



# Vegetation Inventory Project

## *Nez Perce National Historical Park*

Natural Resource Report NPS/UCBN/NRR—2012/531



**ON THE COVER**

NEPE overview at Buffalo Eddy looking at surrounding mountains, valleys, and the Snake River Canyon  
Photograph by: Northwest Management, Inc.



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Natural Resource Report NPS/UCBN/NRR—2012/531

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## Executive Summary

Nez Perce National Historical Park (NEPE) includes multiple sites across parts of Montana, Idaho, Oregon, and Washington in the northwestern U.S. Of the many individual NEPE sites only seven support significant vegetation/wildlife habitat resources and are managed by the National Park Service (NPS) these sites include:

Bear Paw Battlefield (BEPA) – located 16 miles (26 km) south of Chinook, Montana;  
Buffalo Eddy (BUED) – located 18 miles (29 km) south of Asotin, Washington;  
Heart of the Monster (HEMO) – located one mile (1.6 km) south of Kamiah, Idaho;  
Old Chief Joseph Gravesite (OLJO) – located one mile (1.6 km) south of Joseph, Oregon;  
Spalding Site (SPAL) – located 11 miles (18 km) east of Lewiston, Idaho;  
Weippe Prairie (WEPR) – located eight miles (13 km) south of the town of Weippe, Idaho;  
White Bird Battlefield (WHBI) - located 15 miles (24 km) south of the town of Grangeville, Idaho.

The seven sites addressed herein are important to the Nez Perce Tribe (<http://nezperce.org/>) for various reasons. HEMO, WEPR, and BUED are associated with Nez Perce legends, important camp sites, and/or contain evidence of early occupation. SPAL is an important camping and fishing site and is also the location of a historic mission. OLJO represents a campsite and the final burial place of Old Chief Joseph and BEPA and WHBI are both sites of battles waged during the Nez Perce War of 1877. Together the seven sites occur on 1,984 acres (803 hectares) characterized by canyons, mesic meadows, floodplains, rolling upland prairies, foothills, and mountain slopes.

The extant vegetation varies from natural to semi-natural and from grassland to woodland stands among the seven sites with some similarities of plant communities between sites. At BEPA the plant communities include upland prairie comprised of native and non-native grasses and riparian shrublands. The canyon slopes within BUED supports upland native grasslands and mesic non-native forbs and grasslands with scattered deciduous shrublands. HEMO is located on a floodplain supporting stands of non-native and native grass- and forblands interspersed among riparian shrublands and woodlands and upland ponderosa pine (*Pinus ponderosa*) woodlands. OLJO is located on a small hill which supports stands of grasses, deciduous shrublands, and ponderosa pine woodlands. SPAL is situated at the confluence of two streams on a small floodplain terrace and supports non-native and native grass communities, deciduous and coniferous upland woodlands, and riparian shrublands and woodlands. WEPR supports high-altitude mesic prairie plant communities characterized by native forbs and semi-natural grasslands. WHBI is the largest of the sites and the mountain slope landform has been disturbed historically by the introduction of non-native forbs and grasses.

To better understand the ecology and distribution of vegetation within each of the NEPE sites (and the entire NEPE vegetation distribution) an inventory, classification, and mapping project was initiated in 2009 by the NPS Vegetation Inventory Program (NVIP) in conjunction with the Upper Columbia Basin Inventory and Monitoring Network (UCBN). Using experienced contractors and NPS affiliates a three-year, three-phase program was started by the UCBN as part of the network-wide inventory effort. Phase-one, directed by UCBN staff in conjunction



with Northwest Management Incorporated (NMI), Idaho State University (ISU), and S.M. Stoller Corporation (Stoller) resulted in the plant association and vegetation alliance classification using the National Vegetation Classification System (NVCS). Vegetation classification was based on the 2010 field sampling of 260 representative classification plots located within the boundaries of each NEPE site. Analysis of the classification plot data by ISU and Stoller ecologists occurred in 2011. Through this process 47 distinct plant associations and seven vegetation alliances were classified.

Phase-two, directed by NMI and Cogan Technology, Inc. (CTI) resulted in creation of the digital vegetation and land use map and project geodatabase. Mapping was conducted primarily by interpreting vegetation-specific and non-vegetated site signatures from the 2009 and 2011 National Aerial Imagery Program (NAIP) ortho-photography products. CTI created 48 vegetation, four sparsely vegetated, and 17 land use/land cover map units to delineate and attribute the current vegetation in and around the seven NEPE sites. The mapping process relied on manual digitization of homogenous photo-signatures supported by on-site verification. All interpreted data were converted to Geographic Information System (GIS) databases using ArcGIS<sup>®</sup> software. The final map layer is comprised of vegetation and land-use polygons with corresponding map class, NVCS, and modifier attributes.

Draft maps were printed, field tested, reviewed, and revised based on field observations by knowledgeable ecologists. Following verification, edits were applied to create the final vegetation map product for accuracy assessment (AA). In Phase-three the AA was conducted by NMI ecologists during the 2011 field season. Sampling required selecting 686 random point locations throughout the study area based on map unit frequency and abundance. AA locations were accessed by NMI field crews who keyed the vegetation at each target to the proper association and acquired representative ground photographs. The plant associations keyed at each AA target were then compared to the electronic vegetation map and the AA analysis revealed an overall thematic map accuracy of 93%.

Completion of the inventory project during Phase-four included producing the standard project deliverables as described and presented in this report and the accompanying digital video disk DVD. The NEPE deliverables include:

- The *Final Report* that includes keys to the vegetation types and imagery signatures, AA information, and a summary of the methods and results;
- A *Spatial GIS Database* containing spatial data for the vegetation units, classification plots, and AA points;
- *Digital Photos* from sample plots and miscellaneous park unit views;
- *Metadata* for all spatial data [Federal Geographic Data Committee (FGDC)-compliant];
- *Vegetation Descriptions and Photo-Signature Key* to the map units and plant associations/vegetation alliances.

A Summary of the projects statistics is included below:

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Field Work:

- 2010 Plot Sampling = 260 Classification Plots
- 2011 Accuracy Assessment = 686 Points

Classification:

- 47 NVCS Plant Associations
- 7 NVCS Plant Alliances
  - 12 Woodland and Forest Types
  - 10 Shrubland
  - 32 Herbaceous Vegetation

GIS Database:

- Project Size = 42,194-acres (17,075-hectares)
  - Nez Perce National Historical Park = 1,984 acres (804 hectares)
- 
- BEPA = 195 acres (79 hectares)
    - Project area = 5,097 acres (2,064 hectares)
  - BUED = 90 acres (36 hectares)
    - Project area = 5,347 acres (2,166 hectares)
  - HEMO = 61 acres (25 hectares)
    - Project area = 4,248 acres (1,720 hectares)
  - OLJO = 10 acres (4 hectares)
    - Project area = 3,359 acres (1,360 hectares)
  - SPAL = 93 acres (38 acres)
    - Project area = 5,347 acres (2,166 hectares)
  - WEPR = 280 acres (113 hectares)
    - Project area = 5,807 acres (2,352 hectares)
  - WHBI = 1,255 acres (508 hectares)
    - Project area = 12,479 acres (5,54 hectares)
- 
- Total Environs = 40,210 acres (16,285 hectares)
  - Base Imagery = NAIP 2011, True-color, 3-band, 1-meter, 1:12,000-scale ortho-image
  - 69 Map Units = 48 Vegetated, 4 Sparse Vegetation, and 17 Land-use/Land-cover
  - Minimum Mapping Unit = ½ hectare (1.24 acres), modified to ¼ acre (0.1 hectare) for rare woodlands, wetlands and riparian shrub polygons
  - Total Size = 7,786 Polygons
  - Average Polygon Size = 5.4 acres (2.2 hectares)

Overall Thematic Accuracy = 93% (92% Kappa Index)



## Acknowledgments

This unique vegetation inventory project required the enthusiasm and energy of several individuals over three years to complete. The dedication of everyone participating helped to produce the product described herein that we, the authors, thankfully acknowledge.

Foremost, we thank Lisa Garrett and the UCBN staff (including Tom Rodhouse and Gordon Dicus) who provided contracting, data management, and technical review through all aspects of this project. Special recognition is also credited to Dr. Karl Brown and Tammy Cook with the NPS Vegetation Inventory Program for prioritizing this project and providing funding. Without the financial support from the NPS Vegetation Inventory Program this project would not have been possible.

We would like to recognize the staff at each of the park units for their hospitality and assistance with the project. Everyone was very helpful and accomadating during this project. We would like thanks both Jason Lyons and Jannis Jocius for their many hours of reviewing and editing this document.

The NEPE vegetation inventory project benefited greatly from the planning and ecological expertise contributed by Amy Forman, Jeremy Shive (S.M. Stoller, Corporation), and Ken Aho (Idaho State University). We would like to especially acknowledge all of the long days and hard work put in by our field crew members including ecologists and botanists from Northwest Management Incorporated staff.





# Introduction

## Background

In 1994, the U.S. Geological Survey (USGS) and National Park Service (NPS) formed the USGS-NPS Vegetation Mapping Program to cooperatively inventory and map the vegetation resources within the system of National Parks. Presently managed as the National Vegetation Inventory Program (NVIP) by the NPS Natural Resource Program Center, Biological Resource Management Division, program goals are to provide baseline ecological data for park resource managers, obtain data that can be examined in a regional and national context, and provide opportunities for future inventory, monitoring, and research activities (FGDC 1997, 2008 Grossman et al. 1998).

At program initiation, the NVIP adopted the U.S. National Vegetation Classification (USNVC) (The Nature Conservancy (TNC) and Environmental Systems Research Institute (ESRI) 1994a, Grossman et al. 1998) as a basis for the *a priori* definition of vegetation units to be inventoried. The FGDC adopted a modified version of the upper (physiognomic) levels as a federal standard (FGDC-STD-005) (FGDC 1997, 2008). This standard was hereafter termed the National Vegetation Classification Standard (NVCS). The NVCS established a federal standard for a complete taxonomic treatment of vegetation in the U.S. at eight physiognomic levels, they are: (1) Formation Class, (2) Formation Subclass, (3) Formation, (4) Division, (5) Macrogroup, (6) Group, (7) Alliance, and (8) Association, with the finest level being the plant association. Vegetation alliances are usually aggregations of plant associations that are physiognomically uniform and share one or more characteristic or diagnostic species. An association is defined as a plant community or type with a consistent species composition, uniform physiognomy, and homogenous habitat conditions (Flahault and Schroter 1910). The plant association or community type is determined by environmental patterns and disturbance processes.

The NVCS established conceptual taxonomic levels for the floristic units of alliance and association, largely following the USNVC, but did not offer a taxonomic treatment for the floristic levels because of the immense scope of establishing robust floristic units for the entire U.S. The FGDC standard requires that federally funded vegetation classification efforts collect data in a manner that enables cross-walking the data to the NVCS (i.e., the physiognomic levels) and sharing between agencies, but does not require use of that standard by agencies for internal mission needs. NatureServe (2011) maintains a treatment of floristic units (alliances and associations), which, though not a federal standard, are used as classification and mapping units by the NVIP whenever feasible. For purposes of this document, the federal standard (FGDC 1997, 2008) is denoted as the NVCS; the USNVC will refer exclusively to the NatureServe treatment for vegetation floristic units (alliances and associations only).

Use of the NVCS as the standard vegetation classification system is central to fulfilling the goals of the NVIP because it:

- is vegetation based;
- uses a systematic approach to classify a continuum;
- emphasizes natural and existing vegetation;
- uses a combined physiognomic-floristic hierarchy;
- identifies vegetation units based on both qualitative and quantitative data; and
- is appropriate for mapping at multiple scales.

The use of the NVCS and the NVIP vegetation inventory protocols facilitate effective resource stewardship by ensuring compatibility and widespread use of the information throughout the NPS and by other federal and state agencies. The vegetation maps and associated information support a wide variety of resource assessment, park management, and planning needs. In addition they can be used to provide a structure for framing and answering critical scientific questions about vegetation communities and their relationship to environmental conditions and ecological processes across the landscape.

The NVCS has primarily been developed and implemented by TNC and the network of State Natural Heritage Programs over the past forty years (TNC and ESRI 1994a; Grossman. et al. 1998). The NVCS is currently supported and endorsed by multiple federal agencies, the FGDC, NatureServe, State Heritage Programs, and the Ecological Society of America. Refinements to the classification occur in the process of application, which lead to ongoing revisions that are reviewed both locally and nationally. TNC and NatureServe have made available a two-volume publication presenting the standardized classification, providing a thorough introduction to the classification, its structure, and the list of vegetation types occurring within the U.S. as of April 1997 (Grossman. et al. 1998). *Volume I: The National Vegetation Classification Standard* can be accessed electronically on the Internet at: <http://www.natureserve.org/publications/library.jsp>. NatureServe has since superseded *Volume II* of the publication (the classification listing), providing regular updates to ecological communities in the U.S. and Canada. This online database server, NatureServe Explorer®, can be accessed electronically on the Internet at: <http://www.natureserve.org/explorer> (2011).

## NPS Vegetation Inventory Program

The Director of the NPS approved the Natural Resource Challenge (NRC) in 1999 to encourage the NPS to focus on the preservation of the U.S. natural heritage through science, natural resource inventories, and expanded resource monitoring (NPS 1999). The NRC provided funding for 12 baseline inventories to be completed in each of 270 parks with significant natural resources. The vegetation inventory and mapping is considered one of the 12 baseline inventories. Through the NRC, 270 NPS units were organized into 32 networks in 2000 for the purpose of accomplishing natural resource inventory and monitoring (I&M) projects.

The NVIP is a cooperative effort between the NPS and the USGS to classify, describe, and map vegetation communities in more than 270 national park units across the U.S. The scope of this effort is large and implementation is complex due to the fact that vegetation species and communities can be unique from park-to-park. However, when the NVIP is completed the final products will assist park managers to: (1) identify and conserve plant biodiversity; (2) better understand resources and processes including wildlife habitat relationships and wildland fires; and (3) provide the necessary tools to better manage challenge issues including exotic species invasions, insect effects, and diseases.

The primary objective of the NVIP is to produce high-quality, standardized maps and associated data sets of vegetation and other land cover occurring within parks and selected adjacent environments (environs). This information fills data gaps and complements a wide variety of resource assessments, park management, and conservation needs. For example, in Sequoia and Kings Canyon National Parks, the 2007 vegetation map and digital database provided tools to better manage the foxtail pine (*Pinus balfouriana* ssp. *austrina*), an endemic species to the southern Sierra Nevada Mountains that can live for more than 1,000 years.

The NVIP uses well-established procedures that are compatible with other agencies and organizations including the NVCS, a system that is integrated with the major scientific efforts in the taxonomic classification of vegetation, and is a FGDC standard. In addition, stringent quality control procedures ensure the reliability of the vegetation data and encourage the use of resulting maps, reports, and databases at multiple scales.

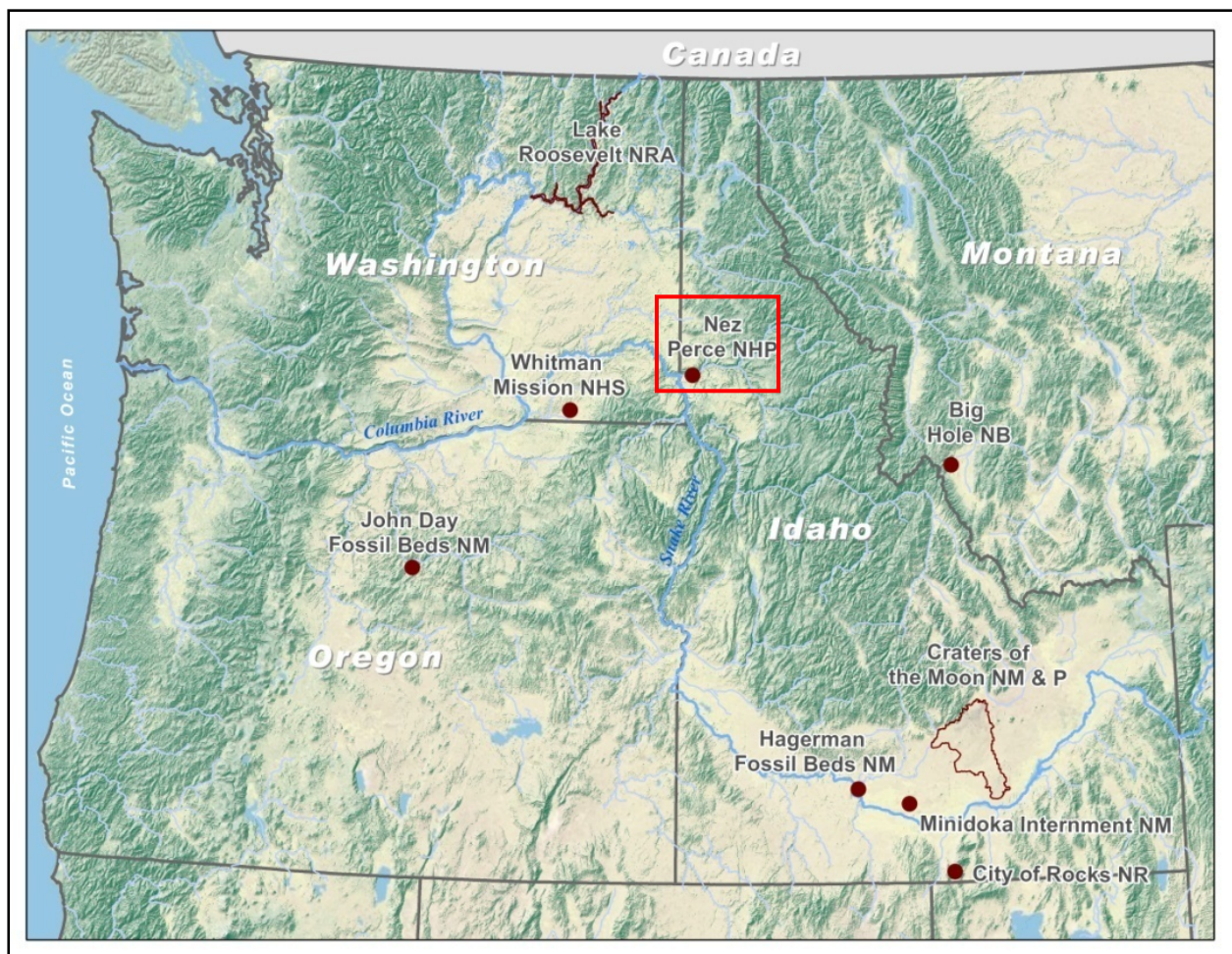
A complete vegetation mapping project for an NPS unit includes the following products, at a minimum:

- Detailed vegetation report
- Digital vegetation map
- Vegetation classification plot data
- Accuracy assessment data and analysis
- Dichotomous vegetation key
- Photo-interpretation key

Maps are produced in Universal Transverse Mercator (UTM) coordinates North American Datum 1983 (NAD 83) with a 1:24,000 scale and a minimum mapping unit of 0.5 hectares (1.24 acres). The vegetation maps must meet the National Map Accuracy Standards for positional accuracy, and the minimum class accuracy goal across all vegetation and land cover classes of 80 percent.

## Upper Columbia Basin Network

The specific decision to classify and map the vegetation within and adjacent to NEPE was made in response to guidelines set forth by the NPS NVIP and implemented by the UCBN, which includes nine NPS units located in four states of the inland Northwest (Figure 1). The UCBN was organized to inventory and monitor status and trends for selected natural resources (network organization facilitates collaboration, information sharing, and economies of scale in natural resource monitoring). The inventory and monitoring information is used by NPS and park unit resource managers to guide management decisions, to inform scientific research, and to provide public education. One goal of the NPS service-wide monitoring program is to collect and serve data to better understand the dynamic nature and condition of park-managed ecosystems and to provide reference points for comparisons with other management types and possibly with altered environments. The development of a vegetation classification to the vegetation alliance/plant association level and associated GIS map and database for each park is viewed as a high priority in reaching this goal.



**Figure 1.** Map of UCBN showing the location of NEPE in the network.

## **Nez Perce National Historical Park**

Nez Perce National Historical Park (NEPE) was established by an Act of Congress on May 15, 1965, under Public Law 89-19. In 1992, Congress expanded the park under Public Law 102-576 (the Nez Perce National Historical Park Additions Act of 1991) to include additional sites in Oregon, Washington, Idaho, and Montana, including the Big Hole National Battlefield (BIHO), already a unit of the NPS under Public Law 88-24. While two distinct units of the NPS, with two Superintendents, two budgets, and two museum collections, the two parks are jointly managed and fall under the authority of the Nez Perce National Historical Park Superintendent (NPS 2007). The vegetation inventory for BIHO was completed in a parallel project for the UCBN (Erixson and Cogan 2011) and final products and draft report for BIHO can be found online at <http://biology.usgs.gov/npsveg/>.

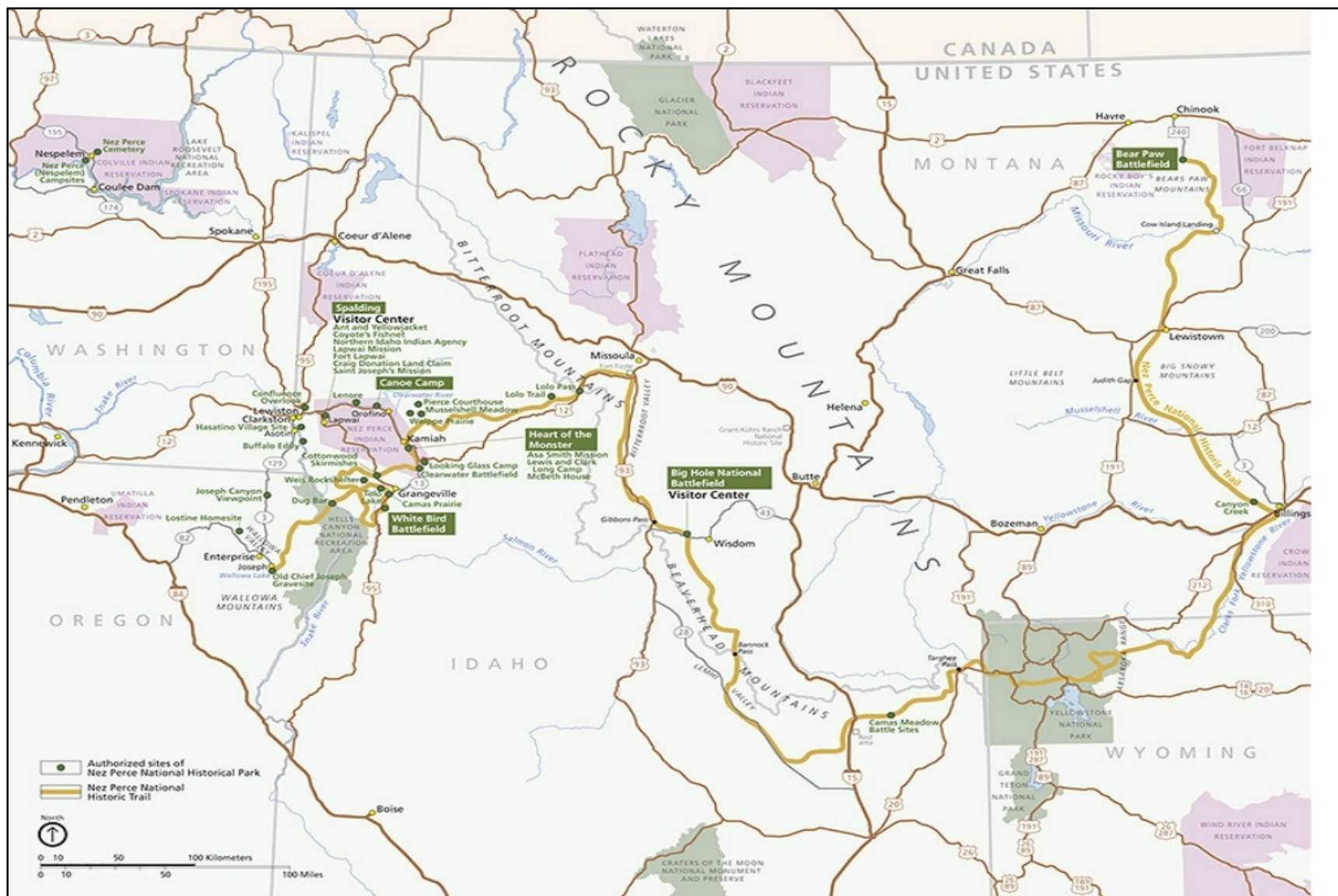
NEPE is composed of many individual sites significant to the history of the Nez Perce people throughout Oregon, Washington, Idaho, and Montana, including the 24 sites originally established in 1965 and 14 sites recommended for addition in 1992. The park is rather unusual in that there is no single contiguous federal landbase and the vast majority of park sites are not owned by the NPS. Of the nearly 40 sites now part of NEPE, the NPS owns land associated with only nine, and seven of these (BIHO was completed in a separate project) have significant vegetation resources to be included in this project. These include: (1) Heart of the Monster (HEMO) (at the East Kamiah Site in Idaho), (2) Spalding (SPAL) (Idaho), (3) Weippe Prairie (WEPR) (Idaho), (4) White Bird Battlefield (WHBI) (Idaho), (5) Bear Paw Battlefield (BEPA) (Montana), (6) Old Chief Joseph Gravesite (OLJO) (Oregon), and (7) Buffalo Eddy (BUED) (Washington) (Figure 2). Together these seven units cover 2,618 acres (1,060 hectares) of NPS-managed land, with the remaining sites owned/managed by various other federal agencies; tribal, state, county, or local governments; and private non-profit groups or individual landowners. The NPS works in partnership with these other landowners to protect the natural and cultural resources and to provide understanding of the Nez Perce Tribal history and culture (NPS 2007).

The seven sites in this project were designated as part of NEPE for various reasons, as follows: (1) HEMO, WEPR, and BUED are associated with important Nez Perce legends or contain evidence of early occupation and Lewis and Clark contact; (2) SPAL has evidence of prehistoric Native American communities and it played an important role as a mission site during the westward expansion of the Nation; (3) OLJO represents an important traditional campsite on the banks of Wallowa Lake and is the final burial place of Old Chief Joseph, the father of the famous Chief Joseph; and (4) BEPA and WHBI are related to the Nez Perce War of 1877.

The Nez Perce War was a five-month conflict resulting from U.S. Army orders to relocate approximately 750 Nez Perce people to the Lapwai Reservation in Idaho. Resisting this order the Nez Perce fled and were subsequently pursued by the U.S. Army across 1,170 miles (1,872 kilometres) from the Wallowa Valley in Oregon to the Bear Paw Mountains in Montana (Figure 3). During pursuit, the Nez Perce led by Chief Joseph and other chiefs fought in various skirmishes and battles including the first major battle at WHBI (where the Nez Perce defeated the U.S. Cavalry) and the last battle at BEPA (where Chief Joseph surrendered).

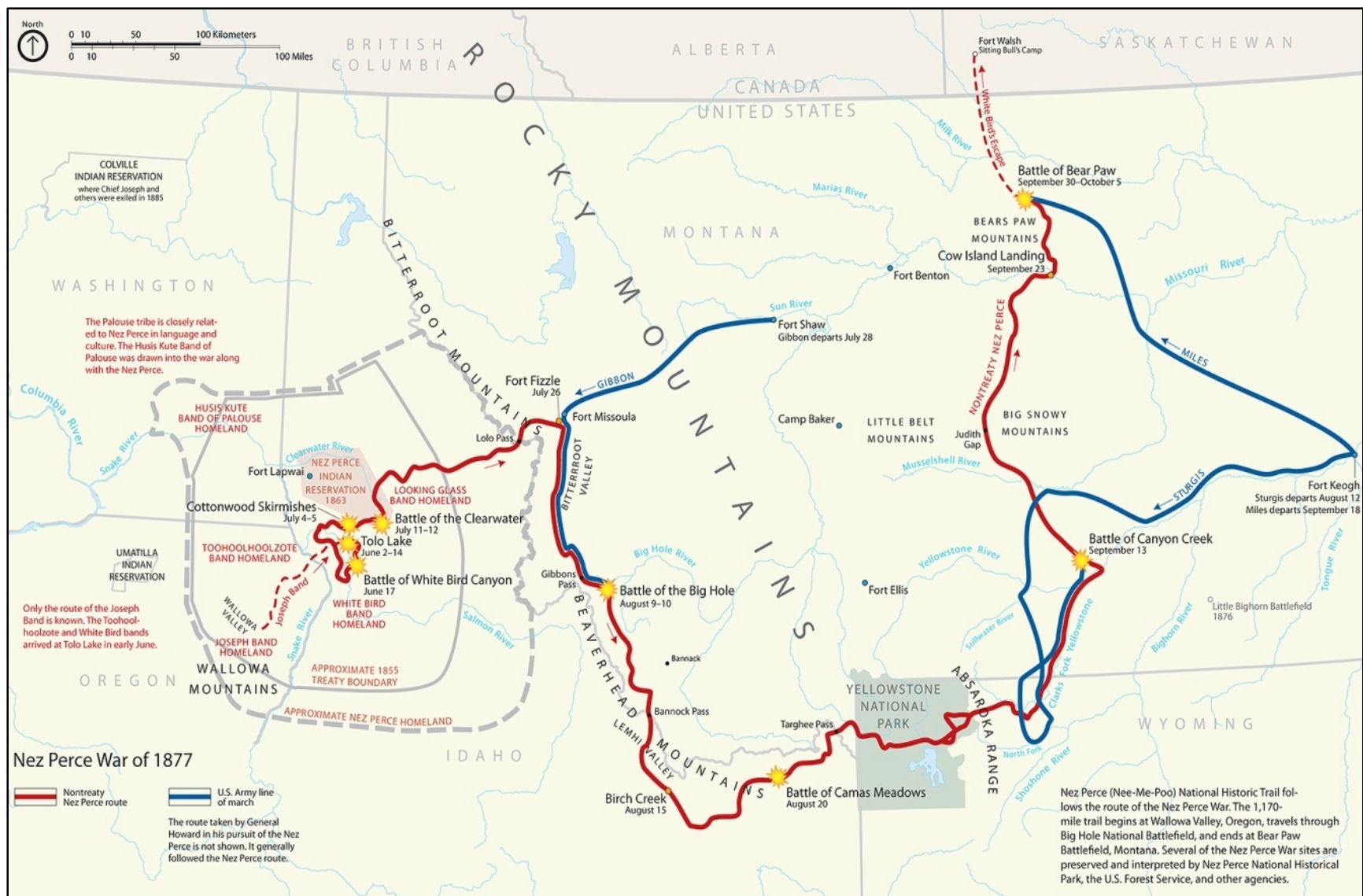
A short summary of the natural setting and vegetation for each of the seven NEPE sites included in this project follows in alphabetical order:





Source: NPS

Figure 2. Map of Nez Perce National Historical Park.



Source: NPS

**Figure 3.** Map of the Nez Perce National Historic Trail that follows the route of the Nez Perce War.



### **Bear Paw Battlefield (BEPA)**

BEPA is located 16 miles (26 kilometers) south of Chinook, Montana on Route 240 (Cleveland Road) in Blaine County. The site preserves and commemorates the campsite, attack, siege, and surrender of the Nez Perce Tribe to the U.S. Army. Beginning on September 29, 1877 the Nez Perce camped on the east side of Snake Creek on their journey to Canada as they resisted the Army's efforts to place them on a reservation. The next morning they awoke to an attack by three hundred mounted troops under the command of Col. Nelson Miles. The initial attack was repulsed but during the conflict the Nez Perce horses were lost and the tribe was trapped in the creek bottom and placed under siege. After five days of bombardment and poor weather, Chief Joseph, and the remaining Nez Perce, surrendered on October 5, 1877.

BEPA currently includes about 194 acres (79 hectares) of NPS owned land at the northern terminus of the Nez Perce National Historic Trail. Visitors access the site via the parking and picnic area loop roads directly off Route 240. Adjacent to the parking lot are several memorials, monuments, and NPS markers (Figure 4). A 1.25 mile (2 kilometers) self-guided interpretive trail starts at the parking lot and accesses much of the former battlefield (Figure 5).

#### ***Natural Setting***

The battlefield and siege sites are situated in a rolling prairie near the base of the north-facing foothill slope of the Bear's Paw Mountains. BEPA abuts agricultural land around most of the boundary and the site affords a dramatic vista to the south including Mans Head Rock, Crown Butte, and McCann Butte (Figure 4). Sayer Butte occurs west of BEPA and seeps and springs emerging/flowing from these formations supply water to streams flowing north and east to the Milk River. The BEPA landscape is moderately rolling and is incised by meandering small creeks and ephemeral drainages containing numerous small agricultural and recreational ponds. Snake Creek bisects the park, flowing intermittently from the southwest to the north (Figure 5). Snake Creek and the associated watershed (mostly an ephemeral drainage system) shaped the local landscape features by meandering, eroding, and depositing sediments to form terraces, floodplains, creek banks, and escarpments (Figure 6).



South Landscape Overview and Picnic Area

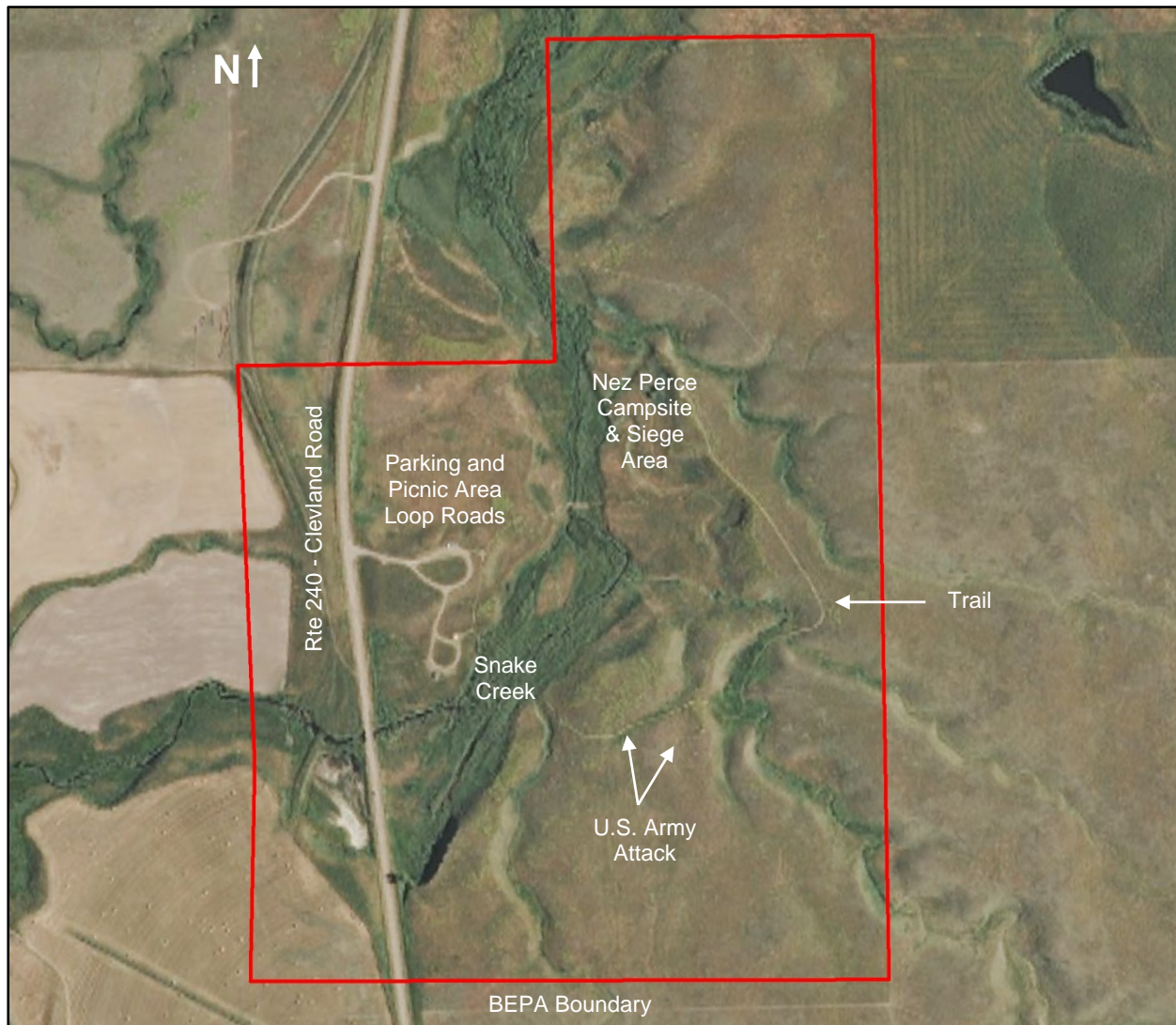


Parking Lot and Monuments

Source: NMI

**Figure 4.** Bear Paw Battlefield landscape and cultural photos.

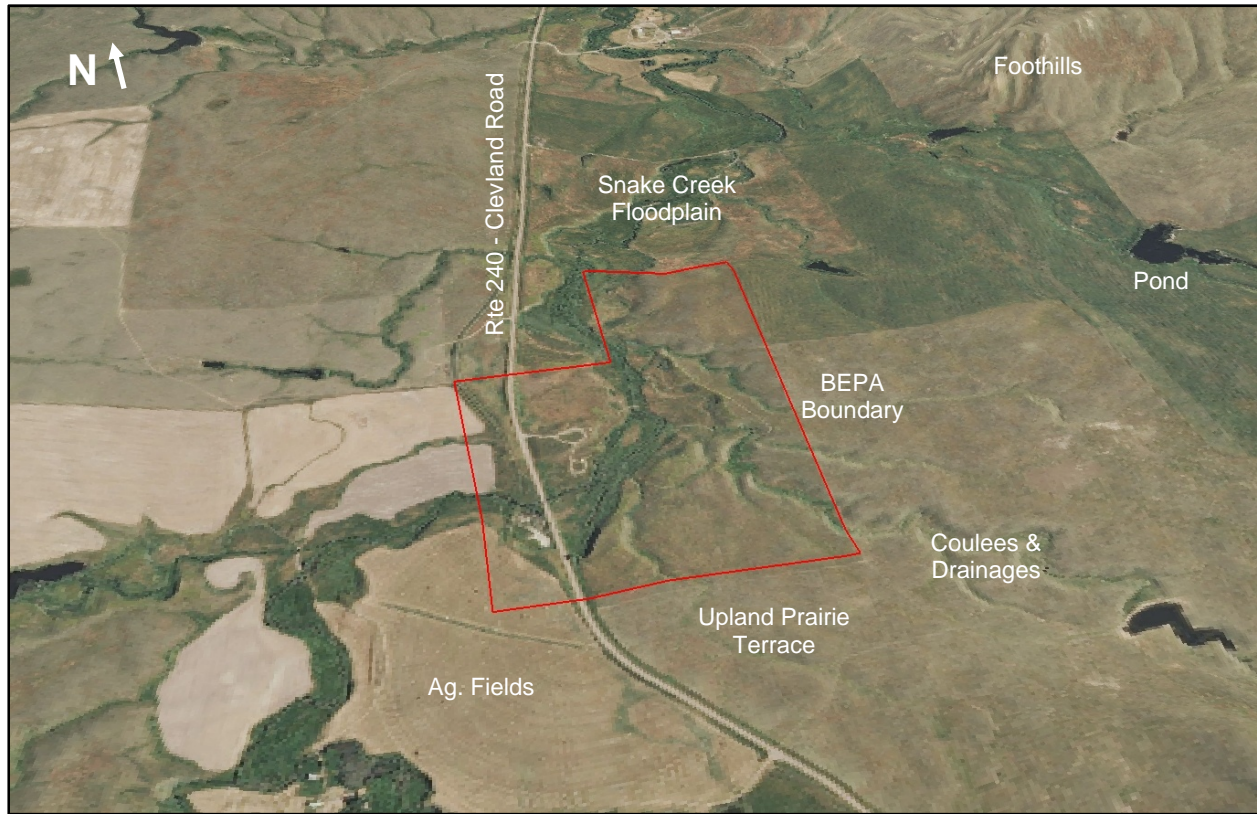




Source: NAIP 2011

**Figure 5.** Bear Paw Battlefield overview map.

BEPA is generally located at low elevation in north-central Montana and is relatively dry receiving about 13 inches (33 centimeters) of precipitation annually, measured in Chinook, Montana. Yearly temperatures for the area are cool with average summer high temperatures of 19 °C (67°F) and winter high temperatures averaging -8 °C (17 °F) (WRCCa 2012). The highest elevation within BEPA is about 3,050 feet (930 meters) above sea level on the upper prairie terrace in the southeast portion of the Battlefield. The lowest elevation of approximately 2,970 feet (905 meters) occurs in Snake Creek where it exits the Battlefield to the north.



Source: USGS 30m DEM and NAIP 2011

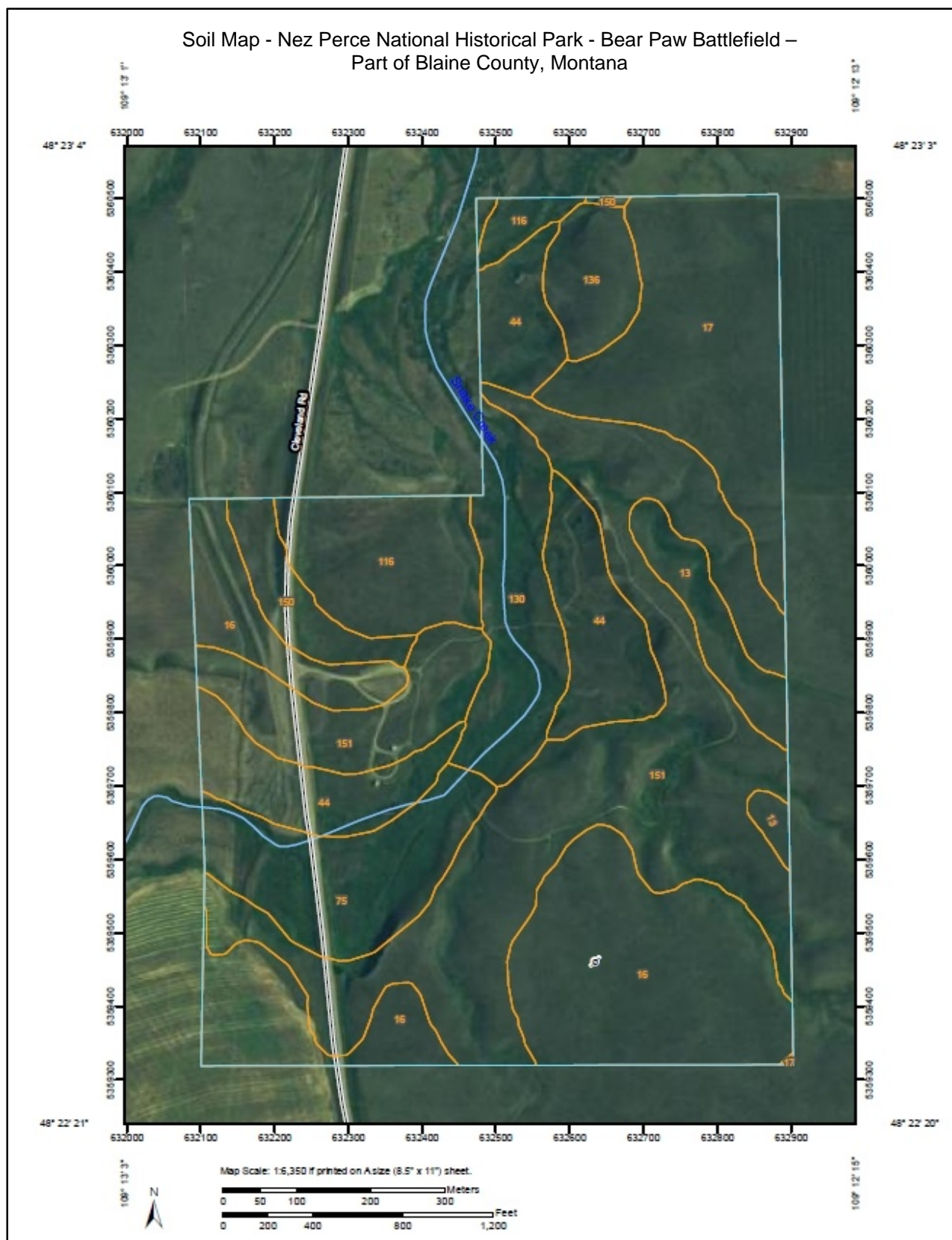
**Figure 6.** BEPA 3d landscape overview map.

