditions that are properly functioning.

The nature of the CMP is to identify goals and objectives for HCNRA management, functioning as a framework for future decisions for individual actions or groups of actions. Generally, the CMP does not cause specific actions to happen, but does identify sideboards within which future actions may be developed or implemented. As such, the effects of the decision are indirect, occurring in the future and resulting after subsequent analysis, decisions, and consultation.

Fire Management

Wildfire is a common disturbance process within the HCNRA, and soil hydrologic functions, watershed processes and associated aquatic species have evolved in response to wildfire. The effects of fire on aquatic systems may be direct (increased stream temperature and reduction in dissolved oxygen) or indirect, occurring down stream or over an extended period of time. Historically, fire resulted in a mosaic of habitats and populations. In an ecologically functioning stream network that provides sufficient connectivity for species refuge, re-establishment of local fish populations is generally rapid (Reiman and Clayton 1997).

Short-term (1 to 2 years) and long-term (10+ years) effects of fire usually result from erosion associated with climatic events that trigger surface erosion and stream channel changing events or an increase in subsurface mass failures (landslides). The intensity and scale of these effects are related to the size and intensity of the wildfire, vulnerability, size of watershed, and climatic triggering event. Water retention of soil, remaining vegetation and organic material, and soil stability afforded by plant root all change both immediately and over the long term after a wildfire.

Research on trade-offs between fire risk and risk to soil, water, riparian and aquatic resources is limited, and opinions vary on whether the greater risk comes from uncharacteristic fire, or from activities to reduce uncharacteristic fire. Wildfire is not viewed as a particular threat to healthy aquatic systems, but depressed and strongly isolated fish populations could be vulnerable to the effects of intense or large fires, especially those that burn uncharacteristically. Mechanisms that affect watershed response following fire, such as the occurrence of high intensity storms and delivery of sediment to a stream network, are important in determining outcomes, and are highly variable.

Usually watershed effects from wildfire are short term and may be offset by compensating watershed responses. For example, where riparian vegetation is burned and shade is reduced, increased streamflow heating may be offset by increases in cooler water from subsurface flow and loss of evapotranspiration. Although fuel loading may be high in some riparian areas, these areas are generally wetter and have different disturbance patterns, intensities, and intervals than hill slopes. Nevertheless, watershed effects from fire can be substantial and long lasting. Some areas present higher risks than others when considering a subwatershed's vulnerability, vegetation conditions, aquatic species present, and adjacent or downstream concerns for life and property associated with BAER subwatersheds. Other areas of concern include highly erodible landscapes, smaller confined streams, and headwater areas where riparian vegetation is similar to upland vegetation conditions that are highly susceptible to fire.

Not all disturbances have the same effects on soil productivity and function. For example, fire can reduce soil productivity, but unless all the organic matter, grass residue, needles, branches, and boles are consumed, loss of soil productivity may not be as high as it would be if soils were compacted and whole trees were removed from the site. Severe wildfire can result in soil conditions that repel water, and increased soil erosion can occur if intense rainstorms also occur. Because of the mosaic pattern wildfire produces, and the residual wood that is left on site, disturbance from wildfire usually has fewer implications for loss of soil productivity and function than disturbances which remove soil organic matter and decrease bulk density as well. Both water-repellent soil

conditions and compacted soils can decrease soil functions (such as water infiltration, nutrient uptake, and biological activity) and increase erosion, but the severity and longevity of declining soil productivity is generally greater under compacted soil conditions.

Aquatic organisms and watershed components have evolved with fire. Natural fire regimes reset plant succession, provide nutrients and coarse woody debris to ecosystems, and remove unhealthy vegetative stands. However, fire can be lethal to local aquatic populations, remove habitat components, and increase sedimentation and streambank disturbances. When fire regimes become uncharacteristic by departing from HRV, these detrimental concerns increase. Due to past fire suppression policies, fire has become less frequent, but more intense. Coupled with severe storm events, uncharacteristic wildfire can be devastating to watershed components especially in highly vulnerable watersheds, and ultimately to aquatic populations. Populations that have been reduced to isolated remnants by past anthropogenic activities are especially vulnerable to effects from large fires.

Suppression tactics can also be harmful to the watershed from the construction of fire lines, road development, use of fire retardant, soil disturbance, and vegetation removal. Management-ignited fire can help reduce effects from uncharacteristic fire by moving vegetation toward HRV and reducing the severity of fire when fire does occur. These controlled fires are often set when and where impacts to important fish habitat and populations would be minimal. Minimum impact suppression tactics (MIST) would be used in all areas of the HCNRA to reduce effects to ESA species and their habitat (FEIS, Appendix C-1, Fire-S3).

Potential effects to soil, water, riparian, and aquatic resources from uncharacteristic fire could vary, due to varying emphasis on prescribed fire and mechanical vegetation treatments.

For thousands of years, wildfires have helped shape and perpetuate the vegetation and wildlife of the HCNRA. From the late 1800s, grazing and fire exclusion has altered the annual number of fires, fire intensity, and acres burned. Fire exclusion has created a build up of fuels in both grasslands and forest. In HCNRA, large fires have burned approximately 252,600 acres since 1986. Some of the grassland fires have burned over the same ground twice. Many of these fires have been at higher intensity and over larger areas than historically. Fire is being managed to bring biophysical environments, based on plant species (FEIS Appendix C, Table C-8), back into a historic range of variability (HRV). The HRV is used as a reference point to establish a baseline set of conditions and enables a comparison to be made to current conditions. In the HCNRA, HRV refers to the range of conditions that are likely to have occurred prior to the settlement of northeastern Oregon by Euro-Americans (approximately 1850).

The selected alternative predicts a total of 65,010 acres of grassland and 50,710 acres of forest will burn by wildland fire use for resource benefits in the next decade. Another 11,035 acres of grassland and 7,645 acres of forest will burn by wildfire. This assumes about 48,505 acres of prescribed burning in grasslands and 19,495 acres in forests would also occur (FEIS, Table 2-19). All these acres represent a return to natural fire processes. Conditions for aquatic/riparian species will be enhanced in the long term by increasing the health of upland and riparian areas. This assumes that noxious weeds will not be increased significantly by fire. Fire standards and guidelines are designed to protect *Endangered Species Act* listed resources including having resource advisors during fire operations (refer to the FEIS, Appendix C, Table C-1, Fire).

It is the expectation of the CMP that application of PACFISH/INFISH standards and guidelines will remove or minimize potential adverse effects to aquatic/riparian species and their habitats from future fire management activities (Specifically the use of PACFISH standard FM 1-5). Further measures to minimize effects to riparian and aquatic resources are included in supplemental standards and guidelines found in the FEIS (Appendix C) and include Rip/Aug-S1 thru 6, Rip/Aug-G1 and G2b, Fire-G3 and G4, and RNA-S6. Changes in fire management practices and implementation of PACFISH/INFISH standards and guides have done much to improve the baseline condition in the HCNRA since 1995. It is anticipated that future site-specific activities (by design) will provide long-term beneficial effects from improved soil and vegetative conditions thus moving watershed habitat towards (or maintaining) conditions that are properly functioning.

The nature of the CMP is to identify goals and objectives for HCNRA management, functioning as a framework for future decisions for individual actions or groups of actions. Generally, the CMP does not cause specific actions to happen, but does identify sideboards within which future actions may be developed or implemented. As such, the effects of the decision are indirect, occurring in the future and resulting after subsequent analysis, decisions, and consultation.

Cumulative and Aggregate Effects

Cumulative effects under the *Endangered Species Act* include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area. There are no effects of future activities that are reasonably certain to occur within the HCNRA that will adversely affect aquatic species or their habitat. Establishment of TMDLs and Water Quality Management Plans by the States of Idaho and Oregon would have favorable effects on water quality over time within the HCNRA however. Future federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to Section 7 of the *Endangered Species Act*.

Aggregate effects are the combined effects of all the separate federal actions when added together. The aggregate effects in Alternative E-modified from forested vegetation treatment, fire, livestock grazing, and recreation (human disturbance) would improve the current condition and provide long-term benefits to aquatic species in the HCNRA.

Potential effects on limiting factors for Snake River salmon, steelhead, and bull trout are presented in various watershed BAs for the HCNRA. Limiting factors are listed as sediment, temperature, stream shade/canopy cover, large woody material, stream flows, pools, and bank stability. The extent to which these parameters are limiting varies by watershed. The incorporation of an aquatic conservation strategy such as PACFISH with standards and guides and the anticipated incorporation of any new standards and guides from site-specific project BAs and BOs is expected to improve habitat conditions. In general, habitat-limiting factors are expected to improve at the same rate as under the current CMP or faster when the selected alternative is implemented. Faster recovery would be due in part to reductions in open road mileage, access limitations along open roads, and closing vacant range allotments. Continued habitat assessments, monitoring, and species surveys (annual spawning counts eg.) will add to our understanding of at-risk species and their habitats, thus leading to better conservation decisions and improving population trends.

Appropriate management and restoration of riparian and aquatic resources generally depends on current and site-specific information about existing biophysical conditions, historical conditions, desired conditions, and social needs. These factors are not easily addressed at the programmatic level. Land management activities with the potential for disturbing or restoring these resources will be assessed through a combination of subbasin reviews, watershed analyses, development of water quality restoration plans, biological evaluations and assessments, inventories and monitoring, and site-specific NEPA analysis. Future site-specific projects are interrelated to the selected alternative because they will follow the standards and guidelines.

It is anticipated that all changes from the current CMP will maintain (only when in properly functioning condition) or improve water quality and aquatic species habitat. Each of the Section 7 assessments previously referenced, include a cumulative effects analysis of the ongoing and proposed activities within the described watershed. The risk rating for NFS lands in the HCNRA area is rated as low or moderate when combined with private and other lands. These analyses are displayed in Chapter VIII of the Snake, Joseph, Imnaha, and Little Salmon River (Rapid River) Section 7 BAs. Effects of the proposed programmatic action will indirectly lead to improved environmental baseline conditions over time for all affected watersheds.

Forest Plan management direction for riparian and aquatic resources for the selected alternative has been developed to maintain or improve watershed and aquatic conditions on NFS lands. Direction occurs at both the Forest-wide and Management Area levels. Soil, water, riparian, and aquatic resource goals and objectives have been designed to achieve desired conditions over the long term, to maintain or restore soil-hydrologic functions and process within watersheds, and to assist in the de-listing of TMDLs, 303(d) WQL Water Bodies, and *Endangered Species Act* listed fish species. Soil, water, riparian, and aquatic standards and guidelines have been designed to maintain, protect, and restore watershed and aquatic conditions that could be adversely affected by other land management activities.

Numerous laws, regulations, and policies govern the use and administration of water, riparian, and aquatic resources on NFS lands. Some of the more important ones-such as PACFISH, INFISH, the BOs for salmon and bull trout, and the Water Quality Protocol would continue to be implemented as described in the FEIS (refer to Appendix C). All land management activities occurring on NFS lands must comply with these laws, regulations, and policies, which are intended to provide general guidance for the implementation and management of, water,

riparian and aquatic resources. Effects will continue to occur within the HCNRA through time and site specific actions regardless of laws, policies, and regulations. The WWNF will however, continue to cooperate with state and federal agencies and Nez Perce Tribe to ensure that other planning efforts such as Snake and Imnaha River TMDL/WQMP development, bull trout recovery unit teams, Hells Canyon Complex relicensing, and current *Forest Plan* planning efforts (Payette National Forest and Wallowa-Whitman National Forest) will lead to improved conditions essential for habitat recovery.

Monitoring and Mitigation

The following ongoing monitoring and mitigation items will be part of the implementation for the selected alternative.

1. Continue cooperative monitoring efforts with the states of Idaho and Oregon and the Nez Perce Tribe to determine presence/absence and spawning densities for *Endangered Species Act* listed fish species across the HCNRA (*Forest Plan*, pg. 4-30 through 31). Although levels of monitoring have shifted in recent years due to decreased funding, an annual level of monitoring will still occur.
2. Continue program of aquatic inventory work across the HCNRA to determine habitat quantity and quality (*Forest Plan*, pg. 4-30 through 31).
3. Continue active participation in recovery efforts for listed aquatic species within the HCNRA (eg. Bull trout Recovery Unit Team participation) (*Forest Plan*, pg. 4-30 through 31). When recovery plans are completed incorporate recovery measures in management activities.
4. Provide site-specific inventory and determinations for sensitive aquatic/riparian species prior to implementation of projects falling under the umbrella guidance of the CMP (*Forest Plan*, pg. 4-30 through 31).
5. Continue to apply PACFISH and INFISH standards in all management activities to provide protection for riparian and aquatic habitats and species (PACFISH/INFISH 1995). New decisions would supplement existing management direction.
6. Ensure IIT implementation and effectiveness monitoring is conducted in HCNRA for developed modules (USDC 1998).

The following will be beneficial outcomes from selected Alternative E-Modified programmatic guidance through future site-specific actions.

1. Monitor and report on the use of prescribed burning and large-scale replacement fires especially in RHCA's (FEIS, Appendix F, Monitoring Plan)
2. Apply PFC protocols, where appropriate, to assess riparian area condition (FEIS, Appendix C, Table C-1, Rip/Aqu-S3 & G2).
3. Restoration (passive and active) will be applied to riparian/aquatic habitat found to be functioning at-risk or is nonfunctional (FEIS, Appendix C, Table C-1 Rip/Aqu-S4).
4. Close 177 miles of road permanently and 27 miles of road seasonally (FEIS, Appendix C, Table C-1, Acc-S1, Acc-S6, Acc-G2, Wld-S7)
5. Construct no new roads within the HCNRA (FEIS, Appendix C, Table C-1, Acc-S4).
6. The use of motorized and mechanical equipment would be prohibited off open designated Forest Service roads, trails and backcountry airstrips, except where authorized by permit. (Public LURs 36 CFR 292.44) (FEIS, Appendix C, Table C-1, Acc-S1).
7. Close all vacant allotments except for 3,641 acres (FEIS, Appendix C, Table C-1, Gra-S7)
8. Continue to monitor jet boat use levels along the Snake River corridor each year (Snake River Plan)
9. Provide resource advisors during fire management activities (FEIS, Appendix C, Table C-1, Fire-S5).

Forest Plan Consultation

Based on the above stated reasons, there is no need to re-initiate consultation on the *Forest Plan* because changes are within the context of the most recent *Forest Plan* consultation for Bull trout, Snake River fall and spring/summer chinook salmon, Snake River sockeye salmon, and Snake River steelhead.

Conclusion and Determination of Effects

The action will update the management plan for NFS lands administered by the WWNF and will have low risk or no risk of causing adverse effects to listed species or elements key to their recovery. The amended *Forest Plan* will apply to a wide range of activities within the HCNRA. Site-specific decisions will be made on individual projects at the forest level, following separate environmental analyses that tier from this action. The effect of implementing the proposed action would provide long-term benefits for *Endangered Species Act* listed and candidate species, and sensitive aquatic species. The goals and objectives for the selected action are designed to minimize effects on *Endangered Species Act* listed or candidate species and their habitats. The following determinations are based on this BA including all monitoring and mitigation items.

Bliss Rapids snail

Based on the above analysis, a determination of **may effect, not likely to adversely affect the species** is anticipated for the selected alternative.

Bull trout

Based on the above analysis, a determination of **may effect, not likely to adversely affect the species** is anticipated for the selected alternative.

Snake River fall and spring/summer chinook salmon

Based on the above analysis, a determination of **may effect, not likely to adversely affect the species or its designated critical habitat** is anticipated for the selected alternative. It is also determined that the implementation of the proposed action **may effect but is not likely to adversely modify or destroy Essential Fish Habitat** for the Snake River fall and spring/summer chinook salmon.

Snake River Sockeye salmon

Based on the above analysis, a determination of **may effect, not likely to adversely affect the species** is anticipated for the selected alternative. It is also determined that the implementation of the selected action **may effect, not likely to adversely modify or destroy the critical habitat** for the Snake River sockeye salmon.

Snake River steelhead

Based on the above analysis, a determination of **may effect, not likely to adversely affect the species** is anticipated for the selected alternative.

Columbia spotted frog

Based on the above analysis, a determination of **may effect, but is not likely to jeopardize the continued existence of this candidate aquatic species** is anticipated for the selected alternative.

This page left intentionally blank.

Plant Species



Analysis of Ongoing Actions and Programmatic Direction

This section provides a description of the status, species distribution, life history and habitat requirements, population, habitat conditions and trends for Howell's spectacular thelypody, MacFarlane's four-o'clock, Spalding's catchfly, Ute ladies' tresses, water howellia, and slender moonwort.

The analysis of the ongoing actions addresses recreation activities, access, vegetation activities, and livestock grazing and provides mitigation and monitoring, and a determination of effects for each species.

The analysis of the programmatic direction from the selected alternative includes the direct and indirect effects, cumulative effects, aggregate effects, conclusion and determination of effects for each species.

New site-specific projects proposals would be subject to Section 7 *Endangered Species Act* consultation process. This would ensure that surveys are conducted and mitigations are developed to protect any listed populations in the project areas. If populations of other listed, proposed, or candidate species are found, consultation with the USFWS will be re-initiated.

Appendix C of this BA summarizes the effects determinations of ongoing actions and actions for MacFarlane's four-o'clock.

Current Management Direction

Refer to the summary of Alternative A (current direction) in Chapter 2 of the FEIS and the full text of the goals, objectives, standards and guidelines in the FEIS, Appendix C, Table C-1 for Biologically Unique Plant Species, Habitats and Ecosystems for an description of the current management direction. Refer also to the complete list of all goals, objectives, standards and guidelines for Alternative A (current direction) that also apply to protection of listed plant species. Ongoing monitoring of MacFarlane's four-o'clock would continue.

Howell's spectacular thelypody (*Thelypodium howellii* ssp. *spectabilis*)

Status

Howell's spectacular thelypody (*Thelypodium howellii* ssp. *spectabilis*) was federally listed as threatened in 1999 (USFWS, CFR 64(101); May 17, 1999).

Species Distribution

Howell's spectacular thelypody is currently known from only eleven sites in the world, all in the Baker Valley of Oregon. The HCNRA is about fifty miles to the east of the nearest known site of Howell's spectacular thelypody.

Life History and Habitat Requirements

The following habitat information is summarized from the final rule on listing of Howell's spectacular thelypody (Federal Register, Vol. 64, No. 101, Page 28393).

Thelypodium howellii ssp. *spectabilis* is an herbaceous biennial mustard that grows in wet, alkaline meadows in valley bottoms, basins, flats, and floodplains. The plants are usually found in and around woody shrubs that dominate the habitat on the knolls and along the edge of the wet meadow habitat between the knolls. Plants at the sites are typical of alkaline soils: greasewood (*Sarcobatus vermiculatus*), alkali saltgrass (*Distichlis stricta*), and alkali cordgrass (*Spartina gracilis*). The known populations range between 3,200 to 3,600 meters in

elevation. Soils at the sites are pluvial-deposited alkaline clays mixed with recent alluvial silts, and are moderately well drained. *Thelypodium howellii* ssp. *spectabilis* may be dependent on periodic flooding for reproduction; it appears to rapidly colonize recently flooded stream terraces.

Population, Habitat Conditions, and Trends

The former Forest Botanist (Paula Brooks direct communication undated) has visited several populations of Howell's spectacular thelypody in the Baker Valley. She observed that the occupied habitat is unique for this area. There are no habitats in the HCNRA that are at all similar to the habitat for Howell's spectacular thelypody in the Baker Valley. Five other botanists or ecologists who have performed fieldwork in the HCNRA also confirmed that they do not know of any places similar to the habitat described for this species (Jerry Hustafa, Marty Stein, James Kagan, Elizabeth Crowe, and Charles Johnson; direct communication January 2001). A Forest Service soil scientist familiar with the HCNRA (Art Kreger direct communication January 2001) confirmed that he does not know of any areas of alkaline wetland soils in the HCRNA. Based upon the information that similar habitat has not been observed in the HCNRA, potential habitat for Howell's spectacular thelypody does not exist in the HCNRA.

Conclusion and Determination of Effects

Therefore, there will be **no effect** to this species from any ongoing activities in the HCNRA or the selected alternative from the FEIS for the Comprehensive Management Plan. This species will not be discussed further in this BA.

MacFarlane's four-o'clock (*Mirabilis macfarlanei*)

Status

MacFarlane's four-o'clock is currently listed as threatened under the *Endangered Species Act* (61 FR 10692). Originally, MacFarlane's four-o'clock was listed as endangered in 1979 (44 FR 61912) with only three known populations. Since then, additional populations have been discovered resulting in the change to threatened status March 15, 1996. Critical habitat has not been designated for this species. The USFWS recently published the Revised Recovery Plan for MacFarlane's four-o'clock (USDI 2000).

Species Distribution

MacFarlane's four-o'clock grows in grassland habitats between 1,000 and 3,000 feet in elevation, in the Imnaha, Snake, and Salmon River drainages of Oregon and Idaho. Populations have been found in many different plant associations, soil types, and on all aspects and slopes. The USFWS counts 12 populations over its range. Of these, five occur in the HCNRA. Because of their proximity to one another, the USFWS considers eight sites in the vicinity of Pittsburg Landing in Idaho as one population. This analysis will refer to each individual site location based on their site name in Table 4-4.

Table 4-4: Site Locations of Documented MacFarlane's four-o'clock

State	GIS #	Site Name	# Plants	Acres	Allotment (Grazing Status)
OR	0207, 0532-0534	Tryon Bar/ Snake River	3,000	100	Canyon (vacant)
	0495	Buck Creek/Imnaha	200	1	Private (grazed?)
	0496	Fall Creek/Imnaha	350	20	Log Creek (FS fenced)
	1324	Pleasant Valley/Snake	100	1	Canyon (vacant)

Table 4-4: Site Locations of Documented MacFarlane's four-o'clock, continued

ID	GIS #	Site Name	# Plants	Acres	Allotment (Grazing Status)
	0488	West Creek/Snake	250	2	Pittsburg (fenced, vacant)

	0487	Mine Gulch/Snake	150	2	Pittsburg (vacant)
	0490	Pleasant Valley/ Island Gulch	40	0.1	Pittsburg (vacant)
	0494	Kurru Creek/Pittsburg	17	0.1	Pittsburg (fenced, vacant)
	0493	West Kurru Divide #1	1,500	3	Pittsburg (vacant)
	0492	West Kurru Divide #2	1	0.1	Pittsburg (vacant)
	0491	West Kurru Divide #3	16	1	Pittsburg (vacant)
	1359	South Kurru Divide	50	1	Pittsburg (vacant)

Life History and Habitat Requirements

MacFarlane's four-o'clock is a long-lived herbaceous perennial species. This plant usually emerges from the ground by early April, blooms May through June, sets seed by mid-summer (June to July), then dies back to a large, tuberous root growing deep in the soil until the following spring. This species appears to reproduce mostly via the growth of underground rhizomes, which then send up new shoots producing new, but genetically identical, plants or ramets. All the ramets arising from and including the "mother" plant are collectively known as the genet or clone. Although few surviving seedlings have been found during monitoring or other research, sexual reproduction is believed to occur based on the high number of distinct genets at some sites (Barnes 1996). The relative amount of sexual vs. vegetative reproduction is not known and may differ from site to site (Kaye and Meinke 1992).

Several researchers have observed insect visitors to *M. macfarlanei* plants that may act as pollinators for this species, including bumblebees (*Bombus* spp.) and solitary bees (*Anthophora* spp. and *Tetralonia* spp.) (Kaye and Meinke 1992, Barnes et al 1995). Common floral visitors to *M. macfarlanei* include long-tongued bees of several genera, such as *Anthophora*, *Bombus*, *Synhalonia*, and *Melecta* (Barnes 1996). These insects are vital to successful sexual reproduction in this species (Barnes 1996). Although *M. macfarlanei* is self-compatible, it apparently requires a vector for pollination (Barnes 1996). Although it appears that sexual reproduction is not the main mode of spread for the species, it is a critical factor for maintaining genetic diversity and may be a key to long-term survival of the species.

Individual plants may live for many years, but the size of crown growth and number of flowers produced annually varies according to temperature and precipitation (Kaye and Meinke 1992, Johnson 1995). Due to this life cycle pattern, the time of year when activities are most likely to directly impact MacFarlane's four-o'clock is during the spring and early summer, when the plants are actively growing, flowering, or fruiting.

MacFarlane's four-o'clock occurs in dry, low elevation canyon slopes of the Snake, Imnaha, and Salmon Rivers. Grassland habitat in good ecological condition appears to be important for the long-term survival of MacFarlane's four-o'clock. In one analysis, the density of nonnative species may have been a factor influencing the presence of MacFarlane's four-o'clock. Apparently suitable but unoccupied habitat had a higher density of exotic species than nearby MacFarlane's four-o'clock locations (Kaye and Meinke 1992). All known populations of MacFarlane's four-o'clock in the HCNRA occur in grassland plant communities below 3,000 feet elevation. These communities are dominated by bluebunch wheatgrass (*Agropyron spicatum*) but may also include sand dropseed (*Sporobolus cryptandrus*), red three-awn (*Aristida longiseta*), and Sandberg's bluegrass (*Poa secunda*). Few generalizations can be made regarding slope angle, aspect, plant associations (other than grassland), or soil types.

Population, Habitat Conditions, and Trends

Population size estimates for MacFarlane's four-o'clock are complicated by the clonal growth habit of this species. Most population size estimations have been based on stem counts, which do not accurately reflect the number of genetic individuals (Barnes et al 1994). Barnes (1996) estimated that a genetic individual has an average of 4.88 stems (ramets) per genet. Using this figure, the USFWS (USDI 2000) estimated the population size over the entire range of MacFarlane's four-o'clock to be 8000-9000 individuals. Applying this calculation to the population size counts provided in Table 4-2 (above), the total population of MacFarlane's four-o'clock in the HCNRA is estimated to be 1150 genetic individuals or 13 percent of the estimated population.

In the revised recovery plan, the USFWS (USDI 2000) identified the following threats to MacFarlane's four-o'clock: herbicide and pesticide application, road construction and maintenance, livestock grazing, invasion by weeds, insect damage and disease, herbivory by wildlife, interruption of natural fire regimes, trampling by

recreationists, off-road vehicle use, scientific collection, horticultural collection, mining, pollinator competition, and inbreeding depression.

Domestic livestock grazing (cattle, sheep, and horses) likely has the greatest potential to impact populations MacFarlane's four-o'clock. Potential negative effects of grazing include ingestion, trampling, erosion from trampling, introduction and spread of noxious weeds, and changes in vegetative composition. MacFarlane's four-o'clock may experience less grazing pressure due to its tendency to grow in more steep or dry areas than plants that grow in riparian areas, where cattle spend more time. Yellow starthistle, an aggressive noxious weed, occurs in patches in the vicinity of the Pittsburg Landing sites. Extensive acres of this weed occur down river. Yellow starthistle could easily overrun MacFarlane's four-o'clock in Hells Canyon.

The HCNRA has historically experienced grazing at various levels by cattle, sheep, and horses. Nez Perce Indians grazed horses as early as the 1730s. In the latter half of the 19th century, Euro-American settlers began grazing livestock. During this time, livestock ranged as long as weather, water, and forage conditions permitted, and much of the accessible range was severely damaged by overgrazing. Heavy impacts began to lessen in the early 1900s when the Forest Service began to regulate numbers of livestock use. Sheep and cattle permits in the Imnaha and Snake River drainages peaked in 1920 with 108,000 animal unit months (AUM: Cow and calf pair grazing for one month). In 1995 domestic sheep grazing ceased on the Oregon side of the HCNRA and by 1998 only 38,620 cattle AUM's were permitted.

Due to a lack of historical reference conditions, it is not possible to determine whether grazing has eliminated patches of MacFarlane's four-o'clock in Hells Canyon.

