APPENDIX G

Detailed Vegetative Data

APPENDIX G
Detailed Vegetative Data

Table of Contents

APPENDIX G

Detailed Vegetative Data

Introduction

This section clarifies the rationale for defining biologically unique resources and the categories of biologically unique resources to meet the intent of Section 7(3) of the *HCNRA Act*. Section 7(3) specifies:

> 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.

Biologically Unique

The HCNRA lies at the junction of three major ecoregions: the Columbia Basin, the Northern Rocky Mountains, and Northern Great Basin. As such, it contains biological features and peculiarities that reflect characteristics taken from those ecoregions.

"Biologically unique," as expressed in Section 7(3) of the *HCNRA Act*, is defined here as biological features and peculiarities (as opposed to physical) that are;

- Limited in distribution solely or principally to the HCNRA; or
- Limited in distribution within the HCNRA, but may be relatively common within the neighboring ecoregions; or
- Relatively abundant in the HCNRA, but limited in distribution within the three neighboring ecoregions.

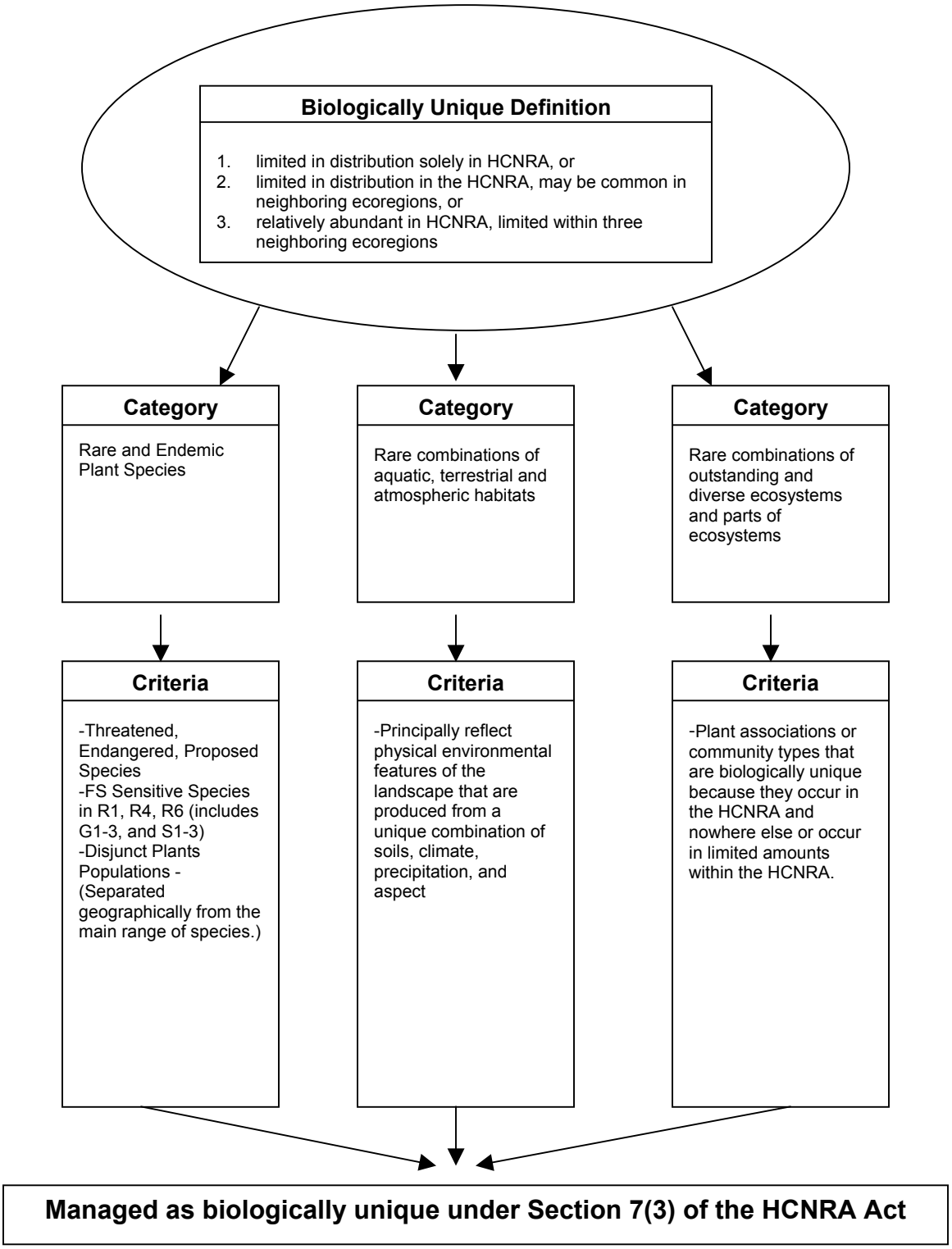
The *HCNRA Act* includes, but does not limit to defining biologically unique features and peculiarities to rare and endemic plants; rare combinations of aquatic, terrestrial and atmospheric habitats; and the rare combinations of outstanding and diverse ecosystems. Disjunct plants, which are plant populations separated geographically from the main range of a species, meet the definition of biologically unique, and thus are also considered a biologically unique feature.

The following categories were derived to describe those "features and peculiarities" responsive to Section 7(3) of the *HCNRA Act* that are biologically unique and for which the management direction in Appendix C of the FEIS would apply.

- Rare and endemic plant species
- Rare combinations of aquatic, terrestrial and atmospheric habitats
- Rare combinations of outstanding and diverse ecosystems and parts of ecosystems associated therewith

The criteria for how species or habitats were determined for each of the biologically unique categories are discussed in more detail below. **Figure G-1** illustrates the determination of biologically unique features and peculiarities for the HCNRA.

Figure G-1: Determination of Biologically Unique Features and Peculiarities



Rare and Endemic Plant Species

Concept of Rarity

Rabinowitz (1981) explored the concept of rarity and noted that rarity is influenced by geographic range, habitat specificity, and local population size. The most rare species have very narrow ranges, occupy specialized habitats, and exhibit small local population sizes. Rarity can be contrasted with endangerment. Endangerment refers to factors, or threats, that may make a species vulnerable to extirpation or extinction. These threats usually have a human origin, such as development that degrades or eliminates a species' habitat. Criteria for rarity can be applied at different scales: throughout a species' range or to a specific geographic area, such as a state or an ecological province. Probably every species on earth is rare somewhere in its range. Often this occurs at a species periphery (Morse 1996).

Therefore, it is necessary to distinguish species that are rare globally from those that are rare in a local geographic area, as in a state or ecological province, even though they may be common elsewhere. Rare plants have low abundance or small range sizes (Gaston 1994, Morse 1996). That is, there are few of them or they are found in only a few places.

Rarity in the HCNRA

As related to Section 7(3) of the *HCNRA Act*, the scope of rarity here includes plants that are

- Rare range-wide (globally), or
- Rare within the states of Oregon or Idaho.

Rare Plant Species on National Forest System Lands

The FS Sensitive species policy is designed to account for species considered rare at both the global scale and within a given state. The principal objectives of the sensitive species program are to:

- Ensure that species do not become threatened or endangered because of FS actions.
- Assist states in achieving their goals for the conservation of endemic species.
- Avoid or minimize impacts to species whose viability has been identified as a concern.
- Review programs and activities, as part of the National Environmental Policy Act projects, through a biological evaluation to determine their potential effect on sensitive species.