The soils of BEPA developed in alluvial valley deposits, windblown loess, and derivatives of the nearby mountain bedrock. Primary soils are both upland loams and clay loams and flooded soils occur in and near Snake Creek. According to the U.S. Department of Agriculture (USDA), Soil Conservation Service (SCS) Soil Survey for Blaine County (Hilts 1986) 10 soil units (Table 1) occur within BEPA (Figure 7).

**Table 1.** Soil unit summary table for BEPA.

Blaine County and Part of Phillips County Area, Montana (MT608)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
13	Bearpaw clay loam, 0 to 4 percent slopes	6.0	3.1%
16	Bearpaw-Vida clay loams, 0 to 4 percent slopes	37.5	19.3%
17	Bearpaw-Vida clay loams, 4 to 8 percent slopes	22.4	11.5%
44	Farnuf loam, 2 to 4 percent slopes	20.6	10.6%
75	Korent-Nesda complex, occasionally flooded	13.3	6.9%
116	Straw-Korent loams	12.8	6.6%
130	Typic Ustifluvents, wet	12.5	6.4%
136	Vida-Zahill clay loams, 8 to 15 percent slopes	5.3	2.7%
150	Zahill clay loam, 25 to 45 percent slopes	4.9	2.5%
151	Zahill-Vida clay loams, 15 to 35 percent slopes	58.7	30.2%
Totals for Area of Interest		194.0	100.0%

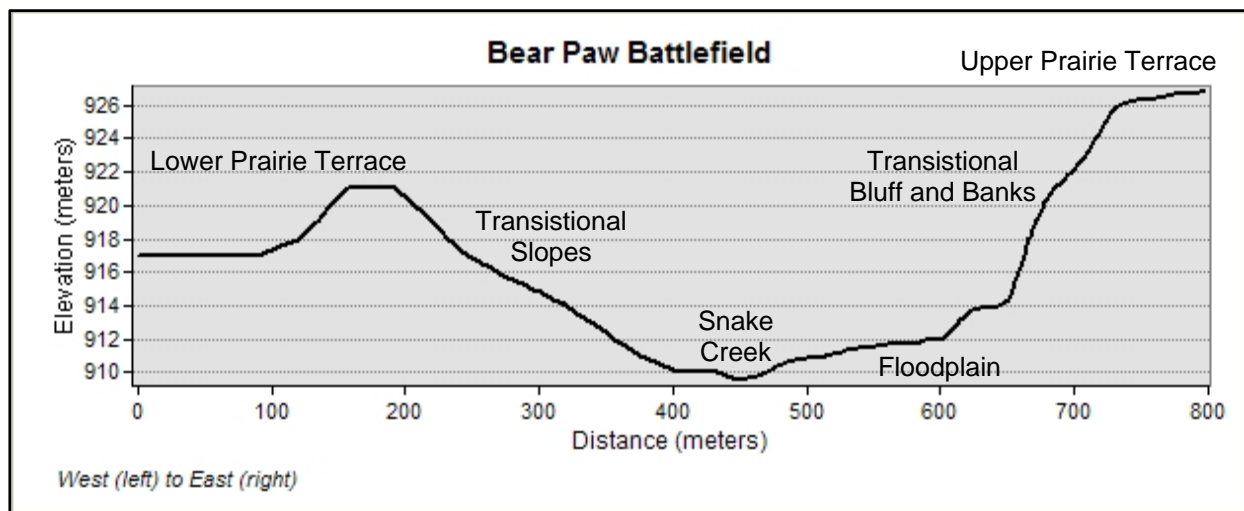




**Figure 7. BEPA Soil Survey Map.**

## Vegetation

BEPA occurs within the Missouri Basin shortgrass prairie ecoregion of Montana and contains three different landforms and life zones consisting of: (1) upland prairie terraces; (2) transitional bluffs and slope; and (3) the Snake Creek floodplain (Figure 8). The landforms support unique vegetation however several grass species have become established within all three life zones. The upland prairie terraces formed in the eastern and southern portions of BEPA and extend in steps down to Snake Creek. Interspersed among the terraces are small ephemeral drainages, coulees, knobs, and ridges. Between the upper terrace and Snake Creek are transitions of east-facing gentle slopes and west-facing, steep eroded banks and rock outcrops.



Source: CTI and USGS 10-meter DEM

**Figure 8.** Representative cross-section of the BEPA topography showing life zones.

Descending towards Snake Creek, a small transition zone is located on steep slopes below the creek bluffs where the soils are rockier and support limited short and dwarf-shrublands characterized by silver sagebrush (*Artemisia cana*) and dwarf fringed sagebrush (*Artemisia frigida*) (Figure 9). Grasslands commonly occur on the lower terraces and are characterized by species also common in upland prairie stands. Adjacent to Snake Creek, the riparian deciduous tall shrublands are characterized by coyote willow (*Salix exigua*) shrub thickets on and near the streambanks and Western snowberry (*Symphoricarpos occidentalis*) short shrubland patches occur on the nearby floodplain foot and toeslopes (Figure 9). Occasional tall and short shrub species occur as small patches or stands including silver buffaloberry (*Shepherdia argentea*). Short shrubs present with low cover within the prairie grassland complex include roses (*Rosa woodsii*, *R. arkansana*) and winterfat (*Krascheninnikovia lanata*). Trees are mostly absent from BEPA although two boxelder (*Acer negundo*) trees were observed.

The BEPA upland prairie is characterized by mixed bunch and rhizomatous grasses including western wheatgrass (*Pascopyrum smithii*) and needle-and-thread grass (*Hesperostipa comata*) on well-developed soils that intergrade with blue grama (*Bouteloua gracilis*) and threadleaf sedge (*Carex filifolia*) on thinner, drier soils (Figure 9). Much of the landscape surrounding BEPA has been altered to support agricultural crops and as a result non-native grass and forb species have become established. Common non-native pasture species include crested wheatgrass (*Agropyron cristatum*), yellow sweet clover (*Melilotus officinalis*), and alfalfa (*Medicago sativa*) on drier sites with Kentucky bluegrass (*Poa pratensis*), quackgrass (*Elymus repens*), and smooth brome (*Bromus inermis*) common to mesic road ditches, coulees, and shallow drainages (Figure 9). The non-native pasture species intermix to some degree with native graminoids or may occur as monotypic stands.

**High – 930 meters (3,050 feet)**



Upland Terrace Native Mixed Grasslands



Upland Terrace Non-Native Mixed Grasslands



Transitional Sagebrush Slopes



Snake Creek Riparian Shrublands

**Low – 905 meters (2,970 feet)**

Source: NMI

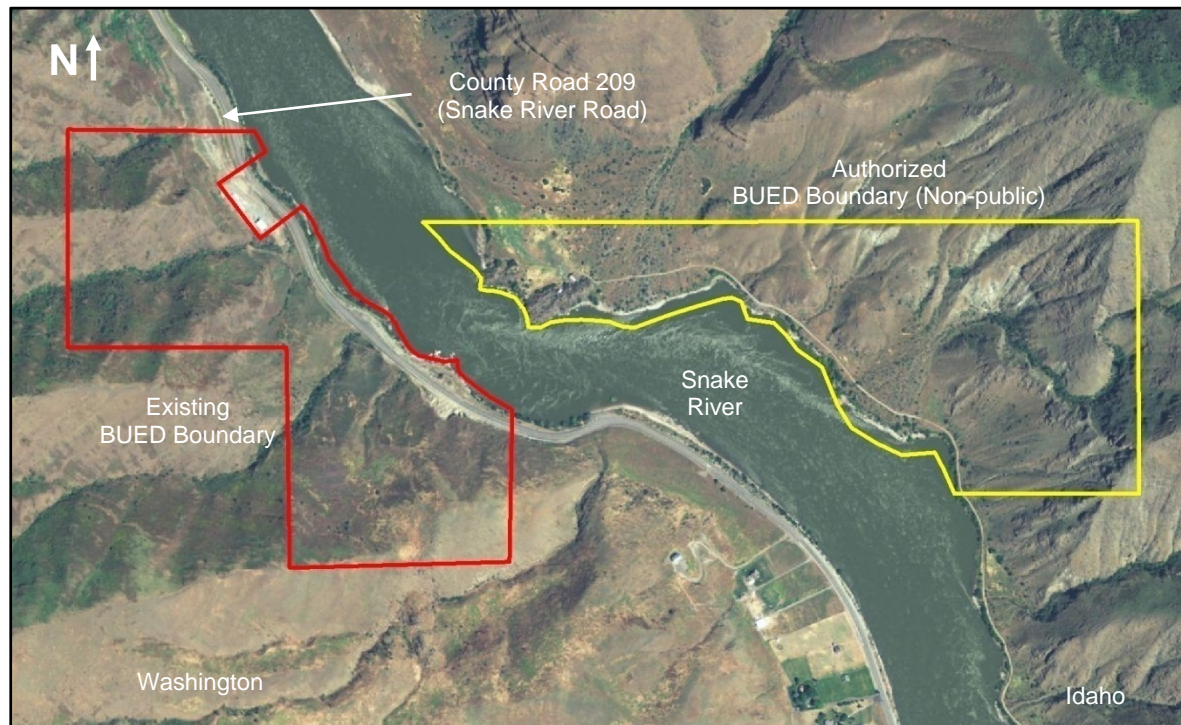
**Figure 9.** Common BEPA vegetation types by elevation.



## Buffalo Eddy (BUED)

BUED is located 18 miles (29 kilometers) south of Asotin, Washington and 20 miles (32 kilometers) south of Lewiston, Idaho on County Road 209 (Snake River Road). The site preserves numerous panels of petroglyphs (rock art) and a few pictographs (drawings or paintings) created by ancient Nez Perce people by removing the outer weathered surface of the rocks by pecking, rubbing, scratching, or incising. The site is named for images on the rocks depicting bison being hunted on horseback near an eddy formed by a series of sharp bends in the Snake River. Rock art is present on cliffs and boulders on both banks of the Snake River and the NPS manages approximately 94 acres (38 hectares) on the western (Washington) bank of the river including about 2,500-foot (762 meters) of shoreline. Another approximately 100 acres (41 hectares) is included in the authorized BUED boundary on the eastern (Idaho) bank of the river (Figure 10) but only the Washington rock art site is open to the public.

Visitors can access BUED via a small parking area adjacent to the Snake River Road. A short trail leads to the petroglyphs and pictographs on the western riverbank. No facilities are available at BUED however interpretive signage is present along the trail.



Source: NAIP 2011

**Figure 10.** Buffalo Eddy overview map.

### **Natural Setting**

BUED is characterized by steep, rocky slopes supporting species of grasses and draws characterized by shrubland communities (Figure 11). Most of BUED is extremely rugged except for the alluvial deposits along the eastern riverbank and the narrow alluvial terrace deposited between the Snake River Road the western bank of the Snake River (Figure 12). Elevations range from 787 feet (240 meters) along the river to 1,560 feet (475 meters) on the western boundary and 1,640 feet (500 meters) on the eastern boundary. BUED is semiarid with precipitation occurring mostly in the form of rain in the early spring and late fall, averaging 13 inches (33 centimeters) annually. BUED experiences hot, dry summers with average high temperatures of 32°C (90°F) in July and cold winters with average high temperatures of 4°C (39°F) in January (recorded at Clarkston Heights, Washington) (WRCCb 2012).



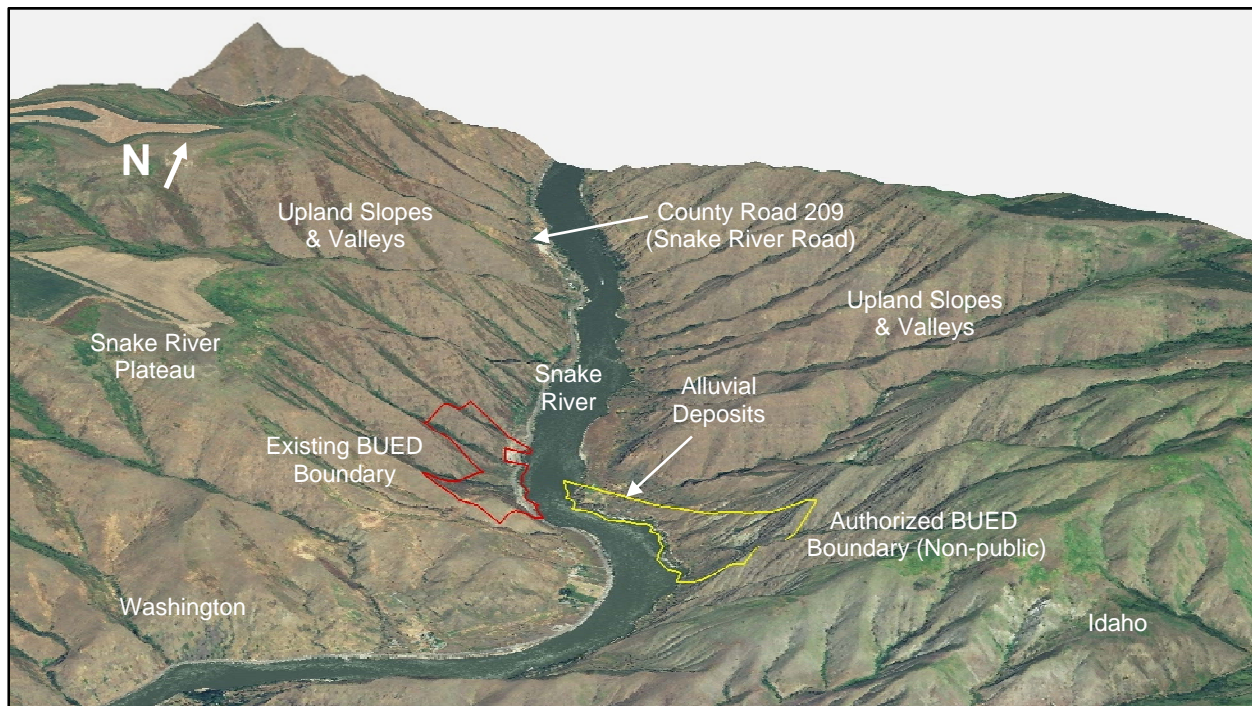
West BUED Landscape Overview (left)



Snake River Road, Snake River and East BUED

Source: NMI

**Figure 11.** Buffalo Eddy landscape photos.



Source: USGS 30m DEM and NAIP 2011

**Figure 12.** BUED 3d landscape overview map.



Mountain and valley slopes within BUED are characterized by steep, rocky surfaces consisting of Grande Ronde Basalt on the Washington (west) side and a mix of Grande Ronde Basalt and metasedimentary and metavolcanic rocks belonging to the Wild Creek Sheep Formation on the Idaho (east) side. Adjacent to the Snake River on the Idaho side are alluvial fan deposits (NPS-GRI 2009). The soils of BUED are loess, colluvium, and slope alluvium formed from weathered basalt parent material. Primary soils include upland loams, clay loams, and flooded soils in and near the Snake River. The USDA, SCS and NRCS Soil Survey for Asotin and Nez Perce Counties (Hahn 2001 and Gentry 1991) mapped 13 soil units (Table 2) within BUED (Figure 13).

**Table 2.** Soil unit summary table for BUED.

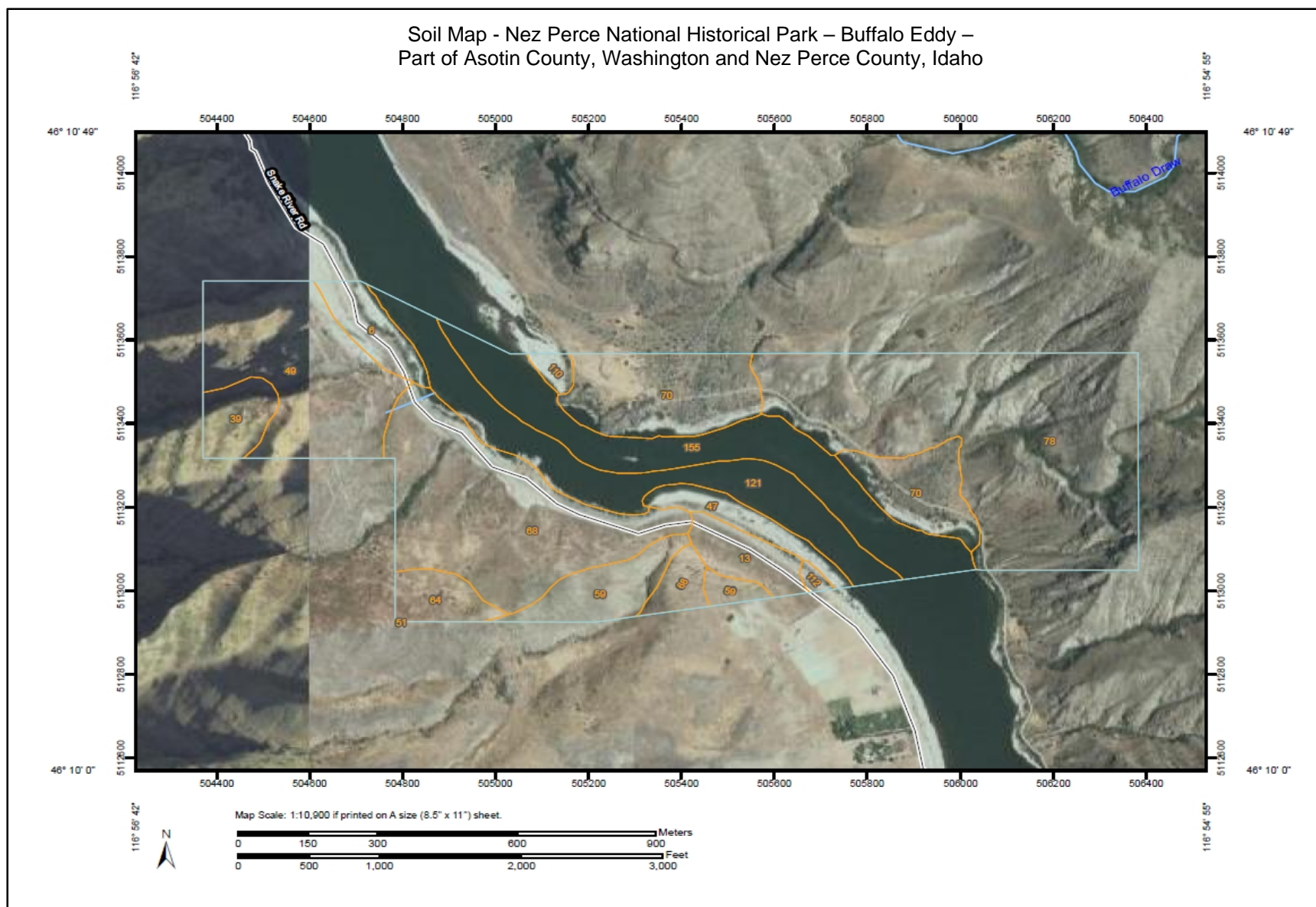
Asotin County Area, Washington (Asotin and Garfield Counties) (WA603)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6	Bridgewater extremely stony sandy loam, 0 to 15 percent slopes	6.5	2.3%
13	Chard loam, 10 to 15 percent slopes	6.8	2.4%
39	Gwinly-Rockly-Rock outcrop complex, 60 to 120 percent slopes	6.1	2.2%
47	Joseph extremely cobbly loamy sand 0 to 3 percent slopes	6.2	2.2%
49	Laufer-Rockly-Rock outcrop complex, 60 to 120 percent slopes	31.1	11.2%
51	Laufer-Thiessen-Rock outcrop complex, 40 to 90 percent slopes	0.0	0.0%
59	Limekiln-Rock outcrop complex, 40 to 120 percent slopes	11.1	4.0%
64	Mallory-Rock outcrop complex, 40 to 90 percent slopes	5.6	2.0%
68	Matheny-Linville-Laufer complex, 40 to 90 percent slopes	44.9	16.2%
112	Veazie silt loam, 0 to 3 percent slopes	0.8	0.3%
121	Water	27.3	9.8%
<b>Subtotals for Soil Survey Area</b>		<b>146.3</b>	<b>52.7%</b>
<b>Totals for Area of Interest</b>		<b>277.6</b>	<b>100.0%</b>

Lewis and Nez Perce Counties, Idaho (ID611)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
70	Lapwai-Bridgewater complex, 1 to 4 percent slopes	29.3	10.6%
78	Limekiln very stony silt loam, 40 to 60 percent slopes	71.1	25.6%
110	Riverwash-Aquents complex, nearly level	1.6	0.6%
155	Water	29.3	10.5%
<b>Subtotals for Soil Survey Area</b>		<b>131.3</b>	<b>47.3%</b>
<b>Totals for Area of Interest</b>		<b>277.6</b>	<b>100.0%</b>

(Note: Acres reported includes the authorized boundary (non-public) and areas in and along the Snake River.)



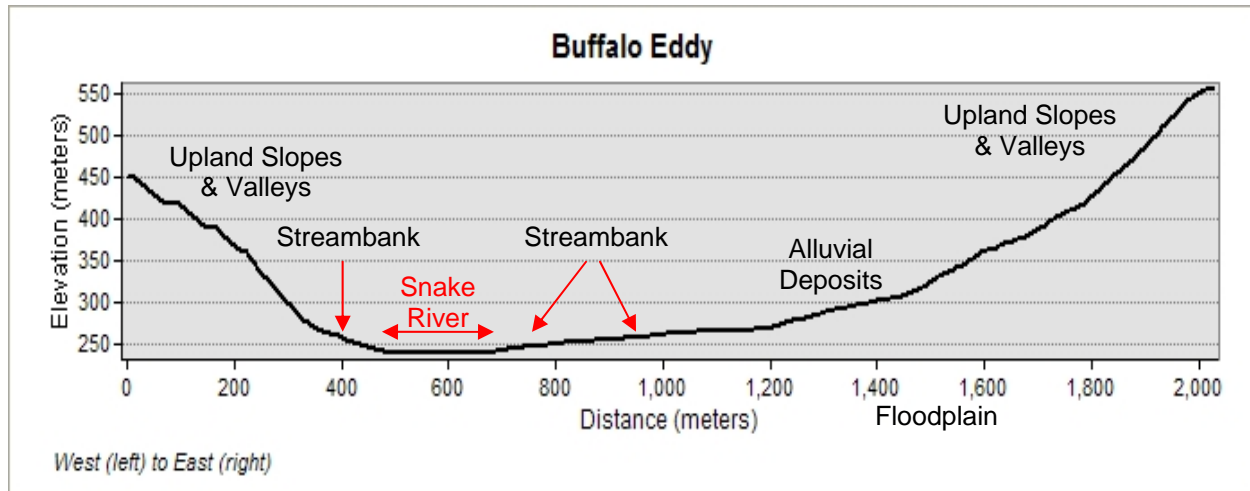


**Figure 13.** BUED Soil Survey Map.

Source: USDA Web Soil Survey 2012

## Vegetation

BUED is located in the sagebrush-steppe ecoregion of the Snake River Plateau along the Idaho-Washington border. The site is situated in a deep, narrow canyon along a bend in the Snake River. BUED contains three landforms and life zones resulting largely from the influence of the river, including: (1) upland slopes and valleys; (2) alluvial deposits; and (3) the Snake River streambanks (Figure 14). Each life zone supports unique plant communities although some grass and shrub species occur within all three zones.



Source: CTI and USGS 10-meter DEM

**Figure 14.** Representative cross-section of the BUED topography showing life zones.

The upland slopes and valleys of the Snake River canyon extend from about mid-slope to the base of the canyon wall/slope. Included on this landform are unique vegetation assemblages influenced by topographic position and slope exposure. Drier south-facing slopes expose rock outcrops supporting grasslands characterized by native bluebunch wheatgrass (*Pseudoroegneria spicata*) and non-native cheatgrass (*Bromus tectorum*). In contrast, the mesic north-facing slopes support dense, non-native grasslands characterized by cheatgrass and chervil (*Anthriscus caucalis*) or tall shrublands with low cover characterized by Lewis' mock orange (*Philadelphus lewisii*) and Saskatoon serviceberry (*Amelanchier alnifolia*). The slopes drain to small, mesic valley bottoms supporting dense tall shrub thickets of Lewis' mock orange, stands of net-leaf hackberry (*Celtis laevigata* var. *reticulata*) trees, and patches of tall mixed-grass species (Figure 15).

Alluvial deposits are more prominent on the eastern side of the Snake River as fans along the canyon footslopes and terraces or bars along the Snake River. These deep, alluvial deposits support scattered net-leaf hackberry trees, Lewis' mock orange and Saskatoon serviceberry tall shrubs, and mixed perennial grass species or annual non-native cheatgrass in the understory (Figure 15). Along both banks of the Snake River are linear patches and stands of net-leaf hackberry trees interspersed with patches of grass species (Figure 15).

The vegetation within BUED is influenced by surrounding agricultural activities on the adjacent Snake River Plateau and development along the Snake River Road. Both areas likely serve as vectors for the introduction of non-native grass and forb species including bur chervil, cheatgrass, crested wheatgrass, Scotch thistle (*Onopordum acanthium*), and yellow star-thistle



(*Centaurea solstitialis*). Along the road, patches of cheatgrass are common and persistent as a result of disturbance related to roadway maintenance. The upland slopes on the western side of the river exhibit signs of past disturbance (likely from livestock grazing) expressed as stands of cheatgrass on dry sites and a mix of chevil and non-native forbs on mesic sites. The non-native grass and forb species intermix to some degree with the native bluebunch wheatgrass, and occur as mixed non-native stands, or form monotypic stands.

**High – 550 meters (1,640 feet)**



Dry Upland Slope Non-native Grassland



Dry Upland Slope Native Grassland



Mesic Upland Slope Non-native Vegetation



Mesic Upland Valley and Slope Shrublands



▼ Alluvial Deposit Shrub and Woodlands  
**Low – 240 meters (780 feet)**



Snake River Streambank Riparian Woodlands

Source: NMI

**Figure 15.** Common BUED vegetation types by elevation.

### **Heart of the Monster (HEMO)**

HEMO occurs in the northwestern panhandle region of Idaho and is located on the eastern bank of the Clearwater River southeast of Kamiah, Idaho along U.S. Highway 12. HEMO includes 53 acres (22 hectares) of NPS-managed land along the western section of the Nez Perce National Historic Trail. HEMO preserves and commemorates the legendary birthplace of the Nez Perce Tribe as it was here that Coyote defeated a monster and created the Nez Perce people. Two large basalt outcrops exposed at the site represent the birthplace and are named the Heart of the Monster and the Liver (Figure 16). The site occupies a Clearwater River floodplain terrace and marks a major prehistoric and historic river crossing for the Nez Perce Tribe.

Visitors to HEMO may access the site via a small parking lot and two short trails adjacent to Highway 12. One trail accesses the interpretive shelter and the other accesses the seating area around the Heart of the Monster formation. Much of the site is maintained as lawn with some linear bands of shrubs and scattered trees.

#### ***Natural Setting***

HEMO is bordered by the Clearwater River to the west and Highway 12 was constructed along the northeastern boundary, splitting the site into two sections near the southern boundary (Figure 17). The surrounding landscape supports a mixture of agricultural land, residential development, and small commercial businesses including RV parks and motels. Kamiah is ringed by foothills of Big Butte, Mount Stewart, Twin Buttes, and Red Rock Butte to the south and Pauch Mountain, Maggie Butte, and Woodrat Mountain in the Clearwater National Forest to the east. The topography of HEMO is influenced by the Clearwater River, associated channels and islands, and the wide floodplain. Much of HEMO is located on the flat primary floodplain terrace and the western boundary area supports a small side channel.



Heart of the Monster Memorial



Clearwater River Floodplain

Source: NMI and NPS

**Figure 16.** Heart of the Monster (East Kamiah Site) landscape and cultural photos.



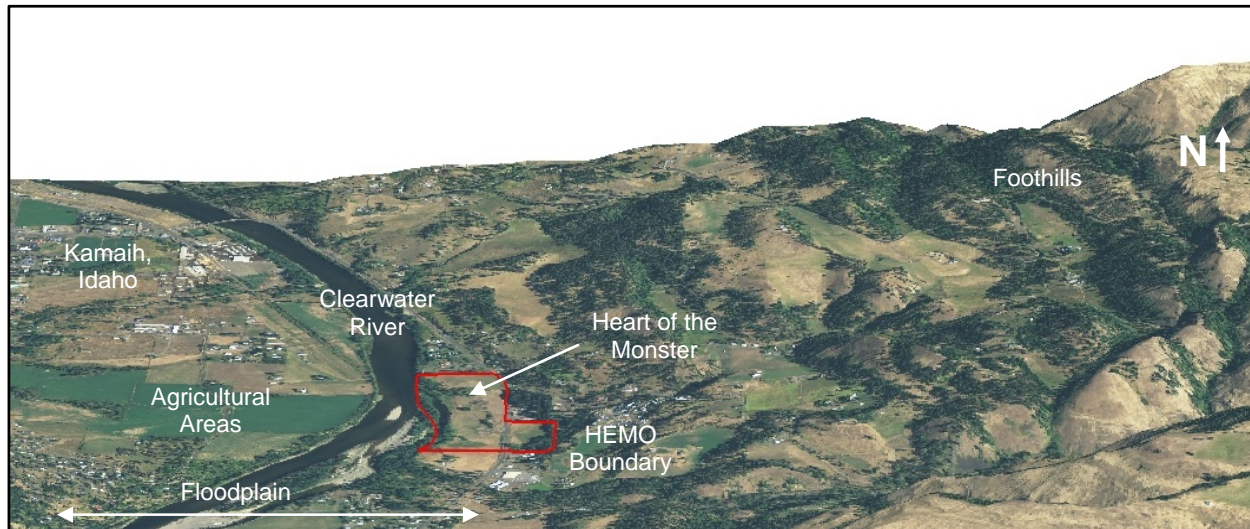


Source: NAIP 2011

**Figure 17.** HEMO (East Kamiah Site) overview map.

HEMO occurs at a moderate elevation in north-central Idaho and receives about 23 inches (58 centimeters) of precipitation annually as measured at Kamiah, Idaho. Annual temperatures are moderate with average summer highs of 19 °C (75°F) degrees in July and average winter highs of -8 °C (30 °F) (WRCCc 2012). The HEMO site is nearly flat (with exception of the basalt formations) with a slight increase in elevation from approximately 1,230 feet (375 meters) at the northwest corner to 1,312 feet (400 meters) in the southeast corner (Figure 18).

Other than the two basalt outcrops soils within HEMO are well-developed loams with minor components of stony and silt loams derived from riverine deposits. The USDA, SCS Soil Survey for Idaho County (Barker 1982) mapped five soil units (Table 3) within HEMO (Figure 19); the non-soils riverwash and open water units comprise about 21% of the site.

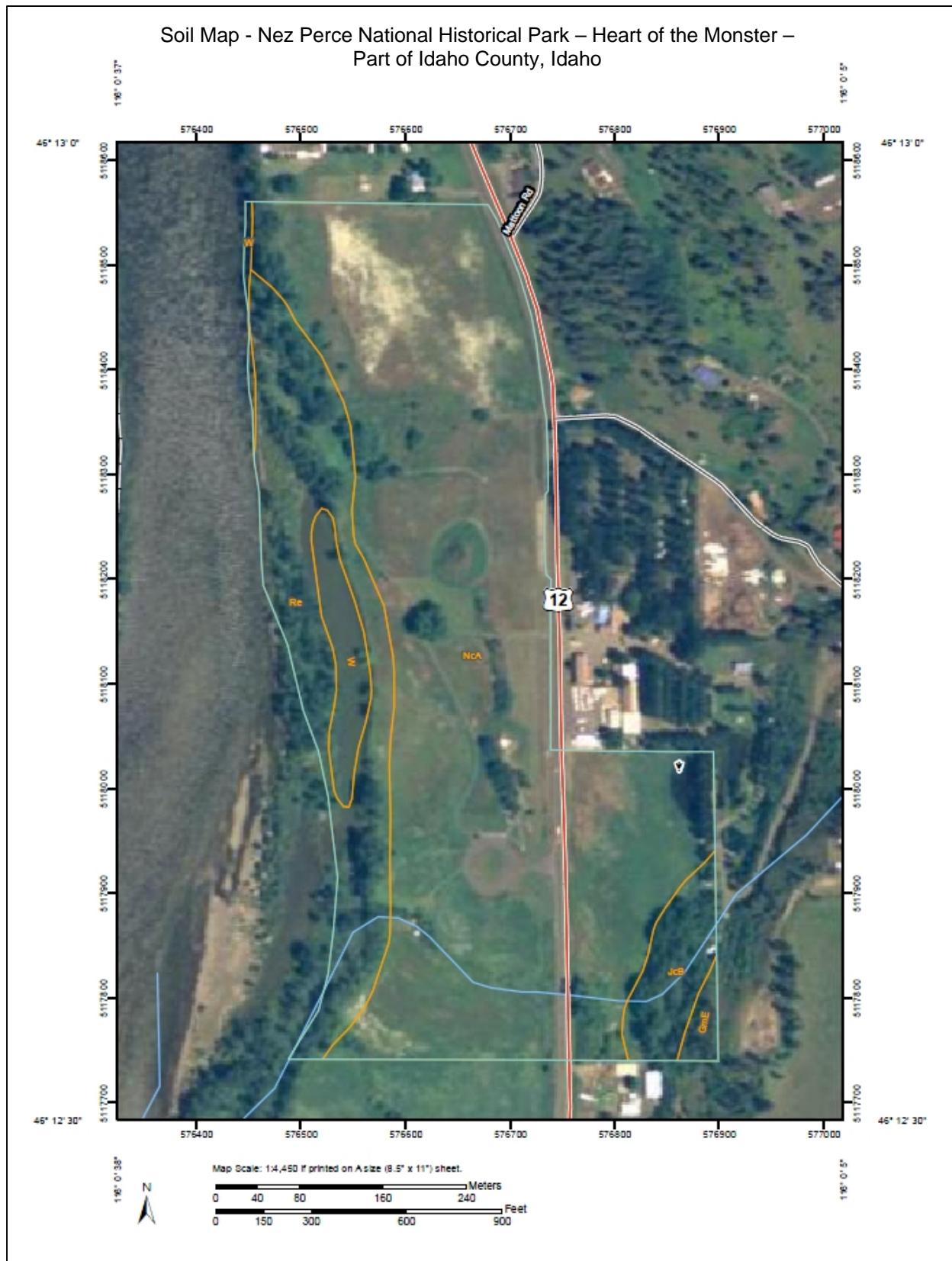


Source: USGS 30m DEM and NAIP 2011

**Figure 18.** HEMO (East Kamiah Site) 3d landscape overview map.

**Table 3.** Soil unit summary table for BEUD.

Kooskia Area, Idaho County, Idaho (ID618)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
GmE	Gwin-Mehlhorn stony loams, 45 to 65 percent slopes	0.5	0.9%
JcB	Jacknife silt loam, loamy variant, 7 to 12 percent slopes	2.5	4.1%
NcA	Nicodemus loam, 0 to 7 percent slopes	44.9	73.3%
Re	Riverwash	11.1	18.0%
W	Water	2.2	3.6%
<b>Totals for Area of Interest</b>		<b>61.3</b>	<b>100.0%</b>

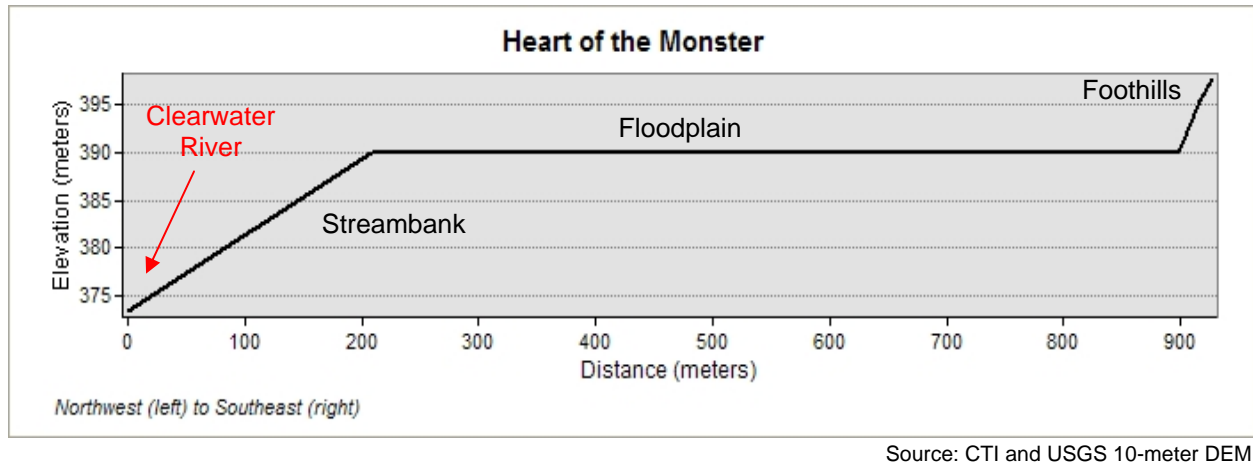


**Figure 19.** HEMO Soil Survey Map.



## Vegetation

HEMO is located in the Palouse grasslands of the shortgrass prairie ecoregion. The extant plant communities are influenced by the floodplain location, continued NPS mowing and maintenance activities, and nearby development. HEMO supports four life zones representing one upland and three floodplain types (Figure 20) that include: (1) floodplain woodlands; (2) riparian shrublands; (3) lowland meadows; and (4) foothill conifer forest. Each life zone supports unique plant communities however some plant species occur in all the life zones.



**Figure 20.** Representative cross-section of the HEMO topography showing life zones.

Mature deciduous floodplain woodlands have become established on the river bank at the lowest elevation along the Clearwater River to the west, around the side channel, and extend into HEMO in the upper north-central site portion (Figure 21). Common floodplain tree species include boxelder and black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) with stands of black locust (*Robinia pseudoacacia*) and individual Douglas-fir (*Pseudotsuga menziesii*) trees. The black locusts are non-native and may have been planted or escaped from nearby landscaped sites. One stand of tall black locust trees occurs southwest from the Heart of the Monster formation and another mixed-aged black locust - black cottonwood stand occurs east of Highway 12.

Riparian tall shrublands are common within HEMO forming linear stands adjacent to the riverbank, flanking the Heart of the Monster formation, and along the interpretive trails (Figure 21). Characteristic tall and short shrub species include black hawthorn (*Crataegus douglasii*), buckthorn (*Frangula purshiana*), chokecherry (*Prunus virginiana*), and common snowberry (*Symphoricarpos albus*). The non-native tall shrub/small tree, European plum (*Prunus domestica*) occurs as individuals within the riparian tall shrublands.

Most of the HEMO landscape supports lowland meadow (with some areas maintained by the NPS in a lawn or field/pasture setting) characterized by a variety of native and non-native grass and forb species (Figure 21). In the northern portion of HEMO is a square field planted to Kentucky bluegrass with a drier inclusion of hair or wiregrass (*Ventenata dubia*). This field is flanked by bands of non-native smooth brome and a disturbed site invaded by spotted knapweed (*Centaurea stoebe*). Grasslands in and around the Heart of the Monster formation maintained by



mowing support patches of Kentucky bluegrass, bulbous bluegrass (*Poa bulbosa*), sheep fescue (*Festuca ovina*), meadow foxtail (*Alopecurus pratensis*), and cheatgrass. The field east of Highway 12 supports non-native Kentucky bluegrass and stands of smooth brome in more mesic areas. One native stand of small camas (*Camassia quamash*) forbs associated with meadow foxtail is located in the southwest corner of HEMO.

The foothill landscape east of HEMO is characterized by hill slopes, valleys, and tables supporting mixed conifer woodland/forest stands (Douglas-fir and ponderosa pine). One slope extends into the eastern boundary of HEMO, east of Highway 12 and is characterized by a small stand of tall ponderosa pine.

**High – 400 meters (1,312 feet)**



Foothill Ponderosa pine Forest



Mixed Lowland Meadow Grasslands



Riparian Shrublands



Floodplain Forest

**Low – 375 meters (1,230 feet)**

Source: NMI

**Figure 21.** Common HEMO vegetation types.

### **Old Chief Joseph Gravesite (OLJO)**

The Old Chief Joseph Gravesite occupies a 13-acre (5 hectare) parcel on the west side of Oregon Highway 82, north of Wallowa Lake and one-mile south of Joseph, Oregon (NPS 1997). Old Chief Joseph was the father of Chief Joseph, a leader of the Nez Perce Tribe during the Nez Perce War of 1877. Old Chief Joseph died in 1870 and was reinterred at this site in 1926. The cemetery is a National Historical Landmark that is sacred to the Nez Perce people.

Visitors to OLJO may access the cemetery via a narrow pullout/parking area along Highway 82. A path accesses the tall stone memorial (Figure 22). From the Old Chief Joseph gravesite views to the south and west include Wallowa Lake and the Wallowa Mountain peaks of Hurricane Point, Sawtooth, Twin, Howard Mountain, Chief Joseph Mountain, and others (Figure 21).



Old Chief Joseph Grave



South Landscape and Wallowa Lake

Source: NPS and NMI

**Figure 22.** Old Chief Joseph Gravesite landscape and cultural photos.

### ***Natural Setting***

OLJO is the only NEPE site in this project located in Oregon. OLJO is bounded by Oregon Highway 82 to the east and the Wallowa River and dam to the west (Figure 23). Adjacent lands to the south and west are privately owned by individuals and a consortium of irrigation companies (NPS 1997). The land immediately north of the OLJO site is Iwetemlykin State Park managed by Oregon State Parks. Development near OLJO includes residential, a boat ramp, and recreational cabins. OLJO is located at moderately high elevation in Wallowa County, Oregon near the northeastern border with Idaho and Washington.

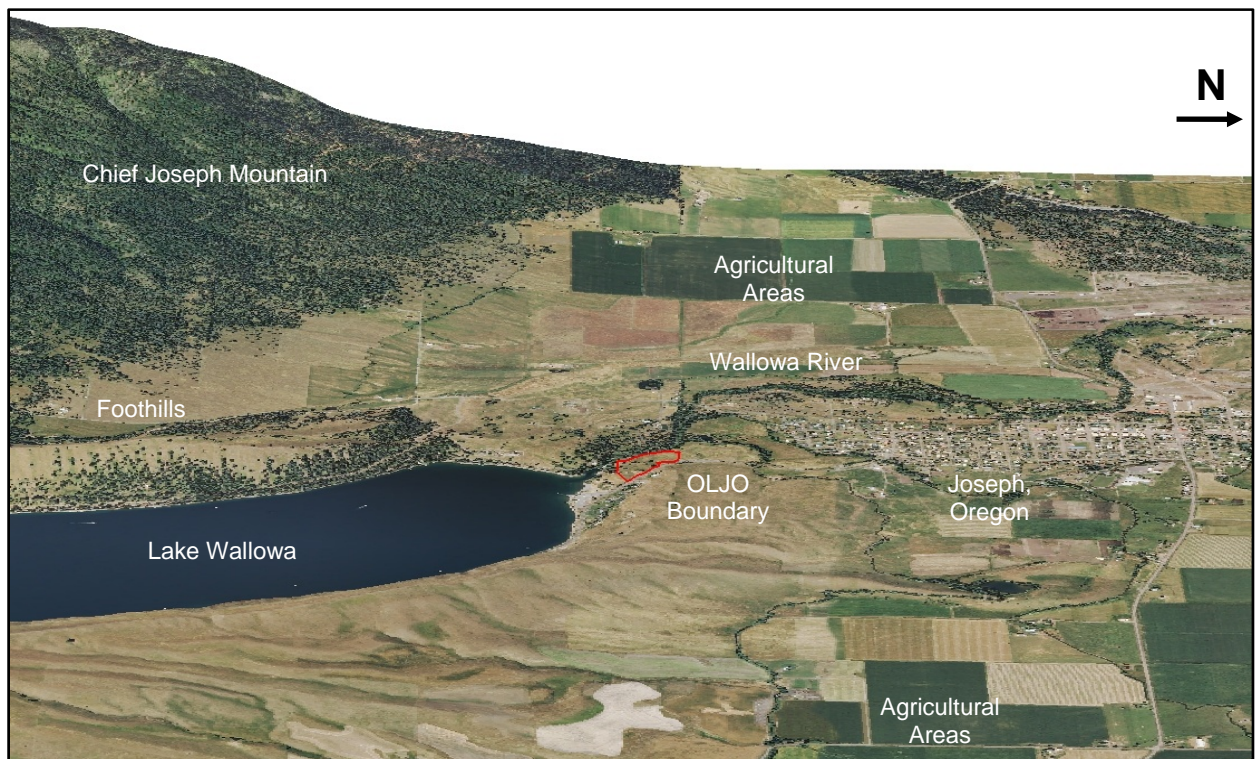
OLJO receives about 18 inches (46 centimeters) of precipitation annually, measured at Joseph, Oregon. Annual temperatures are cool with average summer high temperatures of 18°C (65°F) in July and average winter high temperatures of 3°C (26°F) (WRCCd 2012). OLJO occurs on an upper terrace of the Wallowa River with the gravesite positioned on the crest of a small hill that slopes south and west toward Lake Wallowa and the Wallowa River (Figure 24). The elevation ranges from 4,452 feet (1,357 meters) near the gravesite to 4,360 feet (1,330 meters) on the Wallowa River.