A monitoring study was begun in 2001 to investigate the effects of livestock grazing on MacFarlane's four-o'clock in Hells Canyon. This study will seek to determine the difference in frequency between grazed and ungrazed MacFarlane's four-o'clock; however, ten or more years of data may be needed to clearly determine trends. Although statistically valid monitoring data is not yet available, visual impacts of cattle trails through populations have prompted the Forest to build exclosure fences around two populations near Pittsburg landing, in Idaho, and at one population in the Imnaha River drainage.

Status of Known Populations

The status and effects resulting from ongoing actions at known MacFarlane's four-o'clock sites are discussed below.

Oregon Populations

Tryon Bar/Snake River

Oregon EO #001

GIS #0207, 0532-0534

This population is the largest in Oregon, with at least 3,000 plants estimated. It is near (just north of) Tryon Bar on the Oregon side of the Snake River in the Hells Canyon Wilderness. The population is one continuous colony that includes an estimated several thousand plants spread over approximately 300 acres. The predominant aspect is east, and the slope angle averages over 70 percent (although a few plants are on less than 10% slope).

The Tryon Bar population is in the Canyon cattle and horse allotment, which is currently vacant; livestock have not grazed this area since about 1979. After the Canyon allotment became vacant, it was sometimes permitted for use by livestock on a temporary basis to accommodate cattle displaced from adjacent allotments by wild fire. This included use of the Mormon/Sleepy area during 1990 and 1991, after the Teepee Butte fire. However, known *Mirabilis* populations are several miles away from this area and it is unlikely they were impacted from grazing (Chuck Quimby direct communication undated).

There are no roads or developed recreation sites within several miles of this site. A few individual plants (<10) are near a recreation trail, but they represent a very small fraction of the population. Between 1979 and 1991, the Forest Service used portions of the vacant Canyon Allotment (including the Tryon Allotment area) for winter pasture for administrative stock. Typically 60-80 head of horses and mules used the area from November through April. The stock reportedly stayed up near Tryon Ranch and on the bench or above, which would not be in the known population (Ed Weber direct communication with Jerry Winegar undated). The area is no longer

used for this purpose.

The area where this population occurs burned in the Eastside Complex fire in September of 2000. The site is composed of light fuels: mainly bunchgrass and forbs. This area burned lightly and in a mosaic pattern. Some areas were not burned. A visit to the site in May of 2001, and again in 2002 showed no apparent mortality to MacFarlane's four-o'clock, which would be expected, because the plant was dormant at the time of the fire.

The main human related activities that could affect the site are hiking, horseback riding, and hunting. However, due to the remote location, and steepness of the terrain, these are probably not significant uses of this particular area.

Pleasant Valley/Snake

Oregon EO #005

GIS #13245

Located in the Hells Canyon Wilderness, This population is situated on the lower slopes of the Snake River, about 100 meters south of Pleasant Valley Creek and about one mile north of Pittsburg Landing, on the Oregon side of the river. An Idaho Power botany crew found this population in 1997, who reported about 100 plants. This area burned in the Salt Creek fire in the summer of 1996. In May of 2001 Forest Service staff visited this site and tallied about 90 clumps or plants in a "healthy" population with no indications of disturbance. In 2002, the site was again visited in 2002 when three new clumps were located opposite Pleasant Valley Creek on a south aspect. Both were large vigorous clumps. The total population was estimated between 90 and 100 clumps. There is no domestic grazing, roads, or trails near this population.

Buck Creek/Imnaha

Oregon EO #002

GIS #0495

This population of MacFarlane's four-o'clock is on private land along the Imnaha River, within the boundary of the HCNRA. This population has also been referred to as the Packsaddle and Kettle Creek sites. Two hundred plants are reported in one acre. The MacFarlane's four-o'clock plants are on a steep, rocky hill. No serious impacts from cattle have been noted, although evidence of cows has been observed within the area of the population.

The Eastside fire of 2000 burned near, but not into, this population. The plants are not near any public roads or trails, so impacts from recreation are probably minimal.

Delbert and Garnet Lewis, of Red Cloud, Nebraska, currently own this land; it is under consideration for a future land exchange. This land is surrounded by the Packsaddle pasture of the Log Creek allotment. The private land is mapped as fenced, and excluded from the allotment. The current status of this fence is not known. Maintenance of the boundary fence between public and private lands is the responsibility of the private landowner. It is also not known if HCNRA permitted cows ever trespass onto the private land from the Packsaddle pasture. There is visual evidence of grazing of the private land in this site. Cattle trails have been observed in the vicinity of the four-o'clock, but grazing of it or other grasses in the area have not been observed. A 1992 report speculated that cattle might have used the trails to access other areas but did not graze in the vicinity of the four-o'clock due to the steep slopes that range from 30-50 percent. The use of this land for cattle grazing is not related directly or indirectly to any government allotment (Howard Lyman direct communication undated).

This population lies entirely on private land, and there are no direct, indirect, inter-related or inter-dependent government activities that may impact this population. Therefore, the Forest Service and the USFWS have no jurisdiction over the activities of the private landowners as they relate to this population. Therefore, this population will not be discussed further in this BA, except in the context of cumulative effects.

Fall Creek/Imnaha

Oregon EO #003

GIS #0496

This site has been referred to as Fence Creek and also Dug Bar, and Dug Bar Road sites. It is near Fence Creek, but is actually closer to Fall Creek. It is adjacent to the Dug Bar road, but it is nowhere near Dug Bar itself. Some of this population is on private land, owned by Bruce L. Hamm, of Moscow, Idaho. The private land is outside the congressionally designated boundary of the HCNRA, so it would be difficult for the Forest Service to acquire.

There are approximately 350 plants in 20 acres, some of which is on private land. The aspect ranges from south to east facing with the slope angle between 20-60 percent. Soil is deep sandy loam to coarse lithosol. Plant associations are bluebunch wheatgrass and Idaho fescue types. The soil in much of the population is very loose and is easily eroded by people or animals walking on it. Long term monitoring plots had been installed in this population; however, monitoring was discontinued due to concerns from erosion caused by the people conducting the monitoring.

A power line tower access road dissects the population. Idaho Power is the only legal user of this road, although it is not currently posted as closed to the public.

The federal portion of this population is located in the Packsaddle Pasture of the Log Creek Cattle and Horse Allotment. The permit allows for between 50 and 200 cattle in this pasture from March 1st to April 15th each year. The Annual Operating Plans from 1991 forward state "Cattle entering the Packsaddle Unit during March and April will not graze in the southern end of the unit after March 15th. This will provide protection for endangered plant species." In 2000 the WWNF constructed a fence around most of the portion of the population that lies on NFS land. The fence was built during the time of year when no plants were visible, so it was not possible to ensure the fence encompassed every plant. Natural barriers and riders are used to move cattle away from the remainder of the population after March 15th. Cattle from other allotments are permitted to trail through this site.

The Dug Bar Road (Forest Service Road #4260) goes right by the uphill edge of the Fall Creek population. In 1991, it was noted that road grading had buried several plants with dirt that had been pushed off the side of the road. Posts were erected at each end of the population along the road to alert the grader operators of the location of the population. The road between these two posts is no longer graded, and the plants adjacent to the road appear to have recovered from the dirt that was piled on them (Jerry Hustafa direct communication undated).

Recreation use is probably not a factor at this site, as it is on a steep hill, and quite distant from the Imnaha River. However, this population is locally well known, and the fence or population may be vulnerable to vandalism.

The Eastside fire of 2000 burned near, but not into, this population.

Idaho Populations

West Creek

Idaho EO #006

GIS #0488

The West Creek site is a large population of 250 plants located adjacent to the Big Canyon Road (FS Road #1805). The West Creek site is in the Pittsburg Allotment, which became vacant in 2003. Up to this time, cattle had grazed this pasture through March of each year. Most of the MacFarlane's four-o'clock had been fenced in 1998 to exclude grazing by cattle. The population lies on a steep north-facing slope and had been impacted by cattle before it was fenced. It is probably not being impacted by the nearby road or Canyon visitors. The West Creek site also contains a large patch of teasel (*Dipsacus sylvestris*), an exotic weedy plant that may be impacting MacFarlane's four-o'clock plants. Yellow star-thistle, an aggressive weed is known to occur within ¼ mile and poses a threat to this site.

Pleasant Valley/Island Gulch

Idaho EO #009

GIS #0490

The Pleasant Valley site lies a short distance north of Pittsburg landing near the Snake River. This population occurs on a steep hill about 50 yards above a dirt spur road that leads to the Snake River. The part of the road that is just below the population of plants is not a "system" road. An open road (#493B) curves to the north of the population. The spur that passes under the population is legally closed. Although not posted closed, on the Idaho side of the HCNRA, roads are closed unless posted open. This site had not been fenced from cattle, but grazing impacts had not been observed. This population is in the recently vacated Pittsburg Allotment, Dam Lot pasture, where grazing was scheduled over the winter through March. This population is probably not being impacted by the nearby road or recreation area visitors because there is no evidence of driving impacts.

Mine Gulch/Snake

Idaho EO #007

GIS #0487

The Mine Gulch site has been referred to as the Island Gulch site also. This population of about 150 plants is just a little north and east of the Pleasant Valley/Island Gulch site. Most of the plants are growing on a small rocky ridge and down a steep hill into a gulch. There is a closed road (jeep trail) on the northwest edge of this

population. Signs designating the closure were posted at the end of the open road in the spring of 2000. In 2002, the site was visited and recent ATV use (tracks) was noted on the closed road. Some plants growing directly adjacent this road and a few that grow out of the roadbed itself showed stunted growth, believed to be a result of unauthorized off-road vehicle use. Located in the now vacant Pittsburg Allotment, this site had not been fenced from past cattle grazing and trailing impacts had been noted in the past. Although the plants are near an inactive mining claim, the area is closed to new mining claims, so mining is no longer a threat here.

Kurru Creek

Idaho EO #010

GIS #0494

The Kurru Creek site is just south of Kurru Creek and just east of Pittsburg Landing. The edge of the population is adjacent to the Pittsburg landing road. This is a small population; only 17 plants have been reported. This population is in the recently vacated Pittsburg Allotment, although it was fenced to exclude grazing in the early 1990's, when the allotment was in use. The reconstruction of the Pittsburg road in early 1993 may have impacted some plants that were adjacent to the road. A concrete barricade was placed along the edge of the road so future maintenance actions would not affect this site. Yellow star-thistle, an aggressive noxious weed, as well as scotch thistle and puncture vine, are found nearby and threaten to invade this site.

West Kurru Divide #1

Idaho EO #011

GIS #0493

The West Kurru Divide #1 site lies about one mile east of the large West Creek/Snake population. It is a large population (1,500), with many of the plants on open, loose, almost cinder-like soil, which appears to be very prone to erosion. This population is in the Stonehouse pasture of the recently vacated Pittsburg allotment. The permitted period of livestock use was scheduled between March 20th and April 31st. Impacts from cattle (exposed rhizomes due to erosion) were noted in 1997.

West Kurru Divide #2

Idaho EO #012

GIS #0492

The West Kurru Divide #2 is a single plant located on the ridge, west of West Kurru Divide #1 population. This population is in the Stonehouse pasture of the Pittsburg allotment. The permitted period of livestock use is between March 20th and April 31st. Observations regarding cattle use are not available at this site. Yellow starthistle, an aggressive weed is known to occur within ¼ mile and could threaten this site.

West Kurru Divide #3

Idaho EO #013

GIS #0491

The West Kurru Divide #3 site is found growing with hackberries in some places, which is uncharacteristic for Macfarlane's four-o'clock. This population is in the Lower West Creek pasture of the recently vacated Pittsburg allotment. The permitted period of livestock use had been scheduled between March 20th and April 31st. Evidence of cattle impacts (trails and hoof prints from when the soil was wet) was noted here in 1997. Yellow starthistle, an aggressive weed is known to occur within 200 meters and could threaten this site.

South Kurru Divide

Idaho EO #900

GIS #1359

The South Kurru Divide population, which contains 50 ramets, is near the West Kurru Divide #1 and #2 populations. This population is not well documented and would be revisited to determine its full extent and population size. This population is in the Stonehouse pasture of the recently vacated Pittsburg allotment, where the permitted period of livestock use had been from March 20th to April 31st. The population is reported to be in a very steep area that was isolated from cattle by rim rock. Evidence of livestock impacts have not been observed at this site.

MacFarlane's four-o'clock Potential Habitat

Through a cooperative venture with the Forest Service, the Oregon Natural Heritage program modeled probable habitat for MacFarlane's four-o'clock in the HCNRA (Murray 2001). Known populations were analyzed to determine which features and their relative importance would help predict habitat for MacFarlane's four-o'clock. The Natural Heritage Programs of Oregon, Idaho, Washington and Montana provided information on habitat parameters, locations, and associated flora. Vegetation (34%) and elevation (66%) were found to be most useful; aspect and slope did not have bearing in predicting habitat for MacFarlane's four-o'clock. Both habitat features of vegetation and elevation were then analyzed to determine the relative importance of classes within each type. For example, of the vegetation community types that are known to host MacFarlane's four-o'clock, some types harbor more sites, and some fewer. Community types known to harbor more sites were assigned a higher rank. These results were used to build the model using ArcView® software's ModelBuilder module. A map at the 60 m resolution was produced. Refer to the map of the modeled potential habitat in Appendix B of this BA.

The predictive model identified 39,090 acres of habitat in the HCNRA that may support MacFarlane's four-o'clock. This model further classified MacFarlane's four-o'clock habitat into "moderate," "high," and "very high" probability ranks. The model was compared with known sites of MacFarlane's four-o'clock on the WWNF. Known sites fall within each of the probability ranks (very high: 7; high: 3; moderate: 2); however, more sites are located in very high potential habitat, consistent with the development of the model.

Under the selected alternative (E-modified) 4,258 acres are located in active cattle allotments; 831 acres are in administrative horse pastures; 31,558 acres are in vacant allotments; and 2,443 acres are on private lands within the HCNRA. Table 4-5 displays the acres of these probability ranks within active allotments, administrative horse pastures, abolished allotments, and private lands within the HCNRA. Refer to a map of known MacFarlane's four-o'clock locations and the habitat model located in Appendix B.

Table 4-5: Acres of MacFarlane's four-o'clock Potential Habitat by Probability Class

Probability Class	Administrative Horse Pasture	Active Allotment	Vacant Allotment	Private Lands	Total
Moderate	352	2,711	4,026	1,293	8,382
High	472	1,547	24,382	1,150	27,551
Very High	7	0	3150	0	3157
Total	831	4,258	31,558	2,443	39,090

Thirteen percent of MacFarlane's four-o'clock potential habitat is located in active allotments or administrative horse pastures, but only 0.1% (7 acres) is classified as very high potential habitat. Nearly all very high potential habitats are located within the recently vacated Pittsburg Allotment, portions of which were inventoried for the presence of MacFarlane's four-o'clock in 1991. The Pittsburg Allotment went into vacant status in 2002.

Spalding's catchfly (*Silene spaldingii*)

Status

On December 3, 1999 the USFWS published a proposed rule to list Spalding's catchfly (*Silene spaldingii*) as threatened (64 FR 67814). The final rule for listing was published October 10, 2001 to list Spalding's catchfly as threatened (66 FR 51597).

Species Distribution

Spalding's catchfly has been found at widely scattered sites throughout northeastern Oregon, western Idaho, eastern Washington, western Montana, and southern British Columbia. Spalding's catchfly grows in remnant Palouse prairie and canyon grasslands. In northeastern Oregon the species is typically found in grasslands dominated by Idaho fescue (*Festuca idahoensis*). Depending on soil and moisture characteristics, some sites have few or no shrubs or trees present, whereas other sites may have large shrub thickets (e.g., *Symphoricarpos albus*, *Physocarpus malvaceus*, or *Rosa* spp.). Scattered individuals of Ponderosa pine (*Pinus ponderosa*) or Douglas-fir (*Pseudotsuga menziesii*) may be found in or adjacent to *S. spaldingii* habitat. Some *S. spaldingii*

populations occur in relatively open stands of Ponderosa pine (Gamon 1991, USDA 1997). *Silene spaldingii* sites range from approximately 1,750 to 5,100 feet elevation (State of Oregon, Natural Heritage Program 1998, State of Washington, Natural Heritage Program 1998). Soils are moderate to deep. Slopes range from 0 to approximately 60 percent (Gamon 1991).

On the WWNF, Spalding's catchfly is found on the edge of the Wallowa Valley Ranger District near the Zumwalt Prairie, but is not known to occur in the HCNRA. Most of the Spalding's catchfly in northeast Oregon occurs on private lands of the Zumwalt Prairie and other grassland habitat in the Wallowa Valley.

Life History and Habitat Requirements

Spalding's catchfly is a long-lived perennial herb with four to seven pairs of lance-shaped leaves and small greenish-white flowers. Reproduction is by seed only; Spalding's catchfly does not possess rhizomes or other means of vegetative reproduction (Lesica 1992). Spalding's catchfly seed germinates in the mainly in the spring, grow for two months, then seedlings go dormant until cooler temperatures and rains come with the Autumn, when growth again commences (Lesica 1988). Because of this, seedlings are rarely observed in the summer. Mature Spalding's catchfly plants generally flower from mid-July through August (Lesica 1995), and in Oregon until as late as September (Kagan 1989). The fruits mature from August through September, then the plants senesce and go dormant. The critical growth period that would consider all active growth stages of the plant would therefore run from early spring through the autumn (April through October).

This species often exhibits prolonged dormancy (i.e., plants may not come up for one to several years). Lesica (1997) found that most plants spend nearly half their summers in dormant condition. Germination probably occurs in fall as well as spring. Rosettes are formed the first year, after which vegetative stems are produced.

On the WWNF Spalding's catchfly is found in relatively mesic grassland sites with northwest to northeast facing aspects, or in flat areas. The plants often occur in microhabitats that are at the heads of draws, in small swales, or in depressions in ridge tops. The soils are deep and seem to hold moisture longer than the surrounding areas.

Populations, Habitat Conditions and Trends

There are no known populations of Spalding's catchfly in the HCNRA. There are several populations of the species either adjacent to, or near the area. One population is on private land in Idaho, across the Snake River from the HCNRA. Other nearby populations occur in the Upper Imnaha watershed, about five miles to the west of the HCNRA boundary.

Although no populations of Spalding's catchfly have been discovered during surveys in the HCNRA, this may be partially due to the biology and cryptic nature of Spalding's catchfly. Most surveys that have been done for rare plants in the HCNRA were during the spring and early summer months, before this species would have been in bloom and identifiable. In addition, even when this species is in bloom it is difficult to notice among the tall grasses where it grows. This species is not one that is likely to be found by casual surveys or untrained personnel. It is likely that undiscovered populations of this species exist in the HCNRA. The plant communities with the greatest potential for the species are deep-soiled areas dominated by Idaho fescue.

The WWNF completed a cooperative project with the Oregon Natural Heritage Program to model potential habitat for Spalding's catchfly in the HCNRA. Documentation of known sites throughout the plant's range was used to identify and weight parameters of vegetation, elevation, slope, and aspect (Murray 2001). A sufficiently detailed soil map was not available to be used in the model. This model identified 66,820 acres of potential habitat for Spalding's catchfly in the HCNRA. Of this, 29,034 acres are in active grazing allotments; 1,203 acres are in administrative horse pastures; 864 acres are on private lands within the HCNRA; and the remaining 35,719 acres are in allotments that are vacant or would be closed with the selected alternative. This model further classified habitat into probability ranks of "moderate," "high," and "very high" (Table 4-4).

Table 4-6: Acres of Spalding's catchfly Potential Habitat by Probability Class

Probability Rank	Administrative Horse Pasture	Active Allotment	Vacant Allotment	Private Lands	Total
Moderate	245	19,556	22,320	96	42,217
High	950	7,569	11,284	767	20,570
Very High	8	1,909	2,115	1	4,033
Total	1,203	29,034	35,719	864	66,820

Known populations on the WWNF outside the HCNRA are all in habitat classified very high.

Very high probability habitat was mapped on 4,033 acres, high probability was mapped on 20,570 acres, and moderate probability habitat was mapped on 42,217 acres. The acreages of high and moderate habitat are unusually large, which may be due to the lack of detailed soils information available to the modeler. The total amount of potential habitat for Spalding's catchfly is 71 percent greater than that for MacFarlane's four-o'clock (39,090 acres), a plant that is more likely to be found in greater abundance in the HCNRA. If the acreages for moderate habitat are discounted, and only high and very high probability habitat is considered as "true" potential habitat, then the amount of Spalding's catchfly habitat in the HCNRA falls to 24,603 acres. Of this, less than half (10,436 acres or 42%) is located in active allotments or administrative horse pastures.

Ute ladies' tresses (Spiranthes diluvialis)

Status

The USFWS listed Ute ladies' tresses as threatened in 1992 (57 FR 2048).

Species Distribution

Ute ladies' tresses are not known to occur in the HCNRA or anywhere else on the WWNF. The nearest population of this species is located 200 miles to the north-northwest along the Columbia River near Wenatchee, Washington. The next nearest site is located about 300 miles to the east along the floodplains of the Snake River in eastern Idaho. Surveys have not been done conducted in the HCRNA for this species.

Life History and Habitat Requirements

Ute ladies' tresses is a wetland herb in the orchid family and was described recently by Sheviak (1984). A perennial that grows from tuberous roots, it is found in areas that are seasonally flooded. Current populations are reported for stream terraces, islands in rivers, and along the edges of lakes and ponds. All reported populations are below 6,500 feet. Ute ladies' tresses plants may not bloom, or even emerge, above ground every year. Many *Spiranthes* species are initially saprophytic, persisting underground for many years before emerging above ground. For these reasons, USFWS survey guidelines recommend revisiting potential habitat for this species for several years in a row before determining that the habitat is not occupied. Depending on location, climatic conditions, and seasonal weather, Ute ladies' tresses blooms from mid July through September. This species can be positively identified only when it flowers. Pollination by bumblebees is apparently required for successful sexual reproduction. While monitoring a Colorado population, it was observed that Ute ladies' tresses produced an over-wintering rosette during late summer or fall (Arft 1995). Leaf growth commenced the following growing season and inflorescence buds were produced as early as June. This active growing season for this plant covers a long span. Furthermore, the over-wintering rosette is vulnerable to damage during its dormant period.

Population, Habitat Conditions and Trends

Potential habitat for the Ute ladies' tresses is probably limited in the HCNRA. This plant grows along low-gradient streams or in marshy areas near lakes and ponds. Habitat may exist along the along the Snake River from

between the Imnaha River and the Washington border, and Imnaha River. It is unlikely that this species would be found in the sub-alpine areas of the Seven Devils Mountains, because known populations are at much lower elevations.

The WWNF completed a cooperative project with the Oregon Natural Heritage program to model potential habitat for Ute ladies' tresses in the HCNRA (Murray 2001). This model used the following parameters to predict habitat for Ute ladies' tresses: riverine corridors between 720 and 7000 feet elevation, average annual precipitation between 7.5 and 22 inches, and stream gradient between zero and one percent. This broad model identified 77.9 miles of stream corridors within the HCNRA that could possibly provide habitat for Ute ladies' tresses. Of these, 15.5 miles are within privately held lands and 62.4 miles are NFS lands. To convert river miles to acres, the model assumed an average width of 30 meters for riparian areas. This figure computes to 930 acres of potential habitat for the species in the HCNRA. With 746 acres being NFS lands. A more reasonable assumption for average riparian widths in the HCNRA is 15 meters. Using this, 465 acres of potential habitat exist within the HCNRA, with 373 acres located on NFS lands. Because of the general parameters used in building the model, its estimates of potential habitat are likely quite high. The forest hydrologist (Craig Kendall direct communication 2002) pointed out the model incorrectly identified numerous streams that exceed one percent slope gradient. More accurate figures of potential habitat are expected to be much lower. Suitable habitat for Ute ladies' tresses may be present only along certain reaches of the Snake and Imnaha Rivers.

Water howellia (Howellia aquatilis)

Status

Water howellia (*Howellia aquatilis*) is an annual, aquatic, flowering plant that grows mostly submerged and rooted in the bottom sediments (although it sometimes breaks off and floats) of ponds and sloughs. This species was federally listed as threatened under the *Endangered Species Act* in August of 1994 (59 FR 35860-35864).

Species Distribution

Water howellia historically was known from Washington, Oregon, California, Idaho, and Montana. Historical sites in Oregon are presumed extirpated. The bulk of the currently known populations are in northern Montana, in the Swan Valley, with several others near the Spokane, Washington area. In the last few years, a few populations have been found in California. One population exists near Potlatch, Idaho, approximately 60 miles northeast of the northern boundary of the HCNRA.

There are currently no known populations of water howellia on the WWNF, prior to 1999, the WWNF has not actively inventoried for this species. Although potential habitat is limited, the species may also occur in the HCNRA.

Life History and Habitat Requirements

Plants in Montana grow in glacially formed potholes, or river oxbows. Old historic sites in Oregon are also in small, nonglacial ponds, and river sloughs. The potholes in Montana are generally shallow (<1m deep), but the species has occasionally been observed in water up to approximately 2m in depth. The key factor for the habitat is that the area must stay wet at least into mid-summer (late June), but then dry out at least along the edges of the pond or oxbow. All reported sites are below 4,500 feet and are usually partially shaded by either deciduous or coniferous forest. Sites at higher elevations or in full sun may also provide habitat, although it would be less likely to find the water howellia growing in these sites. Most sites are in ponds with fairly high water quality. Based on this, it is probably safe to assume that artificially constructed livestock watering ponds would not be high probability habitat.

Populations, Habitat Conditions and Trends

Potential habitat for water howellia in the HCNRA is very limited. The area does not have glacially carved topography at moderate elevations that typifies the habitat. The main Snake River probably does not support good habitat, as the daily water fluctuations and flow are highly variable. In addition, there are no oxbows or sloughs on the Snake River as it passes through the HCNRA. There may be potential habitat on the Imnaha River, most of which is probably on private land. Most of the vernal pools in the HCNRA area are so shallow and seasonal that they probably dry out before the species could complete its lifecycle. The area with the greatest potential for habitat is the Duck and Twin Lakes area. There are many small ponds in the area that may have habitat for the species. Because known populations are not found at high elevations, this analysis assumes that subalpine lakes and ponds in the Seven Devils Mountains are not potential habitat.

Slender moonwort (Botrychium lineare)

Status

Botrychium lineare is a candidate species (66 FR 54808). The USFWS published a 12-month finding for a petition to list this small perennial fern. USFWS determined that sufficient information is currently available to support a finding that listing slender moonwort is warranted, but precluded by other higher priority actions (66 FR 30368).

Species Distribution

The slender, or linear-leaved, moonwort (*Botrychium lineare*) is a newly described grapefern (Wagner and Wagner 1994). This species has widespread, but spotty distribution. It is currently known from northeastern Oregon, northern Idaho, Montana, California, Colorado, Quebec, and New Brunswick.

Life History and Habitat Requirements

Habitat for the species is deep grass/forb meadows within lodgepole pine and/or Englemann spruce forest. It is occasionally found on shelves of limestone cliffs, mainly at higher elevations. The areas where it grows tend to be moist in the early season, but dry out by mid-summer.

Other species of grapeferns are known to grow many years underground before they emerge above ground. Individual plants also sometimes do not grow above ground for one to several years after they have produced emergent stems. Dry years also seem to produce fewer above ground individuals. These characteristics increase the difficulty of conducting surveys for the species.

Slender moonwort plants are very small (less than seven inches tall), and extremely difficult to find in the grass and other plants. This species is not likely to be found by casual surveys, or untrained personnel. In addition, it is extremely difficult to distinguish the various species of moonwort. It is possible that there are undocumented populations of the skinny moonwort in the HCNRA.