The FS accomplishes these objectives first by developing a list of sensitive species for each Region. Sensitive species are defined as "those plant and animal species, identified by a Regional Forester, for which population viability is a concern, as evidenced by:

- Significant current or predicted downward trends in population numbers or density.
- Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution (FSM 2670.5)

The FS in Regions 1, 4, and 6 (R-1, 4, and 6) relies mainly on Association of Biodiversity Information (ABI) rankings of plants to determine which plants to designate as sensitive species. The ABI and Natural Heritage Network ranks rare, threatened, or endangered species throughout the world. Devised by The Nature Conservancy, the system is now maintained by ABI in cooperation with state Natural Heritage Programs or Conservation Data Centers in all 50 states (plus four Canadian provinces and 13 Latin American nations.)

On a scale of 1-5, with 1 being the most rare or imperiled and 5 being demonstrably widespread, abundant, and stable, the ranks are based mainly on the number of known occurrences, but also consider threats, sensitivity, and the area occupied by a species. Definitions for these ranks follow (State of Oregon, Natural Heritage Program 2001).

1. Critically imperiled because of extreme rarity or because of factors making it vulnerable to extinction, typically with five or fewer occurrences.
2. Imperiled because of rarity or other factors demonstrably make it vulnerable to extinction or extirpation, typically with 6-20 occurrences.
3. Rare, uncommon, or threatened, but not immediately imperiled, typically with 21-100 occurrences.
4. Not rare and apparently secure, but with cause for long-term concern, usually with more than 100 occurrences.
5. Demonstrably widespread, abundant, and secure.

These ranks can be applied at three different scales:

- Global (G),
- National (N), or
- State-wide in the United States (S)

The ABI evaluates species by applying the ranking criteria to each scale factor, and then assigns a determination of rarity such as G1, G2, or G3; N1, N2, or N3, or S1, S2, or S3. Although some species may be more common on a global or national scale (G4, G5, N4, N5) they may be vulnerable or rare within state (S1, S2 or S3.) An example is the northern twayblade (*Listera borealis*), which is found from Alaska across Canada, south to the Northern Rocky Mountains of the U.S., and barely reaches into Oregon in Wallowa County. This species is ranked G4, S1.

Rare Plant Species in the HCNRA

Because the HCNRA overlies two states and three FS Regions (R-1, 4, and 6), the Regional Forester's sensitive species lists were used to determine which plants are considered rare in the HCNRA. These lists are developed to include all species that are rare range-wide or, if threats to a species' distribution and viability are known, rare within a state, even though it may be common in other areas.

The FS sensitive species program in R-1, 4, and 6 includes plants considered rare both globally (G1, G2, or G3) and within individual states (S1, S2, and S3) (Robert W. Williams Letter to Forest Supervisors, May 13, 1999; R-1 Task Product 1997). These regions differ slightly in addressing factors that place a species at risk of extinction or extirpation.

In R-6, G1-G3 and S1-S2 ranked species are designated sensitive without using further criteria. However, species ranked S3 are assessed using six additional factors (abundance, range, trend, protection, threat, and fragility). If significant concerns for viability arise among these factors, then the species is designated sensitive. In R-1, species with documented threats or inherent vulnerability are identified first and then are screened using the ABI G1-G3 and S1-S3 ranks. Those species with either risks or vulnerability that are G1-G3 or S1-S3 are designated sensitive.

Determination

Based on these rankings, plant species that meet the combinations of rarity and the scale listed in **Table G-1** are considered within the definition of rarity for the HCNRA:

Table G-1: Criteria for Rare Plant Species in the HCNRA

ABI Rank	Rarity Criteria	Global Scale (G)	State Scale (S)
1	Critically imperiled because of extreme rarity or because of factors making it vulnerable to extinction, typically with 5 or fewer occurrences.	HCNRA Rare	HCNRA Rare
2	Imperiled because of rarity or other factors demonstrably make it vulnerable to extinction or extirpation, typically with 6-20 occurrences.	HCNRA Rare	HCNRA Rare
3	Rare, uncommon, or threatened, but not immediately imperiled, typically with 21-100 occurrences. Consideration of additional factors: ▪ abundance, range, trend, protection, threat, and fragility. If significant concerns for viability arise among these factors, then the species is designated sensitive.	HCNRA Rare	HCNRA Rare
4	Not rare and apparently secure, but with cause for long-term concern, usually with more than 100 occurrences.	Not Rare	Not Rare
5	Demonstrably widespread, abundant, and secure.	Not Rare	Not Rare

MacFarlane's four-o'clock (*Mirabilis macfarlanei*) is a good example of a rare plant species in the HCNRA. It is globally rare (G2) because it is found in a few localities in the Salmon River, Snake River, and Imnaha River canyons. Any potentially new plants discovered would need to meet these criteria to be considered rare under the *HCNRA Act*.

Endemic Plants Definition

Plants whose natural distribution is limited to a certain geographic area are endemic to that area. Plants endemic to a relatively large area, e.g. eastern Oregon, are called regional endemics. Plants that have a narrow, restricted geographic range, e.g. one small mountain range or a river canyon, such as Hells Canyon, are called local endemics (Croft et al 1997). Section 7(3) of the *HCNRA Act* clearly indicates to consider plants endemic to the HCNRA, particularly Hells Canyon. Plants endemic to the HCNRA are those species confined to this area, i.e. they are found here and nowhere else. Plants restricted mainly to the HCNRA are considered local endemics (Croft et al 1997).

Because plant distribution does not account for artificial administrative boundaries, the list of endemic plants includes some species that inhabit an area slightly larger than the HCNRA; that is, small portions of their range extend beyond the administrative boundary of the HCNRA. Due to the similarity of habitats, some endemic plants found in the Snake River canyon may also be found farther up the Salmon River upstream from the HCNRA boundary. However, because these plants are restricted mainly to the HCNRA, they are endemic to the HCNRA. The area of endemism for the HCNRA is defined as the Snake River Canyon from Oxbow Dam downriver to the Washington State border, the lower Salmon River, the middle and lower portions of the Imnaha River, including tributaries to these river reaches.

Determination

To determine which plants were endemic, distribution records examined from the Oregon Natural Heritage Program and the Idaho Conservation Data Center. Local experts were also consulted to determine plant species that meet the definition of endemic to the HCNRA.

Refer to **Table G-2** for a complete list of rare and endemic plant species in the HCNRA. The list is expected to be dynamic according to the changes made in the federal listings by USFWS, and the Regional Forester's lists for Regions R-1, 4, and 6. This list reflects the most current information for plants meeting the criteria for rare and endemic as described above. Any potentially new plants discovered would need to meet these criteria to be considered a rare and endemic plant species under the *HCNRA Act*.

Disjunct Plants Definition

Plant populations that are separated geographically are *disjunct* from the main distribution of a species. Plants with disjunct populations in the HCNRA are biologically unique because outside of the HCNRA, they are not found again for dozens to over one hundred miles. Disjunct plants are accordingly rare in this portion of their distribution.

Determination

To determine which plants were disjunct, distribution records obtained from the Oregon Natural Heritage Program and the Idaho Conservation Data Center. Local experts also were consulted to determine plant species that meet the definition of disjunct for the HCNRA.