Source: NAIP 2011

**Figure 23.** OLJO overview map.



Source: USGS 30m DEM and NAIP 2011

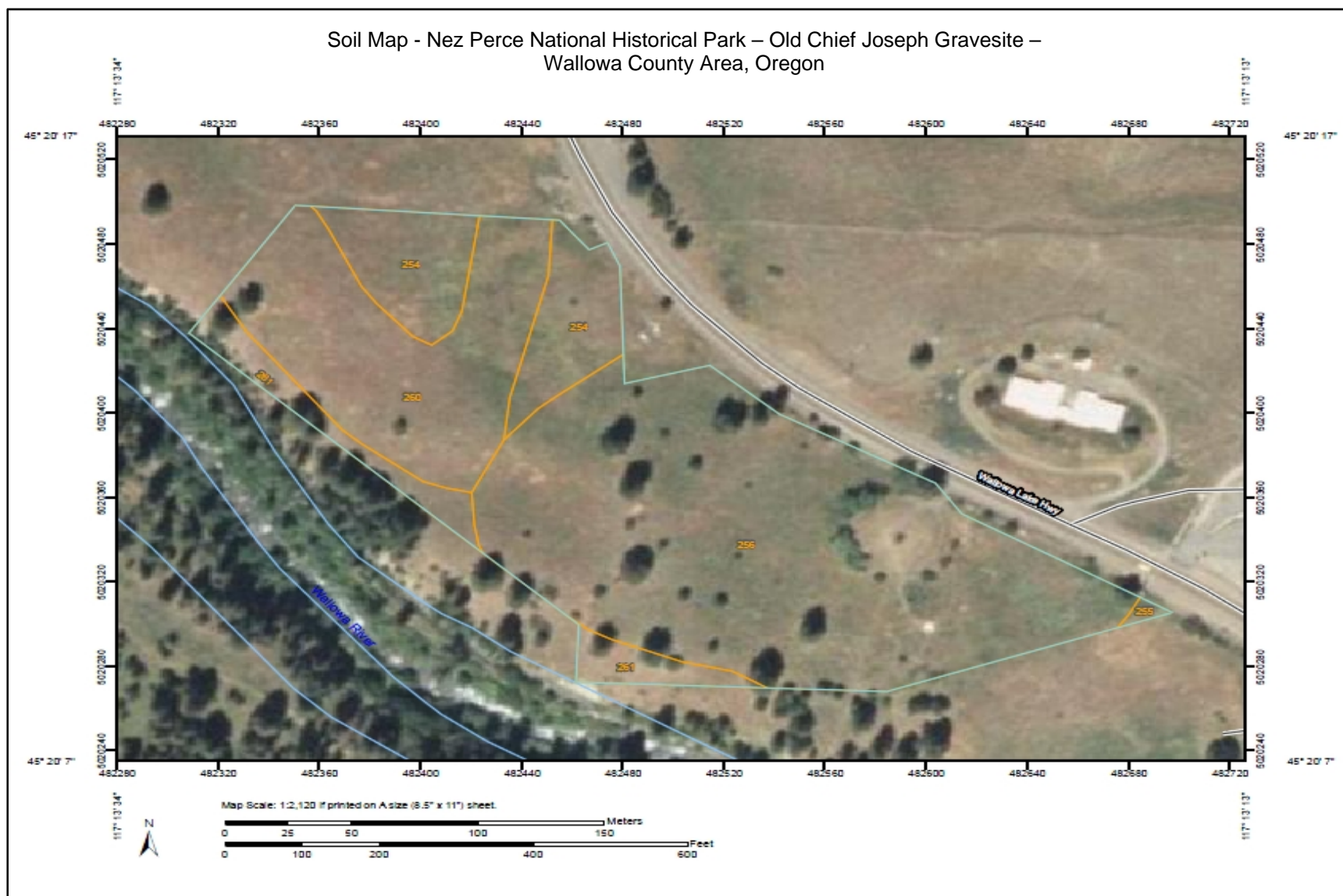
**Figure 24.** OLJO 3D landscape overview map.

Individual glacier-deposited boulders (errata) represent the only exposed geologic features at OLJO. OLJO soils are derived from, and were formed in, mixed glacial till overlaid by loess and volcanic ash (Erixson et. al 2010). Primary soils are upland loams mixed to varying degrees with silt, stones, and boulders. The USDA, NRCS Soil Survey for Wallowa County (Kienzle 2007) mapped five soil units (Table 4) within OLJO (Figure 25).

**Table 4.** Soil unit summary table for OLJO.

<b>Wallowa County Area, Oregon (OR670)</b>			
<b>Map Unit Symbol</b>	<b>Map Unit Name</b>	<b>Acres in AOI</b>	<b>Percent of AOI</b>
254	Rondowa silt loam, 2 to 8 percent slopes	1.3	12.2%
255	Rondowa silt loam, 8 to 15 percent slopes	0.0	0.3%
256	Rondowa stony loam, 2 to 15 percent slopes	6.1	58.9%
260	Rondowa stony loam, 30 to 60 percent south slopes	2.3	22.2%
261	Rondowa bouldery loam, 2 to 15 percent slopes	0.7	6.5%
<b>Totals for Area of Interest</b>		<b>10.3</b>	<b>100.0%</b>



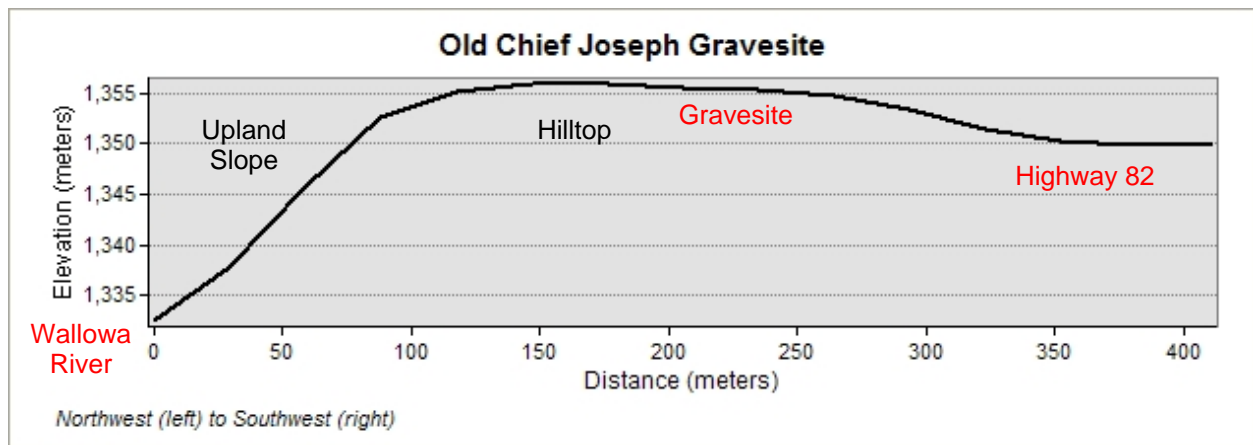


**Figure 25.** OLJO Soil Survey Map.

Source: USDA Web Soil Survey 2012

## Vegetation

OLJO is located at the base of the Wallowa Mountain Range in the conifer/alpine meadows ecoregion of Oregon. The plant communities that have become established on this site are influenced by the Wallowa River, past mowing and maintenance activities, and land development. OLJO supports two life zones representing two upland vegetation types (although floodplain tall shrubland and woodlands occur adjacent to but outside of OLJO) (Figure 26). The life zones include conifer upland woodlands and dry meadows with small inclusions of upland/shrub-steppe stands.



Source: CTI and USGS 10-meter DEM

**Figure 26.** Representative cross-section of the OLJO topography showing life zones.

The plant communities established within OLJO are predominantly open coniferous woodlands on upland slope with stands of dry meadow grasslands on top of the hill. The coniferous woodlands are characterized by ponderosa pine along the western and southern upland slope boundaries of the site (Figure 27). Individual ponderosa pine and Douglas-fir trees are also scattered around the gravesite on the hilltop. Included within these open woodlands are planted or escaped semi-natural deciduous trees and tall shrubs including Siberian elm (*Ulmus pumila*), common lilac (*Syringa vulgaris*), and various fruit trees.

The dry hilltop meadows of OLJO support native grasslands, former agricultural fields, and landscaped areas that were mown and maintained historically. Common grass species include the non-native Kentucky bluegrass around the gravesite and the native Great Basin wildrye (*Leymus cinereus*) and bluebunch wheatgrass in more natural settings (Figure 27). Additional native grass species present in low cover include Idaho fescue (*Festuca idahoensis*) and sheep fescue.

Individual tall and short shrubs and small trees are scattered within OLJO and occur as a partial ring around the gravesite. Included are small juniper (*Juniperus* spp.) trees and Saskatoon serviceberry, Wood's rose, currant (*Ribes* spp.), creeping barberry (*Mahonia repens*), and common snowberry shrubs (Figure 27). East of the OLJO boundary occurs dry slopes that support mixed stands of sagebrush (*Artemisia* spp.), rabbitbrush (*Chrysothamnus* spp.), and other native steppe shrubs and grass species common to this region.

The Wallowa River, downslope and west of OLJO, supports a prominent deciduous riparian forest and tall shrubland flanked by dense stands of ponderosa pine and Douglas-fir coniferous forest. Riparian tree and tall shrub species were not documented but likely are characterized by willow, black cottonwood, and boxelder.

**High – 1,357 meters (4,452 feet)**



Open Non-native Dry Grassland Meadow



Open Native Dry Grassland Meadow



Dry Meadow Grasslands with Shrubs



Ponderosa pine Woodland

**Low – 1,330 meters (4,360 feet)**

**Figure 27.** Common OLJO vegetation types.

Source: NMI

### **Spalding Site (SPAL)**

SPAL is located in western Idaho (north of U.S. Highway 95) approximately 11 miles (18 kilometers) east of Lewiston, Idaho at the confluence of the Clearwater River and Lapwai Creek. The Spalding area has a long history as a fishing and camping site for the Nez Perce people. In 1837 this site was selected by Reverend Henry Spalding to establish a mission that would later become the Nez Perce Indian Agency office. In 1904, the agency office was relocated to Fort Lapwai. The community of Spalding continued to thrive with the development of Watson's General Merchandise Store opened by the Watson's in 1911 and operated until 1965. In 1935, the mission site was preserved and honored by the State of Idaho through creation of Spalding Memorial Park. In 1965, Nez Perce National Historical Park was created by an act of Congress with the Spalding Memorial State Park and additional surrounding lands, became the location of the headquarters and visitor center for NEPE.

Presently, SPAL NPS operations and visitor services are featured in a visitor center, museum, and bookstore (Figure 28). The SPAL visitor center functions as a central NEPE access point, provides space for the park museum, and is a primary location for conducting cultural events and demonstrations. SPAL staff also protects and interprets the historic Watson's Store, an Indian agency cabin, cemeteries (Figure 27), a memorial grove, and the archeological remains of the Spalding Mission (grist mill, sawmill, mill pond, and associated mill-races). Close to but outside the SPAL boundary are other historic sites including the the Spalding Presbyterian Church.

SPAL is divided into two units by the Burlington Northern Railroad right-of-way. Visitors may access the visitor center in the lower unit via U.S. Highway 95. Various social trails and roads including the Old Scenic Highway 12, Spalding Avenue, Main Street, Watson Store Road, and Johnson Road cross the unit and access the historic structures and cemeteries. SPAL is managed in four zones based on visitor use, history, and development. The natural zone includes former agricultural fields, Lapwai Creek, Clearwater River, and the natural hill and riparian areas. The historic zone includes the historic buildings, cemeteries, and earthworks. The development zone includes the visitor center, headquarters, maintenance buildings, parking lots, and transportation right-of-ways. The special use zone consists of the adjacent historic properties and the active cemeteries (NPS 1997).





Landscape and Visitor Center (left)



Cemetery

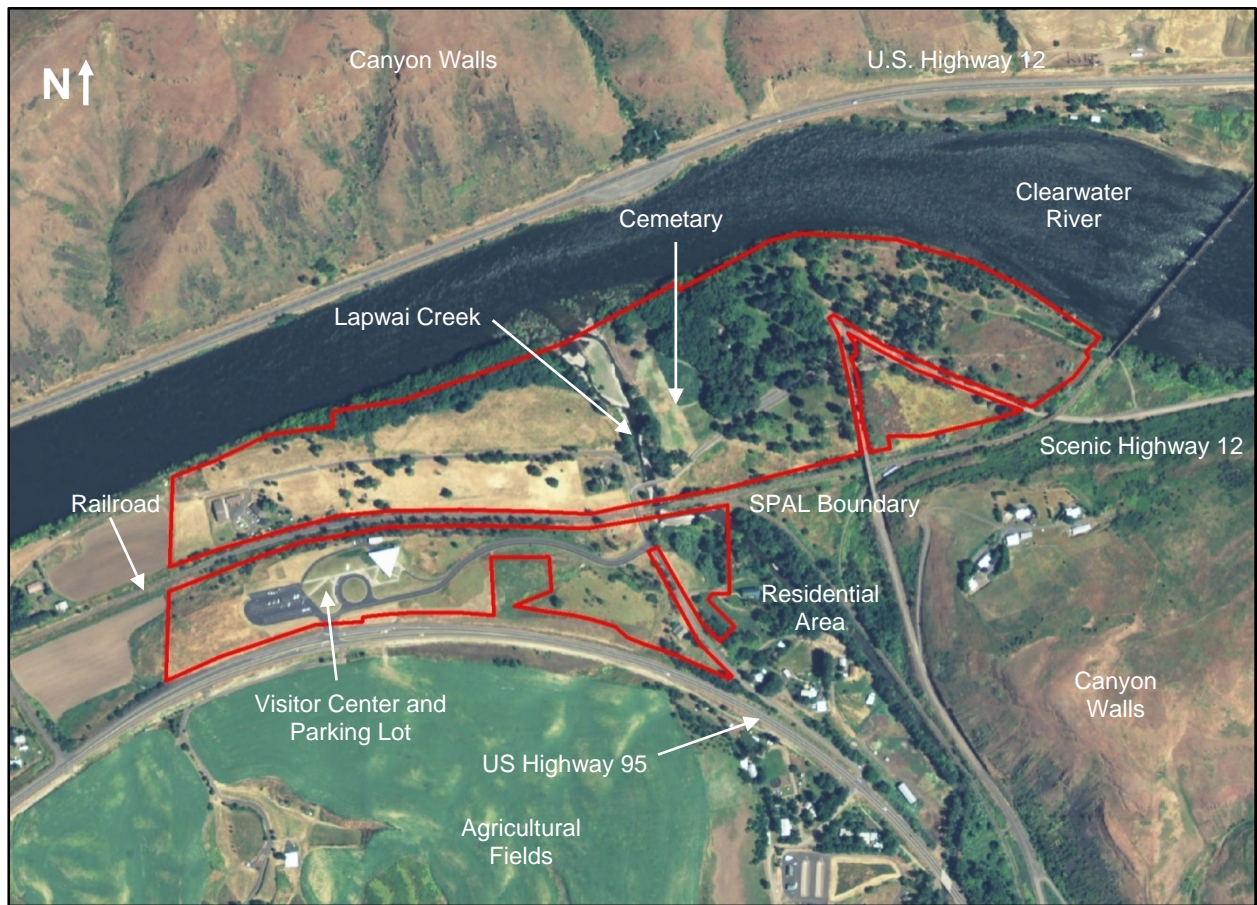
Source: NMI

**Figure 28.** Spalding Site landscape and cultural photos.

### ***Natural Setting***

SPAL is located in western Nez Perce County, Idaho about 11 miles (18 kilometers) from the Washington boundary. The site is bordered by Clearwater River on the north and U.S. Highways 95 and Old Scenic 12 on the south. Lapwai Creek bisects the site from north-to-south and the railroad from east-to-west (Figure 29). SPAL includes approximately 91 acres (37 hectares) of NPS-managed land surrounded by adjacent private, corporate, and Nez Perce tribal land used mainly for agricultural, residential, and transportation purposes.

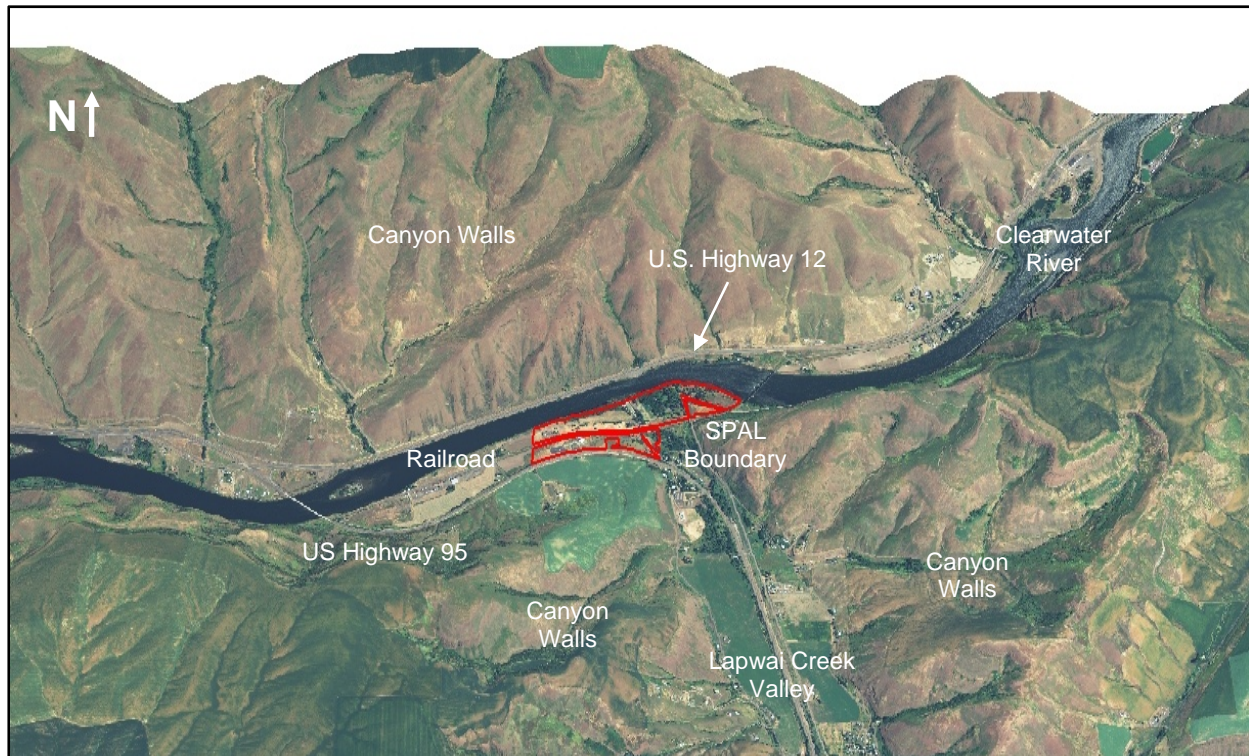
SPAL receives about 13 inches (33 centimeters) of precipitation annually, measured within Lewiston, Idaho. Annual temperatures for the area are moderate with average summer high temperatures of 22°C (72°F) in July and average winter highs of 2°C (36 °F) (WRCCe 2012). The topography of SPAL is influenced due to the location on the Clearwater River floodplain and the Lapwai Creek delta. The land gently slopes north towards the Clearwater River. The relatively flat SPAL landscape contrasts with the steep canyon walls located on the north bank of the Clearwater River and to the east and west of Lapwai Creek (Figure 30). SPAL elevations range from approximately 853 feet (260 meters) above sea level in the southern-most corner (near U.S. Highway 95 and Lapwai Creek) to approximately 778 feet (237 meters) at the confluence of the two streams.



Source: NAIP 2011

**Figure 29.** SPAL overview map.





Source: USGS 30m DEM and NAIP 2011

**Figure 30.** SPAL 3d landscape overview map.

Geologic exposures within SPAL are limited to nearby rocks deposited following rockfall or following flood events. Soils are well developed silt loams on stream terraces and adjacent uplands and occasionally occur as flooded complexes of cobbles, gravels, and loams in the lowland, riparian sites around Lapwai Creek and Clearwater River. The USDA, NRCS Soil Survey for Idaho County (Hahn 2001) mapped four soil units (Table 5) within SPAL (Figure 31).

**Table 5.** Soil unit summary table for SPAL.

Lewis and Nez Perce Counties, Idaho (ID611)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
26	Chard silt loam, 10 to 25 percent slopes	13.9	14.0%
56	Joseph-Tombeall complex, 0 to 2 percent slopes, occasionally flooded	6.1	6.1%
70	Lapwai-Bridgewater complex, 1 to 4 percent slopes	31.6	31.8%
138	Uhlig silt loam, 2 to 8 percent slopes	47.7	48.1%
<b>Totals for Area of Interest</b>		<b>99.2</b>	<b>100.0%</b>

(Note: Acres reported includes non-NPS owned land around the railroad and U.S. Highway 95)



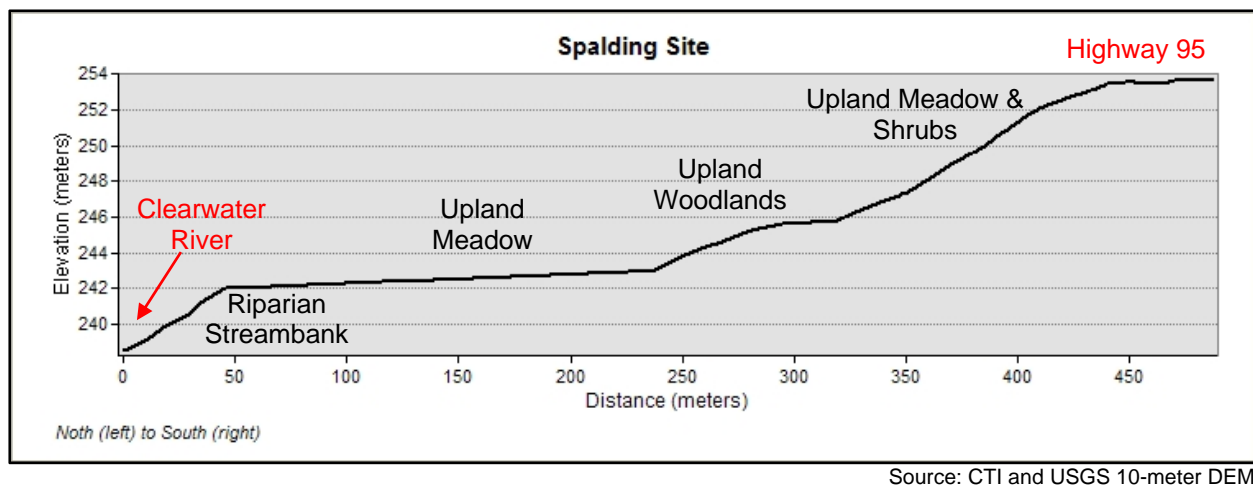
**Figure 31.** SPAL Soil Survey Map.

Source: USDA Web Soil Survey 2012

## Vegetation

SPAL is located in the Palouse Grasslands of the shortgrass prairie ecoregion at the confluence of the Lapwai Creek with the Clearwater River in western Idaho. The nearly level terrain and floodplain position has greatly influenced the site and associated plant communities. Evidence of recent and historic human activity occurs at the level area occupied by the parking lot and visitor center, which was cultivated in the recent past as an agricultural field. Portions of SPAL have also been disturbed due to development of the cemetery, historic town, roads, and railroad resulting in the introduction of non-native grass species maintained as lawns, pastures, and fields. The remaining plant communities include native riparian forest, woodland, and shrubland, upland conifer woodlands, upland semi-natural deciduous woodlands, and semi-natural and restored grasslands.

Plant communities within SPAL can be broadly included into the two landforms, e.g., streambank riparian vegetation and upland dry meadows (Figure 32). The riparian streambank communities have become established along the Clearwater River and Lapwai Creek. Upland communities are characterized by grasslands and patches of shrubs in and around the former agricultural fields east of Lapwai Creek, the cemetery in the central portion of the site, and in the far southeast corner of SPAL. A mixed upland stand of coniferous and deciduous trees have become established on a slightly elevated area between Johnson Road and the Clearwater River. Each landform supports unique plant communities, however some grass, forb, and shrub species are generalists and may occur in all plant communities.



**Figure 32.** Representative cross-section of the SPAL topography showing life zones.



Within streambank riparian habitats, the characteristic tall shrubs include coyote willow, Lewis' mock orange, and fireberry hawthorn (*Crataegus chrysocarpa*), which grow adjacent to riparian forests characterized by black cottonwood, peachleaf willow (*Salix amygdaloides*), and silver maple (*Acer saccharinum*) trees (Figure 33). Patches and stands of riparian herbaceous vegetation have become established on saturated soils and are characterized by dense reed canarygrass (*Phalaris arundinacea*), Bohemian knotweed (*Polygonum cuspidatum*), and quackgrass. Disturbed riparian sites including the periodically flooded sand and gravel bars at the river/creek confluence support sparse herbaceous vegetation, typically the non-native annual cheatgrass and other annual forbs and grasses.

The upland habitats of SPAL have been disturbed historically and support patches and stands of non-native grasslands, native and restored grasslands, open coniferous woodlands, and dense deciduous woodlands (Figure 33). Characteristic non-native grasses established on former agricultural fields and in maintained lawns/cemeteries include Kentucky bluegrass, smooth brome, sheep fescue, bulbous bluegrass, and great brome (*Bromus diandrus*). The non-native annual cheatgrass invades dry sites and the non-native perennial quackgrass becomes established on more mesic areas. The northern unit of SPAL supports former agricultural fields that now support stands of the native western wheatgrass.

The upland grass species (especially the non-natives) mentioned above occurs in low to high cover as understory of the upland shrubland and woodland plant communities. Upland shrubland communities are characterized by hawthorn, common snowberry, and rubber rabbitbrush (*Chrysothamnus nauseosus*) established around the visitor center. Upland woodland communities are confined to the central portion of the northern section of SPAL in and around the cemetery. Deciduous woodland stands occur to the west and are characterized by silver maple, Norway maple (*Acer platanoides*), black locust, an oak species (*Quercus* sp.), and Russian-olive (*Elaeagnus angustifolia*). Coniferous woodland communities characterized by open ponderosa pine stands occur east of Johnson Road.

Plant communities established outside SPAL are also mixed in terms of species composition and are heavily influenced by agricultural practices, transportation, and residential development. Just outside the SPAL boundaries, canyon slopes facing the Clearwater River support mixed grassland communities and sparsely vegetated rock outcrops. There is generally sparse to low tree and shrub cover outside of SPAL except within steep drainage bottoms. Similarly the slopes exposed south, east, and west of SPAL also support mixed grassland communities that are likely used for livestock grazing and hay production. The lower Clearwater River and Lapwai Creek floodplains support linear stands of riparian woodland, shrubland, and herbaceous vegetation, but are primarily developed as agricultural fields, used for transportation corridors, and developed as single-family residential homes.

High –260 meters (853 feet)



Dry Upland Meadow Non-native Grassland



Dry Upland Conifer Woodlands



Dry Upland Deciduous Woodlands



Natural and Restored Dry Upland Grasslands



▼ Streambank Riparian Shrublands  
Low – 237meters (778 feet)



Streambank Riparian Woodlands

Source: NMI

**Figure 33.** Common SPAL vegetation types by elevation.

### **Weippe Prairie (WEPR)**

WEPR occupies 274-acres (111 hectares) of predominantly native prairie habitat (Figure 34) located south of State Highway 11 about eight miles south of Weippe, Idaho. WEPR represents an important cultural resource site where the Nez Perce people gathered to collect camas roots (a traditional food source), socialized, camped, and worshiped for thousands of years. Lewis and Clark first contacted the Nez Perce Tribe on this site in 1805 and the site was used for tribal council during the Nez Perce War of 1877 (NPS 1997).

WEPR is located in north central Idaho and visitors may access the site by traveling east of Weippe and turning south off Highway 11 onto Cemetery Road for two miles then east on Larson Road for about  $\frac{1}{4}$  of a mile (0.4 kilometer). WEPR is trapezoidal in shape, the southern section is bisected by Johnson Road, and the eastern section is bordered by Chapman Road. The northern section of WEPR includes an approximately a one-mile (1.6 kilometer) reach of Jim Ford Creek that flows southeast to northwest through the northern one-third of WEPR (Figure 34). There are no NPS facilities available within WEPR, a roadside sign just west of Weippe provides NPS instructions and introductory information for visitors.



Blooming Camas Prairie



Jim Ford Creek at WEPR

Source: NPS and NMI

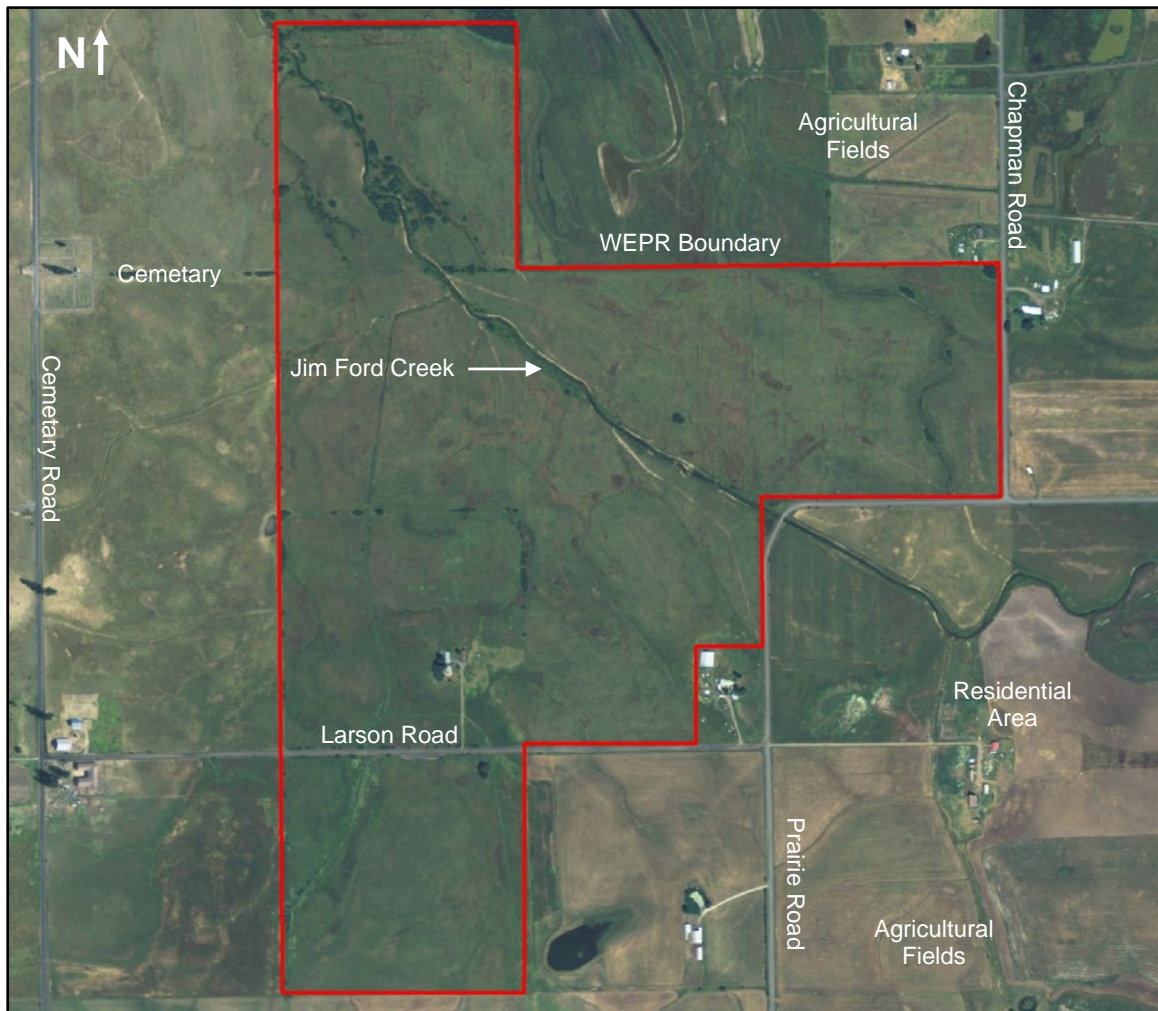
**Figure 34.** Weippe Prairie landscape photos.



### **Natural Setting**

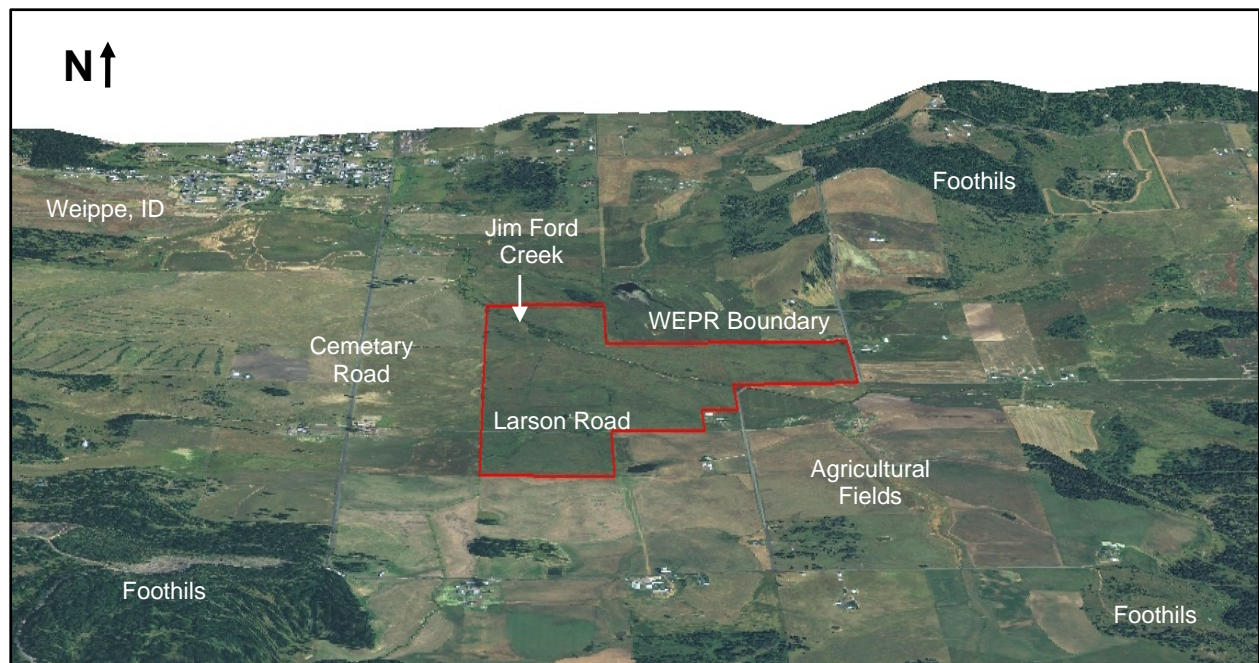
WEPR is located in the southern tip of Clearwater County, Idaho in a moderately high elevation mountain meadow surrounded by foothills, mountain slopes, forests, and valleys including nearby Paunch Mountain, Gold Hill, and Maggie Butte. The flat to rolling topography supports many small ponds and the perennial John Ford Creek flowing east to west to the confluence with the Clearwater River (located about 10 miles west of WEPR). The deep soils and level land are conducive to growing crops and all lands around WEPR are currently used for agricultural crops, transportation, and single-family dwellings (Figure 35).

WEPR receives approximately 41 inches (104 centimeters) of precipitation including 117 inches (297 centimeters) of snow annually, measured in Pierce, Idaho (about 11 miles (18 kilometers) northeast of WEPR). WEPR experiences a cool climate with average summer high temperatures of 17°C (63°F) in August and winter highs averaging -4°C (25°F) (WRCCf 2012). The topography within WEPR is nearly level with only about 20 feet (6 meters) of variation ranging from 3,025 feet (922 meters) in the southwest corner (south of Larson Road) to 3,008 feet (917 meters) in the north where Jim Ford Creek exits the site (Figure 36).



Source: NAIP 2011

**Figure 35.** WEPR overview map.



Source: USGS 30m DEM and NAIP 2011

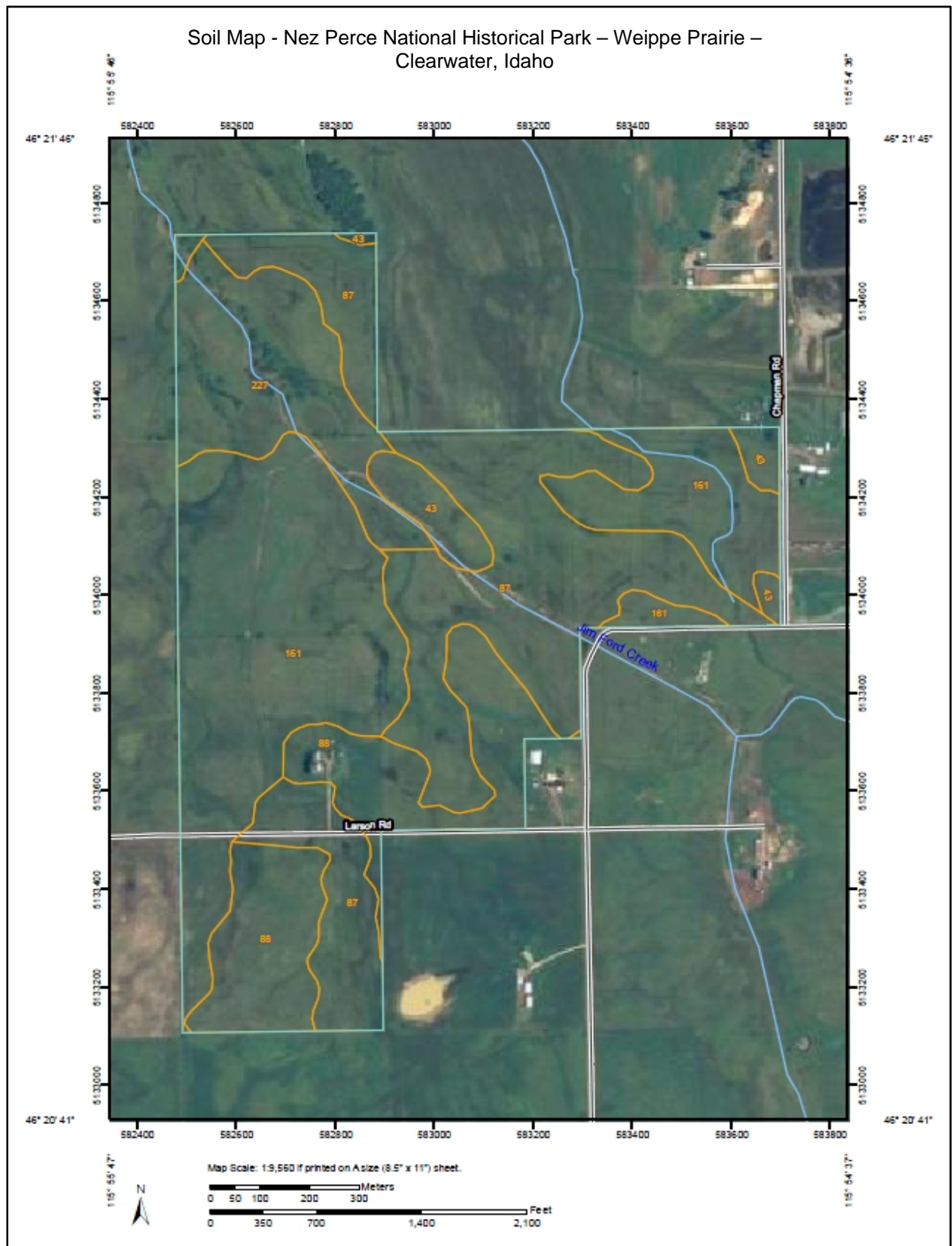
**Figure 36.** WEPR 3d landscape overview map.

Exposed rocks and alluvial soils occur along the incised channel of Jim Ford Creek. Elsewhere soils are well developed, derived from, and formed in ash, loess, alluvium, and lacustrine sediments. The USDA, NRCS Soil Survey for Clearwater County (Hoffman 2011) mapped five soil units (Table 5) within WEPR (Figure 37) consisting of mixed loams, silt loams, and ashy silt loams.

**Table 6.** Soil unit summary table for WEPR.

Clearwater Area, Idaho (ID612)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
43	Burnt creek ashy loam, 0 to 3 percent slopes	10.7	3.8%
87	Gramil-Lewhand complex, 0 to 2 percent slopes	90.5	32.3%
88	Gramil-Reggear complex, 2 to 6 percent slopes	44.2	15.7%
161	Lewhand-Burnt creek complex, 0 to 2 percent slopes	99.4	35.4%
227	Teneb ashy silt loam, 0 to 2 percent slopes	35.7	12.7%
Totals for Area of Interest		280.5	100.0%

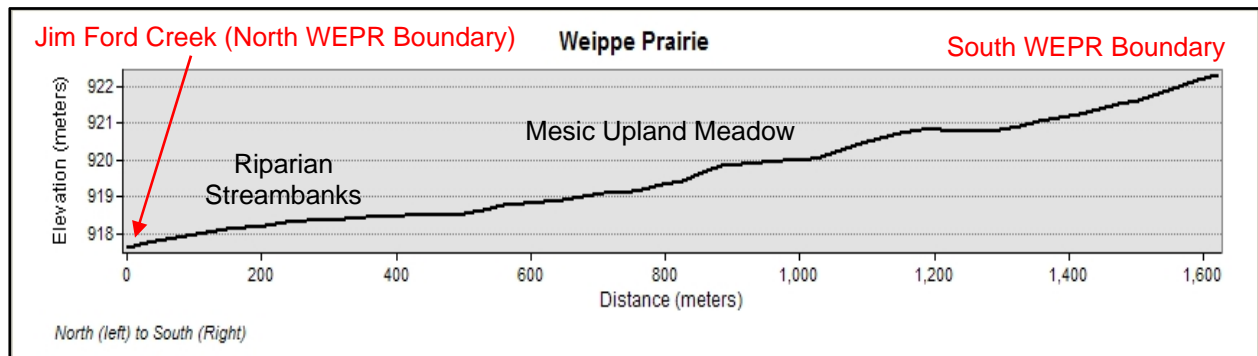




**Figure 37.** WEPR Soil Survey Map.

## Vegetation

WEPR is located in the Palouse Grasslands of the shortgrass prairie ecoregion on a moderately high mountain meadow in north-central, Idaho. The nearly level terrain, high precipitation and soil moisture levels, and past agricultural use have greatly influenced the plant communities. Since the area is gently sloping, one mesic meadow landform occurs that supports two lifezones e.g., mesic upland meadows and riparian shrubland streambanks along Jim Ford Creek (Figure 38).



Source: CTI and USGS 10-meter DEM

**Figure 38.** Representative cross-section of the WEPR topography showing life zones.

The WEPR site was privately owned until 2003 and was used for agricultural crop production and livestock grazing until 2007. Non-native grass species were introduced with early settlement of the area in the late 1800's resulting in monotypic semi-natural grassland stands among various clumps, patches, and linear runs of native small camas and plantainleaf buttercup (*Ranunculus alismifolius*) forbs. The existing plant communities are characterized by large stands of meadow foxtail (*Alopecurus pratensis*), creeping bentgrass (*Agrostis stolonifera*), timothy (*Phleum pratense*), Kentucky bluegrass, quackgrass, and smooth brome (Figure 39).