Population, Habitat Conditions and Trends

There are currently no known populations of the slender moonwort (or any other rare grape fern) in the HCNRA. The two known populations of this species in Oregon are in the Hurricane Creek and Lostine River drainages, 25 miles to the west of the HCNRA.

The Seven Devils area contains the highest probability of habitat for the slender moonwort in the HCNRA. There are many sub-alpine meadows in this area and there have been no rare plant surveys in this portion of the HCNRA. Another area with potential habitat for this species is the upper Imnaha river corridor, from the boundary of the Eagle Cap Wilderness downstream to where private land is encountered. A third area with potential habitat

for this species is the Duck Lake/Twin Lakes area, on the upper rim of the Imnaha River. Potential habitat may also be found in mesic meadows on the plateaus of the Snake River breaks.

Analysis of Ongoing Actions

The analysis of the ongoing actions addresses the activities with the greatest potential risk to impact listed or candidate species. The following analysis describes effects from recreation activities, access, vegetation activities, and livestock grazing and provides mitigation, and a determination of effects for each species.

Rare Plant Surveys

Limited survey work has been done to search for rare plant populations in the HCNRA. Rare plant surveys are generally funded by specific projects, few of which have occurred in habitat for listed plant species in the HCNRA. Most of the surveys were completed for a timber sale or recreation project, which usually avoid habitat for the species under consideration here. Recreation projects are usually very limited spatially, so surveys for those projects only cover those small areas. No formal rare plant surveys have been done in the Seven Devils portion of the Hells Canyon Wilderness in the past ten years, even though there is high potential habitat for rare plants, and there are two active sheep allotments in the area.

Rare plant surveys have been completed in the past for specific ground-disturbing activities, but no surveys have been done for the majority of the areas that are under permit for domestic livestock grazing. Botanical surveys were done in the early 1990s as part of the NEPA analysis for allotment management plans for Log Creek and Pittsburg cattle allotments. Many of the MacFarlane's four-o'clock populations in the Pittsburg landing area were found during these surveys. New populations of rare plant species were not found during the Log Creek Surveys. The Idaho Department of Fish and Game, Idaho Conservation Data Center conducted surveys for MacFarlane's four-o'clock from May 20-24, 1991 (the proper time of year, according to the Section 7 Guidelines) under a cost share agreement with the Forest (Mancuso and Moseley 1991). Extensive areas north and south of Pittsburg Landing were surveyed at this time.

Dispersed campsites along the Lower Dug Bar Road (below the Cow Creek bridge, and the Big Canyon road) were surveyed in the spring of 2000 for MacFarlane's four-o'clock in and around existing dispersed campsites. The lower two miles of the Kirkwood road were also surveyed in May of 2000 for all rare plant species identifiable at that time. No new populations were found in these surveys. No other botanical surveys were done specific to this planning effort.

These historical surveys did not specifically include a search for the Ute ladies' tresses, water howellia, or the slender moonwort because these species were either not yet described (slender moonwort), or were not on any lists of rare plants for the WWNF (Ute ladies' tresses and water howellia).

Most of the limited survey work that has been accomplished in the HCNRA for rare plants was completed during the spring and early summer months, which would be too early in the year to easily locate populations of Ute ladies' tresses, Spalding's catchfly, water howellia, or the slender moonwort.

Several thousand acres of potential habitat in the HCNRA have not been surveyed for rare plants. Therefore, undiscovered populations of MacFarlane's four-o'clock, Ute ladies' tresses, water howellia, Spalding's catchfly and the slender moonwort may be present within the project area.

MacFarlane's four-o'clock (Mirabilis macfarlanei)

The WWNF GIS system was used to overlay the habitat model for MacFarlane's four-o'clock with the locations of ongoing actions, such as: developed campgrounds, dispersed campgrounds, administrative sites, roads, trails, backcountry airstrips, snow play areas, grazing allotments, administrative horse pastures, and active mining claims. Actions outside areas of modeled habitat were considered to have no effect to MacFarlane's four-o'clock or its habitat because the likelihood is low that the species would be found outside areas predicted by the model.

Recreation – Dispersed Campsites

Twenty-six dispersed campsites out of approximately 368 total campsites in the HCNRA including sites in the Hells Canyon Wilderness occur in areas of modeled potential habitat for MacFarlane's four-o'clock: one in very high potential habitat, 21 in high potential habitat, and 4 in moderate potential habitat. Dispersed campsites are generally small areas of compacted ground or an average of 0.06 acres per dispersed site (50' by 50'). At this calculation, only 1.5 acres of dispersed campsites are located in areas of modeled habitat. Campsites themselves are not currently considered habitat because the ground is too compacted and devoid of vegetation. In the past, prior to their use as campsites, these areas may have provided habitat for MacFarlane's four-o'clock, but no longer are capable. Effects to MacFarlane's four-o'clock, if present, would arise from recreationists trampling vegetation in the area immediately adjacent the campsite. These effects are slight and would not extend more than 150 feet beyond the campsite. This places another 42 acres of modeled habitat at risk (1.62 acres of area surrounding each dispersed site in modeled habitat). Recreationists could also inadvertently introduce noxious weeds into the area with vehicle or recreational livestock use.

One dispersed site is located near the Mine Gulch MacFarlane's four-o'clock site, which lies about 100 yards upslope from the campsite. The campsite does not appear to be impacting the four-o'clock, but may serve as a staging area for unauthorized off-road driving that has been observed to impact the four-o'clock at the Mine Gulch site.

Mitigation

In modeled habitat, survey 150-foot buffer around dispersed campsites for the presence of MacFarlane's four-o'clock. Re-initiate consultation if plants are found. Refer to mitigation to post the closed road in the following section on access and travel management in this document.

Determination of Effects

The use of dispersed campsites within areas of modeled habitat **may effect but is not likely to adversely affect** MacFarlane's four-o'clock because 0.1 percent (0.11) of four-o'clock potential habitat falls within or adjacent these areas. Further, dispersed campsites and adjacent areas will be inventoried to determine if the species is present. If MacFarlane's four-o'clock is found in these areas, then consultation with the USFWS would be re-initiated and mitigation measures, if necessary, would be developed to protect the site. The use of dispersed campsites outside areas of modeled habitat would have **no effect** to MacFarlane's four-o'clock because these sites do not contain habitat known to support the plant.

Recreation - Outfitter and Guide Permits

The HCNRA maintains 21 special use permits for outfitting and guiding upland uses (cougar/bear hunting day use, from roads only, no horses – 3; progressive horse/mule trips – 11; llama trips – 2; mountain biking – 1; fishing and whitewater rafting on the Imnaha Wild and Scenic River – 1; photography – 1; motorized ground transportation on roads only – 1; and aircraft landing at backcountry airstrips - 1. Eleven permits operate in the Wilderness and ten permits operate in nonwilderness areas.

One outfitter and guide campsite exists within high potential habitat for MacFarlane's four-o'clock. Effects to MacFarlane's four-o'clock at this site would be the same as disclosed for dispersed campsites above.

Mitigation

In modeled habitat, survey 150-foot buffer around the outfitter and guide campsite for the presence of MacFarlane's four-o'clock. Re-initiate consultation if plants are found.

Determination of Effects

The use of one outfitter and guide campsite **may effect but is not likely to adversely affect** MacFarlane's four-o'clock because this area will be inventoried to determine if the species is present. If MacFarlane's four-o'clock were found in this area, then consultation with the USFWS would be re-initiated and mitigation measures, if necessary, would be developed to protect the site.

Recreation - Developed Campgrounds

Twenty developed campgrounds exist within the HCNRA. One, Pittsburg Landing Launch and Campground, is located within high potential habitat for MacFarlane's four-o'clock. Other developed campgrounds are not within or near modeled habitat for MacFarlane's four-o'clock. Areas around the Pittsburg Landing complex were surveyed for MacFarlane's four-o'clock from May 20-24, 1991 (the proper time of year, according to the Section 7 guidelines for MacFarlane's four-o'clock) by the Idaho Conservation Data Center under a cost share agreement with the Forest. The areas around the Pittsburg Landing Launch and Campground were surveyed extensively. Five new populations were located in the NRA as a result of these surveys. One population, Kurry Creek, was located along the road that leads to the Lower Pittsburg Landing recreational area. The site is about ¼ mile from the developed campground on a slope opposite Forest Road 493. The site is fenced and shows no signs of impact from visitors associated with the campground. Presumably the fence, which was constructed to exclude livestock, also discourages recreationists. Other four-o'clock sites are located at least one mile from the campground.

Determination of Effects

Because developed campsites are not immediately adjacent sites of MacFarlane's four-o'clock and because habitat in the vicinity of developed campgrounds have been surveyed for MacFarlane's four-o'clock, this action will result in **no effect** to MacFarlane's four-o'clock or its habitat.

Recreation - Administrative Facilities

Thirty-eight administrative facilities exist within the HCNRA. Three facilities are situated within high potential habitat for MacFarlane's four-o'clock: Tryon Creek Ranch, Salt Creek, and the Pittsburg Landing Launch and Campground. The Pittsburg Landing Launch and Campground consists of one campground (described above), six outbuildings, an information center, and a boat ramp. As described above in "Developed Campgrounds" the area around the Pittsburg Landing was surveyed in May of 1991. Four-o'clock was not found near the boat ramp and associated structures and parking facilities. One site (Kurry Creek) was near the road that provides access to the Pittsburg Landing area. Effects. This site is closest to the developed campground. Effects from the campground are disclosed above. All other facilities associated with the Pittsburg Landing are farther from the Kurry Creek four-o'clock site than the developed campground, and have no measurable effect on the site.

Tryon Creek Ranch, a complex of four structures; and Salt Creek, a complex of three structures, may affect MacFarlane's four-o'clock. Activities in these sites would consist of occasional maintenance. The immediate vicinity of each site has been altered and does not provide habitat for MacFarlane's four-o'clock. Areas adjacent to each site may receive impacts from visitors or WWNF staff by trampling plants, which would be expected to be greatest within 150 feet of these sites. Lethal effects from trampling would not be expected although individual plants could suffer setbacks in seed production and carbohydrate storage in a given season.

Mitigation

Survey areas around administrative sites in potential (modeled) habitat for the presence of MacFarlane's four-o'clock. Re-initiate consultation with the USFWS if plants are found.

Determination of Effects

The Pittsburg Landing complex was inventoried for MacFarlane's four-o'clock and plants have not been found. Therefore, this action would have **no effect** to MacFarlane's four-o'clock because the plant is presumed not present in the area. Tryon Creek Ranch, and Salt Creek Cabin administrative sites **may affect, but would not**

adversely affect the species because of mitigation to survey areas adjacent to these sites and the re-initiation of consultation with the USFWS if plants are found. Administrative sites not within modeled potential habitat would have **no effect** to MacFarlane's four-o'clock, because the species is presumed to not occur in these areas.

Table 4-7: Determination of Effects to MacFarlane's four-o'clock from Administrative Facilities

Site Name	MIMA Habitat	Determination
Dry Diggins Lookout (Idaho)	None	No effect
Horse Heaven (Idaho)	None	No effect
Heavens Gate Lookout (Idaho)	None	No effect
Seven Devils Guard Station (Idaho)	None	No effect
Cold Spring Cow Camp (Idaho)	None	No effect
Dixon Homestead (Idaho)	None	No effect
Circle C Ranch (Idaho)	None	No effect
Graves Point Lookout	None	No effect
Buckhorn Electronic Site	None	No effect
Cherry Creek	None	No effect
Jim Creek	None	No effect
Jim Creek Butte Electronic Site	None	No effect
Thorn Creek Guard Station	None	No effect
Tryon Creek Ranch	High	NLAA
Palace	None	No effect
Teaser Mountain	None	No effect
Wisenor Place	None	No effect
Dorrance Cow Camp	None	No effect
Somers Point Electronic Site	None	No effect
College Creek	None	No effect
Hat Point Lookout	None	No effect
Memaloose (New)	None	No effect
Memaloose (Old)	None	No effect
The Troughs	None	No effect
McGraw Lookout	None	No effect
Coverdale Guard Station	None	No effect
Ollokot Dry Creek Cabin	None	No effect
Lick Creek Guard Station	None	No effect
Kirkwood Historic Ranch	None	No effect
Salt Creek	High	NLAA
Sand Creek	None	No effect
Sheep Creek	None	No effect
Temperance Creek	None	No effect
Copper Creek Resort	None	No effect
Pittsburg Landing Launch and Campground (Idaho)	None	No effect
Pittsburgh Landing (Oregon)	None	No effect
Dug Bar	None	No effect
Cache Creek Ranch	None	No effect

Access – Roads and Road Maintenance

Five hundred thirty-three miles of road exist within the HCNRA. The table below displays the miles of road in modeled potential habitat for MacFarlane's four-o'clock. Roads crossing private lands were included because these would normally be traveled to access NFS lands.

Table 4-8: Miles of Road in MacFarlane's four-o'clock Potential Habitat

Probability Class	NFS Miles	Private Miles	Total Miles
Moderate	8.8	6.6	15.4
High	12.5	8.3	20.8
Very High	11.9	0	11.9
Total	33.2	14.9	48.1

Road maintenance actions along roads in known populations and potential habitat could affect MacFarlane's four-o'clock. Effects of road maintenance are limited to roads on NFS lands. Refer to 'roads' in the Glossary of the FEIS for a complete description of road maintenance definitions. Road maintenance, primarily the grading of roads, may affect MacFarlane's four-o'clock with the casting of road gravels off the road prism to the downhill sides of roads, potentially burying plants. This was observed at the Fall Creek/Imnaha MacFarlane's four-o'clock site, a situation that has since been mitigated. Posts were erected at each end of this population along the road to alert the grader operators of the location of the population. The road between these two posts is no longer graded, and the plants adjacent to the road appear to have recovered from the dirt that was piled on them (Jerry Hustafa pers. communication undated). The reconstruction of the Pittsburg road (#493) in early 1993 may have impacted some plants that were adjacent to the road. A concrete barricade was placed along the edge of the road so future maintenance actions would not affect this site.

Mitigation

In potential habitat, survey 50 feet adjacent roadsides for the presence of MacFarlane's four-o'clock. If plants are located, re-initiate consultation with the USFWS.

Determination of Effects

Road maintenance **may effect but would not adversely affect** MacFarlane's four-o'clock in potential habitat because plants are not known to occur in these areas at present. These areas will be surveyed (as part of the surveys for off-road impacts, below) and if plants were found, then consultation with the USFWS would be re-initiated. Road maintenance actions at Fall Creek/Imnaha and Kurry Creek populations have **no effect** to MacFarlane's four-o'clock because impacts have been mitigated.

Access – Off-road Vehicle Use

Impacts from off-road driving of vehicles within 300 feet of open roads for dispersed camping and firewood retrieval include direct destruction of plants and alteration of habitat to the point where MacFarlane's four-o'clock could not persist. In potential habitat, effects are assumed possible from both road maintenance and off-road driving to any four-o'clock plants that might be present.

Almost 12 miles of road intersect very high potential habitat. These roads are located on the Idaho side of the Canyon, which was surveyed for MacFarlane's four-o'clock during May of 1991 (see "Rare Plant Surveys" above). Most of the roadways here were examined under these surveys. In moderate and high potential habitat, portions of roads totaling 21.3 miles exist. At this length, a maximum of 1549 acres would be open to off-road vehicle use, assuming topography would not limit vehicles. (Off-road vehicle use is not permitted on the Idaho side of Hells Canyon, where all very high potential habitats are located.)

A closed jeep trail traverses the north edge of the Mine Gulch site. This site was visited in May 2002 and signs of recent ATV use were present (tracks in the jeep trail-bed) despite being a closed road. Roads in this portion (Idaho side) of the HCNRA are closed unless posted open; the jeep trail consequently is not posted closed.

Mitigation

Survey a 50-foot area adjacent to roadsides in potential habitat for the presence of MacFarlane's four-o'clock. If plants are found, re-initiate consultation with the USFWS.

Determination of Effects

Off-road vehicle use **may effect but would not adversely affect** MacFarlane's four-o'clock because plants are not known to occur in these areas at present. These areas will be surveyed and if plants were found, then consultation with the USFWS would be re-initiated.

Access - Trails and Trailheads

Nine hundred and twenty-five miles of trails exist within the HCNRA. Within modeled potential habitat for MacFarlane's four-o'clock, 2.2 miles cross moderate potential habitat, 67.4 miles cross high potential habitat, and 0.7 miles cross very high potential habitat. Trails do not go through known populations of MacFarlane's four-o'clock. Effects from the use of trails to MacFarlane's four-o'clock are assumed not to be potentially lethal. The greatest threat of the use of trails is the introduction of noxious weeds, which could move down the trailside or be introduced by hikers or recreational stock. If a trail were to cut through a population, erosion could be accelerated, eventually unearthing some rooted tubers of the plant. Twenty-seven trailheads are located within the HCNRA. No trailheads are situated within areas of modeled habitat for MacFarlane's four-o'clock.

Mitigation

Survey areas along trails in potential habitat for the presence of MacFarlane's four-o'clock. Re-initiate consultation if plants are found.

Determination of Effects

There would be **no effect** to known sites because trails do not go through or near known sites. In modeled potential habitat, trails **may effect but are not likely to adversely affect** MacFarlane's four-o'clock, because potential habitat would be surveyed for the presence of MacFarlane's four-o'clock and consultation with the USFWS would be re-initiated if plants were found. Because trailheads are not near known sites of MacFarlane's four-o'clock nor within potential habitat for MacFarlane's four-o'clock, this action will result in **no effect** to MacFarlane's four-o'clock or its habitat.

Access - Over-snow Vehicle Travel and Play Areas

Over-snow vehicle travel and play areas do not overlap with known sites or modeled potential habitat for MacFarlane's four-o'clock.

Determination of Effects

There would be **no effect** to MacFarlane's four-o'clock because over-snow play areas are not located within or near known sites or potential habitat.

Access - Backcountry Airstrips

Eight backcountry airstrips are located within the HCNRA. Memaloose and Lord Flat are located in the uplands of the Hat Point/Lord Flat area in Oregon. Cache Creek, Salmon Bar, Dug Bar, and Pittsburg airstrips are within the Scenic section and Big Bar is within the Wild section of the Snake River. Temperance Creek is in the Wild section of the Snake River and is used by permit only. Of these, Big Bar and Temperance Creek are located within modeled high potential habitat. Airstrips are not located within or near known sites of MacFarlane's four-o'clock. Airstrips themselves likely do not provide habitat for MacFarlane's four-o'clock because of past use resulting in soil compaction. Visitors may affect areas immediately adjacent to airstrips, which would receive higher use than more remote areas.

Mitigation

Survey areas around airstrips in modeled potential habitat for the presence of MacFarlane's four-o'clock. Re-initiate consultation if plants are found.

Determination of Effects

Memaloose, Lord Flat, Cache Creek, Salmon Bar, Dug Bar, and Pittsburg airstrips - There would be **no effect** to MacFarlane's four-o'clock because these airstrips are not located within potential habitat for this species.

Temperance Creek and Big Bar airstrip - These airstrips **may effect but is not likely to adversely affect** MacFarlane's four-o'clock, because potential habitat would be surveyed for the presence of MacFarlane's four-o'clock and consultation with the USFWS would be re-initiated if plants were found.

Vegetation - Noxious Weed Management

The WWNF completed an *Integrated Noxious Weed Management Plan* in 1992, which was updated with an additional 106 treatment sites in 1994. Methods include manual, chemical and biological control. A biological evaluation (BE) for the 1994 update was completed on May 3, 1994 (USDA 1994). The BE identified the proximity of MacFarlane's four-o'clock to treatment sites. Three treatment sites are within ½ mile of known MacFarlane's four-o'clock occurrences, two treatment sites are within ¼ mile of a known MacFarlane's four-o'clock occurrence, and one treatment site is within 100 yards of a MacFarlane's four-o'clock occurrence.

Only manual (use of hand operated tools to cut, clear, thin, girdle, or prune herbaceous and woody plant species) control methods are prescribed for the weed site within 100 yards of MacFarlane's four-o'clock. The other weed sites near MacFarlane's four-o'clock have both manual and chemical (spray or spot-application of herbicides) control methods prescribed. The BE concluded that sufficient distance between these MacFarlane's four-o'clock occurrences and treatment sites existed to avoid any effects from the use of herbicides. Herbicide application in these areas would be ground based.

Some weed treatment sites exist near potential habitat for MacFarlane's four-o'clock. Table 4-9 below displays these weed sites and their acreages that fall in potential (modeled) habitat for MacFarlane's four-o'clock. Some of the potential habitat on the Idaho side was surveyed in 1991 by the Idaho Conservation Data Center (Mancuso and Moseley 1991). For other areas, mitigation was included in the BE for the 1994 EA update to survey areas prior to treatment.

Table 4-9: Weed Sites in MacFarlane's four-o'clock Potential Habitat

Weed Site ID	Acres
06160400008	0.37
06160400009	3.16
06160400010	2.65
06160400014	6.71
06160400015	0.92
06160400016	0.38
06160400018	28.32
06160400020	20.00
06160400022	0.80
06160400023	213.48
06160400024	0.73
06160400025	22.97
06160400026	58.40
06160400027	97.86
06160400028	0.56
06160400029	31.04
06160400030	0.92
06160400033	138.52
06160400040	0.67
06160400043	0.92
Total	629.38

Mitigation

Survey areas around noxious weed sites in modeled potential habitat for the presence of MacFarlane's four-o'clock. Re-initiate consultation if plants are found.

Determination of Effects

Known sites - Management of noxious weeds would have **no effect** to MacFarlane's four-o'clock because known sites are sufficiently distant that measurable effects would be avoided.

Modeled potential habitat - Mitigation is included in the 1994 EA and repeated here to survey weed treatment sites prior to treatment for the presence of MacFarlane's four-o'clock. If these surveys locate new sites of MacFarlane's four-o'clock, then consultation with the USFWS would be re-initiated. Noxious weed treatment in potential habitat **may effect, but is not likely to adversely affect**, MacFarlane's four-o'clock.

Livestock Grazing

There are 566,411 acres in the HCNRA where livestock grazing may be permitted. This use is managed on 51 separate livestock allotments. Eleven of these allotments are currently vacant (267,506 acres or 47% of the total). The remaining 40 active allotments include two for domestic sheep (managed by the Payette National Forest) and 38 for cattle.

MacFarlane's four-o'clock or its habitat is not known to occur in active sheep allotments. Modeled potential habitat for MacFarlane's four-o'clock is mapped in 17 of the 42 active cattle allotments in the HCNRA. Known sites of MacFarlane's four-o'clock are located in the Pittsburg Allotment, which recently went into vacant status, and the Log Creek Allotment. The Log Creek allotment will be addressed in greater detail below, followed by an assessment of other allotments in the HCNRA.

Livestock Grazing - Log Creek Allotment

Resource Management Objectives for the Log Creek Allotment are:

1. Maintain and improve grassland conditions
2. Maintain and improve riparian vegetation, stream channel condition and fish habitat.
3. Protect steelhead habitat
4. Maintain and improve visual quality of grassland community within the foreground of Dug Bar Road.
5. Protect recreational trail system.
6. Protect MacFarlane's four-o'clock populations.

Five pastures comprise the Log Creek Allotment. One MacFarlane's four-o'clock site (Fall Creek) and 4.3 acres of modeled high potential habitat occur in one pasture, Packsaddle (03). This pasture normally has use scheduled from March 1 through April 15. The permit allows for between 50 and 200 cattle in this pasture from March 1 to April 15 each year. The Annual Operating Plans from 1991 forward state "Cattle entering the Packsaddle Unit during March and April will not graze in the southern end of the unit after March 15th. This will provide protection for endangered plant species." In 2000, the WWNF constructed a fence around most of the portion of the population that lies on NFS land. The fence was built during the time of year when no plants were visible, so it was not possible to ensure the fence enclosed every plant. Natural barriers and riders are used to move cattle away from the remainder of the population after March 15th. Cattle from other Allotments are permitted to trail through the Packsaddle Unit along the Dug Bar Road, at various times between March 1st and June 1st. The Eastside fire burned portions of this allotment in 2000, but did not burn the MacFarlane's four-o'clock site. Because of this fire, the allotment is in nonuse status for resource protection for the 2001-2002 grazing season.

The Fall Creek MacFarlane's four-o'clock contains about 350 plants in 20 acres, some of which is on private land. This private land is outside the congressionally designated boundary of the HCNRA. The aspect ranges from south to east facing with the slope angle between 20 and 60 percent. Soil is deep sandy loam to coarse lithosol. Plant associations are bluebunch wheatgrass and Idaho fescue types. The soil in much of the population is very loose and easily eroded by people or animals walking on it.

Botanical surveys for federally listed and Forest Service Region 6 sensitive plants were done in the early 1990s as part of the NEPA analysis for the Log Creek Allotment Management Plan. New populations of federally listed or Forest Service sensitive plants were not found during these surveys.

Mitigation

1. Each spring (before April 1st) walk the fence along the private land boundary around the Buck Creek population to ensure that the fence is intact.
2. Each spring, before April 1st, walk the other Fall Creek enclosure to ensure that it is functional.
3. Document the percentage of population inside the enclosure at the Fall Creek population. Increase enclosure to include any four-o'clock plants not fenced in.
4. Ensure that road maintenance activities avoid the Fall Creek site along Dug Bar road.
5. Post as closed to motorized travel the power-line access dirt road near the Fall Creek site. If impacts to MacFarlane's four-o'clock are found to result from unauthorized travel, install a locking gate.
6. Resurvey potential habitat. If plants are found, re-initiate consultation with the USFWS.

Determination of Effects

The Fall Creek MacFarlane's four-o'clock site is protected from grazing by the construction of a fence around the population in 2000, although a few plants may exist outside the protection of the fenced enclosure. The Log Creek Allotment was inventoried for the presence of federally listed and Forest Service Region 6 sensitive plants in the early 1990s as part of allotment management planning. New sites of MacFarlane's four-o'clock (or other listed or sensitive plants) were not located during these surveys. The likelihood that other sites of MacFarlane's four-o'clock exist within the Log Creek Allotment is very low. Some plants at the Fall Creek site may not be protected by the fenced enclosure. Mitigation is included to enlarge the enclosure to include all plants in the population if some are found outside the enclosure. The management of the Log Creek Allotment **may effect but would not likely adversely affect** MacFarlane's four-o'clock.

Livestock Grazing - Pittsburg Allotment

The Pittsburg Allotment is located on the east side of the Snake River in Idaho. This allotment was actively grazed up to mid 2002, at which time it went into vacant status. This means livestock grazing is no longer authorized in the Pittsburg Allotment. Within the Pittsburg Allotment eight sites of MacFarlane's four-o'clock are known to exist: West Creek, Pleasant Valley, Mine Gulch, Kurry Creek, West Kurry Divide #1, West Kurry Divide #2, South Kurry Divide, and West Kurry Divide #3. The status of these populations is discussed earlier in Populations, Habitat Conditions and Trends.

MacFarlane's four-o'clock Potential Habitat in Pittsburg Allotment

About 4000 acres of modeled potential habitat has been mapped in the Pittsburg Allotment. Of this, about 2500 acres are classified as very high potential with the remainder being moderate potential habitat. The table below displays the pastures with modeled potential habitat along with the scheduled season of use and acres.