Refer to **Table G-2** for a complete list of disjunct plant species in the HCNRA. Any potentially new plants discovered would need to meet these criteria to be considered disjunct under the *HCNRA Act*.

Description of Rare and Endemic Plant Species

Table G-2 reflects the most current information for plants meeting the criteria for rare and endemic (including disjunct species) as described above. The list is expected to be dynamic according to the changes made in the federal listings by the USFWS, the Regional Forester's lists for Regions 1, 4, and 6; or based on the discovery of new endemic or disjunct plants.

Table G-2: Rare and Endemic Plant Species in the HCNRA

Plant Species	Federal[1] Status	Forest Service[2] Sensitive Species			Doc[3]	Habitat[4]
		Region 6	Region 4	Region 1		
Threatened, Endangered, or Proposed Species						
Howellia aquatilis	LT	X	X	X		R
Mirabilis macfarlanei	LT	X	X	X	X	G
Silene spaldingii	LT	X	X	X		G
Spiranthes diluvialis	LT		X			R
Thelypodium howellii var. spectabilis	LT					R, G
Candidate Species						
Botrychium lineare		X				R, MWM
Sensitive Species						
Adiantum aleuticum			X			RCB, R
Achnatherum wallowaensis		X			X	L
Allium madidum			X			MWM
Allium tolmeii var. persimile			X		X	L
Allotropa virgata			X	X		CF
Arabis hastatula		X			X	RCB
Astragalus paysonii			X	X		CF
Astragalus vexilliflexus var. vexilliflexus			X			G
Blechnum spicant				X		CF
Botrychium ascendens		X		X		R, MWM
Botrychium campestre		X				R, MWM
Botrychium crenulatum		X		X		R, MWM
Botrychium fenestratum		X				R, MWM
Botrychium lanceolatum		X		X		R, MWM
Botrychium lunaria		X				R, MWM
Botrychium minganense		X		X		R, MWM
Botrychium montanum		X		X		R, MWM
Botrychium paradoxum		X		X		R, MWM
Botrychium pedunculosum		X		X		R, MWM
Botrychium pinnatum		X		X		R, MWM
Botrychium simplex				X	X	R, MWM
Bryum calobryoides			X			CF

Plant Species	Federal[1] Status	Forest Service[2] Sensitive Species			Doc[3]	Habitat[4]
		Region 6	Region 4	Region 1		
Buxbaumia aphylla				X		CF
Buxbaumia piperi			X			CF
Buxbaumia viridis			X	X		CF
Calamagrostis tweedyi			X			CF, G
Calochortus longebarbatus var. longebarbatus		X				R, MWM
Calochortus macrocarpus var. maculosus		X			X	G
Calochortus nitidus		X	X	X	X	G
Camassia cusickii			X		X	R
Cardamine constancei				X		CF
Carex aenea			X			MWM, R
Carex atrata var. atrosquama		X				MWM, A
Carex backii		X				R
Carex buxbaumii			X	X		MWM
Carex dioica var. gynocrates		X				R
Carex flava				X		MWM
Carex flava var. rustica					X	R, MWM
Carex hendersonii				X		G
Carex hystericina		X			X	MWM, R
Carex interior		X			X	MWM, R
Carex livida			X			MWM
Carex nardina		X				A
Carex norvegica		X				A, MWM, R
Carex nova		X				A, MWM
Carex parryana		X				MWM
Carex paupercula				X		MWM
Carex scirpoidea var. stenochlaena		X				MWM
Carex stenophylla		X				G, MWM
Carex straminiformis			X			A, RCB
Castilleja fraternal		X				A, RCB, MWM, R
Castilleja rubida		X				RCB, A
Ceanothus prostratus ssp. Prostrates			X			CF
Cetraria subalpina				X		CF
Chrysothamnus nauseosus			X			RCB
Cicuta bulbifera		X	X			R
Cornus nuttallii				X		CF
Crepis bakeri ssp. idahoensis			X			G
Cypripedium fasciculatum		X	X	X		CF, R
Dasynotus daubenmirei				X		CF
Diphasiastrum complanatum = Lycopodium complanatum		X				CF, R
Douglasia idahoensis			X	X		CF,
Epipactis gigantea			X	X	X	R
Erigeron disparipilus		X			X	L
Erigeron engelmanni var. davisii		X			X	G, RCB
Hackelia davisii			X			RCB
Halimolobos perplexa var. perplexa		X	X	X	X	G
Haplopappus hirtus var. sonchifolius				X	X	MWM
Haplopappus insecticruris			X			G
Haplopappus radiatus = Pyrrocoma radiata			X			G
Helodium blandowii			X			MWM
Hookeria lucens				X		CF, R,
Kobresia bellardii		X				A
Kobresia simpliciuscula		X				MWM, R
Leptodactylon pungens ssp. hazeliae		X	X		X	G, RCB
Lewisia kelloggii			X			A
Listeria borealis		X				CF
Lobaria scrobiculata			X			RCB
Lomatium erythrocarpum		X				A

Plant Species	Federal[1] Status	Forest Service[2] Sensitive Species			Doc[3]	Habitat[4]
		Region 6	Region 4	Region 1		
Lomatium greenmanii		X				A
Lomatium ravenii		X				L
Lomatium salmoniflorum		X	X	X		G
Mimulus ampliatus				X		R
Mimulus clivicola		X	X	X	X	G
Mimulus hymenophyllus		X			X	R, RCB
Pellaea bridgesii		X				RCB
Pentagramma triangularis				X	X	RCB
Peraphyllum ramosissimum			X			G
Phacelia minutissima		X	X		X	MWM,
Phlox multiflora		X				G, RCB
Platanthera obtusata		X				MWM
Pleuropogon oregonus		X				R, MWM
Primula cusickiana		X			X	R, L
Ranunculus oresterus		X				MWM
Rhizomnium nudum				X		CF
Rhynchospora alba			X	X		MWM
Ribes wolfii			X			CF
Rorippa columbiae		X				R
Rubus bartonianus		X	X		X	R, RCB
Salix farriae		X				MWM, R
Salix glauca			X			A
Sanicula graveolens			X			G
Saxifraga adscendens var. oregonensis		X				RCB, A
Saxifraga bryophora var. tobiasiae			X			RCB
Saxifraga tolmiei var. ledifolia			X			CF, A
Scheuchzeria palustris			X			MWM
Sedum borschii			X			RCB
Senecio dimorphophyllus		X				MWM, A
Sphagnum mendocinum				X		MWM
Stylocline filaginea			X			G
Suksdorfia violacea		X				RCB
Syntheris platycarpa				X		CF
Thalictrum alpinum var. hebetum		X				MWM
Thelypodium eucosmum		X				G
Tofieldia glutinosa var. absona			X			MWM
Townsendia montana		X				A
Townsendia parryi		X				A
Triantha occidentalis ssp. Brevistyla			X			MWM, R
Trifolium douglassii		X				G, MWM
Trifolium longipes ssp. multipedunculatum			X			G, MWM
Trollius laxus var. albiflorus		X			X	MWM, R
Waldsteinia idahoensis				X		CF
Endemic Species						
Arabis crucisetosa					X	MWM
Astragalus vallaris					X	G
Frasera albicaulis var idahoensis					X	G
Lomatium rollinsii					X	G
Lomatium serpentinum						G
Nemophila kirtleyi					X	CF
Penstemon elegantulus					X	G
Phlox colubrina					X	G, RCB
Ribes cereum var. colubrinum					X	R
Disjunct Species						
Allium geyeri var. geyeri					X	MWM, R
Bupleurum americanum					X	A
Carex limosa					X	MWM
Cryptogramma stelleri					X	RCB
Drosera anglica					X	MWM
Geum rossii var. turbinatum					X	RCB

Plant Species	Federal[1] Status	Forest Service[2] Sensitive Species			Doc[3]	Habitat[4]
		Region 6	Region 4	Region 1		
Pediocactus simpsonii var. robustior					X	G
Potentilla palustre					X	MWM
Xerophyllum tenax					X	CF, A-MWM

[1]. Federal Status. LT- Listed Threatened as defined by the Endangered Species Act of 1973.