Riparian tall shrublands have become established in linear stands along the Jim Ford Creek banks and along some of the border fencelines. The characteristic tall shrub is black hawthorn mixed with common snowberry in some locations (Figure 39). Individual willow (*Salix* spp.) tall shrubs (similar in appearance to the black hawthorn) occur along a fenceline in the southwest corner of WEPR. Herbaceous wetland vegetation at WEPR occurs as small patches of cattail (*Typha* spp.) along the perimeter fenceline. Non-native plant species include patches of Canada thistle (*Cirsium arvense*), orange hawkweed (*Heiracium aurantiacum*), oxeye daisy (*Lewucanthemum vulgare*), non-native common tansy (*Tanacetum vulgare*), and sulphur cinquefoil (*Potentilla recta*).

The plant communities established outside and adjacent to WEPR are mostly herbaceous and characterized by a mixture of non-native pasture grasses and agricultural fields. Beyond the agricultural land are foothills, valleys, and mountain slope landforms exhibiting localized logging and past wildfires. The plant communities of these montane habitats are characterized by coniferous trees (ponderosa pine and Douglas-fir) on drier sites, quaking aspen (*Populus tremuloides*) and tall shrubs on mesic slopes, and short and tall shrub stands and patches along streams and in valley bottoms.



**High –922 meters (3,025 feet)**



Mesic Plantainleaf Buttercup Meadow



Mesic Non-native Grassland Meadow



Mesic Small Camas and Grassland Meadow



Black Hawthorn Riparian Shrubland

**Low – 917meters (3,008 feet)**

Source: NMI

**Figure 39.** Common WEPR vegetation types by elevation.

### **White Bird Battlefield (WHBI)**

WHBI is located within White Bird Canyon along U.S. Highway 95 in west-central Idaho about 15 miles (24 kilometers) south of Grangeville in the western half of Idaho County. WHBI is bordered on the west by the highway and on the east by White Bird Creek and the old U.S. Highway 95 (White Bird Grade). The two roads merge immediately north of the Battlefield, are divided through the site, and merge again at the southern tip of WHBI near the town of White Bird, Idaho.

The White Bird Canyon was the site of the first battle of the Nez Perce War of 1877 on the morning of June 17. The U.S. Cavalry accompanied by civilian volunteers and scouts entered the canyon from the north and were met by six mounted Nez Perce leaders to discuss a truce. Fighting broke out during the meeting and the Nez Perce warriors outflanked the soldiers and caused the U.S. Cavalry to retreat with 34 killed and four wounded. With only three Nez Perce wounded and the Cavalry in retreat, the opening battle at White Bird Canyon was considered a major defeat for the U.S. Army. The Nez Perce left the area following the battle and were pursued for five months across Idaho, Wyoming and Montana and their journey is now commemorated by the Nez Perce National Historic Trail.

WHBI is situated on a mountain slope surrounded by rugged hills, mountains, and valleys (Figure 40). The NPS manages 1,245-acres of the 1,900-acre (769 hectare) battlefield, holding scenic easements on the remaining 655 acres (265 hectares), and a few parcels of land within the managed boundary are owned by either the State of Idaho or by private landowners. Visitors to WHBI may use various pull-outs and an interpretive shelter along Highway 95 to view the site (Figure 38). An interpretive trail provides visitor access to the battlefield.



Battlefield Overview (looking South)



Landscape Overview (looking East)

Source: NPS and NMI

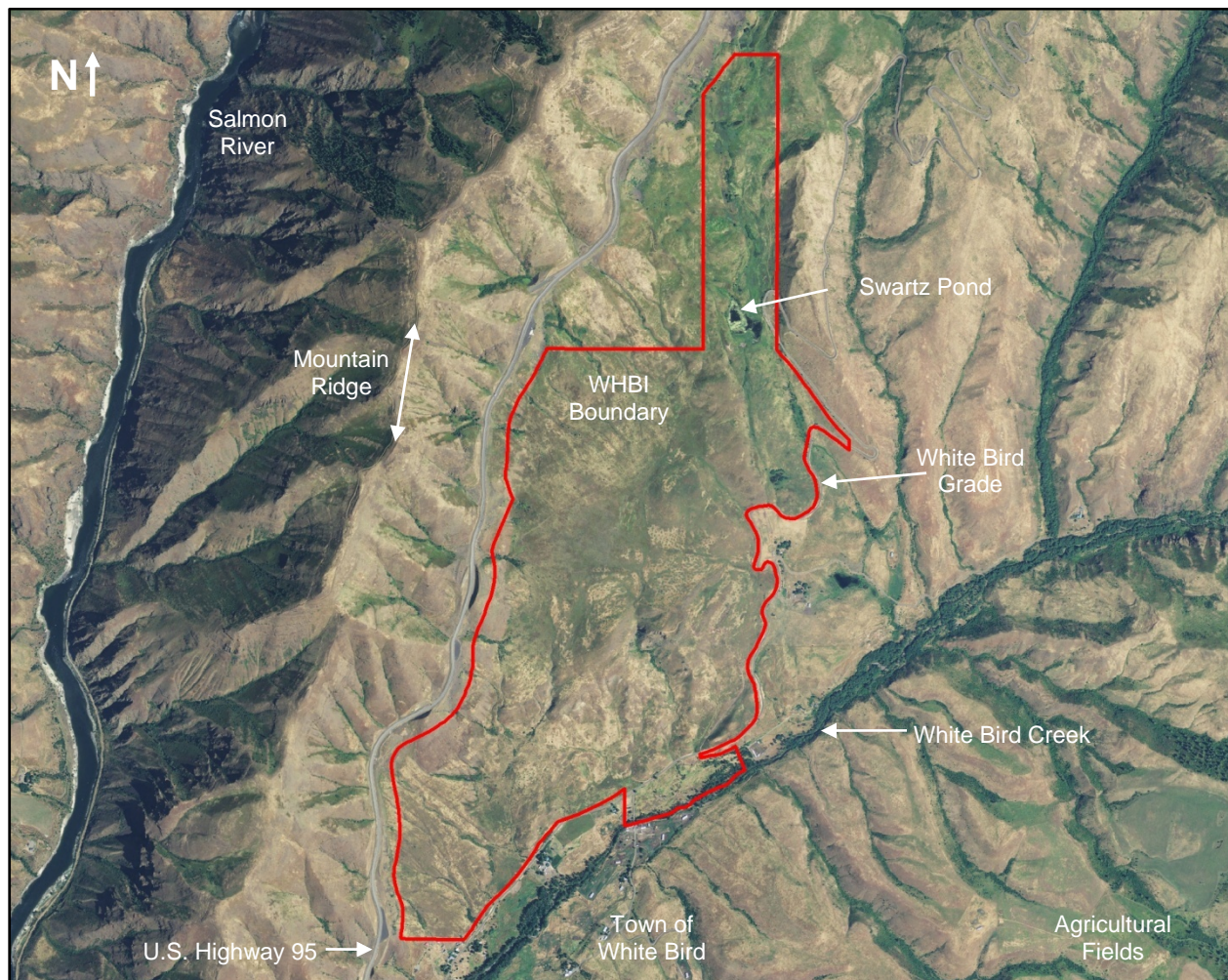
**Figure 40.** White Bird Battlefield landscape photos.



### **Natural Setting**

WHBI is an off-set rectangular-shaped site that follows the south-east facing slope from its northern point below U.S. Highway 95 to the southern tip just north of the town of White Bird. The WHBI site is approximately 3.2 miles (5 kilometers) long and about 1-mile (1.6 kilometers) wide near the middle of the site. The Battlefield follows along a southeast-facing slope located between a mountain ridge to the west and the White Bird Creek drainage to the east (Figure 41). The Salmon River is about 1.5 miles to the west of WHBI (on the other side of the mountain ridge) and the confluence of the Salmon River with White Bird Creek occurs about 1.5 miles south of the site.

Hydrologic features within WHBI include small ephemeral drainages and White Bird Creek. One drainage located in the northern portion contains a natural pond and is one of several natural seeps emerging along a fault oriented through the upper portion of the Battlefield. A man-made dam was created to capture surface run-off and enlarge the size of the pond for livestock watering in the 1880s by a local rancher named Swartz.

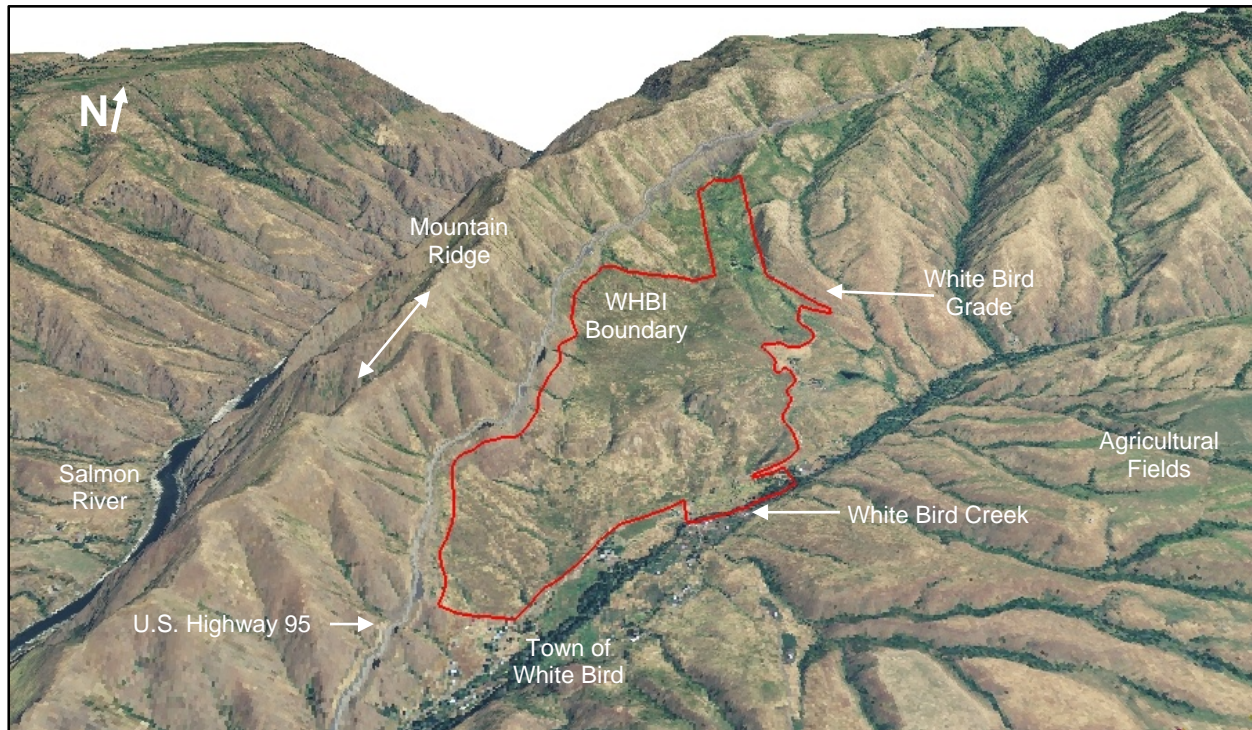


Source: NAIP 2011

**Figure 41.** WHBI overview map.



The topography of WHBI is steep and hilly with small wet drainages, bedrock seeps, and a few ponds. The site generally slopes and curves to the southeast and drains into White Bird Creek. The Battlefield is situated between a mountain ridge to the west and a smaller ridge to the east. The mountain slope of WHBI is steep in the north and west below U.S. Highway 95 and gradually levels to the middle. Large hills and bluffs occur on either side of the northern portion of the site where the boundary occupies a small central drainage. Small hills and bluffs ring the southern portion of WHBI draining to White Bird Creek (Figure 42).



Source: USGS 30m DEM and NAIP 2011

**Figure 42.** WHBI 3d landscape overview map.

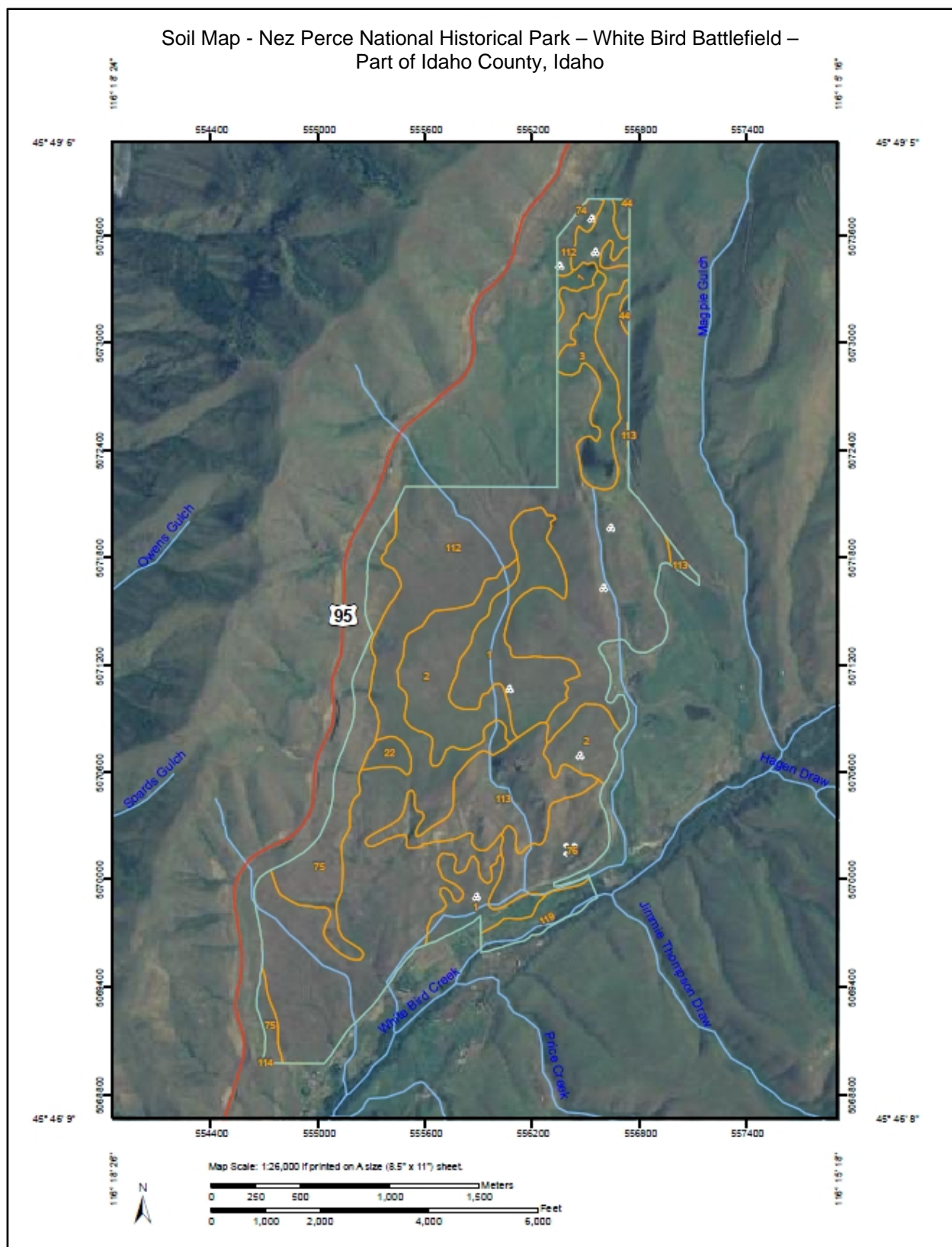
WHBI receives about 17 inches (43 centimeters) of precipitation including 10 inches (25 centimeters) of snow annually as measured at Slate Creek Ranger Station, Idaho. WHBI experiences a moderate climate with average summer high temperatures of 26°C (79°F) in August and average winter high temperatures of 3°C (38 °F) (WRCCg 2012) in January. The topography within WHBI is steep and rugged with about 1,280 feet (390 meters) of variation across the unit. WHBI elevation ranges from 3,050 feet (930 meters) above sea level in the north to 1,770 feet (540 meters) in the south next to White Bird Creek.



Mountain and valley slopes facing WHBI are characterized by steep, rocky surfaces of Grande Ronde Basalt exposures (NPS-GRI 2009). The basalt bedrock has eroded through avalanche, landslide, and mass wasting processes resulting in ridge and talus slope formation. The local soils formed in residuum and alluvium are primarily silt loams with some cobbly and rocky components. Mapped within the USDA, SCS Soil Survey for Idaho County (Barker 1981) are 12 soil units (Table 7) at WHBI (Figure 43).

**Table 7.** Soil unit summary table for WHBI.

Idaho County Area, Idaho, Western Part (ID617)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1	Banner silt loam, 3 to 7 percent slopes	129.7	10.3%
2	Banner silt loam, 7 to 12 percent slopes	110.7	8.8%
3	Banner silt loam, 12 to 25 percent slopes	59.4	4.7%
22	Chard sandy loam, 12 to 25 percent slopes	9.4	0.7%
44	Ferdinand-Bluespru very cobbly loams	2.2	0.2%
74	Lawyer-Bluespru association	0.2	0.0%
75	Lawyer-Tannahill association	94.0	7.5%
76	Lickskillet-Tannahill complex	59.0	4.7%
112	Tannahill loam, 7 to 40 percent slopes	672.2	53.5%
113	Tannahill-Lickskillet complex	96.0	7.6%
114	Tannahill-Rock outcrop complex	0.2	0.0%
119	Typic Xerofluvents, extremely cobbly	23.2	1.8%
Totals for Area of Interest		1,256.2	100.0%

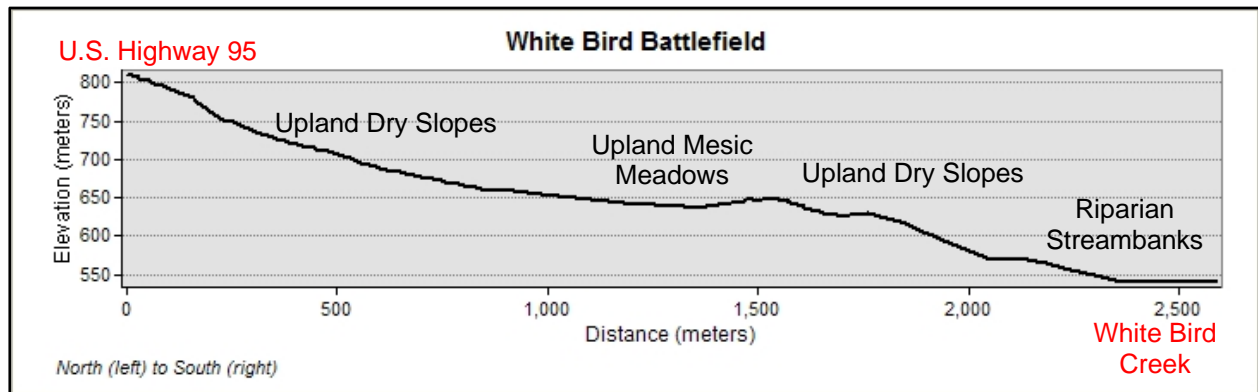


**Figure 43.** WHBI Soil Survey Map.

Source: USDA Web Soil Survey 2012

## Vegetation

WHBI is located in west-central, Idaho in the Palouse Grasslands of the shortgrass prairie ecoregion on a high mountain slope and canyon valley. The steep terrain, wildfires, natural hydrologic features, and past agricultural use have greatly influenced the plant communities growing on these landforms. WHBI is characterized by three landforms and life zones resulting from site topology including: (1) upland dry slopes, (2) upland mesic meadows, and (3) riparian streambanks (Figure 44). Each life zone supports unique plant communities, however a few grass, forb, and shrub species occur within all the life zones.



Source: CTI and USGS 10-meter DEM

**Figure 44.** Representative cross-section of the WHBI topography showing life zones.

Historically WHBI was used for grazing livestock, hay production, and other agricultural purposes, resulting in the introduction of non-native grass and forb species including meadow foxtail, cheatgrass, Japanese brome (*Bromus japonicus*), timothy, ventenata (*Ventenata dubia*), whitetop (*Cardaria draba*), yellow star thistle (*Centaurea solstitialis*), field bindweed (*Convolvulus arvensis*), and medusahead grass (*Taeniatherum caput-medusae*). The resultant mixed prairie plant communities established on the dry upland slopes are characterized by large stands of non-native species and smaller patches of native bluebunch wheatgrass and great basin wildrye (*Leymus cinereus*) (Figure 45).

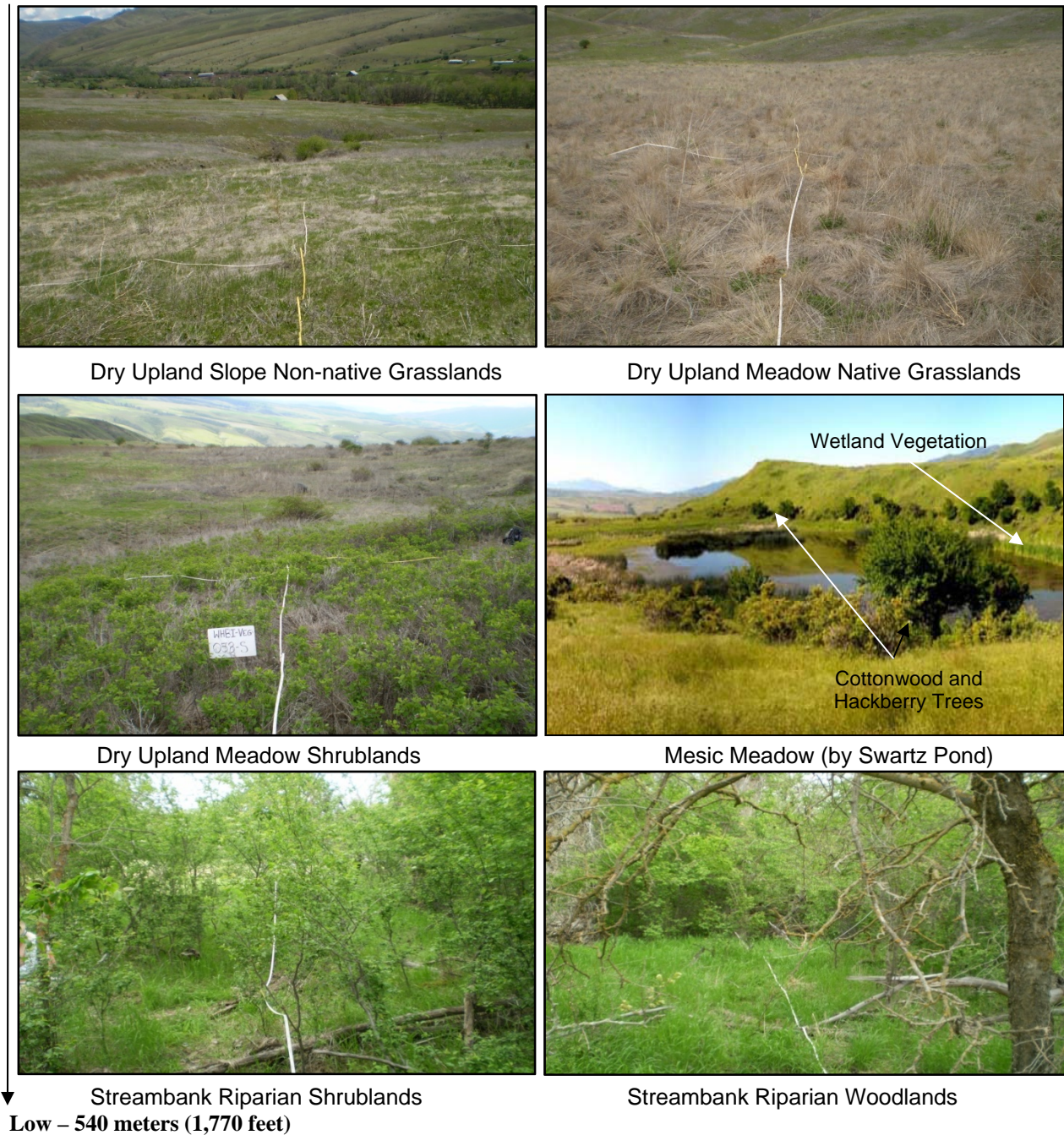
Mesic upland meadow sites occur near drainages and in depressions supporting patches of common snowberry, rose (*Rosa* spp.), and other short shrubs. These mesic upland meadows also support dense cover of the non-native grass and forb species including Kentucky bluegrass, Canada thistle, yellow sweetclover, dalmatian toadflax (*Linaria dalmatica*), and teasel (*Dipsacus fullonum*). Emergent wetlands have become established along perennial drainages and on pond margins and are characterized by patches and stands of cattail and reed canarygrass (Figure 45).

Trees are mostly absent from the WHBI landscape, although perennial drainages, seeps, and springs may support linear stands of black cottonwood, netleaf hackberry, black hawthorn, black locust, European plum, and other non-native fruit trees (Figure 44). Netleaf hackberry, black hawthorn, and small ponderosa pine trees are present in sparse to low cover on the northern site portion. The riparian zone adjacent to White Bird Creek supports large black cottonwoods and scattered coniferous trees. Tall shrubs comprise the riparian woodland understory and also occur as narrow bands adjacent to trees established in drainages. Common riparian tall shrubs include plums (*Prunus* spp.), elderberry (*Sambucus cerulea*), and golden currant (*Ribes aureum*).



The plant communities established adjacent to WHBI includes a mixture of non-native grass and forb species growing on rocky and talus slopes. Herbaceous vegetation stands are bisected by small creeks and ephemeral drainages supporting linear stands of netleaf hackberry and other tall and short shrub species. To the north, east, and west of WHBI the high elevations support ponderosa pine and Douglas-fir stands on drier sites, quaking aspen clones and short shrubs on mesic slopes, and mixed communities of tall deciduous shrubs and short trees within drainages.

**High –930 meters (3,050 feet)**



**Figure 45.** Common WHBI vegetation types by elevation.

Source: NMI



## Nez Perce National Historical Park Vegetation Inventory Project

NEPE is one of nine NPS units served by the UCBN Inventory & Monitoring Program. The UCBN initiated a vegetation mapping inventory for NEPE in 2006 as part of a larger effort to complete vegetation inventory maps for the network. An initial multi-year work plan was developed for the UCBN by Cogan Technology, Inc. (CTI). This work plan provided recommendations for completing the plant community classification, digital database, and map products for each of the nine UCBN parks; it received approval from the Montana Area Service Office (WASO) Inventory Coordinator in May 2006.

In September 2007 the UCBN entered into a contract with NMI to provide all of the vegetation mapping services designated by the work plan and to administer and coordinate the UCBN vegetation mapping projects for nine park units. CTI was retained by NMI as a sub-contractor to assist on the mapping and the creation of final products. NMI started the vegetation classification plot field data collection during the summer of 2010. Following the field data collection NMI contracted with the Idaho State University (ISU) and S.M. Stoller Corporation (Stoller) to provide the preliminary and final vegetation classification. Collectively NMI, CTI, ISU and Stoller were tasked with creating the NEPE classification and mapping products and the following datasets:

\

### Spatial Data

- Aerial and ortho-photography
- Map classification
- Map classification description and key
- Spatial database of vegetation communities
- Digital and hardcopy maps
- Metadata for spatial databases
- Complete accuracy assessment

### Vegetation Information

- Vegetation classification
- Dichotomous field key
- Formal vegetation descriptions
- Ground photos of vegetation classes
- Field data in database format

## **Scope of Work**

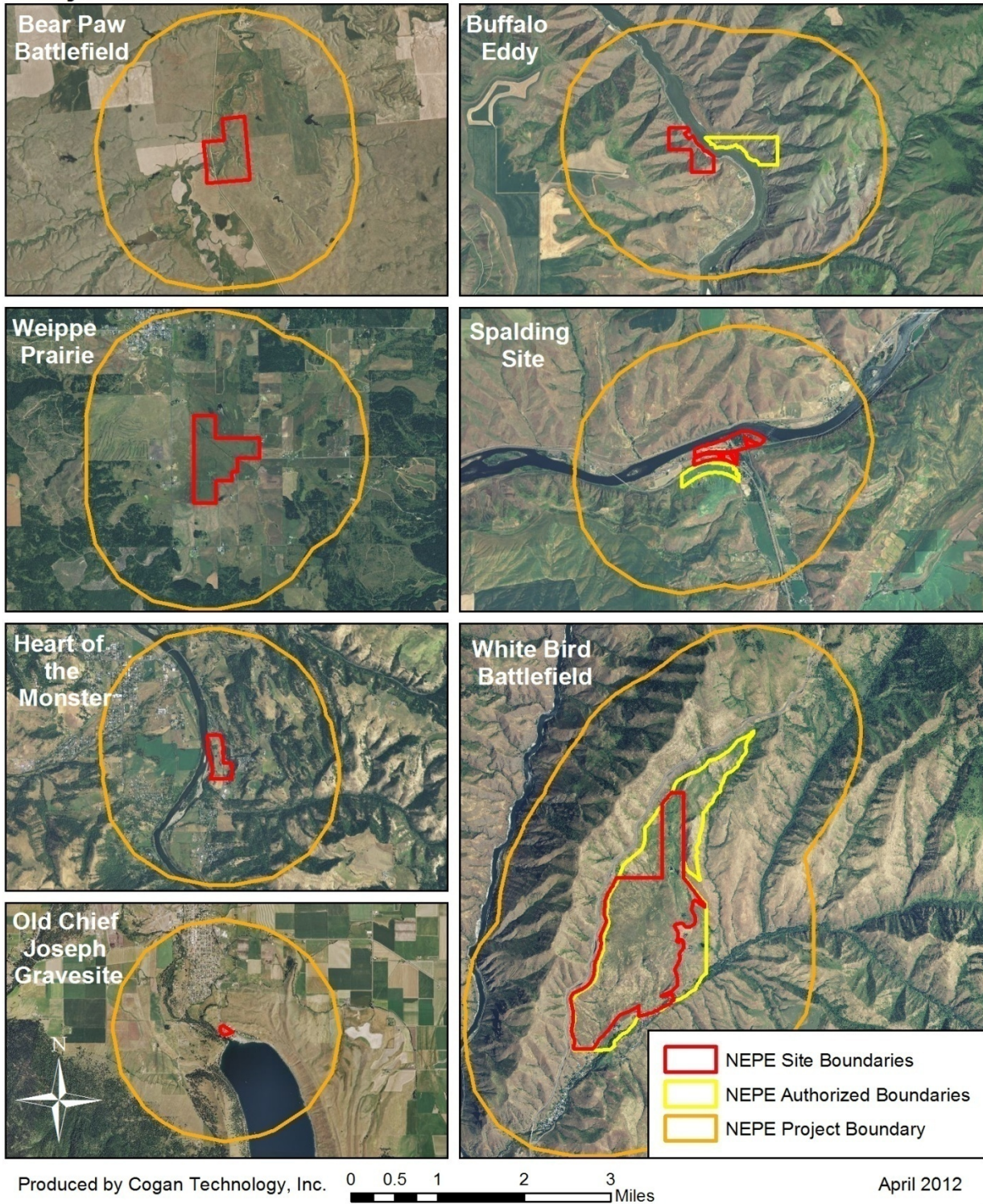
The vegetation inventory for NEPE occurred within an approximately 42,194-acre (17,075-hectare) project area defined by the boundary of the seven individual NEPE units and a general 2-km (1.25-mi) radius around each (Figure 46). The size and project area for each unit included:

- BEPA = 196 acres (79 hectares)/project area = 5,098 acres (2,064 hectares);
- BUED = 90 acres (36 hectares)/project area = 5,347 acres (2,165 hectares);
- HEMO= 61 acres (25 hectares)/project area = 4,248 acres (1,720 hectares);
- OLJO = 10 acres (4 hectares)/project area = 3,359 acres (1,360 hectares);
- SPAL = 93 acres (38 hectares)/project area = 5,347 acres (2,165 hectares);
- WEPR = 280 acres (11 hectares)/project area = 5,807 acres (2,351 hectares); and
- WHBI = 1,255 acres (508 hectares)/project area = 12,479 acres (5,052 hectares).

The final project area was based on management needs, financial constraints, and time limitations. The 2-km (1.25-mi) environs was used to capture lands in the authorized boundaries and to capture various management considerations including exotic/invasive weed dispersal. Also the size of the environs corresponded to the size proposed in the work plan and matches the other vegetation mapping protocols and projects in the UCBN.



## Project Area



**Figure 46.** Map of the NEPE unit and vegetation project boundaries.

## Methods

The vegetation mapping project for NEPE was considered to be in the “large park” category based on the overall size of the project area (TNC and ESRI 1994b). However since each of the units is under 100 km<sup>2</sup> they were treated individually as a “medium park”. As such, the standard methodology for sampling and mapping is to visit the entire NPS site and select representative plant communities for sampling. The representative sites are used to characterize the vegetation types and describe distribution within the park unit without having to survey each stand of vegetation.

Additionally, current National Agriculture Imagery Program (NAIP) ortho-photography was used to create field maps and unique vegetation signatures were highlighted for potential sampling. In this way NEPE in its entirety was systematically visited throughout the summer of 2010. Based on this approach the assignment of responsibilities was divided into five major steps following the flow chart of major steps produced for the national program by the USGS (Appendix A). These responsibilities included:

1. Plan, gather data, and coordinate tasks;
2. Survey NEPE to understand and sample the vegetation;
3. Classify the vegetation using the field data to NVCS standard plant associations and vegetation alliances and crosswalk types to recognizable map units;
4. Acquire current digital imagery and interpret the vegetation (and land use) using the classification scheme and NVCS crosswalk;
5. Assess the accuracy of the final map product; and
6. Create the final project deliverables

All protocols for this project as outlined in the following sections are presented in documents produced by TNC and ESRI (1994a, 1994b, and 1994c) and subsequent updates (Lea and Curtis 2010) for the NVIP and are served at: <http://biology.usgs.gov/npsveg/standards.html>.

### Planning, Data Gathering and Coordination

Based on the work plan and the contract commitments by UCBN, a series of preliminary project conference calls were held in 2009 culminating in the beginning of field work in 2010.

Conference calls were attended by representatives from the principle team members (including NMI, CTI, UCBN, NPS, and NEPE staff). The goals of the scoping process were to: (1) provide an overview of NVIP; (2) learn about NEPE management issues and concerns; (3) discuss availability of existing data; (4) develop a schedule; (5) discuss procedural issues and data; (6) define potential cooperators; and (7) finalize the scope of the project.

As a result of the conference calls a 2-km (1.25-mi) environs was approved as the project boundary for each of the seven NEPE units managed by the NPS and having a vegetation component. A subsequent review of the existing vegetation data and imagery yielded one dataset to review for usefulness in this project, e.g., all NAIP imagery for the area. A reasonable schedule was set with the project completion scheduled for 7/31/12 (Table 8).



**Table 8.** Project timeline for the NEPE Vegetation Inventory Project.

	2009				2010				2011				2012			
Planning and Scoping																
Acquire Imagery																
Field Data Collection																
Image Interpretation																
Vegetation Classification																
Local & Global Descriptions																
Spatial Database																
Plant Association Field Key																
Accuracy Assessment																
Final Report and Products																

Specific work responsibilities were assigned to the following participants:

#### NEPE-UCBN-NPS Responsibilities

- Provide oversight and project funding;
- Provide NEPE plant list;
- Supply digital boundary files and ancillary data files;
- Assist with fieldwork and logistical considerations;
- Work with S.M. Stoller, Inc. and Idaho State University to develop the vegetation classification;
- Compile, review, and update drafts of the vegetation map, classification and report;
- Accept the final products and close the project.

#### NMI Responsibilities

- Provide project management;
- Coordinate the field work with NEPE staff;
- Collect representative classification plot data;
- Collect less detailed observations about the draft vegetation map;
- Write descriptions of the vegetation types occurring in NEPE;
- Collect accuracy assessment data;
- Provide a final report describing all aspects of the project;
- Create a DVD with reports, metadata, guides, vegetation classification, plot data, spatial data, vegetation database (map), graphics, and ground photos.

#### S.M. Stoller Corporation and Idaho State University Responsibilities

- Work with NPS to develop a vegetation classification for the study area based on the NVCS using quantitative analysis and ecological interpretation of the field data;
- Write a field key to the vegetation types occurring in NEPE;
- Provide guidance regarding the crosswalk of vegetation types to map units;
- Review the local vegetation descriptions;
- Review the final database containing the field data.



### CTI Responsibilities

- Help with overall project facilitation and coordination;
- Verify vegetation and land use/land cover signatures on the imagery;
- Develop map units linked to the NVCS;
- Provide field maps and GIS support to the field crews;
- Interpret and delineate the final vegetation and land use types;
- Transfer and automate interpreted data to a digital spatial database;
- Produce spatial layers of plot and accuracy assessment site locations;
- Assist with the accuracy assessment by picking the stratified random target points, creating field maps, and providing GIS support;
- Provide final report sections describing the mapping aspects of the project;
- Provide a visual guide to the photo signatures of each map unit;
- Document FGDC-compliant metadata for all vegetation data (FGDC 1998);
- Assist in creating the project digital video disk (DVD).

### **Field Survey**

Field methods used in this project followed NVIP standards (e.g., TNC and ESRI 1994a, 1994b, 1994c and Lea and Curtis 2010) and UCBN guidance. Important for future projects was the ability to gather consistent data that could contribute to understanding vegetation relationships across broader landscapes within all of the park units in the UCBN. In addition to the basic vegetation data collected at each classification plot, the UCBN and NEPE staff defined summary data fields and made suggestions for including additional information on the forms. Examples of the plot forms and individual data field descriptions appear in Appendix B.

The sampling area included seven NEPE units. NMI field crews were trained and led by ecologists with experience sampling plant communities in national parks and other landscapes. The certified list of NEPE plant species was downloaded from the UCBN website (<http://science.nature.nps.gov/im/units/ucbn/inventory>) and known ecological systems, vegetation alliances, and preliminary plant associations were provided as a starting point for identifying and naming plant associations sampled in the field. The sampling goal was to collect between three and five classification plots in every vegetation alliance/plant association within the NEPE project area. However, some common associations were sampled more often and some rare types were sampled less often. An effort was made to achieve good spatial distribution of classification plots across the landscape and to capture the full range of variation of each plant association.

Once a representative plant community was located, a Relevé macroplot was laid out to capture stand characteristics. In this manner, transitional areas particularly ecotones were avoided. Highly disturbed areas were also avoided unless they supported a distinct or homogenous plant community. Classification plots were generally located in stands exceeding the minimum mapping unit (MMU) of 0.5 hectares. A few classification plots were sampled in smaller patches of distinctive vegetation or communities of rare species. Plot size and shape requirements were consistent with NVIP guidelines (TNC and ESRI 1994a). Classification plot size was determined by the physiognomy of the community being sampled (Table 9) and measuring tapes were used to outline the sampling area. NEPE plot shape was adjusted as needed to sample linear bands of

vegetation in drainage bottoms or other confined sites. Plot size and shape were recorded for all plots and representative photographs were acquired.

**Table 9.** Plot sizes used for vegetation classification sampling at NEPE.

<b>Vegetation Class</b>	<b>Area (m<sup>2</sup>)</b>	<b>Radius (m)</b>
Forest and Woodland	400	22.6
Shrubland	400	22.6
Herbaceous	100	11.3

Following classification plot establishment, environmental data were recorded including: elevation, slope, aspect, landform, topographic position, soil texture and drainage, hydrologic (flooding) regime, and evidence of disturbance or wildlife use. The unvegetated surface was recorded as percent cover of each of the following types: bedrock, litter and duff, wood, bare soil, large rocks (>10 cm), small rocks (0.2-10 cm), sand (0.1-2 mm), lichens, mosses, and fungi.

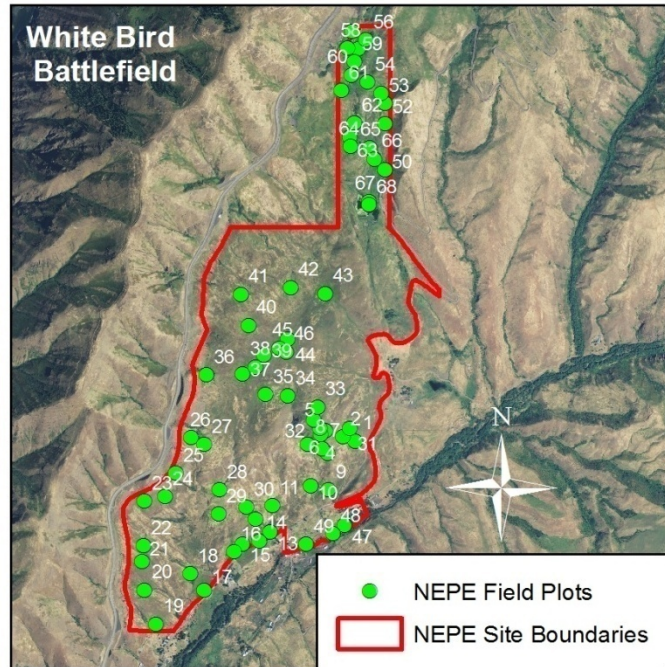
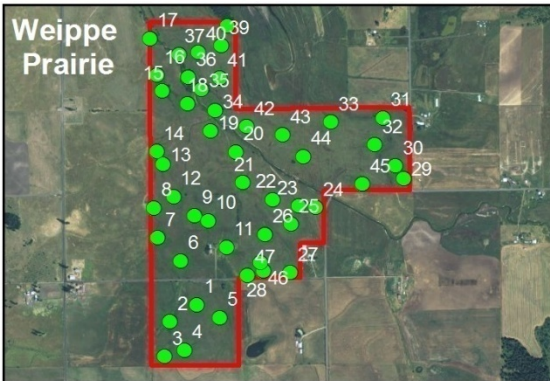
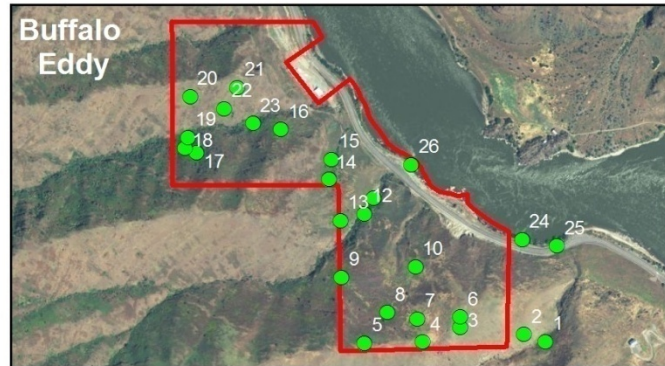
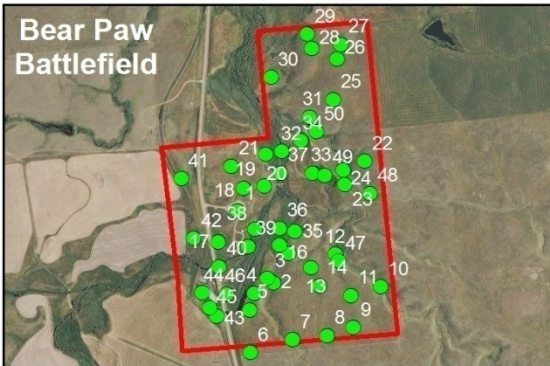
Vegetation at each plot was visually divided into strata, with the height and canopy cover of all plant species estimated for each stratum. Physiognomic class, leaf phenology, and type of dominant stratum were recorded. The species comprising each stratum were listed and percent canopy cover estimated using a twelve-point cover scale (e.g. <1%, 1-5%, >5-15% ...) (Daubenmire 1959). Additional species within the vegetation unit that occurred outside of sampled plots were listed separately. No attempt was made to identify individual non-vascular plant species. Species that were not identifiable in the field were collected for later identification; all plant materials thus collected were destroyed during analysis. Species were recorded by scientific nomenclature familiar to researchers. Finally, a provisional vegetation type name was assigned to the classification plot.

Field crews collected the information for each of the vegetation classification plots in two ways: (1) a species list was developed and recorded on field forms by the team botanist, UTM coordinates, field notes header information (Identifiers/Locators), environmental descriptions and a plot map were also recorded on this form and (2) all other field data were collected with mobile Archer Field PCs.

Following collection of physiognomic and environmental information, field crews used the Garmin GPS 76CSX receiver to record the southeast corner of the plot (no permanent markers were used). UTM NAD83 X-Y coordinates and elevation were recorded both manually on the plot forms and stored as waypoints in the GPS receiver. Four representative photos were acquired facing the four cardinal directions (N, E, S, and W) from the edge of the quadrant facing plot center. Field data collection was conducted from May 3 through July 1 in 2010 and a total of 260 vegetation classification plots were sampled (Figure 47) with the following breakdown by NEPE unit: BEPA = 50, BUED = 26, HEMO = 31, OLJO = 7, SPAL = 31, WEPR = 47, WHBI = 68.