Table 4-10: Acres of MacFarlane's four-o'clock Potential Habitat in Pittsburg Allotment

Allotment	Pasture # Name	Probability Class	2002 Season of Use	Acres
Pittsburg	05 Klopton	Very High	Jun 1 - June 15	7.2
Pittsburg	06 Behean	Moderate	May 1 - May 31	22.2
Pittsburg	06 Behean	Very High	May 1 - May 31	2.3
Pittsburg	07 Mothorn	Moderate	May 1 - May 31	47
Pittsburg	08 Lone Tree	Moderate	Dec 1 - Jan31	0.4
Pittsburg	09 Kurry	Moderate	Dec 1 - Jan31, May - May 31	182.4
Pittsburg	09 Kurry	Very High	Dec 1 - Jan31, May - May 31	184.8
Pittsburg	10 West Creek	Moderate	Mar 20 - Apr 31	174.4
Pittsburg	10 West Creek	Very High	Mar 20 - Apr 31	214.3
Pittsburg	11 Pond Lot	Very High	Feb 1 - Mar 31	67.2
Pittsburg	12 Feed Lot	Very High	Feb 1 - Mar 31	72.4
Pittsburg	13 Hayfield	Moderate	Feb 1 - Mar 31	6.9

Allotment	Pasture # Name	Probability Class	2002 Season of Use	Acres
Pittsburg	13 Hayfield	Very High	Feb 1 - Mar 31	153.4
Pittsburg	14 Dam Lot	Moderate	Feb 1 - Mar 31	85.0
Pittsburg	14 Dam Lot	Very High	Feb 1 - Mar 31	297.4
Pittsburg	15 Airport	Very High	Feb 1 - Mar 31	174.2
Pittsburg	16 Stonehouse	Moderate	Dec 1 - Jan 31, Mar 20 - Apr 31	114.2
Pittsburg	16 Stonehouse	Very High	Dec 1 - Jan 31, Mar 20 - Apr 31	379.3
Pittsburg	17 Stockdale	Moderate	Dec 1 - Jan 31	24.2
Pittsburg	17 Stockdale	Very High	Dec 1 - Jan 31	450.2
Pittsburg	19 Lower West Creek	Very High	Mar 20 - Apr 31	248.8
Pittsburg	20 North Hill - West Creek	Moderate	Mar 20 - Apr 31	64.0
Pittsburg	20 North Hill - West Creek	Very High	Mar 20 - Apr 31	59.7
Pittsburg	23 No Man's Land	Moderate	Oct 1 Dec 15	4.9
Pittsburg	23 No Man's Land	High	Oct 1 Dec 15	1.4
Pittsburg	23 No Man's Land	Very High	Oct 1 Dec 15	24.7
Pittsburg	25 CLOSED AREA	Moderate	Closed Area	793.4
Pittsburg	25 CLOSED AREA	Very High	Closed Area	94.0
Pittsburg	US	Moderate	Closed Area	66.3
Pittsburg	US	Very High	Closed Area	97.6
Total				4,114.2

The Pittsburg Allotment was inventoried for the presence of listed plants and Forest Service Sensitive Plants during the early 1990s as part of the allotment management planning process. Some new sites of MacFarlane's four-o'clock were discovered at this time. These sites are described above in the section Populations, Habitat Conditions and Trends.

Determination of Effects

Because the Pittsburg Allotment is currently in vacant status and grazing is no longer authorized, this allotment would have **no effect** to known sites of MacFarlane's four-o'clock. If livestock grazing were authorized here in the future, consultation with the USFWS would be reinitiated.

Livestock Grazing – Other Allotments

The table below displays the acreage of modeled potential habitat for MacFarlane's four-o'clock on NFS lands within active allotments. The season of use for each pasture is also displayed. Because of wildfires that burned through some areas certain allotments or Pastures have "non-use" scheduled for 2002 season, which means these units will not be grazed this season allowing for the area to recover. These areas would be grazed again in the future, and so for this consultation will be considered stocked according to the current operating plan.

Table 4-11: Acres of MacFarlane's four-o'clock Potential Habitat in Active Allotments

Allotment/Pasture	Pasture # Name	Probability Class	2002 Season of Use	Acres
Blackmore	04 Turner	High	April 16 - May 15	3.3
Cayuse	01 Basin	High	April 16 - May 30	118.7
Cayuse	02 Pumpkin Creek	High	June 1 - 15; Nov, 1-30	1.0
Cayuse	03 Deer Creek	High	April 16 - 30	34.9
Cold Springs	05 Lower Basin	High	Oct 16 - Nov 30	0.6
Cold Springs	10 Cook Creek	High	Nonuse 2001-2002	11.3
College Creek	01 North	High	Nov 1 - 30 (April 16 - May 15 '03)	2.8
Cow Creek	01 Fingerboard	High	Nonuse 2002	24.1
Cow Creek	02 Salt Gulch	High	Nonuse 2002	8
Cow Creek	04 West Cow Creek	High	Nonuse 2002	0.6
Cow Creek	05 Deer Creek	High	Nonuse 2002	13.4
Del Curto	01 Del Curto	High	Apr 14 - June 15	15.8
Dodson-Haas	01 Upper Horse Creek	High	Mar 16 - May 15	0.5
Dodson-Haas	02 Horse Creek North	High	Mar 16 - May 15	12.3
Dodson-Haas	05 School Flat	Moderate	Jan 16 - Apr 15	1.7
Dodson-Haas	05 School Flat	High	Jan 16 - Apr 15	22.8
Dodson-Haas	07 East Pasture	Moderate	Mar 16 - Apr 15	317.5
Dodson-Haas	08 Maggie Beacher	High	Mar 16 - Apr 15	1.4

Allotment/Pasture	Pasture # Name	Probability Class	2002 Season of Use	Acres
Dodson-Haas	10 Corral Creek	High	Jan 16 - Feb 28; Mar 16 - Apr 15	1.7
Dodson-Haas	11 Thorn Creek	Moderate	Mar 16 - Apr 15	23.5
Dodson-Haas	11 Thorn Creek	High	Mar 16 - Apr 15	7.9
Dodson-Haas	12 Bull Pasture	Moderate	Mar 16 - Apr 15	47.7
Dodson-Haas	12 Bull Pasture	High	Mar 16 - Apr 15	12.8
Dunlop-Thorn	01 West	High	May 1 - May 30, Nov 11 - 16	1.8
East Pine Valley	02 Grouse Flat	High	Jun 26 - Jul 26	6.4
Himmelwright	01 Hells Canyon	High	Vacant	3.5
Horse Creek	01 Road	High	Oct 1 - 31 (Holding Unit) Rest St.	4.3
Horse Creek	02 Magpie	High	Nonuse 2002, 2003	1.5
Horse Creek	03 Knapper	High	Apr 16 - May 15	15.2
Horse Creek	04 Imbler	High	Apr 16 - May 15	5.7
Lone Pine	01 Big Canyon	High	Nonuse 2001, 2002 (Dec 1 - Apr 15)	591.3
Lone Pine	04 Little Deep Creek	High	Nonuse (Apr 16 - May 31; Dec 1 - 30)	0.2
Middle Point	03 West I	High	Apr 16 - May 31	58.5
Middle Point	04 East I	High	Apr 16 - May 31	15.9
Middle Point	06 West II	High	Apr 16 - May 31	4.0
Middle Point	07 West III	High	Apr 16 - May 31	132.6
Middle Point	08 West IV	High	Apr 16 - May 31	110.2
Middle Point	09 East II	High	Apr 16 - May 31	81.3
Rhodes Creek	01 Willow Springs	Moderate	Mar 1 - Apr 15	332.0
Rhodes Creek	01 Willow Springs	High	Mar 1 - Apr 15	35.6
Rhodes Creek	02 Holmes	Moderate	Apr 1 - Apr 15	179.7
Rhodes Creek	02 Holmes	High	Apr 1 - Apr 15	2.1
Rhodes Creek	03 Foster	Moderate	Nonuse	36.9
Rhodes Creek	03 Foster	High	Nonuse	0.5
Rhodes Creek	04 Westside Cow	Moderate	Apr 1 - 15, Jan 1 - Mar 15	30.6
Rhodes Creek	04 Westside Cow	High	Apr 1 - 15, Jan 1 - Mar 15	5.2
Rhodes Creek	05 Westbench Lightning	Moderate	Apr 16 - Apr 30, Jan 16 - Feb 15	282.6
Rhodes Creek	05 Westbench Lightning	High	Apr 16 - Apr 30, Jan 16 - Feb 15	17
Rhodes Creek	06 Eastbench Lightning	Moderate	Apr 16 - Apr 30, Jan 16 - Feb 28	1043.2
Rhodes Creek	06 Eastbench Lightning	High	Apr 16 - Apr 30, Jan 16 - Feb 28	3.8
Rhodes Creek	12 Horse Pasture	Moderate	Feb 1 - May 15 (5 head)	171.4
Rhodes Creek	12 Horse Pasture	High	Feb 1 - May 15 (5 head)	16.1
Rhodes Creek	13 Lightning Creek	High	May 1 - May 15, Nov 1 - Jan 15	4.0
Rhodes Creek	17 Heifer Lot 1	Moderate	Feb 1 - Feb 30	0.2
Rhodes Creek	17 Heifer Lot 1	High	Feb 1 - Feb 30	1.6
Rhodes Creek	18 Heifer Lot 2	Moderate	Feb 1 - Feb 30	1.1
Rhodes Creek	18 Heifer Lot 2	High	Feb 1 - Feb 30	2.8
Snell	02 West	High	Apr 16 - Apr 25, May 5 - May 25	43.2
Teepee Elk	01 Temperance Creek	High	Jun 1 - Jul 15, Oct 6 - Oct 31	1.0
Toomey	01 Johnsen Canyon	Moderate	Nonuse 2002	220.7
Toomey	02 Toomey	Moderate	Nonuse 2002	5.0
Toomey	04 Spring Gulch	Moderate	Nonuse 2002	8.4
Toomey	06 Hayfield	Moderate	Nonuse 2002	0.7
Toomey	09 Closed Area	Moderate	Nonuse	7.5
Toomey	09 Closed Area	High	Nonuse	1.0
Total				4171

Domestic livestock grazing (cattle, and horses) may impact populations of MacFarlane's four-o'clock. MacFarlane's four-o'clock or its modeled habitat does not occur in sheep allotments in the HCNRA. Possible negative effects from livestock grazing include ingestion, trampling, erosion from trampling, introduction and spread of noxious weeds, and changes in vegetative composition. MacFarlane's four-o'clock may experience less grazing pressure from cows due to its tendency to grow in more steep or dry areas than plants that grow in riparian areas, where cattle spend more time.

The critical period of growth for MacFarlane's four-o'clock is between April 1 and July 15. That is, MacFarlane's four-o'clock begins growth in the April and is senescent by mid July; grazing during this period would result in direct effects to the plant. Herbivory and trampling at this time would impact the ability of the plant to flower, set seed, and store carbohydrates in the root system (tuber) for the next growing season. Grazing outside the critical growth period could result in indirect effects to MacFarlane's four-o'clock via alteration of the plant community or through the introduction of invasive plants. Grazing at levels that reduce the cover of native grasses or increase the amount of early-seral native or exotic species would negatively affect MacFarlane's four-o'clock. Eventually, changes in the plant community, particularly to invasive exotic species that would outcompete MacFarlane's four-

o'clock for water and nutrients, would eventually cause the demise of the four-o'clock. Conversely, grazing at levels (outside the critical period of growth) that are known to maintain the composition of perennial native vegetation is assumed to maintain MacFarlane's four-o'clock, if it were present, because indirect effects - changes in plant community composition to exotic invasive plants - would be avoided. The effects of grazing during the critical growth period would be more immediate, whereas grazing outside the critical growth period would result in impacts that take longer to effect MacFarlane's four-o'clock.

Mitigation

Because much of the habitat for MacFarlane's four-o'clock has not been surveyed, potential habitat should be inventoried to reduce the uncertainty in determining effects to MacFarlane's four-o'clock. For reasons stated above, high and very high potential habitats in pastures where grazing occurs during the critical period of growth are the first priority to be inventoried. These habitats would be inventoried during the first two years. Moderate potential habitat in active allotments used during the critical period of growth would be inventoried during year 3 following this consultation. Habitat in allotments that are grazed outside the critical period of growth would be inventoried during years 4 and 5 following this consultation. If MacFarlane's four-o'clock plants are found, then consultation with the USFWS would be re-initiated and mitigation measures would be developed to protect the species.

Determination of Effects

Allotments having no modeled potential habitat would have **no effect** to MacFarlane's four-o'clock because the plant is presumed not to occur in these areas. Vacant allotments would have no effect to MacFarlane's four-o'clock because no grazing actions are occurring at this time. Consultation would be initiated when and if these allotments were to be stocked in the future. Some allotments are in non-use status in 2001-02. These allotments are being consulted on now because the non-use is temporary and grazing may begin with the 2002-03 season or later. Allotments with modeled potential habitat, but no known populations, **may effect but would not likely adversely affect** MacFarlane's four-o'clock. Potential habitat in these allotments would be surveyed according to the schedule above and consultation with the USFWS would be re-initiated if plants were found.

Table 4-12: Determination of Effects to MacFarlane's four-o'clock from Livestock Allotments

Allotment Name	Habitat Present	Critical Growth Period	Determination
Big Canyon	Vacant		No effect
Blackmore	Yes, 3.3 acres	Yes	NLAA
Cache Creek	Vacant		No effect
Cannonball	No		No effect
Canyon	Vacant		No effect
Cayuse	Yes, 155 acres	Yes	NLAA
Chalk Creek	No		No effect
Cherry Creek	Vacant		No effect
Chesnimus	No		No effect
Cold Springs	Yes, 12 acres	No	NLAA
College Creek	Yes, 3 acres	Yes	NLAA
Cow Creek	Yes, 46 acres	Non Use 2002	NLAA
Cow Creek- Idaho	No		No effect
Curren Hill	Vacant		No effect
Deep Creek	No		No effect
Del Curto	Yes, 16 acres	Yes	NLAA
Dodson-Haas	Yes	Yes	NLAA
Doe Creek	No		No effect
Double Pine	No		No effect
Dunlop-Thorn	Yes, 2 acres	Yes	NLAA
Dunn Creek	No		No effect
East Pine Valley	Yes	Yes (June 26-July 26)	NLAA
Echols Butte	No		No effect
Ghost Camp	No		No effect
Grizzly Ridge	No		No effect
Grouseline	No		No effect
Himmelwright	Vacant		No effect
Hope Creek	Vacant		No effect
Horse Creek	Yes, 27 acres	Yes	NLAA
Jim Creek	Vacant		No effect
Keeler	No		No effect
Log Creek	Yes	Yes	NLAA

Allotment Name	Habitat Present	Critical Growth Period	Determination
Lone Pine	Yes, 592 acres	Yes (Nonuse 2002)	NLAA
Lost Cow	No		No effect
Marr Flat	No		No effect
Middle Point	Yes, 321 acres	Yes	NLAA
Mud-Duck	Vacant		No effect
Northpine	No		No effect
Papoose	No		No effect
Pittsburg	Yes	Yes	LAA
Rhodes Creek	Yes, 2166 acres	Yes	NLAA
Saddle Creek	No		No effect
Schleur	No		No effect
Sheep Creek	Vacant		No effect
Snake River	No		No effect
Snell	Yes, 43 acres	Yes	NLAA
Teepee Elk	Yes, 1 acre	Yes (Nonuse 2002)	NLAA
Temperance-Snake	Vacant		No effect
Toomey	Yes, 252 acres	Nonuse 2002	NLAA
Turnbull	No		No effect
Turner Creek	Vacant		No effect

Livestock Grazing - Administrative Horse Pastures

Administrative horse pastures are areas within existing active or vacant allotments set aside for the use of Forest Service stock. Eleven administrative horse pastures currently total over 18,500 acres. MacFarlane's four-o'clock is not known to occur in any of the administrative horse pastures; but modeled potential habitat totaling 831 acres has been identified in five of these pastures. The distribution of potential habitat by class is displayed in the table below. These acres represent less than five percent of the total acres used as administrative horse pastures in the HCNRA.

Table 4-13: Acres of MacFarlane's four-o'clock Potential Habitat in Administrative Horse Pastures

Probability Class	Acres
Moderate	352
High	472
Very High	7
Total	831

Administrative horse pastures that contain potential habitat for MacFarlane's four-o'clock are Pittsburg (admin site) (38 acres), Pittsburg Allotment (359 acres), Tryon (179 acres), Salt Creek-Slaughter Bar (248 acres), and the Jim Creek winter pasture (7 acres).

Administrative horse pastures may be used during the critical growth period for MacFarlane's four-o'clock (April 1 - July 15). Depending on the size of individual pastures, the number of head, and duration of use, effects to MacFarlane's four-o'clock - if present - could be more severe than those from cattle. Because of the relatively low amount of potential habitat in administrative horse pastures (2.1%), the likelihood is low that MacFarlane's four-o'clock would be discovered in these areas. Nonetheless, the possibility remains that this plant could be discovered in administrative horse pastures. Although these areas represent a small portion of all potential habitat in the HCNRA, survey records for these areas are lacking.

Mitigation

Survey potential habitat in administrative horse pastures for the presence of MacFarlane's four-o'clock. If plants are found, re-initiate consultation with the USFWS.

Determination of Effects

College Creek, Thorn Creek, Memaloose, Lord Flat, Horse Heaven, Seven Devils administrative horse pastures - The use of College Creek, Thorn Creek Memaloose, Lord Flat, Horse Heaven, Seven Devils administrative horse pastures in the HCNRA would have **no effect** to MacFarlane's four-o'clock because these areas do not contain habitat for MacFarlane's four-o'clock.

Pittsburg (admin site), Pittsburg C&H, Tryon, Salt Creek-Slaughter Bar, and the Jim Creek Winter Pasture - **may effect but would not likely adversely affect** MacFarlane's four-o'clock, because we do not know if plants are present. Potential habitat in these administrative horse pastures would be surveyed for the presence of MacFarlane's four-o'clock. If MacFarlane's four-o'clock were found, then consultation with the USFWS would be re-initiated.

Aggregate Effects

Aggregate effects are the combined effects of all the separate federal actions when added together. The effects of all actions to MacFarlane's four-o'clock at each of the known locations are described above in the section **Population, Habitat Conditions, and Trends**. Some actions **may effect**, but are **not likely to adversely effect** MacFarlane's four-o'clock. None rise to the level where adverse effects are occurring or are expected to occur.

Other potential threats to MacFarlane's four-o'clock may result from ongoing actions in areas where undiscovered populations may exist, at least until such areas have been inventoried for the presence of this plant. Because 87 percent of the potential habitat for MacFarlane's four-o'clock in the HCNRA has been mapped in allotments with vacant or closed status, it is assumed that known populations, plus any undiscovered populations in closed allotments, would continue to contribute to the long-term viability of the species in the HCNRA. Mitigation measures are incorporated into this document to survey potential habitat in areas of ongoing grazing within five years. If new populations were discovered, consultation with the USFWS would be re-initiated, and mitigations would be developed, if necessary, to protect these populations. Likewise, the aggregate effects for all other ongoing actions to MacFarlane's four-o'clock do not rise to the level of adverse effects because the plant is not known to occur in the vicinity of any of these actions. Mitigation is included to survey potential habitat in areas of ongoing actions for MacFarlane's four-o'clock. If plants were found, consultation with the USFWS would be re-initiated.

Cumulative Effects

Cumulative effects, under the *Endangered Species Act*, include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area. Future federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to Section 7 of the *Endangered Species Act*.

Within the action area (HCNRA) MacFarlane's four-o'clock is occurs on public or private land. Potential habitat for MacFarlane's four-o'clock exists in private land within the HCNRA. Since most private lands tend to be managed intensively, these areas may no longer provide habitat for MacFarlane's four-o'clock. The effects of future State, tribal, and local government actions would not add cumulatively to the aggregate effects described above affects to MacFarlane's four-o'clock. Tribal actions are not anticipated; tribal lands do not exist within the action area. State and local government actions are limited to state and county road maintenance, which would be confined to the roads rights-of way and would not affect potential habitat for MacFarlane's four-o'clock. Refer to Appendix C of this BA for a summary of effects for MacFarlane's four-o'clock.

Spalding's catchfly (Silene spaldingii)

The WWNF GIS system was used to overlay the habitat model for Spalding's catchfly with the locations of ongoing actions, such as: developed campgrounds, dispersed campgrounds, administrative sites, roads, trails, backcountry airstrips, snow play areas, grazing allotments, administrative horse pastures, and active mining

claims. Actions outside areas of modeled habitat were considered to have no effect to Spalding's catchfly or its habitat because the likelihood is low that the species would be found outside areas predicted by the model.

Recreation - Dispersed Campsites

Forty-one dispersed campsites out of approximately 368 total campsites in the HCNRA including the Hells Canyon Wilderness occur in areas of modeled potential habitat for Spalding's catchfly: five in very high potential habitat, 29 in high potential habitat, and seven in moderate potential habitat. The FEIS figured an average of 0.06 acres per dispersed site (50' by 50'). At this calculation, only 2.5 acres of dispersed campsites are located in areas of modeled habitat. Campsites themselves are not currently considered habitat because the ground is too compacted and devoid of vegetation. In the past, prior to use as campsites, these areas may have provided habitat for Spalding's catchfly, but are no longer capable. Effects to Spalding's catchfly, if present, would arise from recreationists trampling vegetation in the area immediately adjacent the campsite. These effects are slight and would not extend more than 150 feet beyond the campsite. This places another 66.5 acres of modeled habitat at risk (1.62 acres of area surrounding each dispersed site in modeled habitat). Recreationists may also inadvertently introduce noxious weeds into the area with vehicle or recreational livestock use.

Mitigation

Survey areas around dispersed campsites for the presence of Spalding's catchfly. Re-initiate consultation with the USFWS if plants are found.

Determination of Effects

The use of dispersed campsites within areas of modeled habitat **may effect but is not likely to adversely affect** Spalding's catchfly because potential habitat in dispersed recreation sites amounts to 0.1 percent of all potential habitat and these areas will be inventoried to determine if the species is present. If Spalding's catchfly were found in these areas, then consultation with the USFWS would be re-initiated and mitigation measures, if necessary, would be developed to protect the site. The use of dispersed campsites outside areas of modeled habitat would have **no effect** to Spalding's catchfly, because of the low likelihood of the species occurring in these areas.

Recreation - Outfitter and Guide Permits

The HCNRA maintains 21 special use permits for outfitting and guiding upland uses (cougar/bear hunting day use, from roads only, no horses – 3; progressive horse/mule trips – 11; llama trips – 2; mountain biking – 1; fishing and whitewater rafting on the Imnaha Wild and Scenic River – 1; photography – 1; motorized ground transportation on roads only – 1; and aircraft landing at backcountry airstrips - 1. Eleven permits operate in the Wilderness and ten permits operate in nonwilderness areas.

Two outfitter and guide campsites exist within high potential habitat for Spalding's catchfly. Effects to Spalding's catchfly (if present) at these sites would be the same as disclosed for dispersed campsites above.

Mitigation

Survey areas around the outfitter and guide campsite for the presence of Spalding's catchfly. Re-initiate consultation if plants are found.

Determination of Effects

The use of one outfitter and guide campsite **may effect but is not likely to adversely affect** Spalding's catchfly because this area will be inventoried to determine if the species is present. If Spalding's catchfly were found in this area, then consultation with the USFWS would be re-initiated and mitigation measures, if necessary, would be developed to protect the site. Outfitter and guide campsites located outside modeled potential habitat would have **no effect** to Spalding's catchfly, because of the low likelihood of the species occurring in these areas.

Recreation - Developed Campgrounds

Of the twenty developed campgrounds that exist within the HCNRA none are within or near modeled habitat for Spalding's catchfly or known populations. The likelihood Spalding's catchfly would be found outside modeled potential habitat is low.

Determination of Effects

Because developed campsites are not near known sites of Spalding's catchfly or its modeled habitat, developed campgrounds within the HCNRA will result in **no effect** to Spalding's catchfly or its habitat.

Recreation - Administrative Facilities

Thirty-eight administrative facilities exist within the HCNRA. Two facilities are situated within high potential habitat for Spalding's catchfly: Memaloose (Old) and the Salt Creek. The Salt Creek site consists of a complex of three structures. Administrative sites may affect Spalding's catchfly. Activities in these sites would consist of occasional maintenance. The immediate vicinity of each site has been altered and does not provide habitat for Spalding's catchfly. Areas adjacent to each site may receive impacts from visitors or WWNF staff by trampling plants, which would be expected to be greatest within 150 feet of these sites. Lethal effects from trampling would not be expected although individual plants could suffer setbacks in seed production and carbohydrate storage in a given season.

Mitigation

Survey areas around administrative sites in potential habitat for the presence of Spalding's catchfly. Re-initiate consultation with the USFWS if plants are found.

Determination of Effects

Memaloose (Old) and Salt Creek sites **may effect, but would not adversely affect** the Spalding's catchfly because of mitigation to survey areas adjacent these sites. Administrative sites not within modeled potential habitat for would have **no effect** to Spalding's catchfly, because the species is presumed not to occur in these areas.

Table 4-14: Determination of Effects to Spalding's catchfly from Administrative Facilities

Site Name	SISP Habitat	Determination
Dry Diggins Lookout (Idaho)	None	No effect
Horse Heaven (Idaho)	None	No effect
Heavens Gate Lookout (Idaho)	None	No effect
Seven Devils Guard Station (Idaho)	None	No effect
Cold Spring Cow Camp (Idaho)	None	No effect
Dixon Homestead (Idaho)	None	No effect
Circle C Ranch (Idaho)	None	No effect
Graves Point Lookout	None	No effect
Buckhorn Electronic Site	None	No effect
Cherry Creek	None	No effect
Jim Creek	None	No effect
Jim Creek Butte Electronic Site	None	No effect
Thorn Creek Guard Station	None	No effect
Tryon Creek Ranch	None	No effect
Palace	None	No effect
Teaser Mountain	None	No effect
Wisenor Place	None	No effect
Dorrance Cow Camp	None	No effect
Somers Point Electronic Site	None	No effect
College Creek	None	No effect
Hat Point Lookout	None	No effect
Memaloose (New)	None	No effect
Memaloose (Old)	High	NLAA
The Troughs	None	No effect
McGraw Lookout	None	No effect
Coverdale Guard Station	None	No effect
Ollokot Dry Creek Cabin	None	No effect

Site Name	SISP Habitat	Determination
Lick Creek Guard Station	None	No effect
Kirkwood Historic Ranch	None	No effect
Salt Creek	High	NLAA
Sand Creek	None	No effect
Sheep Creek	None	No effect
Temperance Creek	None	No effect
Copper Creek Resort	None	No effect
Pittsburg Landing Launch and Campground (Idaho)	None	No effect
Pittsburgh Landing (Oregon)	None	No effect
Dug Bar	None	No effect
Cache Creek Ranch	None	No effect

Access – Roads and Road Maintenance

Five hundred thirty-three miles of road exist within the HCNRA. The table below displays the miles of road in modeled potential habitat for Spalding's catchfly. Roads crossing private lands were included because these would normally be traveled to access NFS lands.

Table 4-15: Miles of Road in Spalding's catchfly Potential Habitat

Probability Class	NFS Miles	Private Miles	Total Miles
Moderate	4.1	0	4.1
High	41.6	1.6	43.2
Very High	5.5	0	5.5
Total	51.2	1.6	52.8

Five and one-half miles of road intersect very high potential habitat. In moderate and high potential habitat, portions of roads totaling 45.7 miles exist on NFS lands for a total of 52.8 miles of roads through Spalding's catchfly potential habitat.

Road maintenance actions along roads in potential habitat could affect Spalding's catchfly. Road maintenance, primarily grading of graveled roads, may affect Spalding's catchfly with the casting of road gravels off the road prism on the downhill sides of roads, burying plants.

Mitigation

Survey areas along roadsides in potential habitat for the presence of Spalding's catchfly. Re-initiate consultation if plants are found.

Determination of Effects

Road maintenance and off-road vehicle use occurs in very high, high, and moderate potential habitat **may effect** but is **not likely to adversely affect** Spalding's catchfly because plants are not known to occur in these areas at present. These areas would be surveyed and if plants are found, then consultation with the USFWS would be re-initiated.