[2]. Region 6 Regional Forester's Sensitive Species List. Applies to all Hells Canyon land in Oregon (June 10, 1991) updated by April 1999 listing.

Region 4 Regional Forester's Sensitive Species List. Applies to all land on the Payette National Forest in Idaho that is administered by the HCNRA (November 1995).

Region 1 Regional Forester's Sensitive Species List. Applies to all land on the Nez Perce National Forest in Idaho that is administered by the HCNRA (March 12, 1999).

[3]. Doc - Documented in the HCNRA. Indicates that the species has been documented in the HCNRA.

[4]. Habitat: A=Alpine; CF = Coniferous Forest; G = Grassland; L = Lithosol; MWM = Moist and Wet Meadows; R = Riparian Areas; RCB = Rock Outcrops, Cliffs, and Bluffs.

Rare Combinations of Aquatic, Terrestrial, and Atmospheric Habitats

Definition

Rare combinations of aquatic, terrestrial, and atmospheric habitats are habitats that may have biological significance within the HCNRA. Though these habitats may be common elsewhere, within the HCNRA they are limited. These habitats were identified to represent rare combinations of aquatic, terrestrial, and atmospheric habitats because they reflect the physical environmental features of the landscape that are produced from a unique combination of soils, climate, precipitation, and aspect. These habitats may also occur in combination with rare terrestrial and aquatic species or other species that are dependent upon these habitat types, but were not selected to provide specifically for fish and wildlife habitat. Fish and wildlife habitat are provided protection under Section 7(4) of the *HCNRA Act*. Refer to **Appendix C**, **Table C-1**, for Riparian/Aquatic Habitat and Water Quality, and Wildlife Habitat.

Determination

A team of resource professionals selected these habitats based on their biological uniqueness in the HCNRA using the definition described previously in the HCNRA. These habitats include wet cliffs, natural caves, cliffs and talus slopes, natural salt licks, river beaches, springs, seeps and other wetland areas. Refer to the following section for a complete description of rare combinations of aquatic, terrestrial, and atmospheric habitats in the HCNRA. Any potentially new rare combinations discovered would need to meet these criteria to be considered biologically unique under the *HCNRA Act*.

Description of Rare Combinations of Aquatic, Terrestrial, and Atmospheric Habitats

Wet Cliffs

Perennial water emerges from cracks, seeps, or springs that cascade down rock faces of wet cliffs. This habitat supports several species of plants that are found nowhere else in the HCNRA. The membrane leaved money flower *(Mimulus hymenophyllus)* is a local endemic species that is found in this habitat type. It is on the Region 6 sensitive plant list. A second monkey flower *(Mimulus patulus)* is another, more common, local endemic found in these areas. Oregon bolandra *(Bolandra oregana)* grows on wet cliffs in the HCNRA and in the Columbia Gorge.

Natural Caves

Natural caves, as defined by the *Federal Cave Resources Protection Act* of 1988 (16 USC 4300 - 4309, 102 Stat. 4546; Public Law 100-691), are abundant throughout the HCNRA. Cave types vary from rock shelters (common among basalt flows and rims), solution tubes in limestone formations, and fault-block and talus caves where lithic breakdown has occurred. There are also occasional ``tree-cast'' and superceded stream caves within and between basalt flows. All caves include significant biological resources and commonly include archaeological and/or paleontological values.

The *Federal Cave Resources Protection Act* directs evaluation, analysis, and monitoring for all caves, sinkholes, and other unique geological features. The *Forest Plan* (USDA 1990) includes 16 caves, all within the HCNRA, on the national significant caves list.

Cliffs and Talus Slopes

Cliffs and talus slopes can be found throughout the HCNRA. Talus slopes are steep rocky areas, often below cliffs, that support only sparse vegetation. Cliffs and talus slopes provide habitat to some rare and endemic plants. By their nature cliffs are fairly free from the affects of most management actions that would occur in the HCNRA. Talus slopes are subject to direct effects from road construction, road maintenance, or could be quarried as a source of rock material.

Natural Salt Licks

Natural salt licks are found scattered throughout the lower to mid-elevations of the Snake and Imnaha River canyons. They are normally associated with mineral deposits occurring with volcanic ash. Wild ungulates have used these areas as sources for salt, as have domestic livestock.

River Beaches

Sandbars, river terraces, and other fluvial and alluvial features are considered a basic resource in the Snake River. Fluvial and alluvial features formed through the complex interactions of geology, flows, sediment availability, and river hydraulics. Sediment deposition creates unique habitats within the river system, often linking terrestrial and aquatic resources. Sandbars, river terraces, gravel bars, and cobble bars provide spawning and rearing habitat for aquatic species, substrate for riparian vegetation, sites of cultural significance, popular recreation areas, and in-channel sediment storage.

The Hells Canyon Complex has altered flow and interrupted sediment processes within the mainstem Snake River. Historically, the upstream reaches of the Snake River and its tributaries provided sediment for the development and maintenance of fluvial and alluvial features within Hells Canyon. Clear water releases from Hells Canyon complex dams are reducing the abundance, size, and spatial distribution of fluvial and alluvial features, including beaches, within Hells Canyon.

Springs, Seeps, and Other Wetland Areas

Springs, seeps, and other wetland areas are found throughout the HCNRA. Their importance to the HCNRA is related to the relatively unique microhabitats that they provide, and the relatively large diversity of species that can be found growing in association with the available water. A number of these sites have been developed as water sources for homesteads, livestock, and irrigation.

Rare Combinations of Outstanding and Diverse Ecosystems and Parts of Ecosystems

Definition

Rare combinations of outstanding and diverse ecosystems and parts of ecosystems associated therewith are plant associations and plant community types that are biologically unique to the HCNRA or isolated within the

HCNRA, but may be common elsewhere. The plant associations and plant community types that were chosen to represent rare combinations of outstanding and diverse ecosystems are botanically and ecologically unique within the HCNRA because they occur in the HCNRA and nowhere else or are in limited amounts within the HCNRA.

Determination

For the HCNRA, these plant associations and community types are classified and described in *Plant Associations of the Wallowa-Snake Province* (Johnson and Simon 1987). From among these, the Region 6 Area 3 plant ecologist, Charles G. Johnson, selected those plant communities and plant associations in the HCNRA that met the criteria for biologically unique, based on his extensive knowledge and professional experience of over 25 years of work classifying plant associations and communities, and monitoring sites to study the effect of disturbance factors (primarily fires, grazing, flood events, landslides) on plant succession.