## Field Plots



● NEPE Field Plots  
□ NEPE Site Boundaries

Produced by Cogan Technology, Inc.

(Various Scales)

April 2012

**Figure 47.** Vegetation classification plot locations within the NEPE project area.



## Vegetation Classification

Field data were stored in part in Archer Field PCs with Windows Mobile 5.0 operating systems using DataPlus software. All data from the PCs were transferred and managed in a Microsoft (MS) Access database. Electronic data were transferred directly from the data recorders (NMI created data dictionaries as needed) into Database Files (DBF). DBFs were reviewed by field crews for accuracy each night, then converted and stored in the appropriate database on a laptop computer. All additional field data not recorded electronically (such as field notes) were entered manually into the database for this project. Separate databases were established as necessary. Upon completion of field surveys, all recorded data were entered into a MS Access relational database. The database is a modified PLOTS2 database initially developed specifically for the NPS NVIP so that the electronic data entry fields mirrored the standard field form. Data entry was facilitated by using drop-down menus for each plant species scientific name. Scientific names were updated according to the vascular plant list provided to the crews on the date of sampling presented on the UCBN website and in Appendix E.

Following data entry, quality assurance was performed to minimize errors associated with duplicate entries or erroneously selected plant names. Questions regarding unknown species, especially those with high cover, were resolved, as were other taxonomic issues including grouping subspecies and varieties judged to be ecologically similar. Data were regularly compiled and at the completion of the field work the final database was supplied to S.M. Stoller and ISU statisticians for quantitative analysis. A GIS data layer was also developed to document classification plot field locations.

Quantitative analyses and analytical methods were employed by ISU and S.M. Stoller statisticians to determine the plant associations within NEPE. In summary the classification team evaluated each of the seven NEPE units separately and generated a classification report for each. Classification analyses and methods differed for each unit but in general the classification team identified the most appropriate classification method. The selected method was used to identify the optimal number of vegetation clusters for each unit. The clusters were further refined and matched to existing NVC association or alliances. If no NVC association or alliance clearly matched the cluster then a new vegetation type was proposed.

A summary of the classification methods for each of NEPE units in this project follows:

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**BEPA:** Thirteen plant communities were identified within BEPA; 10 of the 13 plant communities were classified at the plant association level and three at the vegetation alliance level. Eight of the 13 plant associations were represented in the NVC and five plant communities fit within the hierarchy of NVC-recognized vegetation alliances. Two of the three vegetation alliances, the *Artemisia frigida* Dwarf-shrubland Alliance and the *Elymus repens* Herbaceous Alliance each contained one plot and a few classes with low sample sizes were described at the plant association level to differentiate them from similar classes such as *Poa pratensis* - *Bromus arvensis* Semi-natural Herbaceous Vegetation versus the *Poa pratensis* Semi-natural Herbaceous Vegetation type. The plant associations not previously described in the NVC were characterized by non-native grass species, either *Agropyron cristatum* or *Poa pratensis*.



**BUED:** Seven plant communities were identified within BUED and three of the seven plant associations were represented in the NVC. Of the four classes not represented by NVC plant associations, three were described within the range of variation of an appropriate NVC vegetation alliance. Two of the plant associations not previously described in the NVC were characterized by the non-native grass *Bromus tectorum*. One vegetation type characterized by the non-native forb *Anthriscus caucalis* was not represented in the NVC by a plant association or a vegetation alliance. Although non-native species were generally dominant in the four classes which were not previously described, several native species were locally abundant, but were not constant enough to be included in the class name. In many cases, these were native species which may have dominated sites at one time, but which have been replaced by non-native species. For example, some of the vegetation types dominated by *Bromus tectorum* and *Anthriscus caucalis* contained variable cover values by the native bunchgrass *Festuca idahoensis*. Although cover by *Festuca idahoensis* was substantial in some classification plots, the cover/species did not have high enough constancy values for inclusion in plant association names.

**HEMO:** Eleven plant communities were identified within HEMO, nine of them were classified to the plant association level, and two were classified to the vegetation alliance level. Both vegetation alliances were represented in the NVC and one plant association had been previously described in the NVC. Most of the plant communities which had not been described at the plant association level in the NVC were characterized by high cover of a non-native species in the herbaceous layer. All but one plant association, *Centaurea stoebe* Semi-natural Herbaceous Vegetation was assigned to previously described vegetation alliances.

**OLJO:** Five plant communities were identified within OLJO, three were classified to the plant association level, and two were assigned to the vegetation alliance level. One plant association and both vegetation alliances had been previously described in the NVC. The remaining two plant associations had not been described in the NVC at the time the classification was completed, although one association could be assigned to a previously described vegetation alliance. The remaining plant association was the result of an ornamental planting.

**SPAL:** Eleven plant communities were identified, seven were classified at the plant association level, and four were classified at the vegetation alliance level. Eight of the 11 plant communities were represented in the NVC at the time the community list was compiled. Two plant communities were not listed in the NVC at the plant association level, but were described within the range of variation of an appropriate NVC vegetation alliance. Two communities were not represented in the NVC by an appropriate plant association or vegetation alliance. The *Pinus ponderosa* Woodland Alliance was included since there was too little data to adequately characterize the understory and assign it to an appropriate plant association. The *Bromus tectorum* Semi-natural Herbaceous Alliance, *Elymus repens* Herbaceous Alliance, and *Poa pratensis* Semi-natural Herbaceous Alliance were not assigned a plant association-level class because the NVC has not described plant associations within this vegetation alliance. Many of SPAL communities not described in the NVC were characterized by high cover of non-native grasses, including *Bromus tectorum*, *Elymus repens*, *Festuca ovina*, *Poa pratensis*, and/or *Poa bulbosa* in the herbaceous layer. Conversely, communities characterized by *Acer saccharinum* had been described in the NVC, but were not crosswalked since the silver maple within SPAL are a result of past settlement and landscape planting and does not represent the silver maple natural range. Also of note, the *Crataegus douglasii* - (*Crataegus chrysocarpa*) Shrubland is described in the

NVC (2011) as potentially being characterized by either tall shrub species, however within SPAL the three classification plots representing this community were characterized only by *Crataegus chrysocarpa*.

**WEPR:** Nine plant communities were identified, eight plant communities were classified at the plant association level, and one was classified at the vegetation alliance level. Three of the nine plant communities resulting from this classification were represented in the NVC at the time the class list was compiled. Seven communities were not listed in the NVC at the plant association level, but were described within the range of variation of an appropriate NVC vegetation alliance and two communities were not recognized by the NVC at either the plant association or vegetation alliance level. Many of the communities not previously described in the NVC were characterized by non-native grasses in the herbaceous layer. The *Bromus inermis* Semi-natural Herbaceous Alliance was not assigned a plant association-level class because the NVC had not previously described plant associations within this vegetation alliance and the sample size at WEPR was inadequate to justify including it as a plant association.

**WHBI:** Twelve plant communities were identified, nine of the twelve plant communities were described at the plant association level, and three were described at the vegetation alliance level. Five of the plant communities resulting from this classification were represented in the NVC at the time the class list was compiled; two were plant associations and three were vegetation alliances. Many of the plant associations and/or vegetation alliances identified within WHBI but were not previously described in the NVC, were characterized by introduced/non-native plant species in the herbaceous layer.

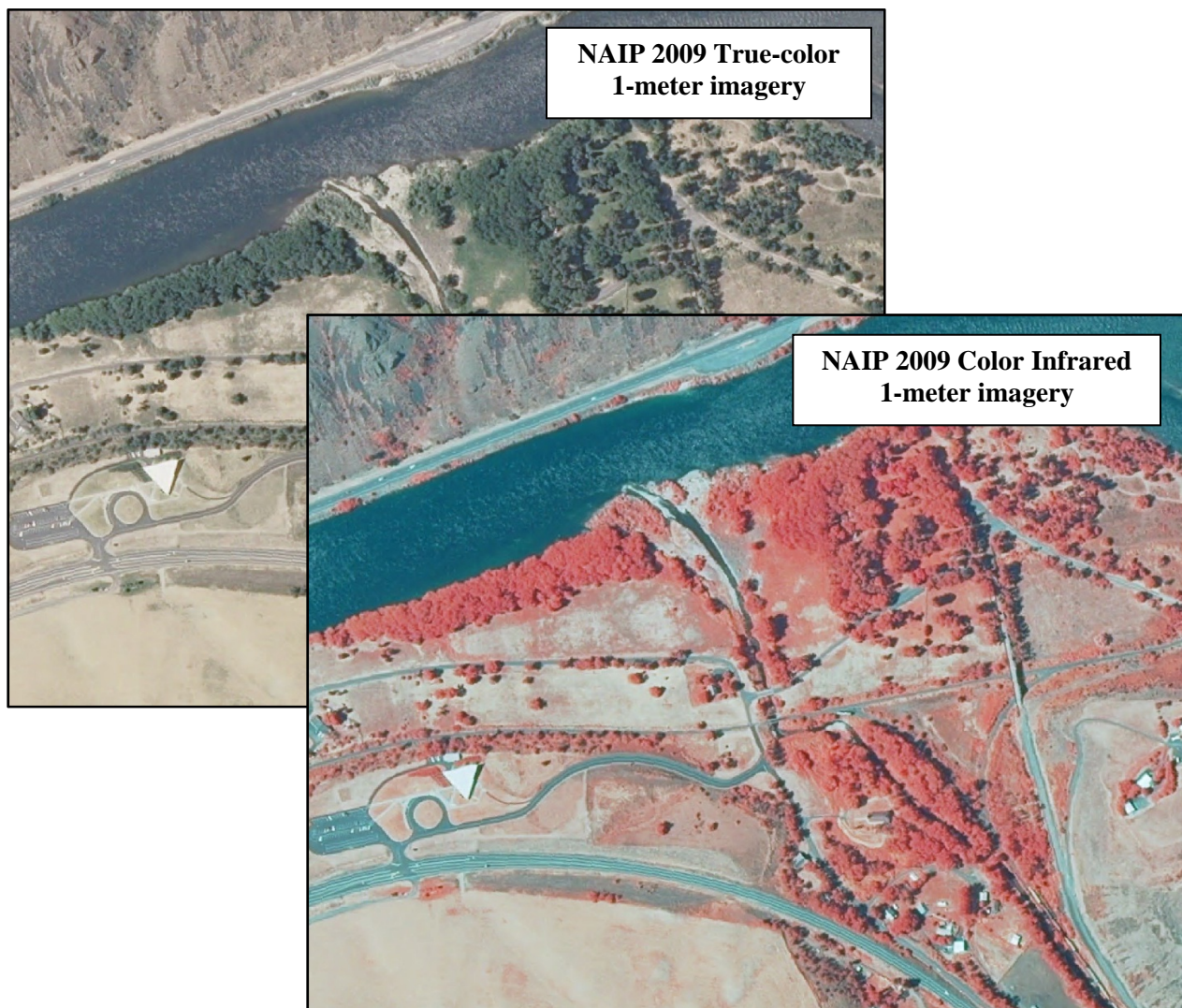
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All plant species nomenclature used in this study is that of the Integrated Taxonomic Information System (ITIS) as reflected by the PLANTS Database (USDA-NRCS 2007). ITIS nomenclature is represented in the NVCS and the NEPE plant associations described herein. Naming the plant associations used indicator (dominant or diagnostic) species for each of the vegetative strata present. The indicator species of the upper strata were listed first, followed by successively lower strata (e.g., canopy, subcanopy, tall shrub, short shrub, herbaceous vegetation, etc.). Plant species that may only be occasionally present in the same stratum are separated by parentheses ( ). Species that always occurred in the same stratum (or were the same lifeform) are separated by a hyphen (-). Indicator species that occurred in different strata (or are a different lifeform) were separated by a slash (/). Vegetation alliance names were concluded with the word “Alliance” to differentiate them from plant association names. Plant association names incorporated the physiognomic class in which the plant association was classified (e.g., Forest, Woodland, or Herbaceous (FGDC 1997, 2008 and Forman et al. 2011)).

The final products of the classification task included a field key and local plant association descriptions. The dichotomous field key to the NEPE plant associations was developed to assist users in identifying plant associations in the field, particularly during the accuracy assessment task (Appendix C). The local descriptions were based on the field data and provide NEPE characteristics for each plant association within the NatureServe template (Appendix D).

## Digital Imagery and Mapping

Existing sources of imagery were evaluated for vegetation mapping and geodatabase development for NEPE. Among the current sources of imagery were NAIP ortho-photography products from 2009 and 2011. Since the mapping portion of this project was initiated in 2010, the 2009 1-meter resolution NAIP ortho-photo was deemed adequate for undertaking vegetation mapping. The 2009 NAIP images for Blaine County, MT, Asotin County, WA, Clearwater County, ID, Idaho County, ID, Lewis County, ID, Nez Perce County, ID, and Wallowa County, OR were accessed and downloaded from the U.S. Department of Agriculture Geospatial Gateway website (<http://datagateway.nrcs.usda.gov/>). The 2009 NAIP product has 1-meter pixel resolution and has 4-bands allowing for display of the image as both true-color and color infrared formats (Figure 48). The entire 2009 NAIP county image was clipped to the project boundary and the clipped image was used to conduct the preliminary delineation and vegetation interpretation in anticipation of the accuracy assessment (AA) task during the summer of 2011.



Source: NAIP 2009

**Figure 48.** Example of the 2009 base-map imagery for NEPE.



Subsequent to the completion of the AA, the 2011 NAIP image was made available and this 1-meter, true-color product was downloaded and processed for NEPE (Figure 49). Since the 2011 image highlighted recent changes in the vegetation at NEPE, the 2011 NAIP basemap was used to update the vegetation mapping. All previous interpreted linework was modified accordingly and the final map product for NEPE is based primarily on the 2011 NAIP ortho-imagery.



Source: NAIP 2011

**Figure 49.** Example of the 2011 true-color base-map imagery for NEPE.

Using the 2009 and 2011 NAIP images, the mapping and photo-signature interpretation for NEPE involved a four-step process consisting of: (1) field reconnaissance; (2) map class development; (3) image processing and interpretation; and (4) spatial database development. Field reconnaissance was conducted by NMI staff during the classification plot data collection task. Paper field maps of the NAIP imagery were printed and vegetation notes were written by field team staff. The goal of the field reconnaissance was to provide site-specific data to familiarize the mapping team with NEPE vegetation patterns, plant community distribution, photo-signatures, and land-use types. As the vegetation mapping progressed in 2010 and 2011 additional feedback on the dominant and characteristic plant species/communities was solicited from the field crews as needed.

All classification plot information sampled in 2010 was documented, summarized, and geo-processed into a GIS shapefile that could be overlain on the NAIP ortho-imagery. CTI created preliminary map classes (also known as map units) based largely on whether the vegetation surrounding the plot locations could be readily identified and delineated on the NAIP imagery (i.e., photo signature development). Once the photo signatures were inventoried they were matched or cross-walked to the preliminary list of plant associations prepared in the project work



plan. Supplemental land-use and land-cover classes (Anderson 1976, amended 2002) were added to classify non-vegetated areas such as developments, roads, streams, ponds, bare ground, and active agricultural areas. All obvious land-use features were manually digitized and incorporated with the project boundary into a draft GIS layer. Initial interpretation and mapping focused only on delineating obvious landforms (e.g., geologic exposures and land use) and physiognomic features (e.g., grasslands versus shrublands versus woodlands).

In 2011, CTI compared the initial map classes (= map units) to both the 2011 NAIP imagery and a draft of the final NEPE vegetation classification. New map classes were added as necessary with emphasis placed on the ability to accurately delineate homogenous polygons from the base ortho-imagery signatures. In general, the level of detail possible in a vegetation map is limited by the imagery, the skill and experience of the interpreter and mapper, and the availability of supporting information. The relationships between the map classes and plant associations are often complex. In most cases, the NEPE map classes were derived on a 1 plant association or 1 vegetation alliance to 1 map class basis. However due to the limitations of the imagery and the lack of ground data on the surrounding private lands some of the photo signatures could not be accurately matched to existing associations.

Mapping ambiguity was addressed by scaling up the NVC to the vegetation alliance level, combining similar plant associations/vegetation alliances into complexes, or creating new general map classes. Vegetation alliances were used when the dominant plant species was the same for multiple plant associations and no reliable photo signature for each could be seen on the imagery, e.g., the Kentucky bluegrass associations. Complexes were created when plant associations/vegetation alliances could not be discerned from each other. Finally, general mapping complexes such as the Mixed Conifer Woodland Complex were created when the physiognomic structure of the vegetation could be discerned on the imagery but not the dominant species. General mapping complexes were primarily used in non-sampled lands in the environs and for small stands of vegetation within NEPE that did not fit the classification, like oak trees within SPAL.

CTI continued NEPE vegetation mapping in 2011 by importing the preliminary NEPE vegetation layer into eCognition software for segmentation comparisons. Automated imagery segments (polygons) were based in part on pixel reflectance and their relationship to neighboring pixels. By incrementally increasing segmentation size within the program, small image objects (i.e., preliminary polygons) were continuously merged into larger polygons. Completion of the segmentation was based on visual judgment of the analyst when obvious, distinct features were lost, the previous segmentation was adopted as the final treatment.

Following segmentation, only those lines/polygons that matched the vegetation patterns within the NEPE project area were exported as ArcInfo shapefiles and converted into ArcInfo coverage format. The resulting coverages were refined through a series of smoothing routines until no obvious artificial or relict breaks in the lines were visible. Following smoothing, the line-work was manually cleaned to remove extraneous lines, very small polygons (<0.25 acre), and polygons that obviously split a homogenous stand of vegetation. The cleaned lines were overlain on the 2011 NAIP imagery and visually inspected for completeness.

At this GIS task stage the mapping approach was switched from an automated process back to a manual interpretation effort. Using the classification plot data, field notes, and ancillary data final vegetation polygons were edited, split, and merged through on-screen digitizing to create consistent, homogenous polygons that matched the mapping units. Mapping progressed by first delineating known areas within NEPE and the Land Trust area and then into unsampled areas in the environs.

When the interpretation effort was considered complete, topology for the final polygon layer was built and attributed and then imported into a spatial database (geodatabase). Each polygon was attributed with a dedicated map unit name, code, and modifier. Polygon-specific modifiers included additional data on the height, density, and patterns of the dominant vegetation. Also, polygons of disturbed sites were identified in a comments field along with any notable dominant understory or locally common plant species. Finally, other map class data including the NVCS crosswalk and the land-use classes were added (Table 10).

### **Accuracy Assessment**

Following the vegetation map completion the accuracy assessment (AA) was conducted. AA is a statistical test of how well the vegetation map represents the vegetation on the ground. The AA compares field observations with the map class assignment. Errors occur when mapped polygon labels differ from field observations. Results of the AA allow users to evaluate the utility of the vegetation mapping data for particular applications. AA results are expressed in two forms: “producers accuracy” (the probability that an AA point was mapped correctly, also referred to as “errors of omission”), and “users accuracy” (the probability that the map represents what was found on the ground, also referred to as “errors of commission”). High producers accuracy combined with low users accuracy indicates that the map class is under-mapped or that it was confused with other map units and not sufficiently delineated. Conversely, low producers accuracy combined with high users accuracy indicates that a type is over-mapped or that more of this type was mapped than actually occurs on the ground.

**Table 10.** Polygon attribute items and descriptions.

<b><u>ATTRIBUTE</u></b>	<b><u>DESCRIPTION</u></b>
<b>AREA*</b>	Surface area of the polygon in meters squared
<b>PERIMETER*</b>	Perimeter of the polygon in meters
<b>NEPE_VEG#*</b>	Unique code for each polygon
<b>NEPE_VEG-ID*</b>	Unique identification code for each polygon
<b>VEG_CODE</b>	Final Map Unit Codes – Project specific
<b>MAP_DESC</b>	Map Unit Common Description Name – Project specific
<b>DENS_MOD</b>	Modifier - Percent cover of the upper stratum layer in the polygon Percent cover classes: Very Sparse <10%, Sparse <b>10 - 25%</b> , Open <b>25 - 60%</b> , Discontinuous - Closed > <b>60%</b>
<b>PTRN_MOD</b>	Modifier - Vegetation pattern within the polygon Vegetation pattern classes: Evenly Dispersed = <b>Homogeneous</b> Grouped Stands of Vegetation = <b>Bunched / Clumped</b> , String of Vegetation = <b>Linear</b>
<b>HT_MOD</b>	Modifier - Height range of the dominant vegetation layer Height classes: < <b>1, 1-5, 5-15, 15-30 &amp; &gt;30 meters</b>
<b>CES_CODE</b>	Ecological Systems Code – NVCS derived (NatureServe)
<b>CES_NAME</b>	Ecological Systems Name – NVCS derived (NatureServe)
<b>NVCS_ELCODE</b>	Corresponding Association Code – NVCS derived (NatureServe) Association = Community Element Global Code – Elcode link to the NVCS
<b>ASSN_NAME</b>	Project Community Name - NVCS Association(s)
<b>ASSN_CNAME</b>	Project Common Community Name - synonym name of Association(s)
<b>NVCS_CODE</b>	NVCS Code - to NVCS Formation level
<b>ALL_CODE</b>	Alliance Name Code – NVCS derived (NatureServe) Alliance = Alliance Global Code – Alliance Link to the NVCS
<b>ALL_NAME</b>	Project Alliance Name = NVCS Alliance(s)
<b>ALL_CNAME</b>	Project Common Alliance Name = NVCS Alliance(s)
<b>FORMATION</b>	NVCS Formation = Formation name NVCS Code – Formation name
<b>SUBGROUP</b>	NVCS Formation Subgroup = NVCS Code – Subgroup name
<b>GROUP</b>	NVCS Formation Group = NVCS Code – Group name
<b>SUBCLASS</b>	NVCS Formation Subclass = NVCS Code – Subclass name
<b>CLASS</b>	Formation Class = NVCS Code – Class name
<b>LUC_II_GEN</b>	General Land Use and Land Cover Classification System Name Project specific based on Level I or II of Anderson et al. (1976)
<b>LUC_II</b>	Specific Land Use and Land Cover Classification System Name Project specific Level II or Level III of Anderson et al. (1976)
<b>COMMENTS</b>	Additional Comments about the Vegetation in Individual Polygons
<b>ACRES</b>	Surface area of the polygon in acres
(*ArcInfo® default items)	

The thematic accuracy of the vegetation map was assessed using the methodology and standards provided by the NVIP Accuracy Assessment Procedures manual (TNC and ESRI 1994c) and subsequently updated in version 2.0 (Lea and Curtis 2010). Assessment methodology included a four-step process consisting of a sample design, sample site selection, data collection, and data analysis. The design of the AA process followed the five possible scenarios (A-E) provided in the first version of the field methods with stratified random targets placed in each map class based on their respective frequency and abundance (Table 11). The AA included most vegetation map classes and was limited to lands within or immediately adjacent to NEPE. Sample sizes for each evaluated map class were selected using the NVIP guidelines (TNC and ESRI 1994b).

All AA parameters were uploaded into a custom GIS program along with the vegetation layer. Following some reformatting of the data, the program automatically picked the various random target locations, buffered each 10 meters (33 feet) away from any polygon boundary, and 50 meters (164 feet) away from other AA points. Being able to choose minimum distance to polygon boundaries helped to minimize confusion and accounted for the horizontal error typically encountered in common GPS receivers ( $\pm 5$  m; [16 ft]). The resulting target locations were restricted to within the NEPE boundary by masking out the environs and any private in-holdings. All land-use and geologic/bare rock map classes were excluded since they are essentially unvegetated.

AA point data were collected within NEPE during the 2011 field season. Following target location selection, NMI ecologists were provided with draft field maps, overview maps, map unit definitions, the field key to the plant associations (Appendix C), and digital GPS files containing the location of the AA targets. The ecologists traveled to the AA target sites and determined the plant association using the field key. At each target ecologists recorded the primary, secondary, or tertiary associations that occurred within a roughly 50-meter radius. They also recorded height and cover of vegetation strata, environmental data, and percent canopy cover of the major species (see field form Appendix B). Other nearby vegetation types outside the 50-meter (164 feet) radius and any recent disturbance were also recorded. To better assist the analysis four digital photographs were acquired at each AA point, in the sequence of cardinal directions, N-E-S-W.



**Table 11.** Sampling protocol for AA points.

Scenario	Description	# Polygons	Area (ac)	Recommended # of Samples
A	The class is abundant. It covers more than 50 hectares (124 acres) of the total area and consists of at least 30 polygons. In this case, the recommended sample size is 30.	> 30	> 125	30
B	The class is relatively abundant. It covers more than 50 hectares (124 acres) of the total area but consists of fewer than 30 polygons. In this case, the recommended sample size is 20. The rationale for reducing the sample size for this type of class is that sample sites are more difficult to find because of the lower frequency of the class.	< 30	> 125	20
C	The class is relatively rare. It covers less than 50 hectares (124 acres) of the total area but consists of more than 30 polygons. In this case, the recommended sample size is 20. The rationale for reducing the sample size is that the class occupies a small area. At the same time, however, the class consists of a considerable number of distinct polygons that are possibly widely distributed. The number of samples therefore remains relatively high because of the high frequency of the class.	> 30	< 125	20
D	The class is rare. It has more than 5 but fewer than 30 polygons and covers less than 50 hectares (124 acres) of the area. In this case, the recommended number of samples is 5. The rationale for reducing the sample size is that the class consists of small polygons and the frequency of the polygons is low. Specifying more than 5 sample sites will therefore probably result in multiple sample sites within the same (small) polygon. Collecting 5 sample sites will allow an accuracy estimate to be computed, although it will not be very precise.	5-30	< 125	5
E	The class is very rare. It has fewer than 5 polygons and occupies less than 50 hectares (124 acres) of the total area. In this case, it is recommended that the existence of the class be confirmed by a visit to each sample site. The rationale for the recommendation is that with fewer than 5 sample sites (assuming 1 site per polygon) no estimate of level of confidence can be established for the sample (the existence of the class can only be confirmed through field checking).	< 5	< 125	Visit all and confirm

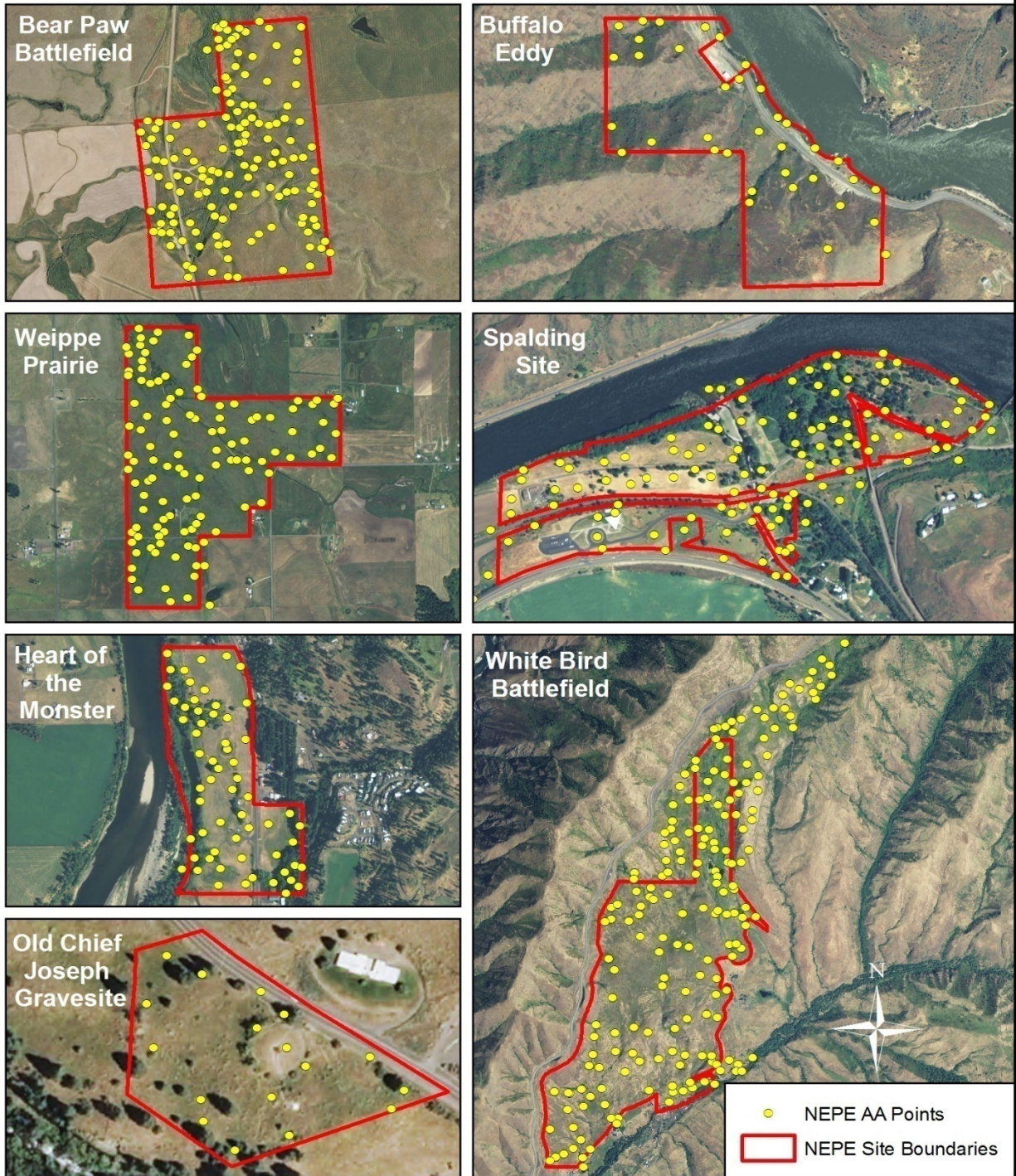
Data from 686 sampled AA sites were imported from the M.S. Access database into a GIS layer (Figure 50) then were visually compared in two steps to the vegetation map. The first step was to compare the AA points to the original target locations to check for erroneous points and remove these from further analysis. General errors in the data were recorded at this time, including documenting points that had GPS and location errors. The most common GPS receiver error included transposing two UTM coordinate numbers. Location errors involved having the final AA point occur in the wrong target polygon either due to poor GPS satellite positioning or the point occurred too close to a polygon boundary. This initial review led to the removal of six AA sites that were either collected in the wrong target polygon or had erroneous UTM coordinates. Nomenclature standards and other data management procedures were the same as for the classification plot data.

The second review step selected between the primary and secondary call for the plant association as recorded by the field crew. In larger vegetation mapping projects such as Rocky Mountain National Park (Salas et al. 2004), AA analysis involved fuzzy logic which assigns different levels of accuracy based on the primary, secondary, and tertiary field calls. However due to the confusion that fuzzy logic can cause, a simple binary assessment was conducted with the NEPE data. CTI assigned a final map unit for every point by choosing between the primary and secondary calls. Assignment was accomplished by first adding a new attribute to the point layer labeled "Final\_Code" and then by comparing the assigned field names of the point with its corresponding location on the digital imagery. In most cases the primary vegetation map unit name assigned by the field crew was used. However some points were assigned the secondary field call based on one of the following reasons: (1) it appeared that the second call was the better choice due to the overhead perspective (e.g., a stand judged to be sparse woodland on the imagery vs. herbaceous vegetation in the field), (2) the data were actually recorded in a stand that was too small (i.e., inclusion), or (3) the second call better matched the ecological context (e.g., riparian woodland located next to a stream vs. upland woodland located next to a stream).

Following AA data review the accuracy analysis was conducted. For NEPE the process was streamlined using methods developed from previous studies at Rocky Mountain National Park (Salas et al. 2004) and Wupatki National Monument (Hansen. et al. 2004). Specifically many of the in-house GIS programs developed for these projects were used to compare the AA data, generate confidence intervals, Kappa statistics, and error matrices (contingency tables). Through this automated process, the final map units in the AA layer were compared to the map unit designations for their corresponding polygons. All statistics and calculations used to analyze these data are described at length in the program manuals (TNC and ESRI 1994c, Lea and Curtis 2010) and are summarized in Table 12. Final assessments for each point were recorded using an error matrix.



## Field Plots



Produced by Cogan Technology, Inc.

(Various Scales)

April 2012

**Figure 50.** Location of the accuracy assessment (AA) points in NEPE.

**Table 12.** Statistics used in AA analysis.

Statistic	Formula	Description
<b>User's - accuracy:</b>	$\frac{n_{ii}}{n_{i+}}$	Where $i$ is the land cover type, $n_{ii}$ is the number of matches between map and reference data and $n_{i+}$ is the total number of samples of $i$ in the map. This formula is the number of "correct" observations divided by the sum of the row.
<b>Producer's accuracy</b>	$\frac{n_{ii}}{n_{+i}}$	Where $n_{+i}$ = total number of sample of $i$ in the reference data. This formula is the number of "correct" observations divided by the sum of the column.
<b>Confidence Interval</b>	$\hat{p} \pm \left\{ z_{\alpha} \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}} + \frac{1}{(2n)} \right\}$	Where $z_{\alpha} = 1.645$ (this comes from a table of the z-distribution at the significance level for a two-sided limit with a 90% confidence interval). The term $1/(2n)$ is the correction for continuity. The correction should be applied to account for the fact the binomial distribution describes discrete populations $\hat{p}$ = the sample accuracy (0 -1.0), $n$ = the number of sites sampled.
<b>Kappa Index</b>	$k = \frac{N \sum_{i=1}^r x_{ii} - \sum_{i=1}^r (x_{i+} \times x_{+i})}{N^2 - \sum_{i=1}^r (x_{i+} \times x_{+i})}$	Where $N$ is the total number of sites in the matrix, $r$ is the number of rows in the matrix, $x_{ii}$ is the number in row $i$ and column $i$ , $x_{+i}$ is the total for row $i$ , and $x_{i+}$ is the total for column $i$ .



## Results

### **Vegetation Classification**

The number of plant species and varieties that were documented during taxonomic inventories and classification plot and AA field data collection was 216 (Appendix E). Based on the dominant/characteristic plant species and other factors, the NEPE vegetation was further classified into 54 community types with 12 woodland and forest, 10 shrubland, and 32 herbaceous vegetation types (47 plant associations and seven vegetation alliances) (Appendix D). Fewer than 50% of the plant communities identified within NEPE are currently listed in the NVCS (NatureServe 2011) as associations. The remaining vegetation communities deviated only slightly from other known NVCS plant associations and could probably be refined with more data and analysis.

Most of the 35 NEPE vegetation types not listed in the NVC can be directly cross-walked to existing NVCS vegetation alliances and Table 13 lists all of the plant associations and vegetation alliances for NEPE by scientific name, common name, code, number of plots and in which NEPE units they occurred. Vegetation classes are ordered by physiognomy including forests, woodlands, shrublands, and herbaceous vegetation.

The following is a brief summary of the classification results by physiognomic group:

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#### ***Forest and Woodland Associations***

Coniferous woodlands were rare within the seven NEPE units but were common on surrounding mountain and foothill slopes. An exception is the ponderosa pine woodlands established within HEMO, OLJO, and SPAL. Also individual ponderosa pine, juniper, and Douglas-fir trees were occasionally present in some of the units but were minor structural components of grassland or riparian woodlands. Deciduous trees were common to abundant within all of the sites, typically in riparian and upland landforms. In general the deciduous trees established within the riparian habitat were native species, including black cottonwood, peachleaf willow, and box-elder. The upland tree species, with exception of netleaf hackberry and hawthorn, included non-natives and landscape species, e.g., black locust, European plum, silver maple, Siberian elm, and Norway maple. Four NEPE units supported deciduous riparian forests/woodlands, they are: BUED, HEMO, SPAL, and WHBI. HEMO, OLJO, SPAL, WHBI, and WEPR supported deciduous upland woodlands; BEPA was nearly devoid of trees supporting less than five box-elders.

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#### ***Shrubland Associations***

Typical shrublands within NEPE units consisted of deciduous short-to-medium-height shrubs established in mesic upland and riparian habitats. Riparian shrubs were mostly native species, including rose, common and western snowberry, coyote willow, Lewis' mock orange, Saskatoon serviceberry, chokecherry, and hawthorn. Deciduous shrublands occurred within all of the NEPE units, however WEPR supported a few individual willow tall shrubs along the southwestern boundary. Evergreen shrubs occurred in stands/communities within BEPA where silver sagebrush and fringed dwarf sagebrush formed minor communities/stands and individuals of both species were scattered throughout the unit.

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**Table 13.** List of 47 plant associations and seven vegetation alliances for NEPE.

Scientific Name	Common Name	Key Code	NVCS Code	N	Park Unit
<b>Forest and Woodland</b>					
<i>Acer negundo</i> Seasonally Flooded Forest Alliance	Box-elder Seasonally Flooded Forest Alliance	ACNE	A.341	1	<b>BEPA, HEMO</b>
<i>Acer saccharinum</i> Forest (Ornamental)	Silver Maple Forest (Ornamental)	ACSA	N/A	6	<b>SPAL</b>
( <i>Celtis laevigata</i> ) / <i>Anthriscus caucalis</i> Woodland	(Netleaf hackberry) / Chevil Woodland	(CELA) / ANCA	N/A	6	<b>WHBI</b>
<i>Celtis laevigata</i> var. <i>reticulata</i> / Mixed Grasses Woodland	Netleaf hackberry / Mixed Grasses Woodland	CELA / Mixed	N/A	1	<b>BUED</b>
<i>Celtis laevigata</i> var. <i>reticulata</i> / <i>Philadelphus lewisii</i> Woodland	Netleaf Hackberry / Lewis' Mock Orange Woodland	CELA / PHLE	CEGL000792	4	<b>BUED</b>
<i>Pinus ponderosa</i> Woodland Alliance	Ponderosa Pine Woodland Alliance	PIPO	A.530	2	<b>HEMO, OLJO, SPAL</b>
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i> Temporarily Flooded Woodland Alliance	Black Cottonwood Temporarily Flooded Woodland Alliance	POBA	A.635	4	<b>HEMO</b>
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i> / Mixed Herbs Forest	Black Cottonwood / Mixed Herbs Forest	POBA / Mixed	CEGL000675	3	<b>SPAL</b>
<i>Populus balsamifera</i> ssp. <i>trichocarpa</i> - <i>Prunus (cerasus, domestica)</i> Woodland	Black Cottonwood (Sour Cherry, European Plum) Woodland	POBA	N/A	4	<b>WHBI</b>
<i>Prunus domestica</i> Semi-natural Woodland	European plum Semi-natural Woodland	PRDO	N/A	3	<b>HEMO</b>
<i>Salix amygdaloides</i> Woodland	Peachleaf Willow Woodland	SAAM	CEGL000947	1	<b>SPAL</b>
<i>Ulmus pumila</i> / <i>Syringa vulgaris</i> Semi-natural Woodland	Siberian Elm / Common Lilac Semi-natural Woodland	ULPU / SYVU	N/A	1	<b>HEMO, OLJO</b>

Scientific Name	Common Name	Key Code	NVCS Code	N	Park Unit
<b>Shrubland</b>					
<i>Artemisia cana</i> ssp. <i>cana</i> / <i>Hesperostipa comata</i> Shrub Herbaceous Vegetation	Plains Silver Sagebrush / Needle-and-Thread Shrub Herbaceous Vegetation	ARCA / HECO	CEGL001553	4	<b>BEPA</b>
<i>Artemisia frigida</i> Dwarf-shrubland Alliance	Fringed Sagebrush Dwarf-shrubland Alliance	ARFR	A.2565	1	<b>BEPA</b>
<i>Crataegus douglasii</i> - ( <i>Crataegus chrysocarpa</i> ) Shrubland	Black Hawthorn - (Fireberry Hawthorn) Shrubland	CRDO	CEGL001093	4	<b>SPAL, WEPR</b>
<i>Crataegus douglasii</i> - <i>Frangula purshiana</i> / <i>Symphoricarpos albus</i> Shrubland	Black Hawthorn - Cascara Buckthorn / Common Snowberry Shrubland	CRDO - FRPU / SYAL	N/A	4	<b>HEMO</b>
<i>Crataegus douglasii</i> / <i>Polygonum bistortoides</i> Shrub Herbaceous Vegetation	Black Hawthorn / American Bistort Shrub Herbaceous Vegetation	CRDO / POBI	N/A	2	<b>WEPR</b>
<i>Philadelphus lewisii</i> Intermittently Flooded Shrubland	Lewis' Mock Orange Intermittently Flooded Shrubland	PHLE	CEGL001170	6	<b>BUED, SPAL</b>
<i>Prunus virginiana</i> - ( <i>Prunus americana</i> ) Shrubland	Chokecherry - (American Plum) Shrubland	PRVI	CEGL001108	1	<b>HEMO</b>
<i>Salix exigua</i> Temporarily Flooded Shrubland	Coyote Willow Temporarily Flooded Shrubland	SAEX	CEGL001197	5	<b>BEPA, SPAL</b>
<i>Symphoricarpos albus</i> Shrubland	Common Snowberry Shrubland	SYAL	CEGL005890	2	<b>HEMO, SPAL, WHBI</b>
<i>Symphoricarpos occidentalis</i> Shrubland	Western Snowberry Shrubland	SYOC	CEGL001131	7	<b>BEPA</b>
<b>Herbaceous Vegetation</b>					
<i>Agropyron cristatum</i> Semi-natural Herbaceous Vegetation	Crested Wheatgrass Semi-natural Herbaceous Vegetation	AGCR	N/A	2	<b>BEPA</b>

Scientific Name	Common Name	Key Code	NVCS Code	N	Park Unit
<i>Agropyron cristatum</i> - <i>Medicago sativa</i> Semi-natural Herbaceous Vegetation	Crested Wheatgrass - Alfalfa Semi-natural Herbaceous Vegetation	AGCR - MESA	N/A	2	<b>BEPA</b>
<i>Alopecurus pratensis</i> Semi-natural Herbaceous Vegetation	Meadow Foxtail Semi-natural Herbaceous Vegetation	ALPR	N/A	6	<b>HEMO, WEPR, WHBI</b>
<i>Alopecurus pratensis</i> - <i>Poa pratensis</i> Semi-natural Herbaceous Vegetation	Meadow Foxtail - Kentucky Bluegrass Semi-natural Herbaceous Vegetation	ALPR - POPR	N/A	16	<b>WEPR</b>
<i>Anthriscus caucalis</i> Semi-natural Herbaceous Vegetation	Chevil Semi-natural Herbaceous Vegetation	ANCA	N/A	2	<b>BUED</b>
<i>Bromus diandrus</i> Herbaceous Vegetation	Great Brome Herbaceous Vegetation	BRDI	CEGL002906	1	<b>SPAL</b>
<i>Bromus inermis</i> Semi-natural Herbaceous Alliance	Smooth Brome Semi-natural Herbaceous Alliance	BRIN	A.3561	7	<b>BEPA, HEMO, WEPR</b>
<i>Bromus inermis</i> - <i>Dactylis glomerata</i> Semi-natural Herbaceous Vegetation	Smooth Brome - Orchard Grass Semi-natural Herbaceous Vegetation	BRIN - DAGL	N/A	2	<b>HEMO</b>
<i>Bromus tectorum</i> Semi-natural Herbaceous Alliance	Cheatgrass Semi-natural Herbaceous Alliance	BRTE	A.1814	7	<b>BEPA, HEMO, OLJO, SPAL, WHBI</b>
<i>Bromus tectorum</i> - <i>Anthriscus caucalis</i> Semi-natural Herbaceous Vegetation	Cheatgrass - Chevil Semi-natural Herbaceous Vegetation	BRTE - ANCA	N/A	4	<b>BUED</b>
<i>Bromus tectorum</i> - <i>Pseudoroegneria spicata</i> Semi-natural Herbaceous Vegetation	Cheatgrass - Bluebunch Wheatgrass Semi-natural Herbaceous Vegetation	BRTE - PSSP	N/A	2	<b>BUED</b>
<i>Cardaria draba</i> Semi-natural Herbaceous Vegetation	Whitetop Semi-natural Herbaceous Vegetation	CADR	N/A	3	<b>WHBI</b>



Scientific Name	Common Name	Key Code	NVCS Code	N	Park Unit
<i>Camassia quamash</i> - <i>Alopecurus pratensis</i> Wet Prairie Herbaceous Vegetation	Small Camas - Meadow Foxtail Wet Prairie Herbaceous Vegetation	CAQU - ALPR	N/A	6	<b>HEMO, WEPR</b>
<i>Camassia quamash</i> Wet Prairie Herbaceous Vegetation	Small Camas Wet Prairie Herbaceous Vegetation	CAQU	CEGL003341	10	<b>WEPR</b>
<i>Centaurea solstitialis</i> - <i>Convolvulus arvensis</i> Semi-natural Herbaceous Vegetation	Yellow Star-thistle - Field Bindweed Semi-natural Herbaceous Vegetation	CESO - COAR	N/A	9	<b>WHBI</b>
<i>Centaurea stoebe</i> Semi-natural Herbaceous Vegetation	Spotted Knapweed Semi-natural Herbaceous Vegetation	CEST	N/A	1	<b>HEMO</b>
( <i>Cirsium arvense</i> , <i>Euphorbia esula</i> , <i>Melilotus</i> spp.) - Mixed Forbs Herbaceous Alliance	(Canada Thistle, Leafy Spurge, Sweetclover species) - Mixed Forbs Herbaceous Alliance	CIAR	A.3564	3	<b>WHBI</b>
<i>Elymus repens</i> Herbaceous Alliance	Quackgrass Herbaceous Alliance	ELRE	A.2658	9	<b>BEPA, SPAL, WHBI</b>
<i>Festuca ovina</i> Semi-natural Herbaceous Vegetation	Sheep Fescue Semi-natural Herbaceous Vegetation	FEOV	N/A	3	<b>HEMO, SPAL</b>
<i>Hesperostipa comata</i> - <i>Bouteloua gracilis</i> - <i>Carex filifolia</i> Herbaceous Vegetation	Needle-and-Thread - Blue Grama - Threadleaf Sedge Herbaceous Vegetation	HECO - BOGR - CAFI	CEGL002037	4	<b>BEPA</b>
<i>Leymus cinereus</i> - <i>Poa pratensis</i> Herbaceous Vegetation	Great Basin Wildrye - Kentucky Bluegrass Herbaceous Vegetation	LECI - POPR	N/A	2	<b>OLJO</b>
<i>Pascopyrum smithii</i> - <i>Hesperostipa comata</i> Central Mixedgrass Herbaceous Vegetation	Western Wheatgrass - Needle-and-Thread Central Mixedgrass Herbaceous Vegetation	PASM - HECO	CEGL002034	8	<b>BEPA</b>
<i>Pascopyrum smithii</i> - <i>Poa pratensis</i> Herbaceous Vegetation	Western Wheatgrass - Kentucky Bluegrass Herbaceous Vegetation	PASM - POPR	N/A	4	<b>BEPA</b>

Scientific Name	Common Name	Key Code	NVCS Code	N	Park Unit
<i>Poa bulbosa</i> - <i>Poa pratensis</i> Semi-natural Herbaceous Vegetation	Bulbous Bluegrass - Kentucky Bluegrass Semi-natural Herbaceous Vegetation	POBU - POPR	N/A	4	HEMO, SPAL
<i>Poa pratensis</i> Semi-natural Herbaceous Vegetation	Kentucky Bluegrass Semi-natural Herbaceous Vegetation	POPR	N/A	15	BEPA, OLJO, SPAL, WHBI
<i>Poa pratensis</i> - <i>Bromus arvensis</i> Semi-natural Herbaceous Vegetation	Kentucky Bluegrass - Field Brome Semi-natural Herbaceous Vegetation	POPR - BRAR	N/A	1	BEPA
<i>Poa pratensis</i> - <i>Dactylis glomerata</i> Semi-natural Herbaceous Vegetation	Kentucky Bluegrass - Orchard Grass Semi-natural Herbaceous Vegetation	POPR - DAGL	N/A	3	HEMO
<i>Poa pratensis</i> - <i>Elymus repens</i> Semi-natural Herbaceous Vegetation	Kentucky Bluegrass - Quackgrass Semi-natural Herbaceous Vegetation	POPR - ELRE	N/A	11	HEMO, WEPR
<i>Pseudoroegneria spicata</i> Herbaceous Vegetation	Bluebunch Wheatgrass Herbaceous Vegetation	PSSP	CEGL001660	13	BUED, OLJO, SPAL, WHBI
<i>Ranunculus alismifolius</i> Temporarily Flooded Herbaceous Vegetation	Plantainleaf Buttercup Temporarily Flooded Herbaceous Vegetation	RAAL	N/A	6	WEPR
<i>Taeniatherum caput-medusae</i> Semi-natural Herbaceous Vegetation	Medusahead Semi-natural Herbaceous Vegetation	TACA	N/A	8	WHBI
<i>Typha</i> ( <i>latifolia</i> , <i>angustifolia</i> ) Western Herbaceous Vegetation	Broadleaf Cattail Marsh	TYLA	CEGL002010	2	BEPA, WEPR, WHBI

### ***Herbaceous Associations***

Species of grass and weedy forbs were common to abundant within the seven NEPE units. Grassland communities were characterized by mainly non-native grass species varying in composition by site and by moisture conditions. Kentucky bluegrass established on mesic and/or maintained lawn sites within BEPA, HEMO, OLJO, WEPR, and WHBI. Similar mesic sites also supported quackgrass and smooth brome within BEPA, HEMO, OLJO, SPAL, WEPR, and WHBI. Non-native dry-site grasslands occurred within all seven NEPE units and were characterized by cheatgrass, meadow foxtail, sheep fescue, medusahead, and crested wheatgrass. Weedy forb communities were common within most NEPE units in varying abundance. WHBI supported dense stands of whitetop, yellow star-thistle, field bindweed, Canada thistle, and other non-native forbs and noxious weeds. HEMO supported patches of spotted knapweed and BUED slopes were characterized by bur chervil. Herbaceous emergent wetlands within NEPE included small stands of cattails within BEPA, WEPR, and WHBI and other herbaceous wetland stands of reed canarygrass occurred within SPAL and WEPR.