Access – Off-road Vehicle Use

Impacts from off-road vehicle for dispersed camping or firewood retrieval within 300 feet of open roads include direct destruction of plants and alteration of habitat to the point where Spalding's catchfly could not persist. In potential habitat, there could be effects from off-road vehicle use to any Spalding's catchfly plants that might be present.

Five and one-half miles of road intersect very high potential habitat. In moderate and high potential habitat, portions of roads totaling 45.7 miles exist on NFS lands. At this length, a maximum of 3323 acres would be open to off-road vehicle use, assuming topography would not limit vehicles. (Off-road vehicle use is not permitted on the Idaho side of Hells Canyon, where a small amount of potential habitat is located.)

Mitigation

Survey the 50-foot area adjacent to roadsides in potential habitat for the presence of Spalding's catchfly. If plants are found, re-initiate consultation with the USFWS.

Determination of Effects

Off-road vehicle use **may effect but would not adversely affect** Spalding's catchfly because plants are not known to occur in these areas at present. These areas would be surveyed and if plants are found, then consultation with the USFWS would be re-initiated.

Access - Trails and Trailheads

Nine hundred and twenty-five miles of trails exist within the HCNRA. Within modeled potential habitat for Spalding's catchfly, 32.7 miles cross moderate potential habitat, 64 miles cross high potential habitat, and 13.9 miles cross very high potential habitat. Effects from the use of trails to Spalding's catchfly are not assumed to be potentially lethal. The greatest threat from the use of trails is the introduction of noxious weeds, which could move down the trailside or be introduced by hikers or recreational stock. If a trail were to cut through a population, erosion could be accelerated, eventually unearthing plants adjacent the trail. Twenty-seven trailheads are located within the HCNRA. Seven trailheads are situated within areas of modeled high potential habitat for Spalding's catchfly:

- 1695 Trailhead (Teepee Butte Road)
- Cow Creek Trailhead
- Tulley Creek Trailhead
- College Creek Trailhead
- Memaloose Trailhead
- 1750 Trailhead (Lord Flat Trail)
- Buck Creek Trailhead

Areas around trailheads are subject to greater impacts from recreationists wandering beyond parking areas into plant communities potentially trampling plants or compacting soil. These effects would be limited to a 50-meter perimeter around trailheads. Impacts around trailheads appear to be limited to this distance (direct observation undated).

Mitigation

Survey areas along trails and around trailheads in potential habitat for the presence of Spalding's catchfly. Re-initiate consultation if plants are found.

Determination of Effects

In modeled potential habitat, trails **may effect, but are not likely to adversely affect** Spalding's catchfly, because potential habitat would be surveyed for the presence of Spalding's catchfly. Consultation with the USFWS would be re-initiated if plants were found.

Access – Over-snow Vehicle Travel and Play Areas

The use of snowmobiles usually begins as early as mid-November and continues through April. Elevations in snow-play areas and routes are between 4000 and 7000 feet. Over-snow routes are sited on open roads and used only during the winter. These would have no effect to Spalding's catchfly because roads, particularly when snow-covered, do not provide habitat for Spalding's catchfly. Snow-play areas are designated for the use of snowmobiles off roads. The total area designated for the use of snowmobiles in the HCNRA is 40,786 acres. Some modeled potential habitat for Spalding's catchfly is mapped in snow-play areas.

Table 4-16: Acres of Snow-Play Areas in Spalding's catchfly Potential Habitat

Probability Class	Acres
Moderate potential:	685
High potential:	2713
Very High Potential	130
Total	3528

A total of 3528 acres of potential habitat has been modeled in snow-play areas. This represents 5.3 percent of Spalding's catchfly potential habitat.

Standards for minimum snow depths for snowmobile use do not exist at present. Snow cover is expected to protect the ground from snowmobile impacts. However if insufficient cover were present, ground impacts to soil and vegetation could be expected especially early or late in the season while the ground is not frozen and snow cover is less deep. While it is conceivable that snowmobile use in snow-play areas could possibly damage Spalding's catchfly, if present, the likelihood of this occurrence is low, since only 5.3 percent of potential habitat is found in snow-play areas, and plants are not known to grow in these sites.

Mitigation

Survey potential habitat in snow-play areas to determine if Spalding's catchfly is present. Re-initiate consultation if with the USFWS if plants are found.

Determination of Effects

There would be **may effect, but would not likely adversely affect** Spalding's catchfly because of the limited habitat found in snow play areas and the protection afforded the plants by a cover of snow.

Access – Backcountry Airstrips

Eight backcountry airstrips are located within the HCNRA. Memaloose and Lord Flat are located in the uplands of the Hat Point/Lord Flat area in Oregon. Cache Creek, Salmon Bar, Dug Bar, and Pittsburg airstrips are within the Scenic section and Big Bar is within the Wild section of the Snake. Temperance Creek is in the Wild section of the Snake River and is used by permit only. Of these, Temperance Creek and Big Bar are located within modeled high potential habitat. Airstrips are not located within or near known sites of Spalding's catchfly. Airstrips themselves do not provide habitat for Spalding's catchfly because of past use that compacted the soil. Visitors may affect areas immediately adjacent to airstrips, which would receive higher use than areas farther away.

Mitigation

Survey a 150-foot area in modeled potential habitat around the Big Bar Airstrip for the presence of Spalding's catchfly. Re-initiate consultation if plants are found.

Determination of Effects

Memaloose, Lord Flat, Cache Creek, Salmon Bar, Dug Bar, and Pittsburg airstrips – the use of these airstrips would result in **no effect** to Spalding's catchfly, because they are not located in areas of potential habitat for this species.

Temperance Creek and Big Bar airstrip – This airstrip **may effect but is not likely to adversely affect** Spalding's catchfly, because potential habitat would be surveyed for the presence of Spalding's catchfly and consultation with the USFWS would be re-initiated if plants were found

Vegetation – Noxious Weed Management

The WWNF completed an *Integrated Noxious Weed Management Plan* in 1992 (USDA 1992), which was updated with an additional 106 treatment sites in 1994 (USDA 1994). Methods include manual, chemical and biological control. A BE for the 1994 update was completed on May 3, 1994. The BE identified the proximity of sensitive species and their potential habitats to treatment sites. The BE did not identify potential habitat for Spalding's catchfly at any treatment sites within the HCNRA. A predictive habitat model for Spalding's catchfly was created in 2001. This model identified potential habitat in mapped weed sites in the HCNRA.

Table 4-17: Acres of Spalding's catchfly Potential Habitat in Weed Sites

Probability Class	NFS Acres	Private acres	Total
Moderate	994.4	81.9	1076.3
High	681.6	159.4	841
Very High	61.4	0.1	61.5
Total	1737.4	241.4	1978.8

A total of 1737.4 acres of potential habitat is found in mapped weed sites. This represents 2.6% of Spalding's catchfly potential habitat. Spalding's catchfly has not been found anywhere in the HCNRA at this time.

Mitigation

The 1992 and 1994 decision for the noxious weed treatments includes mitigation to survey weed sites for the presence of threatened, endangered, and sensitive plant species prior to treatment. If Spalding's catchfly is found during these surveys, consultation with the USFWS should be re-initiated.

Determination of Effects

The ongoing treatment of identified noxious weeds sites under the 1992 and 1994 decision **may effect**, but is **not likely to adversely affect** Spalding's catchfly because of the small percentage of affected habitat (2.6%) and of mitigation included in the project to inventory weed treatment sites for the presence of federally listed and Forest Service sensitive species prior to treatment.

Livestock Grazing

There are 566,411 acres in the HCNRA where livestock grazing may be permitted. This use is managed on 51 separate livestock allotments. Eleven of these allotments are currently vacant (267,506 acres or 47% of the total). The remaining 40 active allotments include two for domestic sheep (managed by the Payette National Forest) and 38 for cattle.

Spalding's catchfly or its habitat is not known to occur in active sheep allotments. Spalding's catchfly is not known to occur in active, vacant or closed grazing allotments in the HCNRA. Modeled potential habitat for Spalding's catchfly has been identified in 31 of the 43 active cattle allotments in the HCNRA. The table below displays the acres of modeled potential habitat for Spalding's catchfly on NFS lands within active allotments. The season of use for each pasture is also displayed.

Table 4-18: Acres of Spalding's catchfly Potential Habitat in Active Allotments

Allotment Name	Pasture	Probability Class	Acres	2002 Season of Use
Blackmore	01 Turner	Moderate	18.9	Apr 16 – May 15
Blackmore	01 Turner	High	11.4	Apr 16 – May 15
Blackmore	02 Blackmore	Moderate	203.8	Apr 16 – May 15, Nov 15 – Dec 16
Blackmore	02 Blackmore	High	8.6	Apr 16 – May 15, Nov 15 – Dec 16
Blackmore	02 Blackmore	Very High	2.7	Apr 16 – May 15, Nov 15 – Dec 16
Cayuse	01 Basin	Moderate	1227.8	Apr 16 – May 30
Cayuse	01 Basin	High	170.6	Apr 16 – May 30
Cayuse	01 Basin	Very High	136.4	Apr 16 – May 30
Cayuse	02 Pumpkin Creek	Moderate	869.2	Jun 1 – Jun 15; Nov 1 – Nov 30
Cayuse	02 Pumpkin Creek	High	269.7	Jun 1 – Jun 15; Nov 1 – Nov 30
Cayuse	02 Pumpkin Creek	Very High	181.9	Jun 1 – Jun 15; Nov 1 – Nov 30
Cayuse	03 Deer Creek	Moderate	535.8	Apr 16 – Apr 30
Cayuse	03 Deer Creek	High	58.9	Apr 16 – Apr 30

Allotment Name	Pasture	Probability Class	Acres	2002 Season of Use
Cayuse	03 Deer Creek	Very High	13.2	Apr 16 – Apr 30
Cayuse	04 Cayuse Flat	Moderate	77.7	Jun 1- Jun 15
Cayuse	04 Cayuse Flat	High	52.7	Jun 1- Jun 15
Cayuse	04 Cayuse Flat	Very High	4.0	Jun 1- Jun 15
Cayuse	05 Horse Creek	Moderate	673.5	Sep 1 Sep 30
Cayuse	05 Horse Creek	High	755.4	Sep 1 Sep 30
Cayuse	05 Horse Creek	Very High	8.0	Sep 1 Sep 30
Cayuse	07 Mormon Sleepy	Moderate	6.7	Jul 16 – Aug 15
Cayuse	07 Mormon Sleepy	High	267.7	Jul 16 – Aug 15
Cayuse	07 Mormon Sleepy	Very High	2.4	Jul 16 – Aug 15
Chalk Creek	01 Campbell	Moderate	95.8	Apr 16 – May 15
Chalk Creek	01 Campbell	High	2.5	Apr 16 – May 15
Chalk Creek	01 Campbell	Very High	4.3	Apr 16 – May 15
Chalk Creek	02 Bob Creek	Moderate	14.1	Apr 16 – May 15
Chalk Creek	02 Bob Creek	Very High	0.6	Apr 16 – May 15
Chalk Creek	04 Gowing	High	0.1	May 16 – Oct 30
Chesnimnus	27 Devils Run	Moderate	15.4	Aug 11 – Sep 20
Chesnimnus	27 Devils Run	High	292.4	Aug 11 – Sep 20
Chesnimnus	28 Poison	High	4.2	Jul 1 – Aug 10
Cold Springs	02 North Cold Springs	Moderate	260.5	Nonuse 2001-2002
Cold Springs	02 North Cold Springs	High	199.3	Nonuse 2001-2002
Cold Springs	02 North Cold Springs	Very High	176.1	Nonuse 2001-2002
Cold Springs	03 Lower Cottonwood	Moderate	447.6	Nonuse 2001-2002
Cold Springs	03 Lower Cottonwood	High	162.9	Nonuse 2001-2002
Cold Springs	03 Lower Cottonwood	Very High	6.5	Nonuse 2001-2002
Cold Springs	04 Lower Bear	Moderate	211.1	Oct 16 – Nov 30
Cold Springs	04 Lower Bear	High	18.7	Oct 16 – Nov 30
Cold Springs	04 Lower Bear	Very High	26.9	Oct 16 – Nov 30
Cold Springs	05 Lower Basin	Moderate	521.0	Oct 16 – Nov 30
Cold Springs	05 Lower Basin	High	66.2	Oct 16 – Nov 30
Cold Springs	05 Lower Basin	Very High	28.7	Oct 16 – Nov 30
Cold Springs	06 North Wildhorse	Moderate	240.5	Aug 1 – Oct 15
Cold Springs	06 North Wildhorse	High	169.5	Aug 1 – Oct 15
Cold Springs	06 North Wildhorse	Very High	100.4	Oct 16 – Nov 30
Cold Springs	07 South Wildhorse	Moderate	224.6	Jun 1 – Jul 31
Cold Springs	07 South Wildhorse	High	396.3	Jun 1 – Jul 31
Cold Springs	07 South Wildhorse	Very High	37.0	Jun 1 – Jul 31
Cold Springs	08 Upper Cottonwood	Moderate	108.4	Nonuse 2001-2002
Cold Springs	08 Upper Cottonwood	High	115.6	Nonuse 2001-2002
Cold Springs	08 Upper Cottonwood	Very High	4.4	Nonuse 2001-2002
Cold Springs	09 South Cold Springs	Moderate	110.7	Nonuse 2001-2002
Cold Springs	09 South Cold Springs	High	329.0	Nonuse 2001-2002
Cold Springs	09 South Cold Springs	Very High	4.0	Nonuse 2001-2002
Cold Springs	10 Cook Creek	Moderate	632.3	Nonuse 2001-2002
Cold Springs	10 Cook Creek	High	70.2	Nonuse 2001-2002
Cold Springs	10 Cook Creek	Very High	15.5	Nonuse 2001-2002
Cold Springs	14 Road Holding Past.	Moderate	0.7	Nonuse 2001-2002
College Creek	01 North	Moderate	80.5	Nov 1 – Nov 30; Apr 16 – May 15, 03
College Creek	01 North	High	5.1	Nov 1 – Nov 30; Apr 16 – May 15, 03
College Creek	02 South	Moderate	77.1	Apr 16 – May 15; Nov 1 – Nov 30, 03
College Creek	02 South	High	7.8	Apr 16 – May 15; Nov 1 – Nov 30, 03
Cow Creek	01 Fingerboard	High	6.6	Nonuse 2002
Cow Creek	02 Salt Gulch	High	1.1	Nonuse 2002
Cow Creek	05 Deer Creek	Moderate	30.2	Nonuse 2002
Cow Creek	05 Deer Creek	High	10.9	Nonuse 2002
Cow Creek	05 Deer Creek	Very High	1.8	Nonuse 2002
Del Curto	01 Del Curto	Moderate	12.0	Apr 14- Jun 15
Del Curto	01 Del Curto	High	5.5	Apr 14- Jun 15
Dodson-Haas	04 Cold Camp	Moderate	0.2	Mar 16 – Apr 15
Dodson-Haas	04 Cold Camp	High	0.4	Mar 16 – Apr 15
Dodson-Haas	04 Cold Camp	Very High	0.8	Mar 16 – Apr 15

Allotment Name	Pasture	Probability Class	Acres	2002 Season of Use
Dodson-Haas	05 School Flat	High	1.9	Jan 16 – Mar 15
Dodson-Haas	08 Maggie Beacher	High	1.2	Mar 16 – Apr 15
Dodson-Haas	10 Corral Creek	High	1.8	Mar 16 – Apr 15
Dodson-Haas	11 Thorn Creek	High	4.9	Mar 16 – Apr 15
Dodson-Haas	12 Bull Pasture	High	1.9	Mar 16 – Apr 15
Doe Creek	03 Fairchild	Moderate	11.4	Aug 11 – Sep 20
Doe Creek	03 Fairchild	High	234.2	Aug 11 – Sep 20
Doe Creek	03 Fairchild	Very High	12.6	Aug 11 – Sep 20
Double Pine	00	Moderate	42.7	Jun 16 – Sep 30
Double Pine	00	High	7.1	Jun 16 – Sep 30
Double Pine	00	Very High	0.9	Jun 16 – Sep 30
Dunlop-Thorn	01 West	Moderate	84.4	May 1 – May 30; Nov 11 – Nov 16
Dunlop-Thorn	01 West	High	6.9	May 1 – May 30; Nov 11 – Nov 16
Dunlop-Thorn	01 West	Very High	2.6	May 1 – May 30; Nov 11 – Nov 16
Dunlop-Thorn	02 Lloyd	Moderate	118.9	Nov 17 – Nov 20
Dunlop-Thorn	02 Lloyd	High	25.4	Nov 17 – Nov 20
Dunlop-Thorn	02 Lloyd	Very High	1.3	Nov 17 – Nov 20
Dunlop-Thorn	03 Thorn	Moderate	479.2	May 1 – May 30; Nov 17 – Nov 20
Dunlop-Thorn	03 Thorn	High	31.9	May 1 – May 30; Nov 17 – Nov 20
Dunlop-Thorn	03 Thorn	Very High	3.8	May 1 – May 30; Nov 17 – Nov 20
East Pine Valley	02 Grouse Flat	Moderate	925.9	Jun 26 – Jul 26
East Pine Valley	02 Grouse Flat	High	199.9	Jun 26 – Jul 26
East Pine Valley	02 Grouse Flat	Very High	20.6	Jun 26 – Jul 26
East Pine Valley	04 Big Elk	Moderate	417.6	Jul 27 – Sep 10
East Pine Valley	04 Big Elk	High	91.4	Jul 27 – Sep 10
East Pine Valley	04 Big Elk	Very High	21.0	Jul 27 – Sep 10
Ghostbull	00	Moderate	362.6	Apr 15 – June 15
Ghostbull	00	High	30.7	Apr 15 – June 15
Ghostbull	00	Very High	20.1	Apr 15 – June 15
Grizzly Ridge	00 Grizzly Ridge	Moderate	703.5	Apr 16 – Jun 30
Grizzly Ridge	00 Grizzly Ridge	High	156.6	Apr 16 – Jun 30
Grizzly Ridge	00 Grizzly Ridge	Very High	144.7	Apr 16 – Jun 30
Grouseline	01 Johnson Creek	Moderate	15.8	May 16 – Nov 30
Grouseline	01 Johnson Creek	High	2.7	May 16 – Nov 30
Grouseline	04 Jaynes Ridge	Moderate	70.3	May 16 – Oct 31
Grouseline	04 Jaynes Ridge	High	41.1	May 16 – Oct 31
Grouseline	04 Jaynes Ridge	Very High	0.9	May 16 – Oct 31
Grouseline	06 Morgan Top	Moderate	2.1	May 15 – Oct 31
Grouseline	06 Morgan Top	High	2.1	May 15 – Oct 31
Himmelwright	01 Hells Canyon	Moderate	453.0	Vacant
Himmelwright	01 Hells Canyon	High	65.0	Vacant
Himmelwright	01 Hells Canyon	Very High	48.7	Vacant
Himmelwright	02 Lander Ridge	Moderate	234.4	Vacant
Himmelwright	02 Lander Ridge	High	54.0	Vacant
Himmelwright	02 Lander Ridge	Very High	2.4	Vacant
Himmelwright	03 Lower Summit	Moderate	25.6	Vacant
Himmelwright	03 Lower Summit	High	3.2	Vacant
Himmelwright	03 Lower Summit	Very High	0.9	Vacant
Himmelwright	04 Summit Ridge	Moderate	70.9	Vacant
Himmelwright	04 Summit Ridge	High	45.1	Vacant
Himmelwright	04 Summit Ridge	Very High	6.2	Vacant
Horse Creek	01 Road	High	1.6	Oct 1 –Oct 31 (holding unit) in rest stat.
Horse Creek	02 Magpie	High	1.1	Nonuse 2002-2003
Horse Creek	03 Knapper	Moderate	391.1	Apr 16 – May 15; Oct 30 – Nov 30
Horse Creek	03 Knapper	High	29.8	Apr 16 – May 15; Oct 30 – Nov 30
Horse Creek	03 Knapper	Very High	16.3	Apr 16 – May 15; Oct 30 – Nov 30
Horse Creek	04 Imbler	Moderate	384.1	Apr 16 – May 15; Oct 30 – Nov 30
Horse Creek	04 Imbler	High	32.6	Apr 16 – May 15; Oct 30 – Nov 30
Horse Creek	04 Imbler	Very High	9.2	Apr 16 – May 15; Oct 30 – Nov 30
Horse Creek	05 Upper Canyon	Moderate	1211.0	May 16 – Jun 15
Horse Creek	05 Upper Canyon	High	210.1	May 16 – Jun 15
Horse Creek	05 Upper Canyon	Very High	23.2	May 16 – Jun 15

Allotment Name	Pasture	Probability Class	Acres	2002 Season of Use
Keeler	01	Moderate	54.7	Nov 16 – Apr 30
Keeler	01	High	6.8	Nov 16 – Apr 30
Keeler	01	Very High	1.8	Nov 16 – Apr 30
Keeler	02	Moderate	9.4	Nov 16 – Apr 30
Keeler	02	High	3.8	Nov 16 – Apr 30
Keeler	03	Moderate	7.6	Nov 16 – Apr 30
Keeler	03	High	16.2	Nov 16 – Apr 30
Log Creek	03 Packsaddle	High	2.3	Mar 1 – Mar 31
Lone Pine	01 Big Canyon	Moderate	3.9	Dec 1 – Apr 15 (Nonuse 2002)
Lone Pine	01 Big Canyon	High	147.0	Dec 1 – Apr 15 (Nonuse 2002)
Lone Pine	04 Little Deep Creek	Moderate	4.9	Apr 16 – May 31; Dec 1 – Dec 30 (Nonuse 2002)
Lone Pine	04 Little Deep Creek	High	0.7	Apr 16 – May 31; Dec 1 – Dec 30 (Nonuse 2002)
Lone Pine	04 Little Deep Creek	Very High	1.3	Apr 16 – May 31; Dec 1 – Dec 30 (Nonuse 2002)
Marr Flat	04 Makin	Moderate	0.2	Jun 15 – Jun 30; Sep 16 – Oct 15
Marr Flat	04 Makin	High	1.1	Jun 15 – Jun 30; Sep 16 – Oct 15
Marr Flat	11 Tyee	High	28.4	July 1 – Sep 15
Marr Flat	15 Lick Creek Riparian	Moderate	2.6	Aug 1 – Aug 15
Marr Flat	15 Lick Creek Riparian	High	1.8	Aug 1 – Aug 15
Marr Flat	16 Imnaha Riparian	Moderate	0.0	May 16 – May 25
Marr Flat	16 Imnaha Riparian	Very High	23.7	May 16 – May 25
Middle Point	02 Sheep I	Very High	0.0	Apr 16 – May 31
Middle Point	03 West I	Moderate	3.2	Apr 16 – May 31
Middle Point	03 West I	High	8.3	Apr 16 – May 31
Middle Point	03 West I	Very High	0.2	Apr 16 – May 31
Middle Point	04 East I	Moderate	79.1	Apr 16 – May 31
Middle Point	04 East I	High	10.6	Apr 16 – May 31
Middle Point	04 East I	Very High	3.6	Apr 16 – May 31
Middle Point	06 West II	Moderate	52.5	Apr 16 – May 31
Middle Point	06 West II	High	0.7	Apr 16 – May 31
Middle Point	06 West II	Very High	0.0	Apr 16 – May 31
Middle Point	07 West III	Moderate	57.6	Apr 16 – May 31
Middle Point	07 West III	High	27.9	Apr 16 – May 31
Middle Point	07 West III	Very High	2.2	Apr 16 – May 31
Middle Point	08 West IV	Moderate	139.6	Apr 16 – May 31
Middle Point	08 West IV	High	24.9	Apr 16 – May 31
Middle Point	08 West IV	Very High	4.5	Apr 16 – May 31
Middle Point	09 East II	Moderate	131.9	Nov 16 – Nov 30
Middle Point	09 East II	High	55.6	Nov 16 – Nov 30
North Pine	01 Jolly Pine	Moderate	600.1	Jun 16 – Sep 30
North Pine	01 Jolly Pine	High	164.2	Jun 16 – Sep 30
North Pine	01 Jolly Pine	Very High	76.8	Jun 16 – Sep 30
North Pine	02 Nelson	Moderate	315.3	Jun 16 – Sep 30
North Pine	02 Nelson	High	278.8	Jun 16 – Sep 30
North Pine	02 Nelson	Very High	29.8	Jun 16 – Sep 30
Pittsburg	01 Corral Creek	Moderate	2.9	Vacant
Pittsburg	01 Corral Creek	High	0.6	Vacant
Pittsburg	01 Corral Creek	Very High	0.9	Vacant
Rhodes Creek	01 Willow Springs	High	4.1	Mar 1 – Apr 15
Rhodes Creek	02 Holmes	High	0.0	Apr 1 – Apr 15
Rhodes Creek	03 Foster	High	0.0	Nonuse
Rhodes Creek	04 Westside Cow	High	1.3	Apr 1 – Apr 15; Jan 1 – Mar 15
Rhodes Creek	05 Westbench Lightning	High	6.4	Apr 16 - Apr 30; Jan 16 – Feb 15
Rhodes Creek	06 Eastbench Lightning	High	1.9	Apr 16 - Apr 30; Jan 16 – Feb 28
Rhodes Creek	08 Rhodes Creek	Moderate	0.1	Nov 1 – Nov 15; May 1 – May 15
Rhodes Creek	08 Rhodes Creek	High	0.6	Nov 1 – Nov 15; May 1 – May 15
Rhodes Creek	10 Tulley	Moderate	2.4	May 1 – May 15
Rhodes Creek	12 Horse Pasture	High	5.6	Feb 1 – May 15
Rhodes Creek	13 Lightning Creek	High	2.8	May 1 – May 15; Nov 1 – Jan 15
Rhodes Creek	14 Lightning/Hangover	Moderate	14.8	Nov 1 – Jan 15

Allotment Name	Pasture	Probability Class	Acres	2002 Season of Use
Rhodes Creek	14 Lightning/Hangover	High	3.1	Nov 1 – Jan 15
Rhodes Creek	14 Lightning/Hangover	Very High	7.1	Nov 1 – Jan 15
Rhodes Creek	17 Heifer Lot 1	High	0.2	Feb 1 – Feb 30
Rhodes Creek	18 Heifer Lot 2	High	1.7	Feb 1 – Feb 30
Saddle Creek	01 Saddle Gulch	Moderate	279.2	May 16 – Jun 15
Saddle Creek	01 Saddle Gulch	High	27.1	May 16 – Jun 15
Saddle Creek	01 Saddle Gulch	Very High	5.9	May 16 – Jun 15
Saddle Creek	02 Basin/W. Freezeout	Moderate	103.8	Oct 1 – Oct 30
Saddle Creek	02 Basin/W. Freezeout	High	29.6	Oct 1 – Oct 30
Saddle Creek	02 Basin/W. Freezeout	Very High	3.4	Oct 1 – Oct 30
Saddle Creek	03 Saddle Creek	Moderate	47.7	Nonuse
Saddle Creek	03 Saddle Creek	High	11.4	Nonuse
Saddle Creek	03 Saddle Creek	Very High	2.2	Nonuse
Saddle Creek	05 Barton Heights	Moderate	285.2	Jun 16 – Jul 6
Saddle Creek	05 Barton Heights	High	51.4	Jun 16 – Jul 6
Saddle Creek	05 Barton Heights	Very High	7.0	Jun 16 – Jul 6
Saddle Creek	06 Lookout /Long	Moderate	1.8	Jul 7 – Aug 30
Saddle Creek	06 Lookout /Long	High	9.5	Jul 7 – Aug 30
Schleur	01 Spring Creek	Moderate	98.6	Apr 16 – Apr 22; Sep 16 – Oct 20
Schleur	01 Spring Creek	High	1.6	Apr 16 – Apr 22; Sep 16 – Oct 20
Schleur	01 Spring Creek	Very High	5.1	Apr 16 – Apr 22; Sep 16 – Oct 20
Schleur	02 Schleur	Moderate	162.6	Apr 23 – Apr 29; Aug 8 – Sep 15
Schleur	02 Schleur	High	8.6	Apr 23 – Apr 29; Aug 8 – Sep 15
Schleur	02 Schleur	Very High	4.0	Apr 23 – Apr 29; Aug 8 – Sep 15
Schleur	03 Adams	Moderate	142.4	Apr 30 – May 7; Jul 1 – Aug 7
Schleur	03 Adams	High	7.6	Apr 30 – May 7; Jul 1 – Aug 7
Schleur	03 Adams	Very High	3.5	Apr 30 – May 7; Jul 1 – Aug 7
Schleur	04 College	Moderate	109.5	May 8 – May 15; Oct 21 – Nov 30
Schleur	04 College	High	12.2	May 8 – May 15; Oct 21 – Nov 30
Schleur	04 College	Very High	3.6	May 8 – May 15; Oct 21 – Nov 30
Schleur	05 Middlepoint	Moderate	2.9	No Use Scheduled
Schleur	05 Middlepoint	High	1.0	No Use Scheduled
Schleur	05 Middlepoint	Very High	2.8	No Use Scheduled
Snake River	01 Squaw Creek	Moderate	641.8	Jun 16 – Sep 30
Snake River	01 Squaw Creek	High	137.9	Jun 16 – Sep 30
Snake River	01 Squaw Creek	Very High	90.8	Jun 16 – Sep 30
Snake River	02 Spring Creek	Moderate	854.4	Jun 16 – Sep 30
Snake River	02 Spring Creek	High	19.0	Jun 16 – Sep 30
Snake River	02 Spring Creek	Very High	5.9	Jun 16 – Sep 30
Snell	01 East	Moderate	148.0	May 5 – May 20
Snell	01 East	High	7.4	May 5 – May 20
Snell	01 East	Very High	4.9	May 5 – May 20
Snell	02 West	Moderate	101.0	Apr 16 – Apr 25; May 5 – May 25
Snell	02 West	High	14.1	Apr 16 – Apr 25; May 5 – May 25
Snell	02 West	Very High	0.4	Apr 16 – Apr 25; May 5 – May 25
Teepee Elk	01 Rock Creek	Moderate	718.0	Jun 1 – Jul 15 (Nonuse 2002)
Teepee Elk	01 Rock Creek	High	150.2	Jun 1 - Jul 15 (Nonuse 2002)
Teepee Elk	01 Rock Creek	Very High	256.2	Jun 1 - Jul 15 (Nonuse 2002)
Teepee Elk	02 Long Ridge	Moderate	37.4	Sep 1 - Oct 5 (Nonuse 2002)
Teepee Elk	02 Long Ridge	High	14.1	Sep 1 - Oct 5 (Nonuse 2002)
Teepee Elk	02 Long Ridge	Very High	30.0	Sep 1 - Oct 5 (Nonuse 2002)
Teepee Elk	04 Holding Pasture	Moderate	150.2	Jun 1 - Oct 31 (Nonuse 2002)
Teepee Elk	04 Holding Pasture	High	68.0	Jun 1 - Oct 31 (Nonuse 2002)
Teepee Elk	04 Holding Pasture	Very High	31.8	Jun 1 - Oct 31 (Nonuse 2002)
Toomey	09 CLOSED AREA	High	4.3	Closed Area
Total			25894.2	

Vacant Allotments

Twelve grazing allotments in vacant status are listed below:

- Big Canyon

- Cache Creek
- Canyon
- Cherry Creek
- Curren Hill
- Himmelwright
- Hope Creek
- Jim Creek
- Mud-Duck
- Sheep Creek
- Temperance Creek
- Turner Creek

The Spalding's catchfly habitat model identified 35,719 acres of potential habitat in vacant or closed allotments (Moderate: 22,320; High: 11,284; Very High: 2115 acres).