This selection of plant associations and community types was then compared to *intrinsically rare* habitat types that were identified in the ICBEMP *Analysis of Vascular Plants* (Croft et al 1997). Intrinsically rare habitat types are naturally restricted due to a unique set of environmental attributes as opposed to managed rare which is a result of human caused activities (Croft et al 1997). Many of the habitat types shown to be intrinsically rare in the ICBEMP study area do not occur in the HCNRA. Some of the plant associations and community types that were found to be biologically unique in the HCNRA also were identified as intrinsically rare in the *Analysis of Vascular Plants.*

Refer to the following section for a complete description of rare combinations of outstanding and diverse ecosystems and parts of ecosystems in the HCNRA. Any potentially new rare combinations discovered would need to meet these criteria to be considered biologically unique under the *HCNRA Act*.

Description of Rare Combinations of Outstanding and Diverse Ecosystems

Bluebunch Wheatgrass/Wyeth's Buckwheat Plant Association

This type characterizes the highest elevation extension of communities in the bluebunch wheatgrass series. It occurs in the Idaho fescue zone, but on soils having minor loss influence. The AGSP/ERHE type is dominated in late and mid seral stages by bluebunch wheatgrass and Wyeth's buckwheat (ERHE) on steep canyon slopes. Sandberg's bluegrass in largely replaced by two grasses not generally found in the other grassland vegetation of the HCNRA – pine bluegrass (POSC) and oniongrass (MEBU). This type has an appearance of bunchgrasses with buckwheat clumps and forb-free interspaces. Perennial forbs are few with yarrow (ACMIL), white-stemmed frasera (FRAL2), Blue Mountain penstemon (PEVE), and lupine (LUCA) most frequently encountered. Bare ground, gravel, and rock averaged almost 50 percent in late seral communities.

This grassland plant association is restricted to the Lonesome Summit and North Pine Creek vicinity. Sites are confined to moderately-steep to steep, southeast-to-southwest facing inter-rims of convex to slightly undulating micro-relief at mid to upper third slope positions. Typical soils on which this association is found are skeletal with surface rock often exceeding 50 percent total cover.

This plant association is unknown from other plants of the Pacific Northwest. A similar kind of community is known from the North Fork of the Clearwater in Idaho but has not been described or classified. Since it is endemic to the HCNRA in a relatively limited area, it is included in this listing of outstanding and diverse ecosystems.

Douglas' Buckwheat-Sandberg's Bluegrass Plant Community Type

Shallow soil ridgetop communities dominated by Douglas' buckwheat (ERDO) with Sandberg's bluegrass (POSA3) define this plant community type. Perennial forbs usually associated with these communities are stonecrops (SEST, SELA2), biscuitroots (LOLE, LOCO2), big-head clover (TRMA), lovely penstemon (PEEL), sticky phlox (PHVI3), Holboell's rockcress (ARHO), hoary balsamroot BAIN), and Snake River daisy (ERDI4). As with many buckwheat communities, the ERDO/POSA3 type may be a product of past soil loss resulting from overgrazing and subsequent soil and wind erosion. With disturbance, erosion pavement and bare ground

increase with a marked decline in moss cover. Forbs tending to increase are pussytoes, biscuitroots, bighead cover, lovely penstemon, and sticky phlox.

Shallow soil ridge top scablands dominated by Douglas' buckwheat with Sandberg's bluegrass define this plant community type. This plant community may be a product of past soil loss resulting from overgrazing and subsequent soil and wind erosion. The community is limited in extent and is located on Cold Springs Ridge.

Although Daubenmire (1970) classified a Douglas' buckwheat-Sandbergs bluegrass habitat type in central Washington, its plant composition was significantly different. These communities in northern Wallowa County are restricted to broad ridges trending toward the Grande Ronde canyon. It appears to be restricted to higher bunchgrass ridge tops where higher precipitation is available. Since it is restricted to a few ridge tops in the HCNRA, it warrants listing as an outstanding and diverse ecosystem.

Bitterbrush/Bluebunch Wheatgrass Plant Association

Bitterbrush occurs with bluebunch wheatgrass on canyon sites that are too low in elevation to support Idaho fescue in the extreme south-eastern flank of the Wallowa Mountains. Late seral stands are dominated by a bluebunch wheatgrass-bitterbrush savannah where bitterbrush covers 20 percent of the area. Associated are Sandberg's bluegrass, arrowleaf balsamroot, and fern-leaved lomatium (LODIE). Endemics to this type are shrubby bedstraw (GAMU) and bulbous bluegrass (POBU). With degradation, bluebunch wheatgrass declines, as bare ground and rock/gravel coverage increases. Increasing perennials are Sandberg's bluegrass, arrowleaf balsamroot and lomatiums (LOTR, LODIE).

Bitterbrush occurs with bluebunch wheatgrass on canyon shrubland sites that are too low in elevation to support Idaho fescue in the extreme southeastern flank of the Wallowas. This association is limited in extent within the HCNRA but is common in the lower North Pine Creek vicinity. Site locations are usually rocky inter-rims at the mid to upper third of slopes, but occasionally are on ridge brows or lower slopes.

Bitterbrush is found in the Wallowas at the upper limits of its ecological range and can maintain its upper elevation dominance on sites that are loess-free and with southerly aspects. Although this plant association is known from elsewhere in the Pacific Northwest, it represents a limited occurrence in HCNRA and is also rare in northeastern Oregon.

Buckwheat/Oregon Bladderpod Plant Association

The ERIOG/PHOR plant association is found as isolated small communities on limited and unique substrates. Two species of buckwheat (*Eriogonum strictum var. proliferum* and *Eriogonum microthecum*) populate hydrothermally altered basaltic outcroppings found sporadically in the lower Imnaha and Snake River Canyons where this type is restricted. These outcroppings are easily weathered and generally contain a talus cone. Spatial patterns develop between the associated plants. Plants demonstrating specific affinity to these sites are: desert evening primrose (OECA2), Oregon bladderpod (PHOR), western prairie-clover (PEOR4), fuzzy tongue penstemon (PEER), pallid milkweed ASCR), and hoary chaenactis (CHDO). Other species commonly found are: prickly pear (OPPO), bristly cyptantha (CRIN3), hairy golden-aster (CHVI2), varied-leaf phacelia (PHHE), hairy milkvetch (ASIN2), yarrow (ACMIL), bluebunch wheatgrass (AGSP), and cheatgrass (BRTE).

This plant association is found as isolated small stands on limited and unique substrates. The type is restricted to hydrothermally altered basalt outcroppings found only in the lower Imnaha River and on ridges separating Horse, Lightening, and Cow Creeks (Vallier 1998).

The substrate is one of shifting pea gravel on steep slopes with a high erosive potential. Since there is little to entice ungulates onto these sites, they retain an erosion pavement that helps the perennial plants establish. The association is interesting botanically with six species demonstrating an affinity to these plant associations. Since these sites are extremely limited in occurrence within the Snake-Imnaha canyon lands, this community warrants special recognition.

Sand Dropseed Plant Association

This type is characterized by communities on the sandy river terraces and alluvial bars where sand dropseed (SPCR) is considered climax. In these communities, sand dropseed dominates as the only perennial bunchgrass

in mid seral stands. Cheatgrass (BRTE) and Japanese brome (BRJA) are usually always thyme leaf sandwort (ARSE), and filaree (ERCI) are the most frequently encountered. Other plants that are restricted to warm, low elevation habitats often occurring with sand dropseed are: moth mullein (VEBL), blazing star (MELA2), ground-cherry (PHLO2), and white-stemmed globemallow (SPMU).