Native grasslands and forblands were minor components of the NEPE landscape but most of the individual units did support small patches on dry slopes or in undisturbed mesic meadow habitats. BUED, OLJO, SPAL and WHBI supported bluebunch wheatgrass, predominantly; OLJO supported Great Basin wildrye; and BEPA supported needle-and-thread grass and western wheatgrass. Native forbs including camas and/or plantainleaf buttercup form stands with several grass species occurred within HEMO and WEPR.

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All of the classified plant associations/vegetation alliances for NEPE were placed into the NatureServes ecological system classification to provide managers with a broader landscape perspective. Ecological systems represent recurring groups of biological communities that establish in similar physical environments and are influenced by similar dynamic ecological processes, such as fire or flooding. They are intended to provide a classification unit that is readily mappable, often from remote imagery, and readily identifiable by conservation and resource managers in the field. Ecological systems within NEPE address only the natural landscape, as developed areas are not currently classified. Thirteen ecological systems occur within the NEPE vegetation mapping project area based on this project (Appendix D) (Table 14).

**Table 14.** List of 13 ecological systems within NEPE.

<b>Ecological System</b>	<b>NVCS Code</b>
Columbia Basin Foothill and Canyon Dry Grassland	CES304.993
Columbia Basin Foothill Riparian Woodland and Shrubland	CES304.768
Columbia Basin Palouse Prairie	CES304.792
Northern Rocky Mountain Montane-Foothill Deciduous Shrubland	CES306.994
Northern Rocky Mountain Ponderosa Pine Woodland and Savanna	CES306.649
Northwestern Great Plains Floodplain	CES303.676
Northwestern Great Plains Mixedgrass Prairie	CES303.674
Rocky Mountain Lower Montane-Foothill Shrubland	CES306.822
Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland	CES306.821
Western Great Plains Floodplain	CES303.678
Western Great Plains Wooded Draw and Ravine	CES303.680
Western Great Plains Sand Prairie	CES303.670
Willamette Valley Wet Prairie	CES204.874



## Digital Imagery and Mapping

For NEPE, 69 map units (48 vegetated, 4 sparse vegetation, and 17 land-use/land-cover) were developed. The final list of map classes/units was directly cross-walked or matched to corresponding plant associations and land-use classes when possible. NEPE map classes represent a compromise between the detail of the NVCS, the needs for park management, the limited extent of the sampling area, and the limitations of the imagery. As a result, the mapping legend does not exactly match the NVCS. When the NVCS link was not feasible, descriptive local map units or park specials were created.

The following types represent the possible map scenarios that were encountered in the NEPE project:

1. **One-to-one relationship** = When a plant association or vegetation alliance had a unique photo signature and could be readily delineated on the imagery, the map unit adopted the plant association/vegetation alliance name or similar synonym.
2. **One-to-many relationship** = When related plant associations shared the same signature and could not be distinguished on the imagery, several plant associations were combined into a single complex.
3. **Park Specials** = When unique stands of vegetation did not have a corresponding NVCS plant association or vegetation alliance or where located outside of the NEPE boundary.
4. **Land Use – Land Cover** = Non-vegetated areas and vegetation types not recognized by the NVCS received Anderson et al. (1976, updated 2002) map unit designations.

Park special map units were created to help address limited off-site data on the dominant species and to categorize plant communities not sampled due to their small size, limited distribution, or if they were only sampled during the AA (after the classification was completed). The following are a list of park special map units added for the NEPE project:

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- *Acer platanoides* Semi-natural Woodland Stand (ACPL) was added for planted and semi-natural stands sampled during the AA within SPAL.
- *Amelanchier alnifolia* Shrubland Alliance (AMAL) was added for natural stands sampled during the AA within BUED and OLJO.
- *Artemisia* spp. – *Chrysothamnus* spp. Mixed Shrubland Stand (ART-CHR) was added to address unknown shrub species occurring outside of BUED and OLJO boundaries.
- *Elaeagnus angustifolia* Semi-natural Woodland Alliance (ELAN) was added for planted and semi-natural stands sampled during the AA within SPAL.
- Mixed Conifer Woodland Complex (MXCON) was added to address unknown conifer woodlands occurring outside of HEMO, OLJO, SPAL, WEPR, and WHBI boundaries.
- Mixed Deciduous Riparian Woodland Complex (MXRIP) was added to address unknown riparian deciduous woodland and forests occurring outside of BUED, HEMO, OLJO, SPAL, WEPR, and WHBI boundaries.

- Mixed Deciduous Woodland Complex (MXWD) was added to address unknown upland deciduous woodlands occurring outside of BEPA, BUED, HEMO, OLJO, SPAL, WEPR, and WHBI boundaries.
  - Mixed Deciduous Shrubland Complex (MXSHB) was added to address unknown medium to tall deciduous shrublands occurring outside of BEPA, BUED, HEMO, OLJO, SPAL, and WHBI boundaries.
  - Mixed Short Shrubland Complex (SSHB) was added to address unknown mountain slopes supporting mats of short deciduous shrubs outside of BUED and WHBI boundaries.
  - Mixed Planted and Semi-natural Grassland Complex (MXGRS) was added to address unknown grasslands occurring outside of BEPA, BUED, HEMO, OLJO, SPAL, WEPR, and WHBI boundaries.
  - *Phalaris arundinacea* Western Herbaceous Vegetation (PHAR) was used to address mesic patches of reed canary grass sampled during the AA within SPAL and WEPR.
  - *Robinia pseudoacacia* Semi-natural Woodland Stand (ROPS) was added for planted and escaped stands of black locust trees sampled during the AA within HEMO and SPAL.
  - Cut Bank Sparse Vegetation (CUTB) was added to describe seasonally and temporarily flooded lands with little vegetation on stream and river banks sampled within the BUED, OLJO, and WHBI project areas.
  - Gravel Bar Sparse Vegetation (GBAR) was added to describe seasonally and temporarily flooded gravel bars sampled in streams and rivers in the HEMO and SPAL project areas.
  - Rock Outcrop Sparse Vegetation (ROCK) was added to describe sparsely vegetated rock outcrops and ridges sampled within the BEPA, BUED, HEMO, SPAL, and WHBI project areas.
  - Talus Sparse Vegetation (TALS) was added to describe sparsely vegetated talus slopes sampled within the BUED, HEMO, and WHBI project areas.
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All NEPE vegetation mapping codes, names, corresponding NVCS plant associations or vegetation alliances (if appropriate), their relationship to the NVC, and the NEPE units of occurrence are listed in Table 15. Please reference Appendix F for detailed descriptions and representative photographs for all vegetation map units.

**Table 15.** Assignment of map classes to NVCS plant associations and vegetation alliances.

Map Class Code	Map Class Name	NVCS Association/Alliance(s) Assigned to Map Class (or Map Unit Description)	Relationship	Park Unit*
<b>Forest and Woodland</b>				
<b>ACNE</b>	<i>Acer negundo</i> Seasonally Flooded Forest Alliance	- <i>Acer negundo</i> Seasonally Flooded Forest Alliance	1:1	<b>BEPa, HEMO</b>
<b>ACPL</b>	<i>Acer platanoides</i> Semi-natural Woodland Alliance	- <i>Acer platanoides</i> Semi-natural Woodland Alliance	1:1	<b>SPAL</b>
<b>ACSA</b>	<i>Acer saccharinum</i> Forest (Ornamental)	- <i>Acer saccharinum</i> Forest (Ornamental)	1:1	<b>SPAL</b>
<b>CELA</b>	<i>Celtis laevigata</i> var. <i>reticulata</i> Woodland Alliance	-( <i>Celtis laevigata</i> ) / <i>Anthriscus caucalis</i> Woodland - <i>Celtis laevigata</i> var. <i>reticulata</i> / Mixed Grasses Woodland - <i>Celtis laevigata</i> var. <i>reticulata</i> / <i>Philadelphus lewisii</i> Woodland	1:Many	<b>BUED, WHBI</b>
<b>ELAN</b>	<i>Elaeagnus angustifolia</i> Semi-natural Woodland Alliance	- <i>Elaeagnus angustifolia</i> Semi-natural Woodland Alliance	1:1	<b>SPAL</b>
<b>MXCON</b>	Mixed Conifer Woodland Complex	N/A	Park Special	<b>HEMO, OLJO, SPAL, WEPR, WHBI</b>
<b>MXRIP</b>	Mixed Deciduous Riparian Woodland Complex	N/A	Park Special	<b>BUED, HEMO, OLJO, SPAL, WEPR, WHBI</b>
<b>MXWD</b>	Mixed Deciduous Upland Woodland Complex	N/A	Park Special	<b>All NEPE</b>
<b>PIPO</b>	<i>Pinus ponderosa</i> Woodland Alliance	- <i>Pinus ponderosa</i> Woodland Alliance	1:1	<b>HEMO, OLJO, SPAL</b>
<b>POBA</b>	<i>Populus balsamifera</i> ssp. <i>trichocarpa</i> Temporarily Flooded Woodland Alliance	- <i>Populus balsamifera</i> ssp. <i>trichocarpa</i> Temporarily Flooded Woodland Alliance - <i>Populus balsamifera</i> ssp. <i>trichocarpa</i> / Mixed Herbs Forest - <i>Populus balsamifera</i> ssp. <i>trichocarpa</i> - <i>Prunus</i> ( <i>cerasus</i> , <i>domestica</i> ) Woodland	1:Many	<b>HEMO, SPAL, WHBI</b>
<b>PRDO</b>	<i>Prunus domestica</i> Semi-natural Woodland	- <i>Prunus domestica</i> Semi-natural Woodland	1:1	<b>HEMO</b>

Map Class Code	Map Class Name	NVCS Association/Alliance(s) Assigned to Map Class (or Map Unit Description)	Relationship	Park Unit*
<b>ROPS</b>	<i>Robinia pseudoacacia</i> Semi-natural Woodland Stand	- <i>Robinia pseudoacacia</i> Semi-natural Forest	1:1	<b>HEMO, SPAL</b>
<b>SAAM</b>	<i>Salix amygdaloides</i> Woodland	- <i>Salix amygdaloides</i> Woodland	1:1	<b>SPAL</b>
<b>ULPU</b>	<i>Ulmus pumila</i> / <i>Syringa vulgaris</i> Semi-natural Woodland	- <i>Ulmus pumila</i> / <i>Syringa vulgaris</i> Semi-natural Woodland	1:1	<b>HEMO, OLJO</b>

#### Shrubland

<b>AMAL</b>	<i>Amelanchier alnifolia</i> Shrubland Stand	- <i>Amelanchier alnifolia</i> Shrubland Stand	Park Special	<b>BUED, OLJO</b>
<b>ARCA / HECO</b>	<i>Artemisia cana</i> ssp. <i>cana</i> / <i>Hesperostipa comata</i> Shrub Herbaceous Vegetation	- <i>Artemisia cana</i> ssp. <i>cana</i> / <i>Hesperostipa comata</i> Shrub Herbaceous Vegetation	Park Special	<b>BEPA</b>
<b>ARFR</b>	<i>Artemisia frigida</i> Dwarf-shrubland Alliance	- <i>Artemisia frigida</i> Dwarf-shrubland Alliance	1:1	<b>BEPA</b>
<b>ART-CHR</b>	<i>Artemisia</i> spp. – <i>Chrysothamnus</i> spp. Mixed Shrubland Stand	N/A	Park Special	<b>BUED, OLJO</b>
<b>CRDO</b>	<i>Crataegus douglasii</i> Shrubland Alliance	- <i>Crataegus douglasii</i> – ( <i>Crataegus chrysocarpa</i> ) Shrubland - <i>Crataegus douglasii</i> - <i>Frangula purshiana</i> / <i>Symphoricarpos albus</i> Shrubland - <i>Crataegus douglasii</i> / <i>Polygonum bistortoides</i> Shrub Herbaceous Vegetation	1:Many	<b>HEMO, SPAL, WEPR</b>
<b>MXSHB</b>	Mixed Deciduous Shrubland Complex	N/A	Park Special	<b>All NEPE</b>
<b>PHLE</b>	<i>Philadelphus lewisii</i> Intermittently Flooded Shrubland	- <i>Philadelphus lewisii</i> Intermittently Flooded Shrubland	1:1	<b>BUED, SPAL</b>
<b>SAEX</b>	<i>Salix exigua</i> Temporarily Flooded Shrubland	- <i>Salix exigua</i> Temporarily Flooded Shrubland	1:1	<b>BEPA, SPAL</b>
<b>SSHB</b>	Mixed Deciduous Short Shrubland Complex	N/A	Park Special	<b>BUED, WHBI</b>
<b>SYAL</b>	<i>Symphoricarpos albus</i> Shrubland	- <i>Symphoricarpos albus</i> Shrubland	1:1	<b>HEMO, SPAL, WHBI</b>



Map Class Code	Map Class Name	NVCS Association/Alliance(s) Assigned to Map Class (or Map Unit Description)	Relationship	Park Unit*
<b>SYOC</b>	<i>Symphoricarpos occidentalis</i> Shrubland	- <i>Symphoricarpos occidentalis</i> Shrubland	1:1	<b>BEPA</b>
<b>Herbaceous Vegetation</b>				
<b>AGCR</b>	<i>Agropyron cristatum</i> Semi-natural Herbaceous Alliance	- <i>Agropyron cristatum</i> Semi-natural Herbaceous Vegetation - <i>Agropyron cristatum</i> – <i>Medicago sativa</i> Semi-natural Herbaceous Vegetation	1:Many	<b>BEPA</b>
<b>ALPR</b>	<i>Alopecurus pratensis</i> Semi-natural Herbaceous Vegetation	- <i>Alopecurus pratensis</i> Semi-natural Herbaceous Vegetation - <i>Alopecurus pratensis</i> - <i>Poa pratensis</i> Semi-natural Herbaceous Vegetation	1:Many	<b>HEMO, WEPR, WHBI</b>
<b>ANCA</b>	<i>Anthriscus caucalis</i> Semi-natural Herbaceous Vegetation	- <i>Anthriscus caucalis</i> Semi-natural Herbaceous Vegetation	1:1	<b>BUED</b>
<b>BRDI</b>	<i>Bromus diandrus</i> Herbaceous Vegetation	- <i>Bromus diandrus</i> Herbaceous Vegetation	1:1	<b>SPAL</b>
<b>BRIN</b>	<i>Bromus inermis</i> Semi-natural Herbaceous Alliance	- <i>Bromus inermis</i> Semi-natural Herbaceous Alliance - <i>Bromus inermis</i> - <i>Dactylis glomerata</i> Semi-natural Herbaceous Vegetation	1:Many	<b>BEPA, HEMO, WEPR</b>
<b>BRTE</b>	<i>Bromus tectorum</i> Semi-natural Herbaceous Alliance	- <i>Bromus tectorum</i> Semi-natural Herbaceous Alliance - <i>Bromus tectorum</i> - <i>Daucus carota</i> Semi-natural Herbaceous Vegetation - <i>Bromus tectorum</i> – <i>Pseudoroegneria spicata</i> Semi-natural Herbaceous Vegetation	1:Many	<b>BEPA, BUED, HEMO, OLJO, SPAL, WHBI</b>
<b>CADR</b>	<i>Cardaria draba</i> Semi-natural Herbaceous Vegetation	- <i>Cardaria draba</i> Semi-natural Herbaceous Vegetation	1:1	<b>WHBI</b>
<b>CAQU</b>	<i>Camassia (cusickii, quamash)</i> Seasonally Flooded Herbaceous Alliance	- <i>Camassia quamash</i> – <i>Alopecurus pratensis</i> Wet Prairie Herbaceous Vegetation - <i>Camassia quamash</i> Wet Prairie Herbaceous Vegetation	1:Many	<b>HEMO, WEPR</b>

Map Class Code	Map Class Name	NVCS Association/Alliance(s) Assigned to Map Class (or Map Unit Description)	Relationship	Park Unit*
<b>CESO-COAR</b>	<i>Centaurea solstitialis</i> - <i>Convolvulus arvensis</i> Semi-natural Herbaceous Vegetation	- <i>Centaurea solstitialis</i> – <i>Convolvulus arvensis</i> Semi-natural Herbaceous Vegetation	1:1	<b>WHBI</b>
<b>CEST</b>	<i>Centaurea stoebe</i> Semi-natural Herbaceous Vegetation	- <i>Centaurea stoebe</i> Semi-natural Herbaceous Vegetation	1:1	<b>HEMO</b>
<b>ELRE</b>	<i>Elymus repens</i> Herbaceous Alliance	- <i>Elymus repens</i> Herbaceous Alliance	1:1	<b>BEPA, SPAL, WHBI</b>
<b>FEOV</b>	<i>Festuca ovina</i> Semi-natural Herbaceous Vegetation	- <i>Festuca ovina</i> Semi-natural Herbaceous Vegetation	1:1	<b>HEMO, SPAL</b>
<b>LECI - POPR</b>	<i>Leymus cinereus</i> - <i>Poa pratensis</i> Herbaceous Vegetation	- <i>Leymus cinereus</i> - <i>Poa pratensis</i> Herbaceous Vegetation	1:1	<b>OLJO</b>
<b>MEDW</b>	Dry Mixed Herbaceous Vegetation Complex	- <i>Hesperostipa comata</i> – <i>Bouteloua gracilis</i> - <i>Carex filifolia</i> Herbaceous Vegetation - <i>Pascopyrum smithii</i> – <i>Hesperostipa comata</i> Central Mixedgrass Herbaceous Vegetation - <i>Pascopyrum smithii</i> - <i>Poa pratensis</i> Herbaceous Vegetation	1:Many	<b>BEPA, SPAL</b>
<b>MXGRS</b>	Mixed Planted and Semi-natural Grassland Complex	N/A	Park Special	<b>All NEPE</b>
<b>PHAR</b>	<i>Phalaris arundinacea</i> Western Herbaceous Vegetation	- <i>Phalaris arundinacea</i> Western Herbaceous Vegetation	1:1	<b>SPAL, WEPR</b>
<b>POBU</b>	<i>Poa bulbosa</i> - <i>Poa pratensis</i> Semi-natural Herbaceous Vegetation	- <i>Poa bulbosa</i> - <i>Poa pratensis</i> Semi-natural Herbaceous Vegetation	1:1	<b>HEMO, SPAL</b>
<b>POPR</b>	<i>Poa pratensis</i> Semi-natural Herbaceous Alliance	- <i>Poa pratensis</i> Semi-natural Herbaceous Vegetation - <i>Poa pratensis</i> - <i>Bromus arvensis</i> Semi-natural Herbaceous Vegetation - <i>Poa pratensis</i> - <i>Dactylis glomerata</i> Semi-natural Herbaceous Vegetation - <i>Poa pratensis</i> - <i>Elymus repens</i> Semi-natural Herbaceous Vegetation	1:Many	<b>ALL NEPE</b>

Map Class Code	Map Class Name	NVCS Association/Alliance(s) Assigned to Map Class (or Map Unit Description)	Relationship	Park Unit*
<b>PSSP</b>	<i>Pseudoroegneria spicata</i> Herbaceous Vegetation	- <i>Pseudoroegneria spicata</i> Herbaceous Vegetation	1:1	<b>BUED, OLJO, SPAL, WHBI</b>
<b>RAAL</b>	<i>Ranunculus alismifolius</i> Temporarily Flooded Herbaceous Vegetation	- <i>Ranunculus alismifolius</i> Temporarily Flooded Herbaceous Vegetation	1:1	<b>WEPR</b>
<b>TACA</b>	<i>Taeniatherum caput-medusae</i> Semi-natural Herbaceous Vegetation	- <i>Taeniatherum caput-medusae</i> Semi-natural Herbaceous Vegetation	1:1	<b>WHBI</b>
<b>TYLA</b>	<i>Typha (latifolia, angustifolia)</i> Western Herbaceous Vegetation	- <i>Typha (latifolia, angustifolia)</i> Western Herbaceous Vegetation	1:1	<b>BEPA, WEPR, WHBI</b>
<b>WEED</b>	Mixed Weedy Semi-natural Herbaceous Vegetation Complex	-( <i>Cirsium arvense</i> , <i>Euphorbia esula</i> , <i>Melilotus</i> spp.) - Mixed Forbs Herbaceous Alliance	1:1	<b>HEMO, WEPR, WHBI</b>

#### Sparse Vegetation

<b>CUTB</b>	Cut Bank Sparse Vegetation	Cut Bank Sparse Vegetation	1 : 1	<b>BUED, OLJO, WHBI</b>
<b>GBAR</b>	Gravel Bar Herbaceous Vegetation	Gravel Bar Herbaceous Vegetation	1 : 1	<b>HEMO, SPAL</b>
<b>ROCK</b>	Rock Outcrop Sparse Vegetation	Rock Outcrop Sparse Vegetation	1 : 1	<b>BEPA, BUED, HEMO, SPAL, WHBI</b>
<b>TALS</b>	Talus Sparse Vegetation	Talus Sparse Vegetation	1 : 1	<b>BUED, HEMO, SPAL, WHBI</b>

#### Land-Use / Land-Cover

<b>AGRI</b>	Agricultural Business	Ranch and farm facilities	N/A	<b>ALL NEPE</b>
<b>BARE</b>	Bare Rock / Sand / Other Bare Ground	Unvegetated rock, cleared land, etc.	N/A	<b>BUED, HEMO, OLJO, WHBI</b>
<b>CANL</b>	Canal / Ditch	Man-made linear water conveyance systems	N/A	<b>BEPA, OLJO, WEPR</b>

Map Class Code	Map Class Name	NVCS Association/Alliance(s) Assigned to Map Class (or Map Unit Description)	Relationship	Park Unit*
<b>CEME</b>	Cemeteries	Cemeteries	N/A	<b>SPAL, WEPR</b>
<b>COMM</b>	Communications and Utilities	Water treatment facilities, water towers, electric sub-stations, etc...	N/A	<b>HEMO, OLJO, WHBI</b>
<b>FACL</b>	Facilities	Visitor centers, housing complexes, maintenance yards, NPS buildings, etc.	N/A	<b>BEPA, BUED, HEMO, SPAL, WEPR, WHBI</b>
<b>FILD</b>	Planted / Cultivated	Tilled and cropped agricultural fields	N/A	<b>All NEPE</b>
<b>HIND</b>	Heavy Industry	Factories, railroad terminals, lumber mills, etc.	N/A	<b>HEMO, SPAL, WEPR</b>
<b>LAKE</b>	Lake / Pond	Large lakes and reservoirs	N/A	<b>OLJO</b>
<b>LIND</b>	Commercial / Light Industry	Businesses and surrounding lands in environs	N/A	<b>HEMO, OLJO, WEPR, WHBI</b>
<b>POND</b>	Lake / Pond	Natural and small human-made water impoundments	N/A	<b>BEPA, BUED, HEMO, OLJO, WEPR, WHBI</b>
<b>RECR</b>	Entertainment / Recreation	Golf courses, urban parks, schools, etc.	N/A	<b>HEMO, OLJO, WEPR</b>
<b>RESD</b>	Residential	Single-family housing	N/A	<b>BUED, HEMO, OLJO, SPAL, WEPR, WHBI</b>
<b>ROAD</b>	Transportation	Paved and earthen roads	N/A	<b>All NEPE</b>
<b>STRM</b>	Stream / River	Natural linear drainage features	N/A	<b>All NEPE</b>



Map Class Code	Map Class Name	NVCS Association/Alliance(s) Assigned to Map Class (or Map Unit Description)	Relationship	Park Unit*
<b>TRANS</b>	Transitional	Previously developed land, fallow fields, roadsides, slash piles, etc...	N/A	<b>All NEPE</b>
<b>URBN</b>	Mixed Urban	Developed land with both residential homes and businesses	N/A	<b>HEMO, SPAL, WEPR, WHBI</b>

\*Note the presence of each vegetation type noted for the individual NEPE Units includes stands occurring in the project environs outside of the NEPE boundary.

### ***Vegetation Map***

The final NEPE vegetation map (Appendix G) consisted of 7,786 polygons totaling 42,194 acres (17,089 hectares) spread across seven individual sites (Table 16). Average polygon size was 5.4 acres (2.2 hectares) that statistic includes adjacent polygons that have the same map code but different density, height, or other attributes. The area within the NEPE site boundaries totaled 2,082 acres (843 hectares) or 5% of the total project area. Of the total number of polygons, 5,917 (76%) represented vegetation map classes, 588 (8%) sparse vegetation, and 1,281 (16%) were land use classes. The most common map class across the entire project area both in terms of size and frequency was the Mixed Planted and Semi-natural Grassland complex (7,668 acres (3,105 hectares) and 842 polygons). This map unit/vegetation type represents almost exclusively unsampled and undocumented grasslands in the environs.

For each NEPE site the largest and most common vegetation classes included:

- BEPA = *Poa pratensis* Semi-natural Herbaceous Alliance 72 acres (29 hectares) and 42 polygons;
- BUED = *Pseudoroegneria spicata* Herbaceous Vegetation 43 acres (17 hectares) and 17 polygons;
- HEMO = *Poa pratensis* Semi-natural Herbaceous Alliance 13 acres (5 hectares) and 5 polygons;
- OLJO = *Leymus cinereus* - *Poa pratensis* Herbaceous Vegetation 2 acres (0.8 hectares) and 1 polygon;
- SPAL = *Bromus tectorum* Semi-natural Herbaceous Alliance 15 acres (6 hectares) and 14 polygons;
- WEPR = *Alopecurus pratensis* Semi-natural Herbaceous Vegetation 143 acres (58 hectares) and 28 polygons;
- WHBI = *Bromus tectorum* Semi-natural Herbaceous Alliance 283 acres (115 hectares) and 51 polygons.

**Table 16.** Summary statistics for the NEPE map class polygons.

Map Code	Map Unit Description	Bear Paw Battlefield			BEPA Project Area (+environs)		
		Polygon Count	Acres	Hectares	Polygon Count	Acres	Hectares
<b>ACNE</b>	<i>Acer negundo</i> Seasonally Flooded Forest Alliance	2	0.1	0.1	2	0.1	0.1
<b>MXWD</b>	Mixed Deciduous Woodland Complex	0	0	0	8	6.0	2.4
<b>ARCA/HECO</b>	<i>Artemisia cana</i> ssp. <i>cana</i> / <i>Hesperostipa comata</i> Shrub Herbaceous Vegetation	9	4.1	1.7	9	4.1	1.7
<b>ARFR</b>	<i>Artemisia frigida</i> Dwarf-shrubland Alliance	2	1.5	0.6	3	4.7	1.9
<b>MXSHB</b>	Mixed Deciduous Shrubland Complex	1	0.1	0.1	1	0.1	0.0
<b>SAEX</b>	<i>Salix exigua</i> Temporarily Flooded Shrubland	8	10.8	4.4	38	72.7	29.4
<b>SYOC</b>	<i>Symphoricarpos occidentalis</i> Shrubland	25	15.7	6.4	73	96.4	39.0
<b>AGCR</b>	<i>Agropyron cristatum</i> Semi-natural Herbaceous Vegetation	19	17.9	7.2	106	444.1	179.9
<b>BRIN</b>	<i>Bromus inermis</i> Semi-natural Herbaceous Alliance	17	7.4	3.0	120	337.9	136.8
<b>BRTE</b>	<i>Bromus tectorum</i> Semi-natural Herbaceous Alliance	6	2.6	1.1	21	39.6	16.0
<b>ELRE</b>	<i>Elymus repens</i> Herbaceous Alliance	4	1.4	0.6	4	5.9	2.4
<b>MEDW</b>	Dry Mixed Herbaceous Vegetation Complex	40	42.0	17.0	105	359.2	145.5
<b>MXGRS</b>	Mixed Planted and Semi-natural Grassland Complex	6	4.2	1.7	108	1,904.4	771.3
<b>POPR</b>	<i>Poa pratensis</i> Semi-natural Herbaceous Alliance	42	71.9	29.1	196	534.0	216.3
<b>TYLA</b>	<i>Typha (latifolia, angustifolia)</i> Western Herbaceous Vegetation	1	0.1	0.1	23	6.1	2.5
<b>ROCK</b>	Rock Outcrop Sparse Vegetation	0	0	0	15	19.6	7.9
<b>AGRI</b>	Agricultural Business	0	0	0	14	11.2	4.5
<b>CANL</b>	Canal / Ditch	0	0	0	2	1.6	0.6
<b>FACL</b>	Facilities	3	0.3	0.1	3	0.3	0.1
<b>FILD</b>	Planted / Cultivated	4	9.8	4.0	50	1,128.6	457.1
<b>POND</b>	Lake / Pond	0	0	0	21	63.5	25.7
<b>ROAD</b>	Transportation	0	0	0	3	47.4	19.2
<b>STRM</b>	Stream / River	2	0.6	0.2	8	3.1	1.3
<b>TRANS</b>	Transitional	2	5.5	2.2	14	6.9	2.8
Total Vegetation		<b>182</b>	<b>180</b>	<b>73</b>	<b>817</b>	<b>3,815</b>	<b>1,545</b>
Total Sparse Vegetation		<b>0</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>19.6</b>	<b>7.9</b>
Total Land-Use/Land Cover		<b>11</b>	<b>16</b>	<b>7</b>	<b>115</b>	<b>1,263</b>	<b>511</b>
<b>Totals</b>		<b>193</b>	<b>196</b>	<b>79</b>	<b>947</b>	<b>5,098</b>	<b>2,065</b>

Map Code	Map Unit Description	Buffalo Eddy			BUED Project Area (+environs)		
		Polygon Count	Acres	Hectares	Polygon Count	Acres	Hectares
<b>CELA</b>	<i>Celtis laevigata</i> var. <i>reticulata</i> Woodland Alliance	16	16.1	6.5	128	286.6	116.1
<b>MXRIP</b>	Mixed Deciduous Riparian Woodland Complex	0	0	0	5	20.9	8.5
<b>MXWD</b>	Mixed Deciduous Woodland Complex	0	0	0	23	53.4	21.6
<b>AMAL</b>	<i>Amelanchier alnifolia</i> Shrubland Stand	7	18.5	7.5	35	186.8	75.7
<b>ART-CHR</b>	<i>Artemisia</i> spp. - <i>Chrysothamnus</i> spp. Mixed Shrubland Stand	4	11.0	4.5	24	138.8	56.2
<b>MXSHB</b>	Mixed Deciduous Shrubland Complex	0	0	0	21	36.9	14.9
<b>PHLE</b>	<i>Philadelphus lewisii</i> Intermittently Flooded Shrubland	5	5.0	2.0	57	183.3	74.2
<b>SSHB</b>	Mixed Deciduous Short Shrub Complex	0	0	0	46	153.0	62.0
<b>ANCA</b>	<i>Anthriscus caucalis</i> Semi-natural Herbaceous Vegetation	9	35.5	14.4	73	614.3	248.8
<b>BRTE</b>	<i>Bromus tectorum</i> Semi-natural Herbaceous Alliance	15	30.6	12.4	114	884.0	358.0
<b>MXGRS</b>	Mixed Planted and Semi-natural Grassland Complex	1	1.1	0.4	75	713.0	288.8
<b>POPR</b>	<i>Poa pratensis</i> Semi-natural Herbaceous Alliance	0	0	0	4	5.8	2.3
<b>PSSP</b>	<i>Pseudoroegneria spicata</i> Herbaceous Vegetation	17	43.1	17.5	105	1,501.0	607.9
<b>CUTB</b>	Lacustrine Cut Bank Sparse Vegetation	5	3.2	1.3	21	17.8	7.2
<b>ROCK</b>	Rock Outcrop Sparse Vegetation	2	11.7	4.7	72	472.2	191.2
<b>TALS</b>	Talus Sparse Vegetation	0	0	0	7	9.1	3.7
<b>AGRI</b>	Agricultural Business	0	0	0	2	5.3	2.1
<b>BARE</b>	Bare Rock / Sand / Other Bare Ground	1	1.1	0.4	2	4.5	1.8
<b>FACL</b>	Facilities	1	2.6	1.1	1	3.4	1.4
<b>FILD</b>	Planted / Cultivated	0	0	0	5	1,77.9	72.0
<b>POND</b>	Lake / Pond	0	0	0	1	0.1	0.0
<b>RESD</b>	Residential	1	0.2	0.1	8	23.8	9.6
<b>ROAD</b>	Transportation	3	3.6	1.5	7	44.6	18.1
<b>STRM</b>	Stream / River	14	5.2	2.1	1	314.4	127.3
<b>TRANS</b>	Transitional	0	0	0	4	6.3	2.6
Total Vegetation		<b>74</b>	<b>161</b>	<b>65</b>	<b>710</b>	<b>4,778</b>	<b>1,935</b>
Total Sparse Vegetation		<b>7</b>	<b>15</b>	<b>6</b>	<b>100</b>	<b>499</b>	<b>202</b>
Total Land-Use/Land Cover		<b>20</b>	<b>13</b>	<b>5</b>	<b>31</b>	<b>580</b>	<b>235</b>
<b>Totals</b>		<b>101</b>	<b>189</b>	<b>76</b>	<b>841</b>	<b>5,857</b>	<b>2,372</b>

Map Code	Map Unit Description	Heart of the Monster			HEMO Project Area (+environs)		
		Polygon Count	Acres	Hectares	Polygon Count	Acres	Hectares
<b>ACNE</b>	<i>Acer negundo</i> Seasonally Flooded Forest Alliance	3	1.0	0.4	6	15.2	6.2
<b>MXCON</b>	Mixed Conifer Woodland Complex	0	0	0	97	595.4	241.1
<b>MXRIP</b>	Mixed Deciduous Riparian Woodland Complex	0	0	0	32	84.3	34.1
<b>MXWD</b>	Mixed Deciduous Woodland Complex	0	0	0	76	148.3	60.1
<b>PIPO</b>	<i>Pinus ponderosa</i> Woodland Alliance	2	0.6	0.2	117	709.4	287.3
<b>POBA</b>	<i>Populus balsamifera</i> ssp. <i>trichocarpa</i> Temporarily Flooded Woodland Alliance	6	6.8	2.8	22	48.5	19.6
<b>PRDO</b>	<i>Prunus domestica</i> Semi-natural Woodland	7	2.9	1.2	12	10.7	4.3
<b>ROPS</b>	<i>Robinia pseudoacacia</i> Semi-natural Woodland Stand	3	2.6	1.1	18	33.0	13.4
<b>ULPU</b>	<i>Ulmus pumila</i> / <i>Syringa vulgaris</i> Semi-natural Woodland	1	1.5	0.6	1	1.5	0.6
<b>CRDO</b>	<i>Crataegus douglasii</i> Shrubland Alliance	5	2.3	0.9	13	23.0	9.3
<b>MXSHB</b>	Mixed Deciduous Shrubland Complex	1	0.3	0.1	88	189.7	76.8
<b>SYAL</b>	<i>Symphoricarpos albus</i> Shrubland	4	0.5	0.2	12	7.2	2.9
<b>ALPR</b>	<i>Alopecurus pratensis</i> Semi-natural Herbaceous Vegetation	3	7.7	3.1	3	7.8	3.2
<b>BRIN</b>	<i>Bromus inermis</i> Semi-natural Herbaceous Alliance	4	4.0	1.6	16	28.6	11.6
<b>BRTE</b>	<i>Bromus tectorum</i> Semi-natural Herbaceous Alliance	4	2.3	0.9	62	223.7	90.6
<b>CAQU</b>	<i>Camassia (cusickii, quamash)</i> Seasonally Flooded Herbaceous Alliance	1	2.6	1.1	1	2.6	1.1
<b>CEST</b>	<i>Centaurea stoebe</i> Semi-natural Herbaceous Vegetation	2	0.5	0.2	3	1.4	0.6
<b>FEOV</b>	<i>Festuca ovina</i> Semi-natural Herbaceous Vegetation	3	2.8	1.1	3	2.8	1.1
<b>MXGRS</b>	Mixed Planted and Semi-natural Grassland Complex	2	1.7	0.7	87	236.2	95.7
<b>POBU</b>	<i>Poa bulbosa</i> - <i>Poa pratensis</i> Semi-natural Herbaceous Vegetation	2	3.2	1.3	2	3.2	1.3
<b>POPR</b>	<i>Poa pratensis</i> Semi-natural Herbaceous Alliance	5	13.1	5.3	23	28.7	11.6
<b>WEED</b>	Mixed Forbs Semi-natural Herbaceous Vegetation Complex	0	0	0	2	4.0	1.6
<b>GBAR</b>	Gravel Bar Sparse Vegetation	0	0	0	10	29.4	11.9
<b>ROCK</b>	Rock Outcrop Sparse Vegetation	0	0	0	32	97.9	39.6
<b>TALS</b>	Talus Sparse Vegetation	0	0	0	2	3.1	1.3
<b>AGRI</b>	Agricultural Business	0	0	0	45	99.2	40.2
<b>BARE</b>	Bare Rock / Sand / Other Bare Ground	0	0	0	2	2.8	1.1
<b>COMM</b>	Communications and Utilities	0	0	0	2	2.6	1.1
<b>FACL</b>	Facilities	1	0.1	0.0	1	0.1	0.0
<b>FILD</b>	Planted / Cultivated	0	0	0	60	729.1	295.3
<b>HIND</b>	Heavy Industry	0	0	0	3	33.1	13.4



Map Code	Map Unit Description	Heart of the Monster			HEMO Project Area (+environs)		
		Polygon Count	Acres	Hectares	Polygon Count	Acres	Hectares
<b>LIND</b>	Commercial / Light Industry	1	0.1	0.0	26	55.3	22.4
<b>POND</b>	Lake / Pond	0	0	0	9	2.7	1.1
<b>RECR</b>	Entertainment / Recreation	0	0	0	6	24.4	9.9
<b>RESD</b>	Residential	2	0.0	0.0	153	385.3	156.0
<b>ROAD</b>	Transportation	3	2.1	0.9	8	182.9	74.1
<b>STRM</b>	Stream / River	5	2.2	0.9	6	167.9	68.0
<b>TRANS</b>	Transitional	0	0	0	5	18.2	7.4
<b>URBN</b>	Mixed Urban	0	0	0	6	8.5	3.4
Total Vegetation		<b>58</b>	<b>56</b>	<b>23</b>	<b>696</b>	<b>2,405</b>	<b>974</b>
Total Sparse Vegetation		<b>0</b>	<b>0</b>	<b>0</b>	<b>44</b>	<b>130</b>	<b>53</b>
Total Land-Use/Land Cover		<b>12</b>	<b>5</b>	<b>2</b>	<b>332</b>	<b>1,712</b>	<b>693</b>
<b>Totals</b>		<b>70</b>	<b>61</b>	<b>25</b>	<b>1072</b>	<b>4,248</b>	<b>1,720</b>