Domestic livestock grazing (cattle, and horses) may impact populations of Spalding's catchfly. Spalding's catchfly or its modeled habitat does not occur in sheep allotments in the HCNRA. Possible negative effects from livestock grazing include ingestion, trampling, erosion from trampling, introduction and spread of noxious weeds, and changes in vegetative composition.

The critical period of growth for Spalding's catchfly is from April 1st through October 31st; grazing during this period would result in direct effects to the plant. Grazing outside this period could result in indirect effects to Spalding's catchfly via alteration of the plant community or through the introduction of invasive plants. It is assumed that improper and excessive grazing would be detrimental to the plant. A level of grazing that would reduce the cover of native grasses or increase the amount of early-seral native or exotic species would negatively affect Spalding's catchfly. Conversely, grazing at levels (outside the critical period of growth) that is known to maintain the composition of perennial native vegetation is assumed to maintain Spalding's catchfly, if it were present.

Mitigation

Because much of the potential habitat for Spalding's catchfly has not been surveyed, it is recommended these areas be inventoried to reduce the uncertainty in determining effects to Spalding's catchfly. High and very high potential habitats in pastures where grazing occurs during the critical period of growth are the first priority to be inventoried. These habitats would be inventoried during the first two years. The need to inventory moderate potential habitat in active allotments would depend on the survey results in high potential habitat. Moderate habitat would be surveyed only if Spalding's catchfly were found in high potential habitat, the next higher probability class. If Spalding's catchfly were not found in high potential habitat, then it is unlikely that the plant would be found in moderate potential habitat, a less probable classification. If Spalding's catchfly were found in high potential habitat, then moderate potential habitat would be surveyed. High and very high potential habitat in allotments that are grazed outside the critical period of growth would be inventoried during years 4 and 5 following this consultation. If Spalding's catchfly plants are found, then consultation with the FWS would be re-initiated and mitigation measures would be developed to protect the species.

Determination of Effects

Allotments lacking potential habitat would have **no effect** to Spalding's catchfly because the plant is presumed not to occur in these areas. Vacant allotments would have no effect to Spalding's catchfly because no grazing actions are occurring at this time. Consultation would be re-initiated if these allotments were to be stocked in the future. Allotments with modeled potential habitat **may effect** but are **not likely to adversely affect** Spalding's catchfly. Spalding's catchfly is not presently known to occur in the HCNRA. Because high and very high potential habitat in pastures used during the critical period of growth would be surveyed within two years, the risks to any Spalding's catchfly plants that may be present would be reduced. Surveys conducted during year three following this consultation present less risk to Spalding's catchfly plants because of the lower likelihood plants would be found in moderate potential habitat. Also, the risk of effects to Spalding's catchfly is lessened where potential habitat lies in pastures used outside the critical period of growth. In these areas, direct effects would not result; risks would arise only from excessive grazing which has degraded a site where an undiscovered Spalding's catchfly site may occur, and current management is designed to reduce or eliminate resource damage.

Table 4-19: Determination of Effects to Spalding's catchfly from Livestock Allotments

Allotment Name	Habitat Present		Determination
Big Canyon	Vacant		No effect
Blackmore	Yes	Yes	NLAA
Cache Creek	Vacant		No effect
Cannonball	No		No effect
Canyon	Vacant		No effect
Cayuse	Yes	Yes	NLAA
Chalk Creek	Yes	Yes	NLAA
Cherry Creek	Vacant		No effect
Chesnimus	Yes	Yes	NLAA
Cold Springs	Yes	Yes	NLAA
College Creek	Yes	Yes	NLAA
Cow Creek	Yes	Nonuse 2002	NLAA
Cow Creek- Idaho	No		No effect
Curren Hill	No		No effect
Deep Creek	No		No effect
DelCurto	Yes	Yes	NLAA
Dodson-Haas	Yes	Yes	NLAA
Doe Creek	Yes	Yes	NLAA
Double Pine	Yes	Yes	NLAA
Dunlop-Thorn	Yes	Yes	NLAA
Dunn Creek	No		No effect
East Pine Valley	Yes	Yes	NLAA
Echols Butte	No		No effect
Ghostbull	Yes	Yes	NLAA
Grizzley Ridge	Yes	Yes	NLAA
Grouseline	Yes	Yes	NLAA
Himmelwright	Vacant		No effect
Hope Creek	Vacant		No effect
Horse Creek	Yes	Yes	NLAA
Jim Creek	Vacant		No effect
Keeler	Yes	Yes	NLAA
Log Creek	Yes	No	NLAA
Lone Pine	Yes	Yes (Nonuse 2002)	NLAA
Lost Cow	No		No effect
Marr Flat	Yes	Yes	NLAA
Middle Point	Yes	Yes	NLAA
Mud-Duck	Vacant		No effect
Northpine	Yes	Yes	NLAA
Papoose	No		No effect
Pittsburg	Yes-Vacant		No Effect
Rhodes Creek	Yes	Yes	NLAA
Saddle Creek	Yes	Yes	NLAA
Schleur	Yes	Yes	NLAA
Sheep Creek	Vacant		No effect
Snake River	Yes	Yes	NLAA
Snell	Yes	Yes	NLAA
Teepee Elk	Yes	Yes (Nonuse 2002)	NLAA
Temperance-Snake	Vacant		No effect
Toomey	Yes	Nonuse 2002	NLAA
Turnbull	No		No effect
Turner Creek	Vacant		No effect

Livestock Grazing - Administrative Horse Pastures

Administrative horse pastures are areas within active or vacant existing allotments set aside for the use of Forest Service stock. Eleven administrative horse pastures currently total approximately 18,500 acres. Spalding's catchfly is not known to occur in any of the administrative horse pastures; but modeled potential habitat totaling 1203 acres has been identified in seven of these pastures. The distribution of potential habitat classes is displayed in the table below. These acres represent less than 6.5 percent of the total acres used as administrative horse pastures and just 1.8 percent of the total potential habitat for Spalding's catchfly in the HCNRA.

Table 4-20: Acres of Spalding's catchfly Potential

Habitat in Administrative Horse Pastures

Probability Class	Acres
Moderate	245
High	950
Very High	8
Total	1203

Horse Pastures that contain potential habitat for Spalding's catchfly are Pittsburg (42.3 acres), College Creek (185.3 acres), Memaloose (226 acres), Lord Flat (327 acres), Tryon (228 acres), Salt Creek-Slaughter Bar (124.5 acres), and the Jim Creek winter pasture (70 acres).

Administrative horse pastures are used during the critical growth period for Spalding's catchfly (April 1st - October 31st). Depending on the size of individual pastures, the number of head, and duration of use, effects to Spalding's catchfly - if present - could be more severe than those from cattle. Because of the low amount of potential habitat in administrative horse pastures (1.8% of all potential habitat), the likelihood is low that Spalding's catchfly would be discovered in these areas. Nonetheless, the possibility remains that this plant could be discovered in administrative horse pastures. Although these areas represent a small portion of all Spalding's catchfly potential habitat in the HCNRA, survey records for these areas are lacking.

Mitigation

Survey potential habitat in administrative horse pastures for the presence of Spalding's catchfly. If plants are found, re-initiate consultation with the USFWS.

Determination of Effects

Thorn Creek, Horse Heaven, Pittsburg C&H, and Seven Devils administrative horse pastures - The use of Thorn Creek, Horse Heaven, and Seven Devils administrative horse pastures in the HCNRA would have **no effect** to Spalding's catchfly because these areas do not contain habitat for Spalding's catchfly.

Pittsburg, College Creek, Memaloose, Lord Flat, Tryon, Salt Creek-Slaughter Bar, and the Jim Creek Winter Pasture - **may effect but is not likely to adversely affect** Spalding's catchfly, because it is not known if plants are present. Potential habitat in these administrative horse pastures would be surveyed for the presence of Spalding's catchfly. If Spalding's catchfly were found, then consultation with the USFWS would be re-initiated.

Aggregate Effects

Aggregate effects are the combined effects of all the separate federal actions when added together. The effects of ongoing actions to Spalding's catchfly are described earlier in the section "Population, Habitat Conditions, and Trends." Spalding's catchfly is not known to occur in the HCNRA. Because inventories for Spalding's catchfly have not been completed in potential habitat where ongoing actions are occurring, undiscovered populations of Spalding's catchfly could possibly exist in the HCNRA. Actions that could impact potential habitat include livestock grazing, off-road vehicle use, road construction and maintenance. An implementation schedule (refer to Appendix C of this BA) to inventory Spalding's catchfly potential habitat in active allotments within three years would limit potential unknown effects to the short-term. If new populations are discovered, consultation with the FWS would be re-initiated and mitigations would be developed if necessary to protect these populations.

None of the actions analyzed above results in effects to Spalding's catchfly that rise to the level of adverse effects. This finding is due to the lack of survey information. Consultation with the USFWS would be re-initiated if plants were found during the planned surveys. Since this strategy is being pursued for all actions that may affect Spalding's catchfly, the aggregate effects of these actions also **may affect**, but are **not likely to adversely affect** Spalding's catchfly.

Cumulative Effects

Cumulative effects, under the *Endangered Species Act*, include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area. Future Federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to Section 7 of the *Endangered Species Act*.

Within the action area (HCNRA), Spalding's catchfly is not known to occur on public or private land. Potential habitat for Spalding's catchfly probably exists in grasslands adjacent the Imnaha River. Since most private lands tend to be managed intensively, these areas may no longer provide habitat for Spalding's catchfly. The effects of future State, tribal, and local government actions would not add cumulatively to the aggregate effects described above affects to Spalding's catchfly. Tribal actions are not anticipated; tribal lands do not exist within the action area. State and local government actions are limited to state and county road maintenance, which would be confined to the roads rights-of way and not affect potential habitat for Spalding's catchfly. Refer to Appendix C of this BA for a summary of effects for Spalding's catchfly.

Ute ladies' tresses (Spiranthes diluvialis)

Recreation - Dispersed Campsites and Outfitter and Guide Permits

A total of approximately 368 campsites dispersed campsites exist in the HCNRA including the Hells Canyon Wilderness. The HCNRA maintains 21 special use permits for outfitting and guiding upland uses (cougar/bear hunting day use, from roads only, no horses – 3; progressive horse/mule trips – 11; llama trips – 2; mountain biking –1; fishing and whitewater rafting on the Imnaha Wild and Scenic River – 1; photography – 1; motorized ground transportation on roads only – 1; and aircraft landing at backcountry airstrips - 1. Eleven permits operate in the Wilderness and ten permits operate in nonwilderness areas.

Dispersed campsites are generally small areas of compacted ground, averaging 50' by 50'. Outfitter and guides operating under special use permits use some of these campsites. Campsites themselves are not considered habitat because the ground is too compacted and devoid of vegetation.

Potential habitat for Ute ladies' tresses has been identified in the Duck Lake and Twin Lakes areas. Effects to Ute ladies' tresses, if present, would arise from recreationists trampling vegetation in the area immediately adjacent the campsite. Dispersed campsites in or near riparian areas that provide habitat for Ute ladies' tresses are capable of affecting the species. The effects from trampling would be slight and not extend more than 150 feet beyond the campsite. Recreationists may also inadvertently introduce noxious weeds into the area with vehicles or stock.

Mitigation

Survey areas around dispersed campsites located within or adjacent potential habitat for Ute ladies' tresses. Re-initiate consultation with the USFWS if plants are found.

Determination of Effects

The use of dispersed campsites within areas of modeled habitat **may effect but is not likely to adversely affect** Ute ladies' tresses because these areas will be inventoried to determine if the species is present. If Ute ladies' tresses were found in these areas, then consultation with the USFWS would be re-initiated and mitigation measures, if necessary, would be developed to protect the site. The use of dispersed campsites outside areas of modeled habitat would have **no effect** to Ute ladies' tresses, because these species are not likely to occur in these areas.

Recreation - Developed Campgrounds

Developed campgrounds that may be near potential habitat for Ute ladies' tresses include Indian Crossing, Evergreen, Hidden, Coverdale, Ollokot, Blackhorse, and Buckhorn.

Mitigation

Survey up to ¼ mile perimeter adjacent developed campgrounds in potential habitat for Ute ladies' tresses.

Determination of Effects

Indian Crossing, Evergreen, Hidden, Coverdale, Ollokot, Blackhorse, and Buckhorn Campgrounds - The use of developed campgrounds within or adjacent areas of potential habitat (as indicated above) **may effect**, but is **not likely to adversely affect** Ute ladies' tresses because these areas will be inventoried to determine if the species is present. If Ute ladies' tresses is found in these areas, then consultation would be re-initiated with the USFWS.

The use of developed campgrounds not within or adjacent areas of potential habitat would have **no effect** Ute ladies' tresses, because these species are not likely to occur in these areas.

Recreation - Administrative Facilities

Thirty-eight administrative facilities exist within the HCNRA. Two facilities are situated within or adjacent potential habitat for Ute ladies' tresses: College Creek and the Thorn Creek. WWNF staff use these sites during the summer to early autumn. The sites do not provide habitat for Ute ladies' tresses; however, the adjacent areas may provide habitat. Effects from the use of these sites are expected largely to remain confined to their limits. Some impacts from trampling may occur to nearby riparian areas.

Mitigation

Survey areas around the Thorn Creek and College Creek administrative sites in potential habitat for the presence of Spalding's catchfly. Re-initiate consultation if plants are found.

Determination of Effects

Thorn Creek and College Creek administrative sites - The Thorn Creek and College Creek administrative sites **may effect, but are not likely to adversely affect** the Ute ladies' tresses because of mitigation to survey areas adjacent these sites and to re-initiate consultation with the USFWS if plants are found.

Administrative sites not within modeled potential habitat for would have **no effect** to Ute ladies' tresses, because the species is presumed not be occur in these areas. Administrative facilities would have **no effect** to Ute ladies' tresses because none are located within areas of potential habitat.

Access – Roads and Road Maintenance

Habitat for Ute ladies' tresses exists along the Imnaha River where Forest roads 3955 and 3960 and Wallowa County Road 727. Five hundred thirty-three miles of road exist within the HCNRA. Roads crossing private lands were included because these would normally be traveled to access NFS lands. About 40 miles of road parallel the Imnaha River, where potential habitat exists for Ute ladies' tresses, with 25 miles crossing private lands. These roads may have eliminated habitat for Ute ladies' tresses, if it was ever present; however, they do not provide habitat at present. Road use and maintenance actions would be confined to the road prism and have no effect to Ute ladies' tresses.

Determination of Effects

Road maintenance potential habitat would have **no effect** to Ute ladies' tresses, because these actions would be confined to the road prism.

Access - Off-road Vehicle Use

Habitat for Ute ladies' tresses exists along the Imnaha River where Forest roads 3955 and 3960 and Wallowa County Road 727. Five hundred thirty-three miles of road exist within the HCNRA. Roads crossing private lands were included because these would normally be traveled to access NFS lands. About 40 miles of road run along the Imnaha River, where potential habitat exists for Ute ladies' tresses, with 25 miles crossing private lands. Effects of off-road vehicle use and road maintenance would be limited to NFS lands.

Off-road vehicle for dispersed camping or firewood retrieval could affect Ute ladies' tresses. Existing regulations permit up to 300 feet off-road vehicle use to access dispersed campsites or firewood gathering with a permit. For the 15 miles of roads on NFS lands, 545 acres of riparian habitat could be impacted by off-road vehicles. Impacts from off-road vehicle use include direct destruction of plants and alteration of habitat to the point that where Ute ladies' tresses could not persist.

Mitigation

Survey area 50-feet adjacent to roadsides in potential habitat for the presence of Ute ladies' tresses. If plants are found, re-initiate consultation with the USFWS.

Determination of Effects

Off-road vehicle use in potential habitat **may effect but would not adversely affect** Ute ladies' tresses because plants are not known to occur in these areas at present. These areas will be surveyed and if plants were found, then consultation with the USFWS would be re-initiated.

Access - Trails and Trailheads

Nine hundred and twenty-five miles of trails exist within the HCNRA. Developed trails or trailheads do not occur along the Imnaha River nor cross through habitat for Ute ladies-tresses.

Determination of Effects

Trails and trailhead would have **no effect** to Ute ladies' tresses, because potential habitat does not exist in or near these areas.

Access - Over-snow Vehicle Travel and Play Areas

The use of snowmobiles usually begins as early as mid-November and continues through April. Elevations in snow-play areas and routes are between 4000 and 7000 feet. Over-snow vehicle trails are sited on open roads and used only during the winter. These would have no effect to Ute ladies' tresses because roads do not provide habitat for either species. Snow-play areas are designated for the use of snowmobiles off roads. The total area designated for the use of snowmobiles in the HCNRA is 40,786 acres. Snow play areas are not located in areas of potential habitat for Ute ladies' tresses.

Determination of Effects

Snow play routes and areas would have **no effect** to Ute ladies' tresses, because potential habitat does not exist in or near these areas.

Access - Backcountry Airstrips

Eight backcountry airstrips are located within the HCNRA. Airstrips are not located within or near potential habitat for Ute ladies' tresses or Ute ladies' tresses.

Determination of Effects

Airstrips would have **no effect** to Ute ladies' tresses, because potential habitat does not exist in or near these areas.

Vegetation - Noxious Weed Management

The WWNF completed an *Integrated Noxious Weed Management Plan* in 1992, which was updated with an additional 106 treatment sites in 1994. Methods include manual, chemical and biological control. A BE for the 1994 update was completed on May 3, 1994. The BE identified the proximity of sensitive species and their potential habitats to treatment sites. The BE did not consider Ute ladies' tresses. Some weed sites lie along the Imnaha River, which may provide potential habitat for Ute ladies' tresses.

The EA for the project includes mitigation to survey weed sites for the presence of threatened, endangered, and sensitive plant species prior to treatment. Some weed sites located in riparian areas along the Imnaha River may require additional surveys for Ute ladies' tresses.

Mitigation

Survey weed treatment sites in potential habitat along the Imnaha Rivers prior to applying herbicides. If plants are found, re-initiate consultation with the USFWS.

Determination of Effects

The treatment of noxious weeds from the 1992 and 1994 decision **may effect**, but is **not likely to adversely affect** Ute ladies' tresses because weed sites in potential habitat along NFS portions of the Imnaha River will be inventoried for the presence of Ute ladies' tresses prior to additional treatments.

Livestock Grazing

There are 566,411 acres in the HCNRA where livestock grazing may be permitted. This use is managed on 51 separate livestock allotments. Eleven of these allotments are currently vacant (267,506 acres or 47% of the total). The remaining 40 active allotments include two for domestic sheep (managed by the Payette National Forest) and 38 for cattle.

Potential habitat Ute ladies' tresses is located in grazing allotments that lie along the Imnaha River. Very little NFS land lays adjacent the lower and middle portions of the Imnaha River. The total river length in the HCNRA is 63.9 miles: 6.3 miles run through active allotments, 21.9 miles run through vacant allotments and the remaining 35.7 miles of river frontage are in private ownership. The table below displays the acres of modeled potential habitat for Ute ladies' tresses on NFS lands within active allotments.

Table 4-21: Miles of River with Ute ladies' tresses Potential Habitat in Active Allotments

Allotment	Pasture	Season of Use	Miles
Cayuse	Basin	Apr 16 - May 30	0.72
Dodson-Haas	School Flat	Jan 16 - Apr 15	0.27
Dodson-Haas	Rye Bench	Mar 16 - May 15	0.03
Dodson-Haas	Maggie Beacher	Mar 16 - Apr 15	0.11
Dodson-Haas	Corral Creek	Mar 16 - Apr 15	0.03
Dodson-Haas	Bull Pasture	Mar 16 - Apr 15	0.66
Horse Creek	Road	Oct 1 - 31 (holding unit) in rest stat.	0.14
Horse Creek	Maggie	Nonuse 2002-2003	0.22

Allotment	Pasture	Season of Use	Miles
Log Creek	Packsaddle	Mar 1 - Mar 31	0.09
Lone Pine	07	Closed Area	0.35
Marr Flat	Imnaha	May 16 - May 25	0.29
Marr Flat	Imnaha Riparian	May 16 - May 25	0.2
Middle Point	West III	Apr 16 - May 31	0.74
Middle Point	West IV	Apr 16 - May 31	0.24
Rhodes Creek	Willow Springs	Mar 1 - April 15	0.05
Rhodes Creek	Horse Pasture	Feb 1 - May 15	0.6
Rhodes Creek	Heifer Lot 1	Feb 1 - Feb 30	0.13
Rhodes Creek	Heifer Lot 2	Feb 1 - Feb 30	0.29
Toomey	09	Closed Area	1.15
Total			6.31

Table 4-22: Vacant Allotments with Potential Habitat for Ute ladies' tresses

Allotment	Pasture	Season of Use	Miles
Cherry Creek	01	Vacant	0.72
Mud-Duck	00	Vacant	0.27

Ute ladies' tresses would be vulnerable to livestock grazing in its habitat at any time of year. Over-wintering rosettes are vulnerable to trampling by livestock during the winter months, particularly if the ground were not frozen and snow covered. During the active growing season (spring through fall) Ute ladies' tresses would be vulnerable to both grazing and trampling along with indirect effects from alteration of the plant community and hydrology, and the introduction of invasive plants.

Mitigation

Survey active allotments with potential habitat for Ute ladies' tresses. Re-initiate consultation with the USFWS if Ute ladies' tresses is found.

Determination of Effects

Allotments lacking potential habitat would have **no effect** to **Ute ladies' tresses** because the plant is presumed not to occur in these areas. Vacant allotments would have no effect to Ute ladies' tresses because grazing actions are not occurring at this time. Consultation would be re-initiated if these allotments were to be stocked in the future. Allotments with potential habitat **may effect** but are **not likely adversely affect** Ute ladies' tresses because potential habitat in these allotments would be surveyed within two years. The table below summarizes the effects to Ute ladies' tresses for each grazing allotment.

Table 4-23: Determination of Effects to Ute ladies' tresses from Livestock Allotments

Allotment Name	Habitat Present	Critical Growth Period	
Big Canyon	Vacant		No effect
Blackmore	No		No effect
Cache Creek	Vacant		No effect
Cannonball	No		No effect
Canyon	Vacant		No effect
Cayuse	Yes	Yes	NLAA
Chalk Creek	No		No effect
Cherry Creek	Yes, Vacant		No effect
Chesnimus	No		No effect
Cold Springs	No		No effect
College Creek	No		No effect
Cow Creek	No		No effect
Cow Creek- Idaho	No		No effect
Curren Hill	Vacant		No effect
Deep Creek	No		No effect
Del Curto	No		No effect
Dodson-Haas	Yes	Yes	NLAA
Doe Creek	No		No effect
Double Pine	No		No effect
Dunlop-Thorn	No		No effect

Allotment Name	Habitat Present	Critical Growth Period	Determination
Dunn Creek	No		No effect
East Pine Valley	No		No effect
Echols Butte	No		No effect
Ghostbull	No		No effect
Grizzly Ridge	No		No effect
Grouseline	No		No effect
Himmelwright	Vacant		No effect
Hope Creek	Vacant		No effect
Horse Creek	Yes	Yes	NLAA
Jim Creek	Vacant		No effect
Keeler	No		No effect
Log Creek	Yes	Yes	NLAA
Lone Pine	Yes, Pasture 07	Closed Pasture	No effect
Lost Cow	No		No effect
Marr Flat	Yes	Yes	NLAA
Middle Point	Yes	Yes	NLAA
Mud-Duck	Yes, Vacant		No effect
Northpine	No		No effect
Papoose	No		No effect
Pittsburg	No		No effect
Rhodes Creek	Yes	Yes	NLAA
Saddle Creek	No		No effect
Schleur	No		No effect
Sheep Creek	Vacant		No effect
Snake River	No		No effect
Snell	No		No effect
Teepee Elk	No		No effect
Temperance-Snake	Vacant		No effect
Toomey	Yes, Pasture 09	Closed Pasture	No effect
Turnbull	No		No effect
Turner Creek	Vacant		No effect

Livestock Grazing - Administrative Horse Pastures

Administrative horse pastures are areas within existing active or vacant allotments set aside for the use of Forest Service stock. Eleven administrative horse pastures currently total over 18,500 acres. Administrative horse pastures do not contain habitat for Ute ladies' tresses. Two horse pastures are in the Imnaha River corridor, but neither is adjacent the river.