Early seral sand dropseed communities are usually invaded by red three awn (ARLO3), goatweed (HYPE), and prickly pear (OPPO) with reduced dropseed coverage. Annual brome coverage is nearly double that of mid seral communities. Annual forbs that are most commonly associated include thyme leaf sandwort (ARSE), blue forget-me-not (MYMI), filaree (ERCI), and small flowered crane's bill (gepu). Bare ground, rock, and gravel exposure increase with disturbance. Moss coverage declines with the site degradation.

This association is characterized by communities on the sandy river terraces and alluvial bars where sand dropseed is considered climax. The species is native within these specific locations and at the northern extent of its range ecologically. Bill's Creek Research Natural Area (RNA) was proposed to highlight a particularly homogeneous community of sand dropseed in a setting where the species is believed to have initiated its increase in the Snake River canyons.

This community is also found on those native bunchgrass sites (i.e., bluebunch wheatgrass) where early spring grazing had damaged the bluebunch wheatgrass (a cool season species) and favored the invasion or increase in sand dropseed (a warm season species). The species is more commonly found in the desert southwest and Great Plains. It reaches its northern extension in the Pacific Northwest in the Snake River canyon.

Since sites supporting sand dropseed communities on river terraces, alluvial fans, and sandbars are relatively limited, the sand dropseed communities that are considered potential natural vegetation along the river corridor merit special recognition.

Wallowa Lewisia Rim Plant Community Type

The Wallowa bitterroot or lewisia sporadically occupies the upper canyon rims and ridge brows of the Snake River Canyon and adjacent canyons in Oregon. It is prolific on stable, rocky walls and peaks of the Seven Devils. Lewisia co-exists with shrubby penstemon (PEFRS) on the rim tops. Sandberg's bluegrass (POSA3), onespike oatgrass (DUAN), stonecrop (SELA2), and scabland fleabane (ERBL) are typical scabland associates while bluebunch wheatgrass and Idaho fescue occur as opportunists from adjacent FEID-KOCR grasslands. Other prominent plants associated are yarrow (ASCMIL), hoary balsamroot (BAIN), Cous biscuitroot (LOCO2), and Blue Mountain penstemon (PEVE). As adjacent deeper-soil bunchgrass sites are overgrazed, lewisia may invade from its rocky habitat.

The stands sampled all occurred at ridgetop or ridgebrow locations in Oregon (Grizzly, Morgan, Jackey, and Deadhorse Ridges). Elevations ranged from 5,000 to 6,500 feet on these sites. The species also clings to rim palisade walls. Other observed communities of lewisia in the Seven Devils ranged from 6,000 to 9,000 feet where the species appeared to be more common as either a reflection of substrate affinities, cooler-moister condition, or by virtue of its geographical setting closer to the center of its range.

The Wallowa bitterroot (lewisia) sporadically occupies the upper canyon rims and ridge brows of the Snake River Canyon. It is prolific on stable, rocky walls and peaks of the Seven Devils. These communities occupy a narrow ecological niche in a very restricted area within the HCNRA. The Wallowa bitterroot is good representative of a showy endemic in the HCNRA.

Subalpine Fir/Fool's Huckleberry Plant Association

This moist site community is dominated by an Engelmann spruce overstory on steep, north slopes and gentle benches where moisture is retained throughout the summer drought period. Subalpine fir is often codominant in the overstory, but always dominates the reproduction in the understory layer. Lodgepole pine is a frequent overstory component as a decadent old-growth member.

Fool's huckleberry (MEFE), a tall shrub, dominates the undergrowth (mean cover: 63 percent) with true huckleberries (VAME, VASC) always associated beneath fool's huckleberry. Sitka alder is often present on these mesic sites. The shrub cover is so dense that other plants are often unable to compete and persist. Only

rattlesnake plantain (GOOB), sidebells pyrola (PYSE) and prince's pine (CHUM) are frequently found occurring beneath the shrubbery.

This association is restricted to mesic, cold site locations at higher elevations in the Seven Devils and above the head of Lightning Creek north of Memaloose.

Although fool's huckleberry is abundant in the northern Rockies, it barely reaches the forests of the Snake River Canyon separating Oregon and Idaho. Due to its rare occurrence in the HCNRA it warrants listing as an outstanding and diverse ecosystem.

Ponderosa Pine/Idaho Fescue and Ponderosa Pine/Bluebunch Wheatgrass Plant Associations

Ponderosa pine totally dominates as the only tree species able to persist in the PIPO/FEID type. Shrubs are essentially absent, but common snowberry and rose do occur in limited amounts. Idaho fescue (FEID), bluebunch wheatgrass (AGSP), and prairie junegrass (KOCR), are the dominant understory species in the type. The most common forbs are lupine (LUPIN), and yarrow (ACMIL).

The PIPO/AGSP community is very dry with trees occurring in a savannah over bluebunch wheatgrass-dominated steppe. Ponderosa pine totally dominates as the only tree species able to persist in the PIPO/AGSP type. Shrubs are absent except for occasional dry-site opportunists (serviceberry, mountain-mahogany, squaw currant). Bluebunch wheatgrass and pine bluegrass (POSC) dominate the understory with cheatgrass usually associated in areas where ungulates have churned the soil beneath the old-growth trees. Idaho fescue is absent as it is unable to persist on these drier sites. Yarrow and lupines are the only common forbs regularly associated.

Both of these plant associations are uncommon in the HCNRA. Most of the ponderosa pine-dominated communities are successional to Douglas fir. These associations occur on substrates that are too harsh for fir potential. The Little Granite RNA was proposed in part to encompass known locations of these associations.

Although ponderosa pine/bunchgrass communities with Idaho fescue and bluebunch wheatgrass potentials are found throughout the inland Pacific Northwest, sites which are too warm and too dry for fir establishment are limited in the HCNRA. Therefore, these restricted communities are worthy of being included as outstanding and diverse ecosystems to the NRA.

Quaking Aspen Plant Community Type

Quaking aspen communities are rare in the HCNRA, and occur in relatively small, scattered clones. Their presence is generally associated with meadows or areas within conifer stands where subsurface moisture is present throughout most of the growing season. Grassland management, forested vegetation management, and fire can all influence the propagation and survival of aspen communities.

Quaking aspen stands are infrequent in the Wallowa-Snake Province. Clones are generally limited to fringes around meadows or as islands in ridge top grasslands where subsurface moisture is available throughout most of the growing season. Cattle and big game generally favor these stands. Mature stands are generally in decadent condition because of old age, disease, overshading, crowding from encroaching conifers, and a general lack of vegetative reproduction due to browsing of root sprouts by ungulate wildlife species and domestic livestock. Aspen is an early-seral, pioneer species that is propagated by root suckering after disturbances like fire or removal of mature stems. Maturation of root sprouts to older age classes most often requires some protection from grazing ungulates. Due to the relatively limited extent of occurrence, quaking aspen community types warrant being included as outstanding and diverse ecosystems to the HCNRA.