Map Code	Map Unit Description	Old Chief Joseph Gravesite			OLJO Project Area (+environs)		
		Polygon Count	Acres	Hectares	Polygon Count	Acres	Hectares
<b>MXCON</b>	Mixed Conifer Woodland Complex	1	0.1	0.1	35	116.2	47.1
<b>MXRIP</b>	Mixed Deciduous Riparian Woodland Complex	1	0.1	0.1	45	39.6	16.0
<b>MXWD</b>	Mixed Deciduous Woodland Complex	0	0	0	7	2.1	0.9
<b>PIPO</b>	<i>Pinus ponderosa</i> Woodland Alliance	3	0.8	0.3	41	217.8	88.2
<b>ULPU</b>	<i>Ulmus pumila</i> / <i>Syringa vulgaris</i> Semi-natural Woodland	1	0.3	0.1	1	0.3	0.1
<b>AMAL</b>	<i>Amelanchier alnifolia</i> Shrubland Stand	1	0.1	0.1	1	0.3	0.1
<b>ART-CHR</b>	<i>Artemisia</i> spp. - <i>Chrysothamnus</i> spp. Mixed Shrubland Stand	0	0	0	7	132.7	53.7
<b>MXSHB</b>	Mixed Deciduous Shrubland Complex	0	0	0	19	10.5	4.3
<b>BRTE</b>	<i>Bromus tectorum</i> Semi-natural Herbaceous Alliance	0	0	0	34	114.2	46.3
<b>LECI-POPR</b>	<i>Leymus cinereus</i> - <i>Poa pratensis</i> Herbaceous Vegetation	1	2.1	0.9	10	23.1	9.4
<b>MXGRS</b>	Mixed Planted and Semi-natural Grassland Complex	0	0	0	50	547.2	221.6
<b>POPR</b>	<i>Poa pratensis</i> Semi-natural Herbaceous Alliance	4	0.9	0.4	71	176.6	71.5
<b>PSSP</b>	<i>Pseudoroegneria spicata</i> Herbaceous Vegetation	3	0.8	0.3	31	350.5	142.0
<b>CUTB</b>	Lacustrine Cut Bank Sparse Vegetation	0	0	0	10	6.5	2.6
<b>AGRI</b>	Agricultural Business	0	0	0	24	31.2	12.6
<b>BARE</b>	Bare Rock / Sand / Other Bare Ground	0	0	0	1	1.0	0.4
<b>CANL</b>	Canal / Ditch	0	0	0	15	11.6	4.7
<b>COMM</b>	Communications and Utilities	0	0	0	2	1.8	0.7
<b>FILD</b>	Planted / Cultivated	0	0	0	33	746.9	302.5
<b>LAKE</b>	Lake / Pond	0	0	0	1	447.3	181.2
<b>LIND</b>	Commercial / Light Industry	0	0	0	20	22.3	9.0
<b>POND</b>	Lake / Pond	0	0	0	10	8.9	3.6
<b>RECR</b>	Entertainment / Recreation	0	0	0	1	15.3	6.2
<b>RESD</b>	Residential	0	0	0	107	222.8	90.2
<b>ROAD</b>	Transportation	1	0.3	0.1	6	88.5	35.8
<b>STRM</b>	Stream / River	0	0	0	2	6.0	2.4
<b>TRANS</b>	Transitional	2	0.3	0.1	22	17.4	7.0
Total Vegetation		<b>15</b>	<b>5</b>	<b>2</b>	<b>352</b>	<b>1,731</b>	<b>701</b>
Total Sparse Vegetation		<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>6.5</b>	<b>2.6</b>
Total Land-Use/Land Cover		<b>3</b>	<b>1</b>	<b>0.2</b>	<b>244</b>	<b>1,621</b>	<b>657</b>
<b>Totals</b>		<b>18</b>	<b>6</b>	<b>3</b>	<b>606</b>	<b>3,359</b>	<b>1,360</b>

Map Code	Map Unit Description	Spalding Site			SPAL Project Area (+environs)		
		Polygon Count	Acres	Hectares	Polygon Count	Acres	Hectares
ACPL	<i>Acer platanoides</i> Semi-natural Woodland Stand	3	1.8	0.7	3	1.8	0.7
ACSA	<i>Acer saccharinum</i> Forest (Ornamental)	9	9.8	4.0	9	13.5	5.5
ELAN	<i>Elaeagnus angustifolia</i> Semi-natural Woodland Alliance	2	0.2	0.1	4	1.3	0.5
MXCON	Mixed Conifer Woodland Complex	2	1.1	0.4	2	1.2	0.5
MXRIP	Mixed Deciduous Riparian Woodland Complex	0	0	0	32	34.4	13.9
MXWD	Mixed Deciduous Woodland Complex	12	2.8	1.1	81	77.1	31.2
PIPO	<i>Pinus ponderosa</i> Woodland Alliance	3	5.6	2.3	3	5.9	2.4
POBA	<i>Populus balsamifera</i> ssp. <i>trichocarpa</i> Temporarily Flooded Woodland Alliance	10	4.1	1.7	18	25.3	10.2
ROPS	<i>Robinia pseudoacacia</i> Semi-natural Woodland Stand	16	4.4	1.8	19	8.9	3.6
SAAM	<i>Salix amygdaloides</i> Woodland	2	0.4	0.2	5	5.3	2.1
CRDO	<i>Crataegus douglasii</i> Shrubland Alliance	9	2.9	1.2	85	214.3	86.8
MXSHB	Mixed Deciduous Shrubland Complex	0	0	0	83	221.0	89.5
PHLE	<i>Philadelphus lewisii</i> Intermittently Flooded Shrubland	1	0.1	0.1	3	1.4	0.6
SAEX	<i>Salix exigua</i> Temporarily Flooded Shrubland	1	0.1	0.1	19	20.6	8.3
SYAL	<i>Symphoricarpos albus</i> Shrubland	2	0.2	0.1	15	62.9	25.5
BRDI	<i>Bromus diandrus</i> Herbaceous Vegetation	6	3.3	1.3	88	171.7	69.5
BRTE	<i>Bromus tectorum</i> Semi-natural Herbaceous Alliance	13	15.1	6.1	180	639.4	259.0
ELRE	<i>Elymus repens</i> Herbaceous Alliance	6	1.7	0.7	14	7.4	3.0
FEOV	<i>Festuca ovina</i> Semi-natural Herbaceous Vegetation	12	8.8	3.6	21	19.9	8.1
MEDW	Dry Mixed Herbaceous Vegetation Complex	4	7.1	2.9	4	7.1	2.9
MXGRS	Mixed Planted and Semi-natural Grassland Complex	0	0	0	193	1209.1	489.7
PHAR	<i>Phalaris arundinacea</i> Western Herbaceous Vegetation	5	0.9	0.4	40	45.5	18.4
POBU	<i>Poa bulbosa</i> - <i>Poa pratensis</i> Semi-natural Herbaceous Vegetation	2	5.4	2.2	2	5.4	2.2
POPR	<i>Poa pratensis</i> Semi-natural Herbaceous Alliance	11	6.7	2.7	28	31.0	12.6
GBAR	Gravel Bar Sparse Vegetation	5	1.2	0.5	8	3.0	1.2
ROCK	Rock Outcrop Sparse Vegetation	0	0	0	151	1006.6	407.7
TALS	Talus Sparse Vegetation	0	0	0	1	1.1	0.4
AGRI	Agricultural Business	0	0	0	35	49.8	20.2
FACL	Facilities	5	2.6	1.1	5	2.6	1.1
FILD	Planted / Cultivated	1	0.1	0.1	36	960.8	389.1
HIND	Heavy Industry	0	0	0	3	4.1	1.7

Map Code	Map Unit Description	Spalding Site			SPAL Project Area (+environs)		
		Polygon Count	Acres	Hectares	Polygon Count	Acres	Hectares
<b>RESD</b>	Residential	2	0.1	0.1	48	71.0	28.8
<b>ROAD</b>	Transportation	7	5.1	2.1	5	147.0	59.5
<b>STRM</b>	Stream / River	4	1.2	0.5	6	241.9	98.0
<b>TRANS</b>	Transitional	0	0	0	15	23.8	9.6
<b>URBN</b>	Mixed Urban	0	0	0	1	4.2	1.7
Total Vegetation		<b>131</b>	<b>83</b>	<b>34</b>	<b>951</b>	<b>2,831</b>	<b>1,147</b>
Total Sparse Vegetation		<b>5</b>	<b>1</b>	<b>0</b>	<b>160</b>	<b>1,011</b>	<b>409</b>
Total Land-Use/Land Cover		<b>19</b>	<b>9</b>	<b>4</b>	<b>154</b>	<b>1,505</b>	<b>610</b>
<b>Totals</b>		<b>155</b>	<b>93</b>	<b>38</b>	<b>1,265</b>	<b>5,347</b>	<b>2,166</b>



Map Code	Map Unit Description	Weippe Prairie			WEPR Project Area (+environs)		
		Polygon Count	Acres	Hectares	Polygon Count	Acres	Hectares
<b>MXCON</b>	Mixed Conifer Woodland Complex	0	0	0	114	855.6	346.5
<b>MXRIP</b>	Mixed Deciduous Riparian Woodland Complex	1	0.1	0.0	46	72.2	29.2
<b>MXWD</b>	Mixed Deciduous Woodland Complex	0	0	0	84	596.9	241.7
<b>CRDO</b>	<i>Crataegus douglasii</i> Shrubland Alliance	34	13.2	5.3	41	22.1	9.0
<b>MXSHB</b>	Mixed Deciduous Shrubland Complex	0	0	0	22	104.7	42.4
<b>ALPR</b>	<i>Alopecurus pratensis</i> Semi-natural Herbaceous Vegetation	28	142.5	57.7	30	161.5	65.4
<b>BRIN</b>	<i>Bromus inermis</i> Semi-natural Herbaceous Alliance	10	37.6	15.2	23	122.1	49.5
<b>CAQU</b>	<i>Camassia (cusickii, quamash)</i> Seasonally Flooded Herbaceous Alliance	32	46.3	18.8	33	49.1	19.9
<b>MXGRS</b>	Mixed Planted and Semi-natural Grassland Complex	6	0.2	0.1	153	1598.9	647.6
<b>PHAR</b>	<i>Phalaris arundinacea</i> Western Herbaceous Vegetation	1	1.7	0.7	1	1.9	0.8
<b>POPR</b>	<i>Poa pratensis</i> Semi-natural Herbaceous Alliance	14	20.2	8.2	29	127.3	51.6
<b>RAAL</b>	<i>Ranunculus alismifolius</i> Temporarily Flooded Herbaceous Vegetation	14	11.9	4.8	14	19.0	7.7
<b>TYLA</b>	<i>Typha (latifolia, angustifolia)</i> Western Herbaceous Vegetation	0	0	0	2	1.8	0.7
<b>WEED</b>	Mixed Forbs Semi-natural Herbaceous Vegetation Complex	0	0	0	13	37.5	15.2
<b>AGRI</b>	Agricultural Business	2	0.2	0.1	57	129.0	52.2
<b>CANL</b>	Canal / Ditch	2	1.3	0.5	2	1.3	0.5
<b>CEME</b>	Cemeteries	0	0	0	1	2.9	1.2
<b>FACL</b>	Facilities	1	1.1	0.4	1	1.1	0.4
<b>FILD</b>	Planted / Cultivated	2	0.5	0.2	61	1584.4	641.7
<b>HIND</b>	Heavy Industry	0	0	0	1	5.9	2.4
<b>LIND</b>	Commercial / Light Industry	0	0	0	5	9.1	3.7
<b>POND</b>	Lake / Pond	3	0.2	0.1	65	32.3	13.1
<b>RECR</b>	Entertainment / Recreation	0	0	0	1	4.8	1.9
<b>RESD</b>	Residential	0	0	0	31	56.5	22.9
<b>ROAD</b>	Transportation	4	1.6	0.6	3	110.4	44.7
<b>STRM</b>	Stream / River	1	3.4	1.4	9	22.3	9.0
<b>TRANS</b>	Transitional	0	0	0	8	61.2	24.8
<b>URBN</b>	Mixed Urban	0	0	0	9	14.9	6.0
Total Vegetation		<b>140</b>	<b>274</b>	<b>111</b>	<b>605</b>	<b>3,771</b>	<b>1,527</b>
Total Land-Use/Land Cover		<b>15</b>	<b>8</b>	<b>3</b>	<b>254</b>	<b>2,036</b>	<b>825</b>
<b>Totals</b>			<b>282</b>	<b>114</b>	<b>859</b>	<b>5,807</b>	<b>2,352</b>

Map Code	Map Unit Description	White Bird Battlefield			WHBI Project Area (+environs)		
		Polygon Count	Acres	Hectares	Polygon Count	Acres	Hectares
<b>CELA</b>	<i>Celtis laevigata</i> var. <i>reticulata</i> Woodland Alliance	40	45.9	18.6	136	404.3	163.7
<b>MXCON</b>	Mixed Conifer Woodland Complex	0	0	0	80	457.4	185.2
<b>MXRIP</b>	Mixed Deciduous Riparian Woodland Complex	0	0	0	11	12.7	5.1
<b>MXWD</b>	Mixed Deciduous Woodland Complex	5	2.6	1.1	78	281.0	113.8
<b>POBA</b>	<i>Populus balsamifera</i> ssp. <i>trichocarpa</i> Temporarily Flooded Woodland Alliance	7	11.2	4.5	40	226.6	91.8
<b>MXSHB</b>	Mixed Deciduous Shrubland Complex	0	0	0	205	842.1	341.1
<b>SSHB</b>	Mixed Deciduous Short Shrub Complex	0	0	0	183	829.8	336.1
<b>SYAL</b>	<i>Symphoricarpos albus</i> Shrubland	11	9.7	3.9	27	97.1	39.3
<b>ALPR</b>	<i>Alopecurus pratensis</i> Semi-natural Herbaceous Vegetation	13	51.4	20.8	16	70.3	28.5
<b>BRTE</b>	<i>Bromus tectorum</i> Semi-natural Herbaceous Alliance	51	282.9	114.6	263	2244.6	909.1
<b>CADR</b>	<i>Cardaria draba</i> Semi-natural Herbaceous Vegetation	3	7.9	3.2	3	7.9	3.2
<b>CESO-COAR</b>	<i>Centaurea solstitialis</i> - <i>Convolvulus arvensis</i> Semi-natural Herbaceous Veg.	41	261.2	105.8	91	602.9	244.2
<b>ELRE</b>	<i>Elymus repens</i> Herbaceous Alliance	8	29.9	12.1	30	89.3	36.2
<b>MXGRS</b>	Mixed Planted and Semi-natural Grassland Complex	1	0.7	0.3	176	1458.9	590.9
<b>POPR</b>	<i>Poa pratensis</i> Semi-natural Herbaceous Alliance	6	21.5	8.7	24	130.6	52.9
<b>PSSP</b>	<i>Pseudoroegneria spicata</i> Herbaceous Vegetation	61	274.7	111.3	273	2168.8	878.4
<b>TACA</b>	<i>Taeniatherum caput-medusae</i> Semi-natural Herbaceous Vegetation	28	136.1	55.1	68	721.6	292.2
<b>TYLA</b>	<i>Typha (latifolia, angustifolia)</i> Western Herbaceous Vegetation	6	8.2	3.3	6	8.2	3.3
<b>WEED</b>	Mixed Forbs Semi-natural Herbaceous Vegetation Complex	21	98.0	39.7	76	375.5	152.1
<b>CUTB</b>	Lacustrine Cut Bank Sparse Vegetation	0	0	0	2	15.8	6.4
<b>ROCK</b>	Rock Outcrop Sparse Vegetation	1	1.8	0.7	203	696.8	282.2
<b>TALS</b>	Talus Sparse Vegetation	2	0.3	0.1	54	80.8	32.7
<b>AGRI</b>	Agricultural Business	0	0.0	0.0	29	67.6	27.4
<b>BARE</b>	Bare Rock / Sand / Other Bare Ground	0	0	0	15	18.7	7.6
<b>COMM</b>	Communications and Utilities	0	0	0	1	0.9	0.4
<b>FACL</b>	Facilities	0	0	0	0	0	0
<b>FILD</b>	Planted / Cultivated	2	0.0	0.0	21	162.7	65.9
<b>LIND</b>	Commercial / Light Industry	0	0	0	2	3.6	1.5
<b>POND</b>	Lake / Pond	4	2.4	1.0	18	6.4	2.6
<b>RESD</b>	Residential	0	0	0	16	42.5	17.2
<b>ROAD</b>	Transportation	8	7.4	3.0	8	205.0	83.0

Map Code	Map Unit Description	White Bird Battlefield			WHBI Project Area (+environs)		
		Polygon Count	Acres	Hectares	Polygon Count	Acres	Hectares
<b>STRM</b>	Stream / River	4	0.6	0.2	9	53.8	21.8
<b>TRANS</b>	Transitional	1	0.1	0.0	31	92.9	37.6
<b>URBN</b>	Mixed Urban	0	0	0	1	1.5	0.6
Total Vegetation		<b>302</b>	<b>1,242</b>	<b>503</b>	<b>1,786</b>	<b>11,030</b>	<b>4,467</b>
Total Sparse Vegetation		<b>3</b>	<b>2</b>	<b>1</b>	<b>259</b>	<b>793</b>	<b>321</b>
Total Land-Use/Land Cover		<b>19</b>	<b>11</b>	<b>4</b>	<b>151</b>	<b>656</b>	<b>266</b>
<b>Totals</b>		<b>324</b>	<b>1,255</b>	<b>508</b>	<b>2,196</b>	<b>12,479</b>	<b>5,054</b>

Normally the standard minimum mapping unit (MMU) for NPS vegetation classification and mapping projects is defined as 0.5 hectare (1.24 acres). However, this is a nominal unit and due to the resolution of the imagery and small size of the NEPE sites it was reduced to ¼ acre (0.1 hectare) for wetland, woodlands, and rare shrub classes. This MMU size allowed for more detail in the mapping and allowed for better delineation of sites deemed important for NEPE management. The ability to recognize small patches of vegetation is reflected in the high number of polygons created and the average size of the polygons for some of the rarer types.

The NEPE vegetation map should more appropriately be considered a spatial database that also contains many additional polygon attributes not presented in the preceding table (i.e., density, height, and pattern). These data are difficult to convey in a table or on a two-dimensional map, but the different attributes can be combined in many ways and at different scales and resolutions to produce other products representing the full spectrum of vegetation diversity. For example, older, more mature riparian woodlands can be quickly located by querying the GIS vegetation layer for the specific vegetation type and then reselecting only those polygons with high density (>60%) and the tallest height class (15 – 30 meters).

Figure 51 is an example of a fine scale (1:4,000-scale) NEPE vegetation map focused on OLJO created from the GIS spatial database with the 2011 NAIP imagery as the background.

### Accuracy Assessment

The 2011 AA yielded 686 points distributed throughout NEPE and these were used to assess the thematic accuracy of the GIS vegetation layer. Using the AA GIS point file created from the AA point coordinates a preliminary error matrix was created and reviewed by CTI. During the review process all AA points whose primary plant association did not match the corresponding map class designation in the GIS layer were highlighted. These mis-matches were further investigated to determine if the second, third or other vegetation call matched. Upon completion of the review a final error matrix was created (Table 17). The final assessment revealed an overall accuracy of 93%.

**Instruction on Using the Accuracy Assessment Contingency Table:** The contingency table or error matrix presents an array of numbers set out in rows and columns corresponding to a particular vegetation map unit relative to the actual vegetation type as verified on the ground. The column headings represent the vegetation classification as determined in the field and the row headings represent the vegetation classification taken from the vegetation map. The highlighted diagonal indicates the number of points assessed in the field that agree with the map label. Conversely, the inaccuracies of each map unit are described as both errors of inclusion (user's or commission errors) and errors of exclusion (producer's or omission errors). By reading across this table (i.e., rows) one can calculate the percent error of commission, or how many polygons for each map unit were incorrectly labeled when compared to the field data. By reading down the table (i.e., columns) one can calculate the percent error of omission, or how many polygons for that type were left off the map. Numbers "on the diagonal" tell the user how well the map unit was interpreted and how confident they can be in using it. Numbers "off the diagonal" yield important information about the deficiencies of the map including which types were: 1) over-mapped - commission errors on the right –more of this type was mapped than occurs at the site or 2) under-mapped - omission errors on the bottom – some of this type was mapped as other map units



## Example of Vegetation Map Classes

<b>MXCON</b>	Mixed Conifer Woodland Complex
<b>MXRIP</b>	Mixed Deciduous Riparian Woodland Complex
<b>MXWD</b>	Mixed Deciduous Woodland Complex
<b>PIPO</b>	<i>Pinus ponderosa</i> Woodland Alliance
<b>ULPU</b>	<i>Ulmus pumila</i> / <i>Syringa vulgaris</i> Semi-natural Woodland
<b>AMAL</b>	<i>Amelachier alnifolia</i> Shrubland Stand
<b>ART-CHR</b>	<i>Artemisia</i> spp. - <i>Chrysothamnus</i> spp. Mixed Shrubland Stand
<b>MXSHB</b>	Mixed Deciduous Shrubland Complex
<b>BRTE</b>	<i>Bromus tectorum</i> Semi-natural Herbaceous Alliance
<b>MXGRS</b>	Mixed Planted and Semi-natural Grassland Complex
<b>LECI-POPR</b>	<i>Leymus cinereus</i> - <i>Poa pratensis</i> Herbaceous Vegetation
<b>POPR</b>	<i>Poa pratensis</i> Semi-natural Herbaceous Alliance
<b>PSSP</b>	<i>Pseudoroegneria spicata</i> Herbaceous Vegetation
<b>CUTB</b>	Cut Bank Sparse Vegetation
<b>AGRI</b>	Agricultural Business
<b>BARE</b>	Bare Rock / Sand / Other Bare Ground
<b>CANL</b>	Canal / Ditch
<b>COMM</b>	Communications and Utilities
<b>FILD</b>	Planted / Cultivated
<b>LAKE</b>	Lake / Pond
<b>LIND</b>	Commercial / Light Industry
<b>POND</b>	Lake / Pond
<b>RECR</b>	Entertainment / Recreation
<b>RESD</b>	Residential
<b>ROAD</b>	Transportation
<b>STRM</b>	Stream / River
<b>TRANS</b>	Transitional

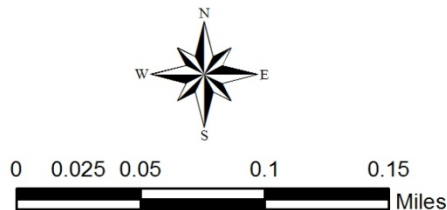


Figure 51. Example of the NEPE vegetation map layer.



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[illegible]

Examination of the final error matrix showed concentrations of users' error among three map classes, possible reasons for this error are as follows:

- 1) The *Acer negundo* Seasonally Flooded Forest had lower than expected accuracy (67%) and the one mis-matched point was confused with the very similar *Populus balsamifera* ssp. *trichocarpa* Temporarily Flooded Woodland Alliance. The close resemblance of the canopy signature between these two deciduous species likely explains this error. Another explanation could be due to intermixing of these two tree species in some areas of NEPE.
- 2) The *Salix amygdaloides* Woodland also had 67% user's accuracy and one mis-matched point was confused with the *Phalaris arundinacea* Western Herbaceous Vegetation map class. This likely represents a point that was taken in a mesic inclusion of reed canarygrass or occurred on the edge of a woodland but was underneath or shaded by the canopy on the NAIP imagery.
- 3) The MXGRS map unit was primarily used for grassland stands that were not documented or sampled during the classification plot data collection stage. Most of these grasslands occurred outside of the NEPE unit boundaries but a few very unique stands occurred inside NEPE were labeled MXGRS because they were unlike the surrounding known grassland stands. During the AA sampling, field ecologists verified these stands as very wet Kentucky bluegrass-dominated fields (the lush growth of Kentucky bluegrass explains the unique photo-signature).

Other general trends in the AA reveal the difficulty in obtaining sufficient numbers of AA points for very rare or small vegetation stands. Having few AA points decreases the confidence levels (i.e., makes them less accurate) and makes it difficult to assume the accuracy of these classes with any certainty. Other trends in the AA include: (1) the difficulty in separating similar-looking grassland map units; (2) the complexity of accurately separating native grasslands with some weedy forbs from disturbed sites completely dominated by weedy forbs; and (3) attempting to reliably delineate different deciduous tree species from one another when they intermix and/or have an overtopping canopy. Additionally, some of the differences/confusion can be explained by the difficulty in resolving the difference in scale and perspective between viewing vegetation on the imagery and assessing it on the ground. For example, field sampling could have occurred in a small forb or weed patch that was actually part of a larger, more heterogeneous grassland polygon.



## Discussion

Nez Perce National Historical Park consists of various individual sites significant to the history of the Nez Perce Tribe and people. The vegetation within seven units managed by the NPS was classified and inventoried in this project. The distances between the park units ranged from about 10 miles between WEPR and HEMO to over 400 miles between BEPA and OLJO which resulted in many unique challenges to complete this project. The most important challenge is to adequately describe and document the unique vegetation at each site while maintaining the continuity across all of NEPE. Each unit presented unique challenges due to limited accessibility onto adjacent/nearby lands, steep slopes, water crossings, and past land-use practices. The successful inventory process described in this report revealed opportunities for improvement that are discussed herein.

Approaches that worked well: Field data and local descriptions of the plant associations provided by project ecologists were extremely important ancillary data sources used by the GIS contractor to delineate map classes. The high-quality field data provided valuable on-site information for photo signature development and the high-to-moderate density of the classification plots provided a strong baseline to build the entire mapping model. Timely and high resolution base imagery is also essential to produce detailed and accurate maps. For mapping, the 2009 and 2011 NAIP imagery was important to this project, providing a timely, high resolution base product that resulted in a recent final map with high overall accuracy.

Areas for Improvement: Inherent to all vegetation inventory projects is the need to produce both a consistent vegetation classification and a comprehensive set of map units. Typically, the systems are very similar, but when using a national classification such as the NVCS there is usually not a strict 1:1 correspondence. Nonconformity is due to the remote sensing nature of the interpretation and its ability to delineate map units based only on photo signatures. Subtle vegetation characteristics due to the presence of non-native weedy species, overlapping canopies, and small trees/shrubs can be seen on the ground but are not necessarily apparent on the imagery. Shadows, soil reflections, and the timing of the imagery acquisition can further affect the vegetation signatures. In the future if a more detailed map or classification is needed, especially for the complex non-native grasslands and riparian woodlands, more field-based ground-truthing work could be concentrated or focused at each NEPE unit. Similarly, if more precision is needed for the delineation of the environs vegetation types more sampling and ground-truthing of the map could be performed if permission is granted by the landowners.

## **Field Survey**

The vegetation classification data driving this project should be used as the baseline from which to begin future vegetation studies. New field survey work in a judicious timeframe would improve both the classification (plant association descriptions) and mapping (refined linework) efforts. Using the AA as a guide, map classes with lower accuracy could be further surveyed and boundaries delineated in the field to create a more accurate GIS layer. While it may appear that there are a large number of plant associations and vegetation alliances described for each of these relatively small areas, some were only minimally sampled likely due to time and budget limitations. For example, some of the herbaceous vegetation types could be further examined throughout the growing season to document both the cool and warm season grass species in order to refine stand composition. Also, accessing neighboring lands would allow new classification plot samples to be obtained increasing the confidence in these types, thereby strengthening the classification.

## **Vegetation Classification**

In addition to private lands access, the other main classification challenge for NEPE is documenting changes to plant life caused by wildfire, drought, erosion, stream levels/flooding, prescribed burns, agricultural pressures (grazing, non-native plantings), and other anthropogenic disturbance. Changes can include reduction of tree and shrub cover or outright removal and spread of invasive plant species. At all times, but especially after these events, new data should be collected to document vegetation changes over time. Additional specialized and targeted data collection in affected areas along with a better understanding of which plant species were historically planted (e.g. black locust and silver maple trees) versus recent additions to the landscape would help to document vegetation changes and would greatly increase the understanding of the landscape in general.

Of special consideration for future NEPE classification refinement would be the interesting mix of native graminoids with non-native grasses and forbs. The herbaceous vegetation communities form intricate ecotones with much species overlap among the dominant and characteristic species. From a management perspective it is likely that some control efforts may occur especially for the noxious, most invasive, and troublesome weeds. The removal of any dominant non-native species through mowing, spraying, fire, or mechanical means will affect the list of NVC associations and alliances. Eliminating or greatly reducing the size and frequency of the non-native and semi-natural vegetation may result in an increase in the importance of the native communities and the need to expand on, or add to, the list of the natural plant associations/vegetation alliances in the future.

## **Digital Imagery and Mapping**

The vegetation map for NEPE was based primarily on the 2011 NAIP ortho-imagery. Therefore, the resulting mapping products correspond to the summer of 2011 timing of image acquisition (i.e., snapshot in time). As the data are used, it should be remembered that fires and other changes to the landscape since the summer of 2011 are not included in this product. In the future it might be beneficial to update the map with newer imagery and GPS coordinates (perimeters) for major events (e.g., wildfire perimeters, insect infestation events, avalanches/mass wasting, etc).



## Accuracy Assessment

An important and necessary aspect of this project is the accuracy assessment; collecting independent ground data determines the usefulness of the vegetation map. As such, users of this product should remember that the GIS mapping and the classification portions were conducted separately from both the classification plot and AA field data collection. Employing divisions when completing tasks created some challenges related to communication among the teams, including: (1) adequately conveying changes to the vegetation classification based on finding potentially new vegetation types during the field portion of the AA; (2) thoroughly testing and adjusting the field key to remove confusing couplets among similar types; (3) insuring that adequate sample sizes are collected for rare and infrequent types; and (4) avoiding having to collect more than the estimated 30 data points for common types. One example for this project occurred at BUED where the classification plot data collection team of botanists identified a dominant forb as Queen Anne's lace (*Daucus carota*) which was later identified as bur chervil by the AA field crews.

Actual errors in the mapping likely stemmed from limitations within the ortho-photography (as previously described), natural changes in the vegetation between field sampling and the acquisition date of the imagery, dichotomous break errors in the field key, or the difficulty in establishing an overhead perspective to exactly match the ground view. Although the accuracy for NEPE assessed high, improvements can be made and users should fully explore and understand the sources of error as presented in the error matrix.

It is also important to understand that the mapping portion of this project is primarily a remotely sensed exercise and the field work was conducted on site, therefore all resulting products are scale dependent. In general the mapping portions should be viewed as a broader overview and the field data as site-specific. An analyst can enlarge the imagery beyond the 1:12,000-scale using GIS software and see more detail; however it should be remembered that the actual interpretation/mapping was conducted at this scale. As such, any work performed with this product at a finer scale (enlarged image) could lead to some uncertainty. In contrast, the field work was conducted at individual locations in one sampling window and extrapolation using these locations to represent out-lying areas or using them to determine species presence at different times/seasons is less reliable. Database users should recognize scale limitations and balance research and modeling projects accordingly.

## Future Recommendations

This project represents the best efforts of a multi-disciplinary team over a short time period. In order to create the best possible "long-term" vegetation classification for NEPE and the most accurate and detailed GIS layer, this project should be viewed as a place to start or baseline rather than an end product. In other words, present and future NPS staff should be encouraged to scrutinize this project, building from its strengths and bolstering its weaknesses. One example would be to periodically perform field checking by examining the map in the field (use qualified NPS or contract staff), document changes, and incorporate changes into newer versions. Realizing that this project represents a snapshot in time, future research can help to understand the vegetation in and around NEPE and how it changes over time.

In summary the products presented herein will assist to direct future vegetation and land-use monitoring and management, as follows:

1. The diversity of plant species and dynamic nature of NEPE with respect to weed control, fire, stream flow fluctuations, and other outside influences warrants periodic **field surveys** by experienced ecologists. Working with and sampling more of the plant communities in the project environs would also be beneficial allowing for the possibility of discovering new associations, updating the descriptions of the current plant associations, and devising better landscape management strategies. All new information could be used to update both the GIS map layer (i.e., better delineation) and the classification (i.e., new associations).
2. Remote sensing does not replace on-the-ground knowledge provided by GPS-linked plots, observations, photographs, and ground verification. Time, topographic features, and funding limitations curtailed the amount of map **ground-truthing** performed. As research opportunities arise, maps should be examined in the field by experienced crews. Also GPS receiver data and other GIS layers (such as soils and geology) should be used to improve and update the spatial data. Data could be collected on a standard field form, stored, and then used to update the GIS layer on an annual basis. The vegetation map layer should not be viewed as static but should be updated with more current and accurate information.
3. To better understand the limitations of the map, the **accuracy assessment** data presented in the error matrix should be thoroughly reviewed by NPS staff. Map classes with low accuracy should be examined to determine if they could be improved with future studies using ground-truthing or other remote-sensing formats (i.e., fine-scale imagery, hyperspectral, etc). Also, landscape modeling may help to tease out the location of specific types based on specific habitat information. For some applications it may make sense to combine map classes into higher units, such as alliances or ecological systems to improve their accuracy.
4. For monitoring purposes, **change over time** could be addressed by similar remote sensing projects. New imagery acquired at regular intervals (every 5-6 years) could be used to create up-to-date vegetation layers that could be overlain on this baseline vegetation and land-use layer. Any changes between the two layers could be extracted and analyzed. Also periodically and immediately following vegetation altering events new data should be collected and any changes noted in a new vegetation layer. That way, new vegetation map layers can be prepared on a regular basis to prevent the vegetation map from becoming out-dated over time.
5. In the future, resource management personnel could link the habitat for **species of concern** to specific associations and map units. These map units could be used to help locate potential sites of rare, endangered, or threatened species and communities in the field or identify areas for non-native plant removal or treatment. Known populations of threatened, endangered, or non-native species could be overlain on the vegetation map using point or small polygon layers to extract helpful plant community indicator data such as soils, slope, aspect, hydrology, etc.

## **Research Opportunities**

Having an accurate and current vegetation classification and map in a geodatabase presents many new and exciting research opportunities. Research could include expanding or linking the GIS layer to derive other information including fire models, habitat monitoring locations, guides for rare plant surveys, wildlife habitat structural analyses, and inventorying areas that are likely vectors for invasive species. The map could also be enhanced by overlaying other existing GIS layers including geology, hydrology, elevation, and soils. In this manner complex interactions between these layers could be examined and yield important information about growth rates, regeneration after disturbance, biomass distribution, and stream morphology among others. Through innovative analyses the vegetation layer could be used as a baseline for other ecological and climate-related studies including examining how the vegetation is impacted by global warming events and how it interacts with soil chemistry, pollution, paleontological/archeological sites, insect infestations, weather patterns, etc.



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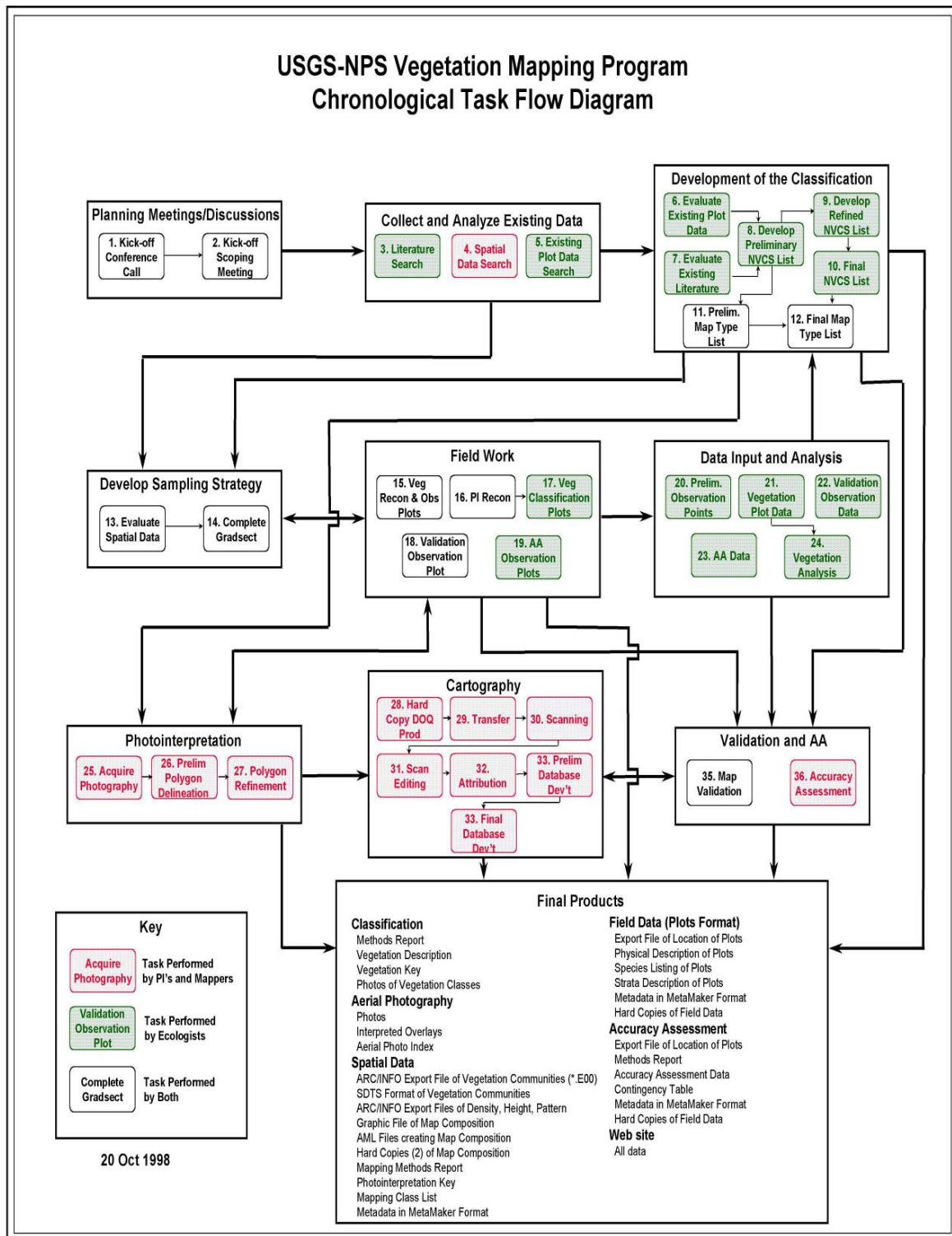


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# Appendix A - Components and Flow Diagram of the Vegetation Inventory Program



Source: Tom Owens, USGS





## **Appendix B - Field Data Forms and Instructions**

### **IDENTIFIERS/LOCATORS**

#### Plot Code

Code indicating the specific plot within the vegetation polygon.

#### Surveyors

Names of surveyors, with principal surveyor listed first.

#### Date

Date the survey was taken; year, month and day.

#### BPU Code

The biophysical unit identified.

#### Provisional Community Name

Using the provisional classification of the park that was provided, assign the name of the vegetation type which most closely resembles this type. Enter the finest level of the classification possible. If it's a new type, name it based on the two or three most dominant species in the plot.

#### Quad Name

Appropriate name/scale from survey map used; use 7.5-minute quadrangle if possible.

#### Park Site Name

Provisional name assigned by field worker that describes where the data were collected. It should represent an identifiable feature on a topographic map.

#### GPS Rover File

Record the number of the file from the GPS unit.

#### Field UTM X

Use GPS; do not estimate. If you can't get a GPS reading, estimate coordinates from a topo map and note on the form that this method was used.

#### Field UTM Y

Use GPS; do not estimate. If you can't get a GPS reading, estimate coordinates from a topo map and note on the form that this method was used.

### Error

Error is recorded from the GPS unit.

### Plot Length and Plot Width

Enter width and length dimensions for square or rectangular plots. Choose the appropriate plot size based on the following:

Vegetation Class	Standard Plot Dimensions	PLOT AREA
Forest	20 m x 20 m	400 m <sup>2</sup>
Woodland	20 m x 20 m	400 m <sup>2</sup>
Shrubland	20 m x 20 m	400 m <sup>2</sup>
Dwarf-shrubland (heath)	10 m x 10 m	100 m <sup>2</sup>
Herbaceous	10 m x 10 m	100 m <sup>2</sup>
Nonvascular	5 m x 5 m	25 m <sup>2</sup>

### Photo numbers

If photos of the plot have been taken at the time of sampling, indicate their numbers from the ones the camera assigns.

### Plot Permanent

Note if the plot has been permanently marked.

### Plot Representativeness

Does this plot represent the full variability of the polygon? If not, were additional plots taken?

Note: we distinguish in this section the plot's ability to represent the stand or polygon you are sampling as one component and the ability of this sample to represent the range of variability of the association in the entire mapping area. The former comment may be ascertained by reconnaissance of the stand. The latter comment comes only after some familiarity with the vegetation type throughout the mapping area and may be left blank if you have no opinion at this time.

## ENVIRONMENTAL DESCRIPTION

### Elevation

Elevation of the plot obtained from the GPS

### Slope

Measure the slope in percent using a clinometer.

### Aspect

Measure the aspect using a compass (be sure compass is set to correct for the magnetic declination).

### Topographic Position

Choose one:

INTERFLUVE (crest, summit, ridge). Linear top of ridge, hill, or mountain; the elevated area between two fluves (drainageways) that sheds water to the drainageways.

SHOULDER (shoulder slope, upper slope, convex creep slope).  
Geomorphic component that forms the uppermost inclined surface at the top of a slope. Includes the transition zone from backslope to summit. Surface is dominantly convex in profile and erosional in origin.

BACKSLOPE. Subset of midslopes that are steep, linear and may include cliff segments (fall faces).

FOOTSLOPE (lower slope, foot slope, colluvial footslope). Inner gently inclined surface at the base of a slope. Surface profile is generally concave and a transition between backslope and toeslope.

TOESLOPE (alluvial toeslope). Outermost gently inclined surface at base of a slope. In profile, commonly gentle and linear and characterized by alluvial deposition.

TERRACE Valley floor or shoreline representing the former position of an alluvial plain, lake, or shore.

CHANNEL (narrow valley bottom, gully, arroyo). Bed of single or braided watercourses commonly barren of vegetation and formed of modern alluvium.

BASIN FLOOR (depression). Nearly level to gently sloping, bottom surface of a basin.

### Describe Topographic Position (Optional)

Give more details here, if needed.

### Cowardin System

Indicate “upland” if the system is not a wetland. If the system is a wetland, check off the name of the USFWS system which best describes its hydrology and landform.

- Riverine: Below the high water mark on a moving water system (a creek bed). A community of *Eleocharis* on a sand bar would be in this category.
- Palustrine: In the riparian zone. Plants regularly have wet roots through much of the summer. A community of willows and sedges would be in this category.
- Lacustrine: Below the high water mark of a lake. The marshy debris on the edge of a lake would be in this category.

Assess the hydrologic regime of the plot using the descriptions below (adapted from Cowardin et al. 1979).

**PERMANENTLY FLOODED** - Water covers the land surface at all times of the year in all years. Equivalent to Cowardin's “permanently flooded.”

**SEMIPERMANENTLY FLOODED** - Surface water persists throughout growing season in most years except during periods of drought. Land surface is normally saturated when water level drops below soil surface. Includes Cowardin's Intermittently Exposed and Semipermanently Flooded modifiers.

**SEASONALLY FLOODED** - Surface water is present for extended periods during the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases and is very variable, extending from saturated to a water table well below the ground surface. Includes Cowardin's Seasonal, Seasonal-Saturated, and Seasonal-Well Drained modifiers.

**SATURATED** - Surface water is seldom present, but substrate is saturated to surface for extended periods during the growing season. Equivalent to Cowardin's Saturated modifier.

**TEMPORARILY FLOODED** - Surface water present for brief periods during growing season, but water table usually lies well below soil surface. Often characterizes floodplain wetlands. Equivalent to Cowardin's Temporary modifier.

**INTERMITTENTLY FLOODED** - Substrate is usually exposed, but surface water can be present for variable periods without detectable seasonal periodicity. Inundation is not predictable to a given season and is dependent upon highly localized rain storms. This modifier was developed for use in the arid West for water regimes of Playa lakes, intermittent streams, and dry washes, but can be used in other parts of the U.S. where

appropriate. This modifier can be applied to both wetland and non-wetland situations. Equivalent to Cowardin's Intermittently Flooded modifier.

UNKNOWN - The water regime of the area is not known. The unit is simply described as a non-tidal wetland.

#### Unvegetated Surface

Estimate the approximate percentage of the *total* surface area covered by each category.

#### Soil Texture

Using the key below, assess average soil texture.

#### Simplified Key to Soil Texture

Soil does not remain in a ball when squeezed.....sand

Soil remains in a ball when squeezed.....2

Squeeze the ball between your thumb and forefinger, attempting to make a ribbon that you can push up over your finger.

2. Soil makes no ribbon.....loamy sand

2. Soil makes a ribbon (may be very short).....3

3. Ribbon extends less than 1 inch before breaking.....4

Add excess water to small amount of soil:

4. Soil feels smooth.....silt loam

4. Soil feels at least slightly gritty.....5

Squeeze a moistened ball:

5. Cast is formed which can be handled CAREFULLY without breaking..... sandy loam

5. Cast is formed which can be handled FREELY without breaking.....loam

3. Ribbon extends 1 inch or more before breaking.....6

5. Soil makes a ribbon that breaks when 1 to 2 inches long;  
cracks if bent into a ring.....7

Add excess water to small amount of soil:

7. Soil feels at least slightly gritty.....clay loam

7. Soil feels smooth.....silt

6. Soil makes a ribbon 2+ inches long;  
does NOT crack when bent into a ring..... 8

Add excess water to a small amount of soil:

8. Soil feels at least slightly gritty.....clay

8. Soil feels smooth.....silty clay



## HANDBOOK ON SOILS

In the field, soil texture is determined by the feel of a moist soil when it is rubbed between the thumb and fingers. While sand particles feel gritty, silt particles have a smooth velvety feel and clay is both sticky and plastic, an estimate of the relative proportions of the separates may be made. This procedure, of course, will not give the exact percentage of sand, silt, and clay, but, with a little practice on samples of known composition, the relative proportions of the individual separates can be closely estimated. Practice with known samples is the only way to acquire this knowledge.

The outstanding physical characteristics of the main textural grades as determined by the feel of the soil are described below.

1. Sandy Soil. A sandy soil is loose and single grained. The individual grains can be seen readily or felt. Squeezed in the hand when dry, it will fall apart when pressure is released. Squeezed when moist, it will form a cast, but will crumble when touched.
2. Sandy Loam Soil. A sandy loam soil contains much sand, but has enough silt and clay to make it somewhat coherent. Individual sand grains can be easily seen and felt. Squeezed when dry, it will form a cast which will readily fall apart; but if squeezed when moist a cast can be formed which will bear careful handling without breaking.
3. Loam Soil. A loam soil is about an equal mixture of the sand and silt with the clay content being between 7 and 27 percent. A loam is mellow with a somewhat sandy feel, yet fairly smooth and slightly plastic. Squeezed when moist, it will form a cast which can be handled freely without breaking.
4. Silt Loam Soil. A silt loam soil, when dry, may appear cloddy, but lumps are readily broken, and when pulverized, it feels soft and floury. When wet, the soil readily runs together. Either dry or moist, it will form casts which can be handled freely without breaking, but when moistened and extruded between the thumb and fingers, it will not form a ribbon, but will give a broken appearance.
5. Clay Loam Soil. A clay loam soil is fine-textured and usually breaks into clods or lumps that are hard when dry. When moist and extruded between the thumb and fingers, it will form a thin "ribbon" which will break readily, barely sustaining its own weight. The moist soil is plastic and will form a cast that will bear much handling. When kneaded in the hand, it does not crumble readily, but tends to work into a heavy, compact mass.
6. Clay Soil. A clay soil is fine-textured and usually forms very hard lumps or clods when dry and is plastic and sticky when wet. When the moist soil is ribboned out between the thumb and fingers, it will form a long flexible strip. A clay soil leaves a "slick" surface on the thumb and fingers when rubbed together and tends to hold the thumb and fingers together due to the stickiness of the clay.

The characteristics described above are suggestive only, and will only apply to a group of similar soils. The characteristics of clay vary with the kind of clay mineral. For this reason, textural grades may exhibit different properties from region to region. For instance, clays of the montmorillonite group are very sticky and plastic; those of the oxide group are plastic and waxy with relatively little stickiness.

The preceding discussion has been directed to those soil particles whose diameters are less than 2 millimeters--the sands, silts, and clays. Soils may also contain larger sized particles that may be collectively called coarse fragments. These large particles may on occasion exceed the smaller soil particles in volume.

### Soil Drainage

The soil drainage classes are defined in terms of (1) actual moisture content (in excess of field moisture capacity) and (2) the extent of the period during which excess water is present in the plant-root zone. It is recognized that permeability, level of groundwater, and seepage are factors affecting moisture status. However, because these are not easily observed or measured in the field, they cannot generally be used as criteria of moisture status. It is further recognized that soil profile morphology, for example mottling, normally, but not always, reflects soil moisture status. Although soil morphology may be a valuable field indication of moisture status, it should not be the overriding criterion. Soil drainage classes cannot be based solely on the presence or absence of mottling. Topographic position and vegetation as well as soil morphology are useful field criteria for assessing soil moisture status.

WELL DRAINED - The soil moisture content does not normally exceed field capacity in any horizon (except possibly the C) for a significant part of the year.

MODERATELY WELL DRAINED - The soil moisture content is in excess of field capacity for a small but significant period of the year.

POORLY DRAINED - The soil moisture content is in excess of field capacity in all horizons for a large part of the year.

## **VEGETATION DESCRIPTION**

### Leaf Phenology

Select the value which best describes the leaf phenology of the dominant stratum. The dominant stratum is the uppermost stratum that contains at least 10% cover.

EVERGREEN - Greater than 75% of the total woody cover is never without green foliage.

COLD DECIDUOUS - Greater than 75% of the total woody cover sheds its foliage in connection with an unfavorable season mainly characterized by winter frost.

MIXED: EVERGREEN & COLD DECIDUOUS - Evergreen and deciduous species generally contribute 25-75% of the total woody cover. Evergreen and cold-deciduous species are mixed.

PERENNIAL - Herbaceous vegetation composed of more than 50% perennial species.

ANNUAL - Herbaceous vegetation composed of more than 50% annual species.

### Leaf Type

Select the value which best describes the leaf form of the dominant stratum. The dominant stratum is the uppermost stratum that contains at least 10% cover.

BROAD-LEAVED - Woody vegetation primarily broad-leaved (generally contributes greater than 50 percent of the total woody cover).

NEEDLE-LEAVED - Woody vegetation primarily needle-leaved (generally contributes greater than 50 percent cover).

GRAMINOID - Herbaceous vegetation composed of more than 50 percent graminoid/stipe leaf species.

FORB (BROAD-LEAF-HERBACEOUS) - Herbaceous vegetation composed of more than 50% broad-leaf forb species.

PTERIDOPHYTE - Herbaceous vegetation composed of more than 50 percent species with frond or frond-like leaves. (Ferns)

### Physiognomic Class

Choose one:

Forest: Trees with their crowns overlapping (generally forming 60-100% cover).

Woodland: Open stands of trees with crowns not usually touching (generally forming 25-60% cover). Canopy tree cover may be less than 25% in cases where it exceeds shrub, dwarf-shrub, herb, and nonvascular cover.

Shrubland: Shrubs generally greater than 2.5 feet tall with individuals or clumps overlapping to not touching (generally forming more than 25% cover, trees generally less than 25% cover). Shrub cover may be less than 25% where it exceeds tree, dwarf-shrub, herb, and nonvascular cover.

Dwarf-Shrubland: Low-growing shrubs usually under 2.5 feet tall. Individuals or clumps overlapping to not touching (generally forming more than 25% cover, trees and

tall shrubs generally less than 25% cover). Dwarf-shrub cover may be less than 25% where it exceeds tree, shrub, herb, and nonvascular cover.

**Herbaceous:** Herbs (graminoids, forbs, and ferns) dominant (generally forming at least 25% cover; trees, shrubs, and dwarf-shrubs generally with less than 25% cover). Herb cover may be less than 25% where it exceeds tree, shrub, dwarf-shrub, and nonvascular cover.

**Nonvascular:** Nonvascular cover (bryophytes, non-crustose lichens, and algae) dominant (generally forming at least 25% cover). Nonvascular cover may be less than 25% where it exceeds tree, shrub, dwarf-shrub, and herb cover.

**Sparse Vegetation:** Abiotic substrate features dominant. Vegetation is scattered to nearly absent and generally restricted to areas of concentrated resources (total vegetation cover is typically less than 25% and greater than 0%).

#### Strata, Height Class, Cover Class, Diagnostic Species

Visually divide the community into vegetation layers (strata). Indicate the average height class of the stratum in the first column, using the Height Scale on the form. Enter the average percent cover class of the whole stratum in the second column, using the Cover Scale on the form. Height and Cover classes are also listed below.

Trees are defined as single-stemmed woody plants, generally 15 feet in height or greater at maturity and under optimal growing conditions. Shrubs are defined as multiple-stemmed woody plants generally less than 15 feet in height at maturity and under optimal growing conditions.

List the dominant species in each stratum.

#### Animal Use Evidence

Comment on any evidence of wildlife (i.e., tracks, scat, gopher or prairie dog mounds, etc.). Notes on domestic animals should be made in the field below.

#### Natural and Anthropogenic Disturbance

Comment on any evidence of natural or anthropogenic disturbance and specify the source.

#### Environmental Comments

Enter any additional noteworthy comments on the environmental setting. This field can be used to describe site history such as fire events (date since last fire or evidence of severity) as well as other disturbance or reproduction factors

#### Other Comments

Any miscellaneous comments.

## **Species/Strata/Percent Cover Table**

The main use of the strata information is to categorize the plots by life form, in order to subset the data into forest, woodland, shrublands, and herbaceous plots for analysis. It is imperative that things be called the same throughout the data set.

Starting with the uppermost stratum, list all the species present and their cover class using the scale provided below. If a species is in the tree layer (single-stemmed woody plants, generally 15 feet in height or greater at maturity), list whether it is T1 (emergent tree), T2 (tree canopy), or T3 (tree sub-canopy). If a species is in the shrub layer, note if S1 (tall shrub), or S2 (short shrub), or S3 (dwarf shrub). If in the ground layer, note if H (herbaceous) or N (nonvascular). Some species will be in more than one layer. For example, Cottonwoods might have one or two especially tall specimens, which would be in the T1 (emergent tree) layer. Then the majority of the mature trees would be in T2 (tree canopy). The saplings that are coming up in the understory would be in the T3.

Seedlings are defined as trees less than “breast height” or less than 4.5 feet tall. Seedlings between knee height and breast height should be labeled as being in the short shrub layer (S2), and those below knee height should be labeled as being in the dwarf shrub layer (S3).

### Cover Scale for Species Percent Cover

Use the cover scales provided on the forms.



# NATIONAL PARK VEGETATION MAPPING PROGRAM: PLOT SURVEY FORM

## IDENTIFIERS/LOCATORS

Plot Code _____	Polygon Code _____
Provisional Community Name _____	
State _____	Park Name _____
Park Site Name _____	
Quad Name _____	Quad Code _____
GPS file name _____	Field UTM X _____ m E Field UTM Y _____ m N
Error +/- _____ m	
<i>please do not complete the following information when in the field</i>	
Corrected UTM X _____ m E	Corrected UTM Y _____ m N UTM Zone _____
Survey Date _____	Surveyors _____
Directions to Plot _____	
Plot length _____	Plot width _____
Plot Photos (y/n) _____	Roll Number _____
Frame Number _____	Plot Permanent (y/n) _____
Plot representativeness _____	

## ENVIRONMENTAL DESCRIPTION

Elevation _____	Slope _____	Aspect _____
Topographic Position _____		
Landform _____		
Surficial Geology _____		

Cowardin System	<u>Non-Tidal</u>	
____ Upland	____ Permanently Flooded	____ Saturated
____ Riverine	____ Semipermanently Flooded	____ Seasonally Flooded/Saturated
____ Palustrine	____ Seasonally/Temporarily Flooded	____ Intermittently Flooded
____ Lacustrine		

Environmental Comments:	Soil Taxon/Description
	Unvegetated Surface: <i>(please use the cover scale on next page)</i> ____ Bedrock ____ Litter, duff ____ Wood (> 1 cm) ____ Large rocks (cobbles, boulders > 10 cm) ____ Small rocks (gravel, 0.2-10 cm) ____ Sand (0.1-2 mm) ____ Bare soil ____ Other: _____
Soil Texture ____ sand ____ loamy sand ____ sandy loam ____ loam ____ silt loam ____ silt ____ clay loam ____ silty clay ____ clay ____ peat ____ muck	Soil Drainage ____ Rapidly drained ____ Well drained ____ Moderately well drained ____ Somewhat poorly drained ____ Poorly drained ____ Very poorly drained

# VEGETATION DESCRIPTION

Leaf phenology (of dominant stratum)	Leaf Type (of dominant stratum)	Physiognomic class	Cover Scale for Strata & Unvegetated Surface		Height Scale for Strata	
<u>Trees and Shrubs</u>	<u>Broad-leaved</u>	<u>Forest</u>	01	5%	01	<0.5 m
<u>Evergreen</u>	<u>Needle-leaved</u>	<u>Woodland</u>	02	10%	02	0.5-1m
<u>Cold-deciduous</u>	<u>Microphyllous</u>	<u>Shrubland</u>	03	20%	03	1-2 m
<u>Drought-deciduous</u>	<u>Graminoid</u>	<u>Dwarf Shrubland</u>	04	30%	04	2-5 m
<u>Mixed evergreen - cold-deciduous</u>	<u>Forb</u>	<u>Herbaceous</u>	05	40%	05	5-10 m
<u>Mixed evergreen - drought-deciduous</u>	<u>Peridophyte</u>	<u>Nonvascular</u>	06	50%	06	10-15 m
		<u>Sparse Vegetated</u>	07	60%	07	15-20 m
			08	70%	08	20-35 m
			09	80%	09	35 - 50 m
			10	90%	10	>50 m
			11	100%		
<u>Herbs</u>						
<u>Annual</u>						
<u>Perennial</u>						

Strata	Height Class	Cover Class	Diagnostic species (if known)
T1 Emergent			
T2 Canopy			
T3 Sub-canopy			
S1 Tall shrub			
S2 Short Shrub			
H Herbaceous			
N Non-vascular			
V Vine/liana			
E Epiphyte			
<i>please see above table for height and cover scales</i>			
Animal Use Evidence			
Natural and Anthropogenic Disturbance Comments			
Other Comments			

Species/percent cover: Starting with the uppermost stratum, list all species with % cover for each species in the stratum. For each tree species estimate seedling, sapling, mature and total cover indicating stratum. Also for forests and woodlands, on a separate page or line below each tree species, list the DBH of all trees above 5 cm diameter. Separate measurements with a comma (note if measurements are from multi-stemmed tree). Put an asterisk next to any species that are known diagnostics for a particular community in the classification. **Also list species outside the plot at the end of the table or designate with a 0 in Cover Class column.**

[illegible]

T = >0-1%	5 = >45-55%
P = >1-5%	6 = >55-65%
1 = >5-15%	7 = >65-75%
2 = >15-25%	8 = >75-85%
3 = >25-35%	9 = >85-95%
4 = >35-45%	10 = >95%

ACCURACY ASSESSMENT POINT FORM  
UPPER COLUMBIA BASIN NETWORK VEGETATION MAPPING PROJECT

**IDENTIFIERS/LOCATORS**

AA Plot Number: <b>LARO-AA</b> _ _ _ _		AA Point Shape:    circle    other	
Park Site Name <u>Lake Roosevelt National Recreation Area</u>			
Survey Date    _____		Surveyor(s)    _____	
GPS Unit: <u>Garmin Map 76</u>	Datum NAD 83	UTM Zone: <u>11</u>	Error +/-:    _____ m
Camera Name and Model (circle one): <u>Olympus Stylus FE-210</u> Other: _____			
Camera #	Frame #	Photographer	Direction/Comments

**PLANT ASSOCIATION INFORMATION**

ASSOCIATIONS AT AA POINT	MAP UNIT AT AA POINT	New?	OTHER ASSOCIATIONS WITHIN 80 M OF AA POINT
Primary Name/Code	Map Code		1.
Secondary Name/Code			2.
Tertiary Name/Code			3.
Representativeness of point within polygon:    Good    Fair    Poor    Unk    .....of association to description    Good    Fair    Poor			
Classification Comments: (complications, uncertainties, explanation of fair/poor representativeness)			

**ENVIRONMENTAL DESCRIPTION**

Elevation    _____ m/ft    Front GPS	Slope    _____    Aspect    _____
Topographic Position: <u>Circle One</u>	
Interfluv    Shoulder    Backslope    Footslope    Toeslope    Step in slope    Valley floor    Terrace    Channel	
Environmental Comments:	

Unvegetated Surface Cover+: (please use the cover scale below)		
_____ Bedrock	_____ Large rocks (cobbles, boulders > 10 cm)	_____ Sand (0.1-2 mm)
_____ Litter, duff	_____ Small rocks (gravel, 0.2-10 cm)	_____ Bare soil
_____ Wood ( > 1 cm)	_____ Nonvascular	_____ Other: _____

ACCURACY ASSESSMENT POINT FORM  
UPPER COLUMBIA BASIN NETWORK VEGETATION MAPPING PROJECT

VEGETATION DESCRIPTION

Leaf phenology (dominant stratum)	Leaf Type (of dominant stratum)	Physiognomic Class	Height Class (m)	Cover Class
<u>Trees and Shrubs</u>		<u>Pick one</u>	T < 1ft.	t < 0.5%
_____ Evergreen	_____ Broad-leaved	_____ Forest	01 1-5ft.	T 0.5- 0.99%
_____ Deciduous	_____ Needle-leaved	_____ Woodland	05 5-15ft.	01 1-1.9%
_____ Mixed evergreen - deciduous	_____ Graminoid	_____ Shrubland	15 15-30ft.	02 2-4.9%
	_____ Forb		30 > 30ft.	05 5-9.9%
<u>Herbs</u>	_____ Peridophyte	_____ Dwarf shrubland		10 10-14%
_____ Perennial	_____ Non Vascular	_____ Herbaceous		15 15-24%
_____ Annual	_____ Mixed	_____ Nonvascular		25 25-34%
		_____ Sparsely vegetated		35 35-49%
				50 50-74%
				75 75-94%
				95 > 95%

Strata	Height Class	Cover Class	2 - Dominant species (mark any known diagnostic species with a # )	Individual Species Cover
T1 Emergent	_____	_____	_____	_____
T2 Canopy	_____	_____	_____	_____
			_____	_____
			_____	_____
T3 Sub-canopy	_____	_____	_____	_____
			_____	_____
S1 Tall shrub	_____	_____	_____	_____
			_____	_____
			_____	_____
S2 Short Shrub	_____	_____	_____	_____
			_____	_____
			_____	_____
S3 Dwarf-shrub	_____	_____	_____	_____
			_____	_____
H Herbaceous	_____	_____	_____	_____
			_____	_____
			_____	_____
N Non-vascular	_____	_____	_____	_____

Please check this box if AA point has more than one plant association (e.g. two or more species list at a point recorded on form)





# Appendix C - Dichotomous Key to NEPE Plant Associations

## Dichotomous Key to the Classification

The field key to plant communities for NEPE and environs follows. The key is structured into physiognomic classes (or lifeform groups). These classes do not constraint the classification *per se*; rather they are employed to assist in applying the classification. In the field, different expressions of a given plant association may occur as different physiognomic classes. Given this, associations may be found through multiple pathways within the key.

### Use of the Key

To use the field key most effectively, identify a representative, homogeneous stand of vegetation. Work through the entire hierarchy of the key, beginning with *Key to Lifeform Groups*, to each sequential dichotomous lead. Estimate plant cover on an area of approximately 405 m<sup>2</sup>. If a satisfactory determination is not made in stands with low total cover consider adjusting diagnostic species cover break-points downward. Assignment of individual species to lifeform follows USDA, NRCS (2007).

In the key the term *relative cover* is used. In this context relative cover refers to the proportional abundance of the given species (or group of species) with respect to the total abundance of the associated group. The value is calculated by dividing the percent cover of the species under consideration by the total cover of the respective group of species. For example, the relative cover of native graminoid species is calculated as follows: (sum of native graminoid species cover within the sample) / (total cover of all graminoids within the sample) = (relative native graminoid composition).

### Key to Lifeform Groups

- 1a) Tree canopy cover (alone or combined)  $\geq 10\%$ , **Forest and Woodland**
- 1b) Tree canopy cover  $< 10\%$ , lead 2a.
  - 2a) Shrub canopy cover  $\geq 10\%$ , **Shrublands and Shrub Herbaceous Vegetation**
  - 2b) Shrub canopy cover  $< 10\%$ 
    - 3a) Herbaceous canopy cover  $\geq 10\%$ , **Herbaceous Vegetation**

## BUED Plant Community Key

- 1a** Trees are common to abundant, providing at least 10% absolute canopy cover

**Woodland Vegetation Classes pg 1**

- 1b** Trees are absent to sparse; when present, individuals are scattered with less than 10% absolute canopy cover

**Shrubland and Herbaceous Vegetation Classes pg 1**

### Woodland Vegetation Classes

- 1a** *Celtis laevigata* is the dominant tree species and *Philadelphus lewisii* is abundant in the shrub layer

**Vegetation Class 5: CELA / PHLE**

- 1b** *Celtis laevigata* is the dominant tree species and *Philadelphus lewisii* is absent or sparse in the shrub layer

**Vegetation Class 7: CELA / Mixed**

### Shrubland and Herbaceous Vegetation Classes

- 1a** *Philadelphus lewisii* forms a distinct shrub stratum

**Vegetation Class 6: PHLE**

- 1b** Shrubs may be present in the plant community but don't contribute substantial cover

- 2a** Native grasses dominate the herbaceous stratum

**Vegetation Class 1: PSSP**

- 2b** Introduced species dominate the herbaceous stratum

- 3a** *Bromus tectorum* is the dominant herbaceous species

- 4a** *Pseudoroegneria spicata* ranges from abundant to co-dominant

**Vegetation Class 2: BRTE - PSSP**

- 4b** *Daucus carota* ranges from abundant to co-dominant

**Vegetation Class 4: BRTE - DACA**

- 3b** *Daucus carota* is the dominant herbaceous species

- 5a** *Bromus tectorum* is abundant in the herbaceous layer

**Vegetation Class 4: BRTE - DACA**

- 5b** *Bromus tectorum* may be present but does not contribute substantial cover

**Vegetation Class 3: DACA**

## HEMO Plant Community Key

- 1a** Trees are common to abundant, providing at least 10% absolute canopy cover

**Forest and Woodland Vegetation Classes pg 1**

- 1b** Trees are absent to sparse; when present, individuals are scattered with less than 10% absolute canopy cover

- 2a** Shrubs are common to dominant; herbaceous species may range from sparse to co-dominant

**Shrubland Vegetation Classes pg 1**

- 2b** Herbaceous species clearly dominate the plant community; trees and shrubs may be present, but don't contribute substantial cover

**Herbaceous Vegetation Classes pg 1**

### Forest and Woodland Vegetation Classes

- 1a** The most abundant tree species are deciduous

- 2a** Native tree species dominate the canopy

- 3a** *Acer negundo* is the most abundant native tree species

**Vegetation Class 6: ACNE**

- 3b** *Populus balsamifera* is the most abundant native tree species

**Vegetation Class 7: POBA**

- 2b** *Prunus domestica* dominates the canopy

**Vegetation Class 10: PRDO**

- 1b** *Pinus ponderosa* is the most abundant tree species

- 4a** *Acer negundo* is abundant in the canopy

**Vegetation Class 6: ACNE**

- 4b** *Prunus domestica* is abundant in the canopy

**Vegetation Class 10: PRDO**

### Shrubland Vegetation Classes

- 1a** *Prunus virginiana* is the most abundant species in the tall shrub layer

**Vegetation Class 9: PRVI**

- 1b** Other deciduous shrub species are more abundant in the tall shrub layer

**Vegetation Class 4: CRDO – FRPU / SYAL**

### Herbaceous Vegetation Classes

- 1a** *Camassia quamash* is common to abundant in the plant community

**Vegetation Class 5: CAQU - ALPR**

- 1b** *Camassia quamash* is very sparse to absent in the plant community

- 2a** Graminoids dominate the plant community

- 3a** The dominant grass species is rhizomatous

- 4a** *Poa pratensis* ranges from abundant to dominant in the plant community

- 5a** *Elymus repens* is abundant in the herbaceous layer

**Vegetation Class 1: POPR - ELRE**

**5b** *Dactylis glomerata* is abundant in the herbaceous layer

**Vegetation Class 3: POPR - DAGL**

**4b** *Poa pratensis* may be present, but does not contribute substantial cover to the plant community

**6a** *Bromus inermis* is dominant or co-dominant in the plant community

**7a** *Bromus inermis* clearly dominates the herbaceous layer, other species may be present but sparse, not contributing substantial cover

**Vegetation Class 2: BRIN**

**7b** *Dactylis glomerata* ranges from abundant to co-dominant in the herbaceous layer

**Vegetation Class 11: BRIN - DAGL**

**6b** *Bromus inermis* is sparse or absent from the plant community

**8a** *Elymus repens* is the most abundant herbaceous species

**Vegetation Class 1: POPR - ELRE**

**8b** *Alopecurus pratensis* is the most abundant herbaceous species

**Vegetation Class 5: CAQU - ALPR**

**3b** *Dactylis glomerata* is the dominant grass species

**9a** *Poa pratensis* is abundant in the plant community

**Vegetation Class 3: POPR - DAGL**

**9b** *Bromus inermis* is abundant in the plant community

**Vegetation Class 11: BRIN - DAGL**

**2b** *Centaurea stoebe* is the dominant herbaceous species

**Vegetation Class 8: CEST**



## OLJO Plant Community Key

**1a** Trees are common to abundant, providing at least 10% absolute canopy cover

**2a** *Pinus ponderosa* is the most abundant tree species

**Vegetation Class 4: PIPO**

**2b** *Ulmus pumila* is the most abundant tree species

**Vegetation Class 5: ULPU / SYVU**

**1b** Trees are absent to sparse; when present, individuals are scattered with less than 10% absolute canopy cover

**3a** Native grasses dominate the plant community

**4a** *Leymus cinereus* is the most abundant grass species

**Vegetation Class 1: LECI - POPR**

**4b** *Pseudoroegneria spicata* is the most abundant grass species

**Vegetation Class 2: PSSP**

**3b** *Poa pratensis* dominates the plant community

**5a** *Poa pratensis* clearly dominates the plant community; other species may be present, but don't contribute substantial cover

**Vegetation Class 3: POPR**

**5b** Other species are abundant and contribute substantial cover to the plant community

**6a** *Leymus cinereus* is abundant in the plant community

**Vegetation Class 1: LECI - POPR**

**6b** *Pseudoroegneria spicata* is abundant in the plant community

**Vegetation Class 2: PSSP**

## SPAL Plant Community Key

- 1a** Trees are common to abundant, providing at least 10% absolute canopy cover

**Forest and Woodland Vegetation Classes pg 1**

- 1b** Trees are absent to sparse; when present, individuals are scattered with less than 10% absolute canopy cover

**Shrubland and Herbaceous Vegetation Classes pg 1**

### Forest and Woodland Vegetation Classes

- 1a** The dominant tree species are deciduous

- 2a** The dominant tree species are endemic and occurred historically in the area

- 3a** *Populus balsamifera* is the most abundant tree species

**Vegetation Class 7: POBA / Mixed**

- 3b** *Salix amygdaloides* is the most abundant tree species

**Vegetation Class 9: SAAM**

- 2b** *Acer saccharinum*, which was once planted as an ornamental, dominates the tree canopy

**Vegetation Class 6: ACSA**

- 1b** *Pinus ponderosa* is the dominant tree species

**Vegetation Class 5: PIPO**

### Shrubland and Herbaceous Vegetation Classes

- 1a** *Crataegus chrysocarpa* forms a distinct shrub stratum

**Vegetation Class 10: CRCH**

- 1b** Shrubs may be present in the plant community but don't contribute substantial cover

- 2a** Annual bromes dominate the plant community

- 3a** *Bromus diandrus* is the most abundant grass species

**Vegetation Class 2: BRDI**

- 3b** *Bromus tectorum* is the most abundant grass species

**Vegetation Class 4: BRTE**

- 2b** Perennial grasses dominate the plant community

- 4a** The dominant species is a bunchgrass

- 5a** *Poa bulbosa* is the most abundant grass species

- 6a** *Poa pratensis* contributes substantial cover to the plant community

**Vegetation Class 3: POBU - POPR**

- 6b** *Bromus tectorum* contributes substantial cover to the plant community

**Vegetation Class 4: BRTE**

- 5b** *Festuca ovina* is the most abundant grass species

**Vegetation Class 11: FEOV**

- 4b** The dominant grass species is rhizomatous

- 7a** *Poa pratensis* is the most abundant grass species

- 8a** *Poa pratensis* strongly dominates the herbaceous community, widely scattered trees and shrubs may be present

**Vegetation Class 1: POPR**

**8b** *Poa bulbosa* is abundant in the herbaceous community; *Bromus inermis* may be common as well

**Vegetation Class 3: POBU - POPR**

**7b** *Elymus repens* is the most abundant grass species

**Vegetation Class 8: ELRE**

## WEPR Plant Community Key

- 1a** Shrubs are common to dominant; herbaceous species may range from sparse to co-dominant

### Shrubland and Shrub Herbaceous Vegetation Classes pg 1

- 1b** Herbaceous species clearly dominate the plant community; shrubs may be present, but don't contribute substantial cover

### Herbaceous Vegetation Classes pg 1

## Shrubland and Shrub Herbaceous Vegetation Classes

- 1a** *Crataegus douglasii* forms an open canopy and *Polygonum bistortoides* is abundant in the understory

### Vegetation Class 7: CRDO / POBI

- 1b** *Crataegus douglasii* forms a dense canopy and *Polygonum bistortoides* is sparse or absent from the understory

### Vegetation Class 9: CRDO

## Herbaceous Vegetation Classes

- 1a** The plant community is dominated by a grass species

- 2a** *Alopecurus pratensis* dominates or co-dominates the plant community

- 3a** *Alopecurus pratensis* clearly dominates the plant community; other species may be present, but do not contribute substantial cover

### Vegetation Class 4: ALPR

- 3b** Other species range from common to co-dominant in the plant community and contribute substantial cover

- 4a** *Poa pratensis* is abundant in the plant community

### Vegetation Class 2: ALPR - POPR

- 4b** *Camassia quamash* is abundant in the plant community

### Vegetation Class 6: CAQU - ALPR

- 2b** *Alopecurus pratensis* ranges from absent to abundant, but other grass species dominate the plant community

- 5a** *Poa pratensis* and/or *Elymus repens* dominates the plant community

### Vegetation Class 5: POPR - ELRE

- 5b** *Bromus inermis* dominates the plant community; *Poa pratensis* may range from sparse to abundant

### Vegetation Class 1: BRIN

- 1b** The plant community is dominated by a forb species

- 6a** *Camassia quamash* dominates or co-dominates the plant community

- 7a** *Alopecurus pratensis* co-dominates the plant community

### Vegetation Class 6: CAQU - ALPR

- 7b** *Alopecurus pratensis* ranges from sparse to abundant, but does not co-dominate the plant community

### Vegetation Class 3: CAQU

- 6b** *Ranunculus alismifolius* dominates the plant community

### Vegetation Class 8: RAAL

# WHBI Plant Community Key

**1a** Trees are common to abundant, providing at least 10% absolute canopy cover

**Woodland Vegetation Classes pg 1**

**1b** Trees are absent to sparse; when present, individuals are scattered with less than 10% absolute canopy cover

**Shrubland and Herbaceous Vegetation Classes pg 1**

## Woodland Vegetation Classes

**1a** The tree canopy is dominated by a native, endemic species

**2a** *Populus balsamifera* is the most abundant tree species

**Vegetation Class 5: POBA**

**2b** *Populus balsamifera* is sparse to absent; *Celtis laevigata*, *Acer negundo*, or *Crataegus douglasii* is the most abundant tree/tall shrub species

**Vegetation Class 4: (CELA) / DACA**

**1b** The tree canopy is dominated by a species which was introduced as an ornamental or is not otherwise native to the area

**Vegetation Class 5: POBA**

## Shrubland and Herbaceous Vegetation Classes

**1a** *Symphoricarpos albus* forms a distinct shrub stratum

**Vegetation Class 9: SYAL**

**1b** Shrubs may be present in the plant community but don't contribute substantial cover

**2a** The plant community is dominated by native species

**3a** Herbaceous wetland species are abundant in the plant community

**4a** *Typha latifolia* is the most abundant wetland species

**Vegetation Class 12: TYLA**

**4b** *Schoenoplectus tabernaemontani* is the most abundant wetland species

**Vegetation Class 11: CIAR**

**3b** *Pseudoroegneria spicata* is the dominant herbaceous species

**Vegetation Class 2: PSSP**

**2b** The plant community is dominated by introduced species

**5a** Grasses dominate the herbaceous layer

**6a** Dominant grass species are annual

**7a** *Bromus tectorum* is the most abundant annual grass

**Vegetation Class 3: BRTE**

**7b** *Taeniatherum caput-medusae* is the most abundant annual grass

**8a** *Elymus repens* is abundant, contributes substantial cover

**Vegetation Class 6: ELRE**

**8b** *Elymus repens* is absent or sparse

**Vegetation Class 1: TACA**

**6b** Dominant grass species are perennial



- 9a The most abundant grass species is rhizomatous
  - 10a *Elymus repens* is the most abundant grass
    - Vegetation Class 6: ELRE**
  - 10b *Alopecurus pratensis* is the most abundant grass
    - Vegetation Class 10: ALPR**
  - 9b *Festuca ovina* is the most abundant grass species
    - Vegetation Class 6: ELRE**
- 5b Forbs dominate the herbaceous layer
  - 11a Dominant forb species are annual or biennial
    - 12a Biennials dominate the plant community
      - 13a *Daucus carota* is the most abundant herbaceous species
        - Vegetation Class 4: (CELA) / DACA**
      - 13b *Dipsacus fullonum* is the most abundant herbaceous species
        - Vegetation Class 11: CIAR**
    - 12b *Centaurea solstitialis* is the dominant herbaceous species
      - Vegetation Class 7: CESO - COAR**
  - 11b Dominant forb species are perennial
    - 14a The dominant species is characterized by an upright growth form
      - 15a *Cardaria draba* is the most abundant herbaceous species
        - Vegetation Class 8: CADR**
      - 15b *Cirsium arvense* is the most abundant herbaceous species
        - Vegetation Class 11: CIAR**
    - 14b *Convolvulus arvensis* is the dominant species
      - 16a Introduced annual grasses co-dominate the plant community
        - 17a *Bromus tectorum* is the most abundant annual grass
          - Vegetation Class 3: BRTE**
        - 17b *Taeniatherum caput-medusae* is the most abundant annual grass
          - Vegetation Class 1: TACA**
      - 16b *Centaurea solstitialis* is abundant, contributes substantial cover to the plant Community
        - Vegetation Class 7: CESO - COAR**

## BEPA Plant Community Key

- 1a** Shrubs and/or dwarf-shrubs are common to dominant; herbaceous species may range from sparse to co-dominant

**Shrubland, Dwarf-shrubland, and Shrub Herbaceous Vegetation Classes pg 1**

- 1b** Herbaceous species clearly dominate the plant community; shrubs and/or dwarf-shrubs may be present, but don't contribute substantial cover

**Herbaceous Vegetation Classes pg 1**

### Shrubland, Dwarf-shrubland, and Shrub Herbaceous Vegetation Classes

- 1a** The shrub stratum is dominated by a cold deciduous species

- 2a** *Salix exigua* is the most abundant shrub species

**Vegetation Class 10: SAEX**

- 2b** *Symphoricarpos oreophilus* is the most abundant shrub species

**Vegetation Class 3: SYOC**

- 1b** The shrub stratum is dominated by an *Artemisia* species

- 3a** *Artemisia cana* is the most abundant shrub species

- 4a** *Hesperostipa comata* is abundant in the herbaceous understory

**Vegetation Class 4: ARCA / HECO**

- 4b** *Pascopyrum smithii* is abundant in the herbaceous understory

**Vegetation Class 5: PASM - POPR**

- 3b** *Artemisia frigida* is the most abundant shrub species

**Vegetation Class 6: ARFR**

### Herbaceous Vegetation Classes

- 1a** The plant community is dominated by native graminoid species

- 2a** The most abundant species a bunch grass or sedge

- 3a** The most abundant species is a grass

- 4a** *Artemisia frigida* is present and conspicuous in plant community

**Vegetation Class 6: ARFR**

- 4b** *Artemisia frigida* is sparse or absent from the plant community

- 5a** *Pascopyrum smithii* is abundant, contributes substantial cover

**Vegetation Class 7: PASM - HECO**

- 5b** *Pascopyrum smithii* is sparse or absent

**Vegetation Class 13: HECO – BOGR - CAFI**

- 3b** *Carex filifolia* is the most abundant species

**Vegetation Class 13: HECO – BOGR - CAFI**

- 2b** *Pascopyrum smithii* is the most abundant graminoid

- 6a** *Hesperostipa comata* ranges from common to co-dominant in the herbaceous stratum

**Vegetation Class 7: PASM - HECO**

- 6b** *Poa pratensis* ranges from common to co-dominant in the herbaceous stratum

**Vegetation Class 5: PASM - POPR**

- 1b** The plant community is dominated by grass and/or forb species which were introduced or are

not otherwise endemic to the area

**7a** The dominant species is a grass

**8a** The dominant grass species is perennial

**9a** The dominant grass species is rhizomatous

**10a** *Poa pratensis* is the most abundant grass species in the plant community

**11a** *Poa pratensis* clearly dominates the plant community; other species may be present, but do not contribute substantial cover

**Vegetation Class 2: POPR**

**11b** Other graminoids contribute substantial cover to the plant community

**12a** *Pascopyrum smithii* is abundant in the plant community

**Vegetation Class 5: PASM – POPR**

**12b** *Bromus arvensis* is abundant in the plant community

**Vegetation Class 9: POPR - BRAR**

**10b** *Poa pratensis* ranges from sparse to abundant, but does not dominate the plant community

**13a** *Bromus inermis* is the most abundant grass species

**Vegetation Class 8: BRIN**

**13b** *Elymus repens* Is the most abundant grass species

**Vegetation Class 12: ELRE**

**9b** *Agropyron cristatum* is the dominant grass species

**14a** *Agropyron cristatum* clearly dominates the plant community; other species may be present, but do not contribute substantial cover

**Vegetation Class 11: AGCR**

**14b** *Medicago sativa* ranges from abundant to co-dominant

**Vegetation Class 1: AGCR - MESA**

**8b** *Bromus arvensis* is the dominant grass species

**Vegetation Class 9: POPR - BRAR**

**7b** *Medicago sativa* is the dominant species

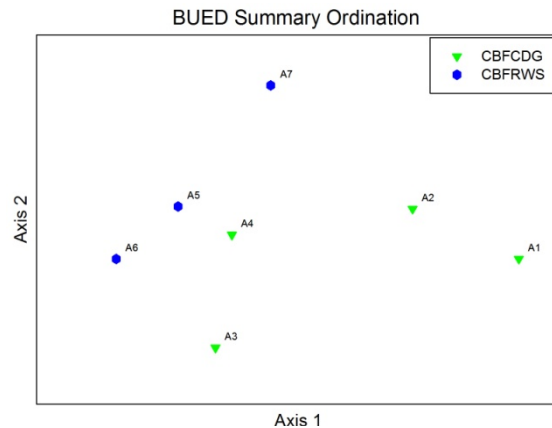
**Vegetation Class 1: AGCR - MESA**

# Appendix D - NEPE Plant Association Descriptions

## BUED Association Descriptions

### **A1** Bluebunch Wheatgrass Herbaceous Vegetation

*Pseudoroegneria spicata* Herbaceous Vegetation



#### Description

This association is characterized by an open vegetation layer that is dominated by the cool-season, perennial bunchgrass *Pseudoroegneria spicata* with moderate total cover. *Koeleria macrantha* is also generally present in low abundance. Other common native grasses may include *Festuca idahoensis* and *Poa secunda*; which, if present, have low cover. A sparse dwarf-shrub layer may be present and can include a variety of woody species. Several low-growing forbs (often cushion plants) are present with very low cover. A diverse and abundant forb layer probably indicates a degraded occurrence of this vegetation type. Introduced species such as *Bromus tectorum* and *Centaurea solstitialis* are present in some stands.

This herbaceous association occurs on rock outcrops, talus, mesas, plateaus, windswept bluffs, ridgetops and mountains. It frequently occurs on moderate to steep, mid- to high-slope landforms, although stands on gentle slopes are not uncommon. Sites are relatively xeric and are often found on southerly aspects at lower elevations or on harsh, steep or windswept areas at higher elevations on well-drained clay soils that are very prone to erosion. Substrates are typically shallow, often calcareous, rocky soils and include sandstone and marlstone, limestone, shale, and granite. Ground surface often has significant bare ground, gravel and/or rock on the surface. Evidence of erosion is often present.

CONSERVATION RANK G2

DATABASE CODE CEGL001660

CHARACTERISTIC SPECIES (n = 6, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Pseudoroegneria spicata* (bluebunch wheatgrass) V.38, *Bromus tectorum* (cheatgrass) V.8

**Forb**

*Achillea millefolium* (common yarrow) V.1, *Erodium cicutarium* (redstem stork's bill) V.<1, *Centaurea solstitialis* (yellow star-thistle) IV.1

**RANGE**

*Buffalo Eddy, Nez Perce National Historical Park*

Enter Buffalo Eddy specific information here.

*Global*

This association has been described from northern Colorado and northwestern Wyoming but is likely to occur in Utah, Idaho, Oregon, Washington, and Montana as well.

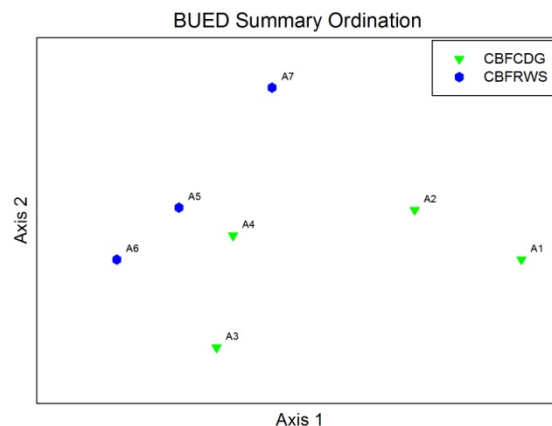
**COMMENTS**

Grazing has a negative effect on this association, and it is believed that it now occupies a very small portion of the original range. *Pseudoroegneria spicata* does not tolerate grazing and will eventually convert to a *Koeleria macrantha* or *Poa secunda* grassland if grazing pressures continue. The stands may also convert to non-native species such as *Bromus tectorum* under continuous pressure or when combined with other disturbances, such as fire.

**A2**

## Cheatgrass - Bluebunch Wheatgrass Semi-natural Herbaceous Vegetation

*Bromus tectorum* - *Pseudoroegneria spicata* Semi-natural Herbaceous Vegetation



### Description

The vegetation in this association is dominated by *Bromus tectorum*, an introduced, annual grass species. Total vegetation cover may be highly variable from one stand to another. Native species, particularly *Pseudoroegneria spicata*, persist in most stands, however cover and diversity are typically low and component native species can be quite variable depending on the plant community that was present prior to the conversion to introduced herbaceous species. Native shrubs may occur sporadically with low densities. Several non-native perennial and annual forb species may also be sparse and variable across stands of this type. *Sisymbrium altissimum*, *Centaurea solstitialis*, *Daucus carota*, and *Onopordum acanthium* occur with the greatest frequency in this vegetation type.

This association can occur across a wide range of environmental conditions in semi-arid ecosystems and is not tightly constrained by slope, aspect, soil texture, or soil depth. This association often occurs on or near sites that have been disturbed.

CONSERVATION RANK N/A

DATABASE CODE N/A

### CHARACTERISTIC SPECIES (n = 3, xx)

#### Tree

None

#### Shrub

None

#### Dwarf-shrub

None

#### Graminoid

*Bromus tectorum* (cheatgrass) V.15, *Pseudoroegneria spicata* (bluebunch wheatgrass) V.8, *Poa bulbosa* (bulbous bluegrass) IV.6

#### Forb

*Centaurea solstitialis* (yellow star-thistle) V.3, *Daucus carota* (Queen Anne's lace) IV.2, *Onopordum acanthium* (Scotch thistle) IV.2, *Sisymbrium altissimum* (tall tumbled mustard) IV.1



## RANGE