Determination of Effects

Because habitat for either species is not present, the use of administrative horse pastures would have **no effect** to Ute ladies' tresses.

Aggregate Effects

Aggregate effects are the combined effects of all the separate federal actions when added together. The effects of ongoing actions to Ute ladies' tresses are described earlier in the section "Population, Habitat Conditions, and Trends." Because inventories for Ute ladies' tresses have not been completed in potential habitat where ongoing actions are occurring, undiscovered populations of Ute ladies' tresses could possibly exist in the HCNRA, although the likelihood of this is not great since habitat for this plant is quite limited. Some effects to Ute ladies' tresses may be deduced based on known effects to the habitats in which the plant is known to occur. Actions that could impact these habitats include livestock grazing and off-road vehicle use. The greatest threat to Ute ladies' tresses is from livestock grazing in areas where undiscovered populations may exist, at least until such areas have been inventoried for its presence, mainly riparian areas along the Imnaha River. However, grazing impacts on any undiscovered populations are not considered so severe that they would contribute toward a loss of species viability. An implementation schedule (Appendix C of this BA) to inventory Ute ladies' tresses potential habitat in active allotments within three years would limit potential unknown effects to the short-term. Mitigation measures are incorporated into this document to survey potential habitat in areas of ongoing actions within three years. If new populations are discovered, consultation with the USFWS would be re-initiated and mitigations

would be developed if necessary to protect these populations.

Cumulative Effects

Cumulative effects, under the *Endangered Species Act*, include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area. Future Federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to Section 7 of the *Endangered Species Act*.

Within the action area (HCNRA) Ute ladies' tresses is not known to occur on public or private land. Potential habitat for Ute ladies' tresses probably exists in riparian areas along the Imnaha River, most of which is in private ownership. Since private lands tend to be managed intensively, these areas may no longer provide habitat for Ute ladies' tresses. The effects of future State, tribal, and local government actions would not add cumulatively to the aggregate effects described above affects to Ute ladies' tresses. Tribal actions are not anticipated; tribal lands do not exist within the action area. State and local government actions are limited to state and county road maintenance, which would be confined to the roads rights-of way and not affect potential habitat for Ute ladies' tresses. Refer to Appendix C of this BA for a summary of effects for Ute ladies' tresses.

Water howellia (Howellia aquatilis)

Water howellia has only a small amount of potential habitat in the HCNRA and is not known to occur in the HCNRA.

Recreation - Dispersed Campsites and Outfitter and Guide Permits

A total of approximately 368 campsites dispersed campsites exist in the HCNRA including the Hells Canyon Wilderness. Dispersed campsites are generally small areas of compacted ground, that average 50' by 50' in size. The HCNRA maintains 21 special use permits for outfitting and guiding upland users (cougar/bear hunting day use, from roads only, no horses – 3; progressive horse/mule trips – 11; llama trips – 2; mountain biking – 1; fishing and whitewater rafting on the Imnaha Wild and Scenic River – 1; photography – 1; and motorized ground transportation on roads only – 1; and aircraft landing at backcountry airstrips – 1. Eleven permits operate in the Wilderness and ten permits operate in nonwilderness areas. Outfitter and guides operating under special use permits use some of these campsites. Campsites themselves are not considered habitat because the ground is too compacted and devoid of vegetation.

Effects to water howellia, if present, would arise from recreationists trampling vegetation in the area immediately adjacent the campsite. For this to occur to either species, the dispersed campsite would need to be located adjacent potential habitat, i.e. riparian areas. Potential habitat for water howellia has been identified in the Duck Lake and Twin Lakes areas. The effects from trampling would be slight and not extend more than 150 feet beyond the campsite. Recreationists may also inadvertently introduce noxious weeds into the area with vehicles or stock.

Mitigation

Survey areas around dispersed campsites located within or adjacent potential habitat for water howellia. Re-initiate consultation with the USFWS if plants are found.

Determination of Effects

The use of dispersed campsites within areas of modeled habitat **may effect but is not likely to adversely affect** water howellia because these areas will be inventoried to determine if the species is present. If water howellia were found in these areas, then consultation with the USFWS would be re-initiated and mitigation measures, if necessary, would be developed to protect the site. The use of dispersed campsites outside areas of modeled habitat would have **no effect** to water howellia, because this plant is not likely to occur in these areas.

Recreation - Developed Campgrounds

Of the twenty developed campgrounds that exist within the HCNRA two, Duck Lake and Twin Lake, are near potential habitat for water howellia.

Mitigation

Survey up to ¼ mile perimeter adjacent developed campgrounds in potential habitat for water howellia.

Determination of Effects

The use of Duck Lake and Twin Lake developed campgrounds within or adjacent areas of potential habitat (as indicated above) **may effect**, but is **not likely to adversely affect** water howellia because these areas will be inventoried to determine if the species is present. If water howellia is found in these areas, then consultation with the USFWS would be re-initiated and mitigation measures, if necessary, would be developed to protect the species. The use of other developed campgrounds (not within or adjacent areas of potential habitat) would have **no effect** to water howellia, because this species is not likely to occur in these areas.

Recreation - Administrative Facilities

Thirty-eight administrative facilities exist within the HCNRA. No administrative facilities are located within or near habitat for water howellia.

Determination of Effects

Administrative facilities would have **no effect** to water howellia because none are located within areas of potential habitat.

Access – Roads, Road Maintenance and Off-road Vehicle Use

Habitat for water howellia is not near roads except those associated with the developed campgrounds at Duck Lake and Twin Lakes, whose effects were described above.

Mitigation

Survey areas along roadsides in potential habitat for the presence of water howellia. Re-initiate consultation with the USFWS if plants are found.

Determination of Effects

Road maintenance and off-road vehicle use **may effect but would not adversely affect** water howellia because this plant is not known to occur in areas subject to effects. These areas will be surveyed and if plants are found, then consultation with the USFWS would be re-initiated.

Access - Trails and Trailheads

Nine hundred and twenty-five miles of trails exist within the HCNRA. Developed trails or trailheads do not run along the Imnaha River nor cross through habitat for water howellia.

Determination of Effects

Trails and trailhead would have **no effect** to water howellia, because potential habitat does not exist in or near these areas.

Access - Over-snow Vehicle Travel and Play Areas

The use of snowmobiles usually begins as early as mid-November and continues through April. Elevations in snow-play areas and routes are between 4000 and 7000 feet. Over-snow vehicle trails are sited on open roads and used only during the winter. These would have no effect to water howellia because roads do not provide habitat for this plant. Snow-play areas are designated for the use of snowmobiles off roads. The total area designated for the use of snowmobiles in the HCNRA is 40,786 acres. Snow play areas are not located in areas of potential habitat for water howellia.

Determination of Effects

Snow play routes and areas would have **no effect** to water howellia, because potential habitat does not exist in or near these areas.

Access - Backcountry Airstrips

Eight backcountry airstrips are located within the HCNRA. Airstrips are not located within or near potential habitat for water howellia.

Determination of Effects

Airstrips would have **no effect** to water howellia, because potential habitat does not exist in or near these areas.

Vegetation - Noxious Weed Management

The WWNF completed an *Integrated Noxious Weed Management Plan* in 1992, which was updated with an additional 106 treatment sites in 1994. Methods include manual, chemical and biological control. A BE for the 1994 update was completed on May 3, 1994. The BE identified the proximity of sensitive species and their potential habitats to treatment sites; however, the BE did not consider effects to water howellia.

The WWNF GIS was used to compare weed locations with the potential habitat for water howellia that is around Duck Lake and Twin Lakes. Weed sites do not occur in or near areas of potential habitat for water howellia at this location.

The EA for the project includes mitigation to survey weed sites for the presence of threatened, endangered, and sensitive plant species prior to treatment.

Determination of Effects

Weed treatments authorized under the 1992 and 1994 EAs would have **no effect** to water howellia because treatment sites are not located in areas of potential habitat for this species.

Livestock Grazing

There are 566,411 acres in the HCNRA where livestock grazing may be permitted. This use is managed on 51 separate livestock allotments. Eleven of these allotments are currently vacant (267,506 acres or 47% of the total). The remaining 40 active allotments include two for domestic sheep (managed by the Payette National Forest) and 38 for cattle.

Potential habitat for water howellia is located in only the vacant Mud-Duck Allotment.

Determination of Effects

Grazing allotments would have **no effect to water howellia** because active allotments are not located in areas of potential habitat for this species. Habitat exists only in the vacant Mud-Duck Allotment. If this allotment is

proposed for stocking in the future, an allotment management plan would be prepared and consultation with the USFWS would be undertaken.

Livestock Grazing - Administrative Horse Pastures

Administrative horse pastures are areas within active or vacant existing allotments set aside for the use of Forest Service stock. Eleven administrative horse pastures currently total over 18,500 acres. Administrative horse pastures do not contain habitat water howellia.

Determination of Effects

Because habitat for either species is not present, the use of administrative horse pastures would have **no effect** to water howellia.

Aggregate Effects

Aggregate effects are the combined effects of all the separate federal actions when added together. The effects of ongoing actions to water howellia are described earlier in the section "Population, Habitat Conditions, and Trends." Because inventories for water howellia have not been completed in potential habitat where ongoing actions are occurring, undiscovered populations of water howellia could possibly exist in the HCNRA, although the likelihood of this is not great since habitat for this plant is quite limited. Some effects to water howellia may be deduced based on known effects to the habitats in which the plant is known to occur. Actions that could impact these habitats include livestock grazing and off-road vehicle use. The greatest threat to water howellia is from livestock grazing or excessive recreation use in areas where undiscovered populations may exist, at least until such areas have been inventoried for its presence. However, grazing is not occurring in potential habitat for this plant in the action area. An implementation schedule (Appendix C of this BA) to inventory water howellia potential habitat in active allotments within three years would limit potential unknown effects to the short-term. Mitigation measures are incorporated into this document to survey potential habitat in areas of ongoing actions within three years. If new populations are discovered, consultation with the USFWS would be re-initiated and mitigations would be developed if necessary to protect these populations.

Cumulative Effects

Cumulative effects, under the *Endangered Species Act*, include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area. Future Federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to Section 7 of the *Endangered Species Act*.

Within the action area (HCNRA) water howellia is not known to occur on public or private land. Potential habitat for water howellia exists in riparian areas in the Duck and Twin Lakes areas, which is in federal ownership. For this reason, there would be no effects from future state, tribal, local or private actions that would affect water howellia. Tribal actions are not anticipated; tribal lands do not exist within the action area. State and local government actions are limited to state and county road maintenance, which would be confined to the roads rights-of way and not affect potential habitat for water howellia. Refer to Appendix C of this BA for a summary of effects for water howellia.

Analysis of Programmatic Direction

The analysis of the programmatic direction from the selected alternative includes the direct and indirect effects, cumulative effects, aggregate effects, conclusion and determination of effects for each species.

New projects proposals would be subject to Section 7 *Endangered Species Act* consultation process. This would ensure that surveys are conducted and mitigations are developed to protect any listed populations in the project

areas. If populations of other listed, proposed, or candidate species are found, consultation with the USFWS will be re-initiated.

Selected Alternative E-modified

The selected alternative includes goals, objectives, standards, and guidelines for threatened, endangered and proposed (TEP) plant species, which includes direction to systematically survey for TEP plants in the HCNRA. Implementation of this direction would significantly improve management and the long-term viability of the TEP plant species in the planning area. Monitoring of MacFarlane's four-o'clock would continue.

Refer to the summary of Alternative A (current direction) and Alternative E-modified in Chapter 2 of the FEIS and the full text of the goals, objectives, standards and guidelines in the FEIS, Appendix C, Table C-1 for Biologically Unique Plant Species, Habitats and Ecosystems for an understanding of the change in programmatic direction.

Refer also to the complete list of all goals, objectives, standards and guidelines for Alternative A (current direction) and Alternative E-modified that also apply to protection of listed plant species.

MacFarlane's four-o'clock (Mirabilis macfarlanei)

Direct and Indirect Effects

Potential factors affecting MacFarlane's four-o'clock from the selected alternative include 1) recreation, 2) access, 3) noxious weed management, 4) forested vegetation treatments, 5) fire management, 6) livestock grazing, and 7) mining.

Recreation – Dispersed Campsites, Outfitter and Guide Permits, Developed Campgrounds, and Administrative Facilities

Camping and other recreational activities could potentially pose a risk to rare plant populations. The greatest impacts are trampling and soil compaction from recreationists at campsites. These activities are usually very restricted spatially. Recreationists tend to use the same areas repeatedly.

There are currently 21 permitted outfitter and guides in the HCNRA. The selected alternative would allow an opportunity for one more permit for guided fishing/whitewater rafting on the Imnaha River. These outfitters use trails and camps designated on their permits. The same impacts from recreational stock could potentially occur from permitted guide and packer operations. However, due to the permit system, more controls can be exerted on these operators; potential impacts would be mitigated through the permit process.

Horses, mules, and llamas used for recreation in the HCNRA may impact rare plants by grazing or trampling. Impacts from recreational livestock tend to be localized but possibly more severe than impacts from permitted grazing, because their animals are usually restricted to small areas, which tend to be used repeatedly throughout the season. In addition, the introduction of noxious weeds and other undesirable exotic plants is a serious concern, because recreationists may bring stock and feed from distant places and may introduce new species of weeds to the area.

The appropriate objectives, standards and guidelines (below) for recreation use of livestock incorporated with Alternative E-modified would help ameliorate weed introductions and other impacts from recreationists' and outfitter and guides' use of stock

Applicable HCNRA Alternative E-modified Goals, Standards, and Objectives

- Rec-S7: All users of pack and saddle stock must carry and use pelletized feed or other certified weed-free feed.
- Rec-S10: Limits party size for all users to 8 people and 16 stock animals in the Hells Canyon Wilderness and wild and scenic sections of the Snake River.

- Rec-O6: Manage outfitter-guide operations to promote restoration of human-caused impacts to soil, water, and riparian areas.
- Rec-S11: Manage outfitter-guide operations through special use permit process to insure compliance with permit terms and operation plans.

Access – Roads and Road Maintenance, Trails and Trailheads, Over-snow Vehicle Travel and Play Areas, and Backcountry Airstrips

Road and trail construction, off-road driving, and over-snow vehicle travel are activities that pose historic and ongoing threats to rare plant habitat. The known populations of MacFarlane's four-o'clock in the HCNRA are areas closed to off-road motor vehicle use and most sites are situated on steep slopes where unauthorized motorized vehicle impacts would probably not be a significant problem. There may be potential for impacts from people "hill-climbing" on motorcycles and ATVs. In 2000, signs were erected in the Pittsburg landing area to remind visitors to stay on the roads which would help reduce the incidence of off-road driving in areas with MacFarlane's four-o'clock. Alternative E-modified would limit motorized and mechanized travel to designated open roads and trails only.

Although the known populations of MacFarlane's four-o'clock are mostly on steep slopes, there is a possibility that undiscovered populations inhabit roadsides in potential habitat; there is a risk that vehicles may impact individual plants. If new sites were to be found in areas experiencing negative impacts from vehicles, actions would be taken to protect MacFarlane's four-o'clock.

Construction of new roads and trails, and extraction of rock from borrow pits could potentially impact rare plant habitat. However, all new projects would undergo NEPA analysis including rare plant surveys. Any potential impacts would be avoided or mitigated if populations are found. The same is true for projects to close and obliterate roads.

Over-snow vehicle travel may have some potential to impact rare plant populations and/or habitat. The greatest potential direct impact from over-snow vehicle travel would be in the spring when some areas have melted and people drive over wet, exposed areas with their machines. A potential indirect effect is that changes in snowmelt patterns may lead to shorter growing seasons or other changes in water relationships. Over-snow vehicle travel is not expected to occur in known populations or modeled habitat for MacFarlane's four-o'clock because these exist at elevations below normal winter snow pack.

Applicable HCNRA Alternative E-modified Goals, Standards, and Guidelines

- Acc-S1: The use of motorized and mechanical equipment would be prohibited off open designated Forest Service roads, trails, and backcountry airstrips, except where authorized by permit (Public LURs, 36 CFR 292.44)
- Acc-G2a: Decommission or convert to trails roads not needed for future management, or for achievement of recreation goals. On a site-specific basis, determine road restoration or road decommissioning activities to restore watershed integrity, soil productivity, and ecosystem function to the extent practicable.
- Acc-G8: Manage roads and trails in coordination with the *Integrated Noxious Weed Management Plan*.

Noxious Weed Management and Other Exotic Plants

Noxious weeds, and other invasive nonnative plants, pose a potential threat to MacFarlane's four-o'clock populations and habitat due to competition, and allelopathy. Noxious weed spraying has the potential to negatively affect rare plant populations, however any future projects would undergo site-specific NEPA analysis and surveys before implementation. The elimination of noxious weeds and restoration of native plant communities would benefit rare plants in the long-term. Insect control activities may also indirectly affect rare plants, due to impacts to pollinators. The advance of yellow star-thistle up the Snake River is alarming and potentially a grave threat to MacFarlane's four-o'clock. Any actions pursued to prevent or slow this invasion would be beneficial to MacFarlane's four-o'clock.

The impacts from restoration projects would depend entirely on the specifics of each project. In general, projects that improve ecological conditions would improve conditions for rare plants. The main restoration activity that could potentially have negative effects to rare plants is the seeding of rhizomatous perennial grasses, and/or annual grasses. These grasses could potentially outcompete rare plant seedlings. In addition, if range drills or other soil disturbing equipment are used, there is potential for impacts from these activities. However, any future noxious weed or restoration projects will be analyzed under NEPA, so concerns will be addressed on a project specific level.

Applicable HCNRA Alternative E-modified Goals, Standards, and Objectives

- Minimize the potential for transport of invasive plant seeds or creation of habitats suitable for establishment of invasive species (Rec-S7)
- Evaluate the extent of nonnative invasive plants and potential for restoration (Nox-O2)
- Manage noxious weeds to reduce impacts to native plants (Nox-O1).
- Evaluate the factors contributing toward the spread of invasive plants and implement appropriate prevention strategies (Nox-O3).
- Restore grassland sites to mid-seral status to improve the ability of native vegetation to resist invasion by noxious weeds (Gra-S2).
- Provide for natural restoration of degraded sites by modifying management activities as necessary (Nox-G3).
- Consider quarantine or closure of some areas, trails, or roads to prevent spread of noxious weeds to adjacent areas; and contain or control aggressive noxious weeds and other nonnative plants (Nox-G7).

Forested Vegetation Treatment

Forested vegetation treatments may affect rare plants due to ground disturbance, soil compaction, and trampling. In addition, changes in shading and hydrology could potentially indirectly affect populations of rare plants. However, Macfarlane's four-o'clock does not grow in the forested areas that would receive treatment. In addition, botanical surveys and the BA process would insure that any populations of rare plants found adjacent to projects would be protected on a project-by-project basis.

Fire Management

MacFarlane's four-o'clock grows in grassland habitats where fire is an integral part of the ecosystem. Although natural fires tend to occur from mid to late summer, MacFarlane's four-o'clock completes its aboveground life cycle before mid-summer avoiding nearly all of the wildfire season. Due to the deep-rooted nature of the species, it is likely that fires do not affect the below ground parts of the plant, even if the aboveground parts burn. Monitoring studies on the Cottonwood District of the BLM showed that MacFarlane's four-o'clock populations that burned in two areas exhibited no adverse effects from the fires. However, one of these fires occurred in the early spring, before any plants started growing that year. The other was late in the summer after all plants had gone dormant (Johnson 1994). Johnson also noted that ungulates tend to congregate in recently burned areas. Light and medium intensity fires tend to stimulate grasses and some other plants to grow more vigorous than normal. An indirect impact of fire is that ungulates tend to congregate in these areas. This concentrated use could potentially lead to indirect effects from fire, due to increased grazing in areas following burns. Also, impacts from fire probably have a relatively short duration and magnitude.

Since most natural fires occur in late summer to fall, prescribed burning in the spring presents a greater risk to species that are actively growing at that time. Project-level planning for prescribed fires would consider the timing of burns to reduce impacts to rare plant populations and habitat.

Macfarlane's four-o'clock grows in grasslands, where historically, fire burned frequently in the HCNRA, every 2-20 years. Because of past fire suppression efforts, only 26 percent of grassland habitat in the HCNRA has burned from 1970 to 1994. In the historical past it is likely all 300,000 acres of grassland habitat would have burned during a 25-year period, with most areas having burned twice. By stimulating the health of the grasslands, increasing the acres of prescribed fire in grasslands, along with the practice of allowing natural fires to burn, would likely benefit Macfarlane's four-o'clock in the long term.

Environmental analysis, including rare plant surveys, would be completed before conducting prescribed burns, so potential conflicts with rare plant management would be addressed and mitigated first.

Wildfire suppression actions pose a greater risk to Macfarlane's four-o'clock than fire alone. Fire suppression and rehabilitation activities could impact undiscovered populations of Macfarlane's four-o'clock. Ground disturbing activities associated with fire suppression (e.g., fireline construction, burnouts, helispot landings, artificially created safety zones, fire camps, and "mop-up" actions) could lead to locally severe effects. However, these probably would occur over relatively small areas. Fire suppression activities would follow minimum impact suppression techniques (MIST), as described in the WWNF *Fire Management Plan* (USDA 2001). Current fire control and rehabilitation procedures in the HCNRA include coordination between the district botanist and fire personnel to ensure that suppression and rehabilitation activities do not affect known populations of rare plants. To conserve rare plants selected alternative would require construction of fire lines to avoid any known threatened, endangered, or proposed plant species locations unless coordinated with a Resource Advisor and suitable alternative locations and actions are not possible (Fire-S6).

Applicable HCNRA Alternative E-modified Goals, Standards, and Objectives

- Fire-S6: Construction of fire lines shall avoid any known threatened, endangered, or proposed plant species locations unless coordinated with a Resource Advisor and suitable alternative locations and actions are not possible.

Livestock Grazing

Domestic livestock grazing (cattle and horses) may impact populations of MacFarlane's four-o'clock. (MacFarlane's four-o'clock or its modeled habitat does not occur in sheep allotments in the HCNRA). Possible negative effects from grazing include ingestion, trampling, erosion from trampling, introduction and spread of noxious weeds, and changes in vegetative composition. MacFarlane's four-o'clock may experience less grazing pressure from cows due to its tendency to grow in more steep or dry areas than plants that grow in riparian areas, where cattle spend more time. A recent study found that solitary bees often nest in old rodent burrows and that compaction due to cattle caves in these nests (Sugden 1985). This may indirectly affect the long-term viability of MacFarlane's four-o'clock by decreasing pollination and seed set.

Current grazing in the known populations of MacFarlane's four-o'clock is being managed to reduce negative effects to the species. Monitoring studies investigating the effects of livestock grazing and trampling on MacFarlane's four-o'clock in Hells Canyon have found no significant trend between grazed or ungrazed sites. This may be due to the long-lived nature of the species; 20 or more years of data may be necessary to clearly determine trends. Although monitoring studies have not shown statistically significant effects from light to moderate grazing, visual impacts of cattle trails through populations have prompted the WWNF to build fences around two populations in Idaho near Pittsburg landing and at one population in the Imnaha River drainage.

Applicable HCNRA Alternative E-modified Goals, Standards, and Objectives

The following objectives, standards and guidelines for Alternative E-modified have been designed to manage grazing practices to improve the health and function of grasslands, which would accordingly benefit MacFarlane's four-o'clock:

- Gra-O1: Manage grassland vegetation to ensure continued ecological function and sustainability of native ecosystems. Maintain or restore the ecological status of grassland communities to their natural potential condition and their historic range of variability.
- Gra-O3: Evaluate rangeland capability and suitability, and present rangeland condition or ecological status in relation to potential natural community.
- Gra-S1: On lands determined to be unsuitable or not capable for grazing by domestic livestock or determined to be in an unsatisfactory condition, the rangeland vegetation production for these lands would not be allocated to the allotment's carrying capacity.
- Gra-S3: Allotment management plans would establish site-specific recovery rates to achieve goals for ecological status.
- Gra-G1: Emphasize enhancement or restoration of potential native vegetation.

- Gra-G6: Plan restoration projects to improve the health and sustainability of grasslands where current ecological conditions are early to mid-seral.
- TES-O4: Conduct habitat improvement projects for federally listed species. These may include fencing, burning, closing roads, treatment of noxious weeds, plant propagation, or other actions.
- TES-G2: Consider modifications to activities such as seasonal or permanent closures for roads, trails, exclusion of domestic livestock grazing, and modification of grazing plans where conflicts with the protection of rare plant species are identified.

Mining

Mining has the potential for serious, but usually localized, impacts to populations. Any plants in areas that will be mined would probably be destroyed. One mine, no longer active, exists in the HCNRA. No new mining claims are allowed in the HCNRA, as per the *Public LURs*.

Cumulative Effects

Cumulative effects, under the *Endangered Species Act*, include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area. Future Federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to Section 7 of the *Endangered Species Act*.

Within the action area (HCNRA) MacFarlane's four-o'clock is occurs on public or private land. Potential habitat for MacFarlane's four-o'clock exists in private land within the HCNRA. Since most private lands tend to be managed intensively, these areas may no longer provide habitat for MacFarlane's four-o'clock. The effects of future State, tribal, and local government actions would not add cumulatively to the aggregate effects described above affects to MacFarlane's four-o'clock. Tribal actions are not anticipated; tribal lands do not exist within the action area. State and local government actions are limited to state and county road maintenance, which would be confined to the roads rights-of way and would not affect potential habitat for MacFarlane's four-o'clock.

Conclusion and Determination of Effects - MacFarlane's four-o'clock

Grazing, road maintenance, and access are not believed to be causing significant impacts to known populations of MacFarlane's four-o'clock. Effects to undiscovered populations (that may be present in areas that have not been inventoried for the presence of MacFarlane's four-o'clock) could not be determined at this time. In these areas the greatest potential for impacts to MacFarlane's four-o'clock would be from livestock grazing. However, grazing impacts on any undiscovered populations are not considered so severe that they would contribute toward the loss of species viability. Because 76 percent of the potential habitat for MacFarlane's four-o'clock in the HCNRA is in allotments in vacant status or (with Alternative E-modified) closed allotments, it is assumed that known populations plus any undiscovered populations in closed allotments would continue to contribute to the long-term viability of the species in the HCNRA. Furthermore, a schedule to inventory potential habitat in active allotments within three years (refer to Appendix C of this BA) would limit potential unknown effects to the short-term.

The number of livestock grazing in the HCNRA has been dramatically reduced from its peak in the early 20th century. The adoption of goals, objectives standards and guidelines to improve the ecological condition of grasslands, improve grazing practices, and protect threatened and endangered species from management actions would be beneficial to MacFarlane's four-o'clock. Limiting access to designated open roads and designated sites or areas represents a low level of risk to MacFarlane's four-o'clock. The indirect effect of restocking small portions of vacant allotments is similarly a small risk because site-specific analysis and inventories would be completed first. These subsequent analyses would require new decisions and consultation with the USFWS. New objectives, standards, and guidelines (Alternative E-modified) for livestock grazing on grasslands would improve the health of grassland ecosystems and accordingly, MacFarlane's four-o'clock.