Netleaf Hackberry/Bluebunch Wheatgrass Plant Association

The hackberry communities of the Wallowa-Snake Province are generally found at lower slope positions in deep canyons, occupying see page lines on river terraces, and along riparian margins. Bluebunch wheatgrass is commonly associated as are annual bromes. Cheatgrass (BRTE), cleavers (GAAP), shading animals have disturbed the ground. Common associated tend to be some of the most drought-tolerant plants of the canyon lands (i.e., hairy golden aster (CHVI2) shaggy fleabane (ERPU), prickly pear (OPPO), and moth mullein (VEBL) Poison ivy (RHRA) occurs frequently with this community where it can tap deep moisture reserves. In more

disturbed communities, skullcap (SCAN), yarrow (ACMIL), cheatgrass (BRTE), and common yellow sweet clover (MEOF) may form weedy patches.

Giant Wildrye Plant Community Type

Giant wildrye occurs at lower elevations along riparian stream courses on colluvial or alluvial terraces. These stands are usually very dense with wildrye often dominating to the exclusion of other plants. Miner's lettuce (MOPE) is always associated. Disturbance of stands show weediness by cleavers (GAAP), white top (*Cardaria sp*.), and annual bromes.

Wildrye sites are usually gently sloping and below 3,000 foot elevation in canyon bottoms. They occur as riparian stringers or patches at toe of slope positions on deep, fine-textured soils.

Many giant wildrye sites in the Snake River Canyon and its tributary canyons have been overgrazed resulting in the presence of only relic clumps of the species. These giant wildrye bottoms were once much more extensive in the canyon land bottoms. Heavy overgrazing by sheep as well as intensive haying of the native stands has reduced them to relict status in many places. Giant wildrye was extensively cut for hay in the early settlement days. Giant wildrye is very susceptible to grazing and mowing below eight inches. Cattle grazing in the winter often prefer this species following softening of its harsh herbage from fall and winter storms. In many canyon bottoms, the most preferred grass species (i.e., bluebunch wheatgrass of Idaho fescue) were lost to overgrazing resulting in greater dependence on once abundant giant wildrye stands. In these situations, the succulent new spring growth of giant wildrye may have been more highly sought after by livestock with injurious results for the plant.

Giant wildrye plants can regularly be found at the base of talus slopes, on pit house sites and along fence rows. However, communities dominated by giant wildrye are scarce throughout Hells Canyon NRA. Past overgrazing has reduced stands of the grass to relict status. As the wildrye is overgrazed, annual plants invade and become prominent (i.e.- bedstraw *(Galium aparine)*, miners lettuce *(Montia perfoliata)* and annual bromes.

The larger stands existing in Hells Canyon are small in comparison to those found today. Prior to Euro-American settlement and subsequent overgrazing by livestock, giant wildrye bottoms were much more extensive where drainages cross benchlands and river terraces.

The most prominent stand of giant wildrye remaining in the HCNRA is located along Pleasant Valley Creek in the proposed Pleasant Valley Research Natural Area.

Spiny Green-bush/Bluebunch Wheatgrass Plant Association

The GLNE/AGSP type is found exclusively on rock outcrops and canyon rims and occurs as small isolated shrub groupings in a vegetation complex with bunchgrass communities. Spiny green-bush (GLNE) occupies the fractures of the rimrock with bluebunch wheatgrass (AGSP) occurring more commonly on deeper soil areas between rims. Bluebunch wheatrass, varileaf phacelia, and shaggy fleabane are generally present in late seral stages. Annual bromes (BRBR, BRTE) field chickweed, and yarrow, commonly occurs. Prickly pear is opportunistic on shallow soil sites of the rim rest while the whorled penstemon (PETR), occupies crevices of the rim face. Mosses are high in cover (mean: 19 percent) as is bedrock, rock, and gravel (mean: 50 percent).

Spiny green-bush communities occupy steep slopes where rock outcrops dominate into an almost continuous palisade of bedrock. These are extremely harsh sites for plant growth. The leaves are inconspicuous as a strategy for survival. The HCNRA communities are confined to the Snake River Canyon at low elevations (2,000-3,000 feet). The shrub occupies rock outcrop fractures that define its distribution across the slope. Bedrock outcrops regularly above 25 percent and up to 40 percent. The hot, dry microenvironment limits perennial plants associated with the shrub. Bluebunch wheatgrass, whorled penstemon (*Penstemon triphyllus*) and shaggy fleabane (E*rigeron pumilus*) are the most common associates. The Alum Beds Research Natural Area (proposed) contains excellent stands of this association.

Curlleaf Mountain-Mahogany Plant Community Type

Bluebunch wheatgrass is the most commonly occurring plant beneath Snake River Canyon mountain-mahogany stands. Other common associates in late seral and mid degradation, bluebunch wheatgrass declines as annual bromes increase.

Three elevation levels were sampled where mountain-mahogany occurs. At the lower elevations (900-1,000 feet), the species was encountered only on toe slopes and river bar sites north of Mountain sheep Creek in association with netleaf hackberry and serviceberry. Snake River phlox and field chickweed occurred regularly with bluebunch wheatgrass beneath the shrubs. At mid-elevation (2,000-4,000 feet) the stands of mountain-mahogany generally occurred on rim outcrops with an affinity for limestone. Here, spiny green-bush (GLNE) and Snake River phlox (PHCO2) were often associated. At the highest elevations (5,000-6,000 feet), mountain snowberry (SYOR), syringa (PHLE2), and oceanspray (HODI) often occurred with mountain-mahogany. On these more moist sites, Idaho fescue (FEID) and bluebunch wheatgrass (AGSP) were associated along with other fescue series members – Wyeth's buckwheat, arrowleaf balsamroot, and fern-leaved biscuitroot. Wyeth's buckwheat and elk sedge form mats on colluvial exposures at these higher elevations.

Curlleaf mountain-mahogany is widespread in the southern Blue Mountains. However, it is extremely limited in occurrence in the HCNRA. Its distribution was found at three elevations in differing environmental and topographic settings. At upper elevations (5,000-6,000 feet) it is associated with mountain snowberry *(Symphoricarpos oreophilus),* Idaho fescue *(Festuca idahoensis)* and bluebunch wheatgrass. At mid-elevations (2,000-4,000 feet) it is found as a rim and outcrop community with an affinity for limestone. At the lowest elevations (900-1,000 feet) it can be sporadically found on river terraces and toe slopes north of Mountain Sheep Creek where it associates with hackberry *(Celtis reticulata)* and bluebunch wheatgrass.

Stands are restricted to sites where outcroppings or talus provide sanctuary from fire mortality and where abundant vernal moisture is found deep in the fissures to sustain the shrub on these harsh, hot, dry outcroppings. The outcroppings of the Pittsburg Formation (Vallier 1974) occur on both sides of the Snake River Canyon from Wildhorse Butte to Grave Point in Idaho and from Pittsburg Creek to Pleasant Valley Creek in Oregon. This is one of the areas of greatest concentration for mountain-mahogany communities in HCNRA. The Pleasant Valley Research Natural Area (proposed) contains representative stands of this type on the Pittsburg Formation.

Mountain Big Sagebrush/Idaho Fescue Plant Association

The mountain big sagebrush/Idaho fescue plant association is separated topographically into a steep slope type found at higher elevations in the Wallowa and Seven Devils Mountains and a gentle ridgetop type at moderate elevations across the dissected plateau tops of the HCNRA.

ARTRV/FEID (seep, high) – In late seral stands Idaho fescue is the principal associate with mountain big sagebrush. With degradation, fescue declines while the following plants increase: mountain brome (BRCA), Hood's sedge (CAHO), Wyeth's buckwheat (ARHE), yarrow (ACMIL), and groundsel (SEIN). Heavy site deterioration results in dramatic increases by tailcup lupine (LUCA) and Wyeth's buckwheat (ERHE).