In addition to objective TES-O3, an objective that directs the WWNF to work cooperatively with the USFWS to implement recovery plans for federally listed plants, implementation of the programmatic direction in Alternative E-

modified incorporates as additional objectives, standards, and guidelines, several tasks from the Revised Recovery Plan for MacFarlane's four-o'clock (USDI 2000):

Table 4-24: Recovery Plan Tasks for MacFarlane's four-o'clock

Recovery Plan Task	CMP Objective, Standards, & Guidelines
Task No. 1.1.3.1: Surveys should be conducted in all allotments where grazing is authorized in areas containing suitable habitat for MIMA.	TES-S5: To reduce the risk of impacts to federally listed plant species from ongoing activities, implement a botanical survey program.
Task No. 1.1.3.3: Implement weed control measures.	NOX-O1: Manage noxious weeds to reduce negative impacts to native plants, wildlife, and other resources.
Task No. 1.1.3.5: Implement effective ORV use control measures.	ACC-S1: The use of motorized and mechanical equipment would be prohibited off open designated Forest Service roads, trails, and backcountry airstrips, except where authorized by permit (Public LURs, 36 CFR 292.44)
Task No. 2.1: Monitor MIMA populations/sites annually.	TES-S4: Monitor population trends and habitat conditions for federally listed and proposed species.
Task No. 4.1: Conduct surveys on federal lands where activities may affect MIMA habitat.	TES-S2: When evaluating new projects, conduct botanical surveys to search for populations of federally listed and proposed plants in potential habitat. TES-S5: To reduce the risk of impacts to federally listed plant species from ongoing activities, implement a botanical survey program.
Task No. 4.3: Protect newly discovered MIMA populations.	TES-S5: If populations are found during surveys, develop mitigations and re-initiate consultation with the USFWS.
Task No. 6.1: Develop and implement a re-introduction plan for MIMA, if re-introduction is warranted.	TES-G1: To achieve recovery goals, consider re-introduction of federally listed species in suitable, currently unoccupied habitat.

A complete description of all recovery plan tasks that are being adopted through mitigations with both ongoing actions and programmatic direction is found in **Appendix C-1** of the BA.

Appendix C-3 of this BA summarizes the effects determinations for ongoing actions and the programmatic direction from the selected alternative for MacFarlane's four-o'clock. A schedule to inventory potential habitat for MacFarlane's four-o'clock is also found in **Appendix C-2**.

Because the effects resulting from programmatic direction found in the HCNRA CMP, as described above, do not rise to the level of adverse effects and for the number of recovery plan tasks included as objectives, standards and guidelines the HCNRA CMP **may effect, but is not likely to adversely affect** MacFarlane's four-o'clock.

Spalding's catchfly (Silene spaldingii)

Direct and Indirect Effects

Potential factors affecting Spalding's catchfly from the selected alternative include 1) recreation, 2) access, 3) noxious weed management, 4) forested vegetation treatments, 5) fire management, 6) livestock grazing, and 7) mining.

Recreation – Dispersed Campsites, Outfitter and Guide Permits, Developed

Campgrounds, and Administrative Facilities

Camping and other recreational activities could potentially pose a risk to rare plant populations. The greatest impacts are trampling and soil compaction from recreationists at campsites. These activities are usually very restricted spatially. Recreationists tend to use the same areas repeatedly.

There are currently 21 permitted packer/guides in the HCNRA. The selected alternative would allow the opportunity for one more guided fishing/whitewater rafting permit on the Imnaha River. These outfitters use trails and camps designated on their permits. The same impacts from recreational stock could potentially occur from permitted guide and packer operations. However, due to the permit system, more controls can be exerted on these operators; potential impacts would be mitigated through the permit process.

Horses, mules, and llamas used for recreation in the HCNRA may impact rare plants by grazing or trampling. Impacts from recreationists' livestock tend to be localized but possibly more severe than impacts from permitted grazing, because their animals are usually restricted to small areas, which tend to be used repeatedly throughout the season. In addition, the introduction of noxious weeds and other undesirable exotic plants is a serious concern, because recreationists may bring stock and feed from distant places and may introduce new species of weeds to the area.

The appropriate objectives, standards and guidelines (below) for recreation use of livestock incorporated with Alternative E-modified would help ameliorate weed introductions and other impacts from recreationists' and outfitter and guides' use of stock

Applicable HCNRA Alternative E-modified Goals, Standards, and Objectives

- Rec-S7: All users of pack and saddle stock must carry and use pelletized, or other certified weed-free feed
- Rec-S10: Limits party size for all users to 8 people and 16 stock animals in the Hells Canyon Wilderness and wild and scenic sections of the Snake River
- Rec-O6: Manage outfitter-guide operations to promote restoration of human-caused impacts to soil, water, and riparian areas
- Rec-S11: Manage outfitter-guide operations through special use permit process to insure compliance with permit terms and operation plans

Access – Roads and Road Maintenance, Trails and Trailheads, Over-snow Vehicle Travel and Play Areas, and Backcountry Airstrips

Road and trail construction, access, and over-snow vehicle travel are activities that pose historic and ongoing threats to rare plant habitat. Alternative E-modified would limit motorized and mechanized access to designated open roads, trails and designated sites or areas only would present limited risk of impacts to Spalding's catchfly, if present. There may be potential for impacts from unauthorized "hill-climbing" on motorcycles and ATVs. Until potential habitat adjacent to open roads and dispersed camping areas has been surveyed for Spalding's catchfly, there is a risk that vehicles may impact individual plants. If new sites were to be found in areas experiencing negative impacts from vehicles, actions would be taken to close or post those areas.

Construction of new roads and trails, and extraction of rock from borrow pits could potentially impact rare plant habitat. However, all new projects would undergo NEPA analysis including rare plant surveys. Any potential impacts would be avoided or mitigated if populations are found. The same is true for projects to close and obliterate roads.

Over-snow vehicle travel may have some potential to impact Spalding's catchfly habitat. The greatest potential direct impact from over-snow vehicle travel would be in the spring when some areas have melted and people drive over wet, exposed areas with their machines disturbing the soil and possibly any root crowns of Spalding's catchfly, if present. Soil disturbance may also invite colonization by weedy exotics. Over-snow use would be managed in specific areas.

Applicable HCNRA Alternative E-modified Goals, Standards, and Guidelines

- Acc-S1: The use of motorized and mechanical equipment would be prohibited off open designated Forest Service roads, trails, and backcountry airstrips, except where authorized by permit (Public LURs, 36 CFR 292.44)
- Acc-G2a: Decommission or convert to trails roads not needed for future management, or for achievement of recreation goals. On a site-specific basis, determine road restoration or road decommissioning activities to restore watershed integrity, soil productivity, and ecosystem function to the extent practicable.
- Acc-G8: Manage roads and trails in coordination with the *Integrated Noxious Weed Management Plan*.
- A minimum of two feet of snow depth is required for over-snow travel (Standard Acc-S11) would prevent help prevent damage to soil and vegetation.

Noxious Weed Management and Other Exotic Plants

Noxious weeds, and other invasive nonnative plants, pose a potential threat to Spalding's catchfly populations and habitat due to competition and allelopathy. Noxious weed herbicide spraying has the potential to impact rare plant populations, however future projects would undergo NEPA analysis and surveys before their implementation. The elimination of noxious weeds and restoration of native plant communities would benefit Spalding's catchfly in the long-term. Insect control activities may also indirectly affect Spalding's catchfly, due to impacts to pollinators. The advance of yellow star-thistle up the Snake River is alarming and pose a threat to Spalding's catchfly if present in the canyon. Any actions pursued to prevent or slow this invasion would be beneficial to undiscovered sites of Spalding's catchfly.

The impacts from restoration projects would depend entirely on the specifics of each project. In general, projects that improve ecological conditions would improve conditions for rare plants. The main restoration activity that could potentially have negative effects to rare plants is the seeding of rhizomatous perennial grasses, and/or annual grasses. These grasses could potentially outcompete rare plant seedlings. In addition, if range drills or other soil disturbing equipment are used, there is potential for impacts from these activities. However, any future noxious weed or restoration projects will be analyzed under NEPA, so concerns will be addressed on a project specific level.

Applicable HCNRA Alternative E-modified Goals, Standards, and Objectives

- minimize the potential for transport of invasive plant seeds or creation of habitats suitable for establishment of invasive species
- evaluate the extent of nonnative invasive plants and potential for restoration (Nox-O2)
- manage noxious weeds to reduce impacts to native plants (Nox-O1)
- evaluate the factors contributing toward the spread of invasive plants and implement appropriate prevention strategies (Nox-O3)
- restore grassland sites to mid-seral status to improve the ability of native vegetation to resist invasion by noxious weeds (Gra-S2)
- provide for natural restoration of degraded sites by modifying management activities as necessary (Nox-G3)
- consider quarantine or closure of some areas, trails, or roads to prevent spread of noxious weeds to adjacent areas; and contain or control aggressive noxious weeds and other nonnative plants (Nox-G7)

Forested Vegetation Treatment

Timber harvest and pre-commercial thinning may affect rare plants due to ground disturbance, soil compaction, and trampling. In addition, changes in shading and hydrology could potentially indirectly impact populations of rare plants. However, Spalding's catchfly does not grow in the heavily forested areas that are likely to receive treatment. In addition, botanical surveys and the BA process would insure that any populations found adjacent to timber projects would be protected on a project-by-project basis.

Fire Management

Although not known to occur in the HCNRA, Spalding's catchfly grows in a grassland environment, which historically burned every two to 20 years. Because wildfires have been controlled in the recent past, only 26 percent of grassland habitat in the HCNRA burned from 1970 to 1994. In the historical past, all 300,000 acres of grassland habitat probably would have burned during this period, with most areas having burned twice. By stimulating the health of the grasslands, the increased use of prescribed fire, along with the practice of allowing natural fires to burn, would likely benefit Spalding's catchfly in the long term. Lesica (1992) found a trend for increased flowering and recruitment of Spalding's catchfly in burned plots with no evidence of mortality. Density was greatest in spring burns versus later season burns.

Project-level planning for prescribed fires would consider the timing of burns to reduce impacts to rare plant populations and habitat. Environmental analysis, including rare plant surveys, would be completed prior to conducting prescribed burns, so potential conflicts with rare plant management would be addressed and mitigated first.

Wildfire suppression actions pose a greater risk to Spalding's catchfly than fire alone. Fire suppression and rehabilitation activities could impact undiscovered populations of Spalding's catchfly. Ground disturbing activities associated with fire suppression (fireline construction, "mop-up") could lead to locally severe effects. However, these probably would occur over relatively small areas. Fire suppression activities would follow minimum impact suppression techniques (MIST), as described in the WWNF *Fire Management Plan* (USDA 2001). Current fire control and rehabilitation procedures in the HCNRA include coordination between the district botanist and fire personnel to ensure that suppression and rehabilitation activities do not affect known populations of rare plants. To conserve rare plants selected alternative would require construction of fire lines to avoid any known threatened, endangered, or proposed plant species locations unless coordinated with a Resource Advisor and suitable alternative locations and actions are not possible (Fire-S6).

Applicable HCNRA Alternative E-modified Goals, Standards, and Objectives

- Fire-S6: Construction of fire lines shall avoid any known threatened, endangered, or proposed plant species locations unless coordinated with a Resource Advisor and suitable alternative locations and actions are not possible.

Livestock Grazing

Domestic livestock grazing (cattle, and horses) may impact populations of undiscovered populations of Spalding's catchfly. Possible impacts from grazing include ingestion, trampling, erosion from trampling, introduction and spread of noxious weeds, and changes in plant community composition. Spalding's catchfly may experience less grazing pressure from cows due to its tendency to grow in dry grasslands rather than in riparian areas, where cattle spend more time.

Applicable HCNRA Alternative E-modified Goals, Standards, and Objectives

The following objectives, standards and guidelines for Alternative E-modified have been designed to manage grazing practices to improve the health and function of grasslands, which would accordingly benefit MacFarlane's four-o'clock:

- Gra-O1: Manage grassland vegetation to ensure continued ecological function and sustainability of native ecosystems. Maintain or restore the ecological status of grassland communities to their natural potential condition and their historic range of variability
- Gra-O3: Evaluate rangeland capability and suitability, and present rangeland condition or ecological status in relation to potential natural community
- Gra-S1: On lands determined to be unsuitable or not capable for grazing by domestic livestock or determined to be in an unsatisfactory condition, the rangeland vegetation production for these lands would not be allocated to the allotment's carrying capacity
- Gra-S3: Allotment management plans would establish site-specific recovery rates to achieve goals for ecological status

- Gra-G1: Emphasize enhancement or restoration of native
- Gra-G6: Plan restoration projects to improve the health and sustainability of grasslands where current ecological conditions are early to mid-seral.
- TES-O4: Conduct habitat improvement projects for federally listed species. These may include fencing, burning, closing roads, treatment of noxious weeds, plant propagation, or other actions.
- TES-G2: Consider modifications to activities such as seasonal or permanent closures for roads, trails, exclusion of domestic livestock grazing, and modification of grazing plans where conflicts with the protection of rare plant species are identified.

Mining

Mining has the potential for serious, but usually localized, impacts to populations. Any plants in areas to be mined would probably be destroyed, although no new mining claims are permitted in the HCNRA, per the HCNRA Act. One active mine exists in the HCNRA.

Cumulative Effects

Cumulative effects, under the *Endangered Species Act*, include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area. Future Federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to Section 7 of the *Endangered Species Act*.

Within the action area (HCNRA), Spalding's catchfly is not known to occur on public or private land. Potential habitat for Spalding's catchfly probably exists in grasslands adjacent the Imnaha River. Since most private lands tend to be managed intensively, these areas may no longer provide habitat for Spalding's catchfly. The effects of future State, tribal, and local government actions would not add cumulatively to the aggregate effects described above affects to Spalding's catchfly. Tribal actions are not anticipated; tribal lands do not exist within the action area. State and local government actions are limited to state and county road maintenance, which would be confined to the roads rights-of way and not affect potential habitat for Spalding's catchfly.

Conclusion and Determination of Effects - Spalding's catchfly

The adoption of goals, objectives, standards and guidelines to improve the ecological condition of grasslands, improve grazing practices, and protect threatened and endangered species from management actions would be beneficial to Spalding's catchfly. The allowance for driving up to 20 feet off roadsides represents a low level of risk to Spalding's catchfly. Periodic wildfire for resource use and prescribed fire would likely have a beneficial effect to Spalding's catchfly by maintaining grassland communities (and preventing the succession by shrubs).

New objectives, standards, and guidelines (Alternative E-modified) for livestock grazing would improve the health of grassland ecosystems and, accordingly, Spalding's catchfly. The indirect effect of restocking small portions of vacant allotments is similarly a small risk because site-specific analysis and inventories would be completed first. A schedule to inventory potential habitat within three years of the adoption of the plan reduces the risks to any populations of Spalding's catchfly that may be present. If new populations are discovered, consultation with the USFWS would be re-initiated and mitigations would be developed, if necessary, to protect new populations.

Implementation of the programmatic direction in Alternative E-modified **may effect, but is not likely to adversely affect** Spalding's catchfly.

Appendix C of this BA summarizes the effects determinations of ongoing actions and the programmatic direction from the selected alternative for Spalding's catchfly. A schedule to inventory potential habitat for Spalding's catchfly is found in Appendix C.

Ute ladies' tresses (Spiranthes diluvialis)

Direct and Indirect Effects

Ute ladies' tresses has not been found in the HCNRA. Only a small amount of suitable habitat for Ute ladies' tresses exists in a few areas along the Snake and Imnaha rivers. These areas have not been inventoried for the presence of Ute ladies' tresses. Potential factors affecting Spalding's catchfly from the selected alternative include 1) noxious weed management, 2) forested vegetation treatment, 3) fire management, and 4) livestock grazing.

Noxious Weed Management and Other Exotic Plants

Purple loosestrife (*Lythrum salicaria*) is widespread upriver from the HCNRA and could pose a threat to potential habitat for Ute ladies' tresses.

Forested Vegetation Treatment

Timber harvest and associated activities is not expected to occur in or near habitats where Ute ladies' tresses may grow.

Fire Management

Wildfire or prescribed fire could affect Ute ladies' tresses. Arft (1994) established demographic monitoring plots in three locations to evaluate the effects of mowing, grazing, and burning. An "early burn" was applied to simulate summer wildfire and a "late burn" was used to simulate fire in winter. Both treatments produced flowers earlier than control plots but the late burn produced significant mortality by July-August. Proposed burn projects would analyze environmental effects to threatened species and large wildfires would use a Resource Advisor to mitigate effects to Ute ladies' tresses. Because of the limited habitat available in the HCNRA, the risk to Ute ladies' tresses from wildfire is low.

Livestock Grazing

While heavy grazing in the early 20th century may have eliminated populations of Ute ladies' tresses, if present, current livestock grazing along NFS portions of the Snake and Imnaha Rivers is probably not impacting the species. The final listing rule (57 FR 2051) reports mild to moderate grazing may be beneficial to Ute ladies' tresses.

Cumulative Effects

Cumulative effects, under the *Endangered Species Act*, include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area. Future Federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to Section 7 of the *Endangered Species Act*.

Within the action area (HCNRA) Ute ladies' tresses is not known to occur on public or private land. Potential habitat for Ute ladies' tresses probably exists in riparian areas along the Imnaha River, most of which is in private ownership. Since private lands tend to be managed intensively, these areas may no longer provide habitat for Ute ladies' tresses. The effects of future State, tribal, and local government actions would not add cumulatively to the aggregate effects described above affects to Ute ladies' tresses. Tribal actions are not anticipated; tribal lands do not exist within the action area. State and local government actions are limited to state and county road maintenance, which would be confined to the roads rights-of way and not affect potential habitat for Ute ladies'

tresses.

Conclusion and Determination of Effects - Ute ladies' tresses

The direction, standards and guidelines proposed in the Alternative E-modified would not add measurably to the effects of ongoing actions, and in many situations (e.g. designation of open roads and trails only) would decrease the effects to Ute ladies' tresses. Wildfire use for resource benefits and prescribed fire would likely have a beneficial effect to Ute ladies' tresses. New objectives, standards, and guidelines (Alternative E-modified) for livestock grazing would improve the health of grassland ecosystems and accordingly, Ute ladies' tresses.

Based on limited habitat available for Ute ladies' tresses in the HCNRA and the new standards and guidelines that would apply to livestock grazing management, implementation of the programmatic direction in Alternative E-modified **may effect, but is not likely to adversely affect** Ute ladies' tresses.

Appendix C of this BA summarizes the effects determinations of ongoing actions and the programmatic direction from the selected alternative for Ute ladies' tresses. A schedule to inventory potential habitat for Ute ladies' tresses is found in Appendix C.

Water howellia (Howellia aquatilis)

Direct and Indirect Effects

The listing package (58 FR 1993) for water howellia states:

"Because water howellia has very narrow ecological requirements, even subtle changes in habitat could be devastating to a population. It is suspected that any disturbance that alters the local surface or subsurface hydrology around the habitat may influence the colonies. By altering water quality and the composition of the wetland bottom and vegetation, some activities may affect wetland succession and the viability of howellia colonies. The species does not appear to be capable of colonizing disturbed habitats."

Potential factors affecting water howellia from the selected alternative include 1) noxious weed management, 2) forested vegetation treatment, 3) fire management, and 4) livestock grazing.

Noxious Weed Management and Other Exotic Plants

Reed canary grass (*Phalaris arundinacea*) has invaded many ponds in Montana and Washington where water howellia grows. Purple loosestrife (*Lythrum salicaria*) has been cited as another noxious weed concern; however, loosestrife needs perennial water, so it is not as likely to grow in the same habitat as howellia. These and other nonnative aquatic plants may out-compete howellia.

Forested Vegetation Treatment

Timber harvest could potentially affect populations due to decreased shade, and associated increases in water temperature and evaporation rates. Roads built to accommodate logging could lead to increased sedimentation. Current PACFISH/INFISH standards for riparian buffers do not apply to the ephemeral wet habitats where this plant often occurs.

Fire Management

Natural or prescribed fire could also affect populations due to decreased shading, and associated increases in water temperature and evaporation rates. In addition, fire could potentially lead to increased sedimentation rates.

Livestock Grazing

The following information on impacts from grazing is from the USFWS listing package:

“Livestock, by their grazing and trampling, can also adversely affect howellia populations due to the disturbance of shorelines and associated vegetation. Trampling of bottom sediments adversely affects the seed bank and the consolidated substrate, which appears to be necessary for germination. Additionally, livestock waste increases nutrient loading in wetlands causing a change in the water quality that may alter pond vegetation composition. ... The cumulative impacts of grazing and other human-induced disturbances threaten a number of populations.”

The Flathead National Forest has taken a conservative approach to permitted grazing by excluding cattle from known sites (Mantus 1998). It is recommended that livestock be excluded from any populations that are discovered on the WWNF in the future.

The area around Duck Lake identified as potential habitat for this species is not located in a cattle allotment. However, there is no fence on the northern boundary of the East Pine Cattle allotment, and trespass cows have been noted in the area in the past. It is not known whether these trespasses have impacted pond habitat in the area.

Cumulative Effects

Cumulative effects, under the *Endangered Species Act*, include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area. Future Federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to Section 7 of the *Endangered Species Act*.

Within the action area (HCNRA) water howellia is not known to occur on public or private land. Potential habitat for water howellia exists in riparian areas in the Duck and Twin Lakes areas, which is in federal ownership. For this reason, there would be no effects from future state, tribal, local or private actions that would affect water howellia. Tribal actions are not anticipated; tribal lands do not exist within the action area. State and local government actions are limited to state and county road maintenance, which would be confined to the roads rights-of way and not affect potential habitat for water howellia.

The direction, standards and guidelines proposed in Alternative E-modified would not add measurably to these effects, and in many situations (e.g. designation of open roads and trails only, standards to protect unique habitats) would decrease the effects to water howellia, if present.

Conclusion and Determination of Effects - Water howellia

Potential habitat for water howellia in the Twin Lakes and Duck Lake area is located in a vacant allotment that would be closed with the adoption of Alternative E-modified. Ongoing and future recreation use in this area could possibly impact the plant, if present. Site-specific decisions would be made on individual projects at the forest level following separate environmental analyses including field inventories that tier from this action.

Implementation of the programmatic direction in Alternative E-modified, with its standards and guidelines, would improve ecological conditions from the current situation in the HCNRA. This action **may effect** but is **not likely to adversely affect** water howellia.

Appendix C of this BA summarizes the effects determinations of ongoing actions and the programmatic direction from the selected alternative for water howellia. A schedule to inventory potential habitat for water howellia is found in Appendix C.

Slender moonwort (Botrychium lineare)

Direct and Indirect Effects

The slender moonwort is a newly described, and extremely rare species. No data specific to the slender moonwort regarding effects of disturbance and management activities is available at this time. However, some information is available about other species of related moonworts. The effects discussion below is derived from information regarding other species of moonworts that occur in similar habitat to the slender moonwort and considers 1) access, 2) fire management, and 3) livestock grazing.

Access – Roads and Road Maintenance, Trails and Trailheads, Over-snow Vehicle Travel and Play Areas, and Backcountry Airstrips

Many rare moonwort populations have been found on the WWNF adjacent to roads, or in the roadbeds of old roads and skid trails. Road maintenance could potentially impact populations of this species. However, most of the areas that have high potential habitat for this species in the HCNRA are not near roads, so this may not be a major concern in this area. Any road decommissioning projects would include a survey for rare plants before implementation, and mitigations would be developed as needed for new sites.

Fire Management

Most fires do not seem to impact moonwort plants. The depth of the rootcrown in the soil likely insulates meristem tissue from heat generated by fires. In a study conducted on prairie moonworts in Iowa and Minnesota, Johnson-Groh and Farrar (1996) found no difference between burned and unburned plots of *Botrychium campestre*, *B. gallicomontanum* and *B. simplex*, and no difference between spring or fall burns. A hot burn during drought conditions did correlate with a decline in numbers, but this was followed by a slow recovery. Following this, a wildfire during the heat of summer could impact moonworts. One population of lance-leaved moonwort (*Botrychium lanceolatum*) on the Baker Ranger District of the WWNF burned in the Sloan's ridge fire of 1995. For the two years after the fire, the same number of plants reappeared as before the fire. Johnson-Groh (direct communication undated) recommends planning prescribed burns to avoid drought conditions and high intensities.

Livestock Grazing

Observations from WWNF staff have reported the grazing of moonwort plants even in areas without domestic livestock, which was attributed to rodent activity. The limited literature available offers contradictory information regarding the effects of sheep and cattle grazing. Some authors claim that light grazing may actually benefit grapeferns, while others contend that it simply makes them easier to find (miscellaneous notes, WWNF files). Areas where domestic sheep graze potentially may be heavily trampled in bedding areas. Pack and saddle stock also may pose a serious risk of impacts to this species. The open, grassy meadows that this species prefers are also highly popular for grazing horses and mules. No formal studies have been done that can statistically demonstrate changes to populations due to grazing.

Potential habitat for the slender moonwort exists in the west portion of the Echols Butte pasture of the Smith Mountain sheep allotment (Nez Perce National Forest) and the West Fork pasture of the Cannon Ball cattle allotment (Payette National Forest). The Nez Perce has completed a BA for animals on the Smith Mountain sheep allotment, but since listed plants are not present or believed present, they have not consulted on the slender moonwort. Habitat also exists in the Curren Hill sheep allotment, but the portion of this allotment in the HCNRA is closed to grazing. Surveys have not been completed in this area, so it is possible that undiscovered populations of this species exist and are being affected by sheep grazing. Two other areas in the HCNRA that have high probability habitat for moonworts are not in active grazing allotments (Upper Imnaha and Duck Lake areas). However, there are no boundary fences between the adjacent allotments and these areas. Trespass cattle sometimes have been observed to enter these areas, although it is not common.

Mitigation

Survey potential habitat in the Echols Butte pasture of the Smith Mountain sheep and the West Fork pasture of the Cannon Ball cattle allotment.

Cumulative Effects

Cumulative effects, under the *Endangered Species Act*, include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area. Future Federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to Section 7 of the *Endangered Species Act*.

Within the HCNRA slender moonwort is not known to occur on nonfederal public or private land. For this reason, there would be no effects from future state, tribal, local or private actions that would affect slender moonwort. Tribal actions are not anticipated; tribal lands do not exist within the action area. State and local government actions are limited to state and county road maintenance, which would be confined to the roads rights-of-way and not affect potential habitat for slender moonwort.

Conclusion and Determination of Effects - Slender moonwort

Slender moonwort is not currently known to occur in the HCNRA. Potential habitat in the HCNRA for slender moonwort occurs in the Seven Devils area, a small portion of which is in active sheep allotments, and the Duck Lake and Twin Lakes areas, which are currently in a vacant allotment. Inventories for slender moonwort have not been completed in potential habitat where ongoing actions are occurring. Undiscovered populations of slender moonwort could possibly exist in the HCNRA, although the likelihood of this is not great since habitat for this plant is limited.

Implementation of the programmatic direction in Alternative E-modified, with its standards and guidelines, would improve ecological conditions from the current situation in the HCNRA. Standards and guides included in Alternative E-modified to maintain or improve riparian conditions (Properly Functioning Condition) would maintain or improve habitat for slender moonwort, if present.

Upon completing specific searches for slender moonwort in potential habitat and applying any necessary mitigation, the action **may effect**, but is **not likely to adversely affect** the slender moonwort.

Appendix C of this BA summarizes the effects determinations of ongoing actions and the programmatic direction from the selected alternative for slender moonwort. A schedule to inventory potential habitat for slender moonwort is also found in Appendix C.

Determination of Irreversible or Irretrievable Commitment of Resources

This decision would not lead to any irreversible or irretrievable commitment of resources in respect to any of the rare plant species discussed in this BA. Although there is potential for negative effects to individual plants, and possibly entire populations, the overall viability of the species would not be in jeopardy from the implementation of this plan.