Past sheep grazing and use has eliminated many of these subalpine-montane sagebrush communities. In highly disturbed communities, Wyeth's buckwheat, mountain brome, yarrow, and golden buckwheat (ERFL) often replace the Idaho fescue. However, Hood's sedge tends to remain intact on moist concavities and deeper soil areas with Idaho fescue.

This high elevation type occurs on shallow gravelly soils from 7,700 to 7,900 feet in elevation, and on southwesterly aspects. Slopes average 40 percent. Total herbaceous production from two sampled sites ranged from 200 to 600 lbs./acre (dry wt.).

The occurrence of this shrub/bunchgrass community in the HCNRA is limited. Communities occur on the northern extremities of HCNRA where broad ridgetops consist of Columbia River basalts with loessal soils derived from the Columbia River basin. It is here that limited stands occur. Daubenmire (1970) recognized these stands as disjunct edaphic climax populations that are relict from a hypsithermal period when climates were more conducive for more widespread, contiguous stands in the area. Today's population is centered on Cold Springs Ridge in the Downey Saddle and Grasshopper Ridge vicinity north of the Frog Pond.

A second area of occurrence in the HCNRA is in the Seven Devils Mountains. Here stands are restricted to southerly and westerly aspects on steep mountainous slopes at 8,000 feet. In the Blue and Wallowa Mountains outside the HCNRA this same plant association is commonly found. The unique character of these HCNRA communities occurs in their disjunct nature as outliers in the Seven Devils and on the southern edge of the Palouse Region.

Slender Sedge Plant Community

This community has been found in only one location within the entire Blue Mountain province. It is located on a floating sphagnum bog on Duck Lake (which is within the proposed Duck Lake Research Natural Area). The next closest locations are on the east slopes of the Cascades. Growing within the community are other vascular plant species that are also rare within HCNRA and the Blue Mountain province, mud dedge (*Carex limosa*), sundew (*Drosera anglica)*, Purple cinquefoil (*Potentilla palustris*), Northern mannagrass, *Glyceria borealis*, and bog buckbean (*Menyanthes trifoliata*). Twin Lakes and some other small nearby ponds also have *Drosera* and *Menynathes* and perhaps some of these other species.

Features and Peculiarities Considered, but not included as Biologically Unique

Other features and peculiarities were evaluated in terms of meeting the determination of biologically unique under Section 7(3) of the *HCNRA Act* as outlined in **Figure G-1**.

The *HCNRA Act* specifies preservation of species with respect to rare and endemic plant species. Regional endemic plants and edge of range plants, whether common or rare, and plants that are widespread but rare were considered because they are limited in distribution to the Blue Mountains and western Idaho or the edge of their range extends to the HCNRA. The rare regional endemics, rare edge of range, and widespread but rare plants are encompassed by the FS sensitive species list and are considered biologically unique under the Rare and Endemic Plant Species category as described above. Common regional endemics or common edge of range plants were not included because they do not meet the criteria specified for this category.

Managed Rare[1] habitats - which are the result of human-caused activities - as described in the *Analysis of Vascular Plants* (Croft et al 1997), that may be present in the HCNRA were not considered biologically unique. These habitats are managed through the forested and grassland vegetation strategies found in the Forested Vegetation, Grasslands, and Forest Understory sections of **Chapter 3** and **Appendix C** of the FEIS.

Terrestrial and aquatic species were also evaluated. There are no terrestrial or aquatic species endemic to the HCNRA. Rare terrestrial and aquatic species are defined as threatened, endangered, and sensitive, but they do not meet the definition of biologically unique categories and criteria as described above in **Figure G-1**. These species, however, would continue to be protected under Section 7(4) of the *HCNRA Act* that specifies protection of fish and wildlife habitat. Management direction for federally listed species and other terrestrial and aquatic habitat is located in **Appendix C** under Wildlife Habitat and Riparian/Aquatic Habitat and Water Quality to meet the intent of the *HCNRA Act*.

Habitats such as described in *Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-Scale Trends and Management Implications* (Wisdom et al 2000) were considered. Only a portion of the riparian and other wetland vegetation within the HCNRA has been sampled and none has been classified. Neither of these habitat types meets the definition of biologically unique, categories, and criteria as described in **Figure G-1**. Management direction for these habitats is provided under Section 7(4) of the *HCNRA Act*, which provides for the protection of fish and wildlife habitat. Management direction for other terrestrial, aquatic and atmospheric habitats would be provided under Wildlife Habitat, Riparian/Aquatic Habitat and Water Quality, and Air Quality as described in **Appendix C** of the FEIS.

Other species such as insects, pollinators, amphibians, carnivores, and fungi were evaluated, but were determined not to be biologically unique as described in **Figure G-1**. However, the rare combinations of aquatic, terrestrial, and atmospheric habitats and rare combinations of outstanding and diverse ecosystems may provide important resources for these species or associated habitats. Management direction for the biologically unique categories described above in combination with management direction for Forested Vegetation, Grasslands and

Forest Understory, Wildlife Habitat and Riparian/Aquatic Habitat and Water Quality and other management direction in **Appendix C** would protect these species and their associated habitat.

The following plant communities or plant associations were considered, but were not included because they did not meet the definition of biologically unique as described in **Figure G-1**.

- Green fescue-Hood's sedge plant community type
- Bluebunch wheatgrass/prickly pear communities
- Talus garland plant community type
- Smooth sumac/bluebunch wheatgrass plant association.

Refer to the sections above for a complete list and description of rare and endemic plant species including disjunct plant species; rare combinations of aquatic, terrestrial, and atmospheric habitats; rare and outstanding and diverse ecosystems and parts of ecosystems in the HCNRA.

Consideration of New Features and Peculiarities

To be considered biologically unique under the HCNRA Act, any future discoveries of potentially new species, habitats, or ecosystems would be evaluated using the determination process outlined in **Figure G-1** using the biologically unique definition in conjunction with the categories and criteria as specified previously.

If a new discovery meets this determination process, the feature or peculiarity would be managed under the direction provided for Biologically Unique Species, Habitats, and Ecosystems in **Appendix C**. If it does not meet these criteria, it would be considered for protection under the other management direction provided for wildlife habitat, riparian/aquatic habitat and water quality, air quality, soils, vegetation and other management direction in **Appendix C** to meet the intent of the *HCNRA Act*.

Contributors

This information has been developed by WWNF specialists including Gene Yates, Forest Botanist; Mitchel Bulthuis, Forest Range Program Manager; Bob Mason, Endangered Species Act Coordinator; Tim Schommer, Forest Wildlife Biologist; Ralph Browning, Forest Fisheries Biologist; and Charles Johnson, Area Ecologist for the three Blue Mountain national forests.

Other contributors include Paula Brooks, (former WWNF botanist); Charles Quimby, (former WWNF range conservationist); Jerry Hustafa (botanist for the HCNRA), and Susan Geer, (former botanist for the HCNRA). The various plant listings were developed from a variety of local sources such as botanical surveys, inventories, transects, ecological plots, range analyses, photo-point information, stand exams, stream surveys, plant association and other vegetation publications. Local knowledge from these specialists has been combined with published documentation on habitat and species occurrence and ranges to provide an account of the biological uniqueness of the HCNRA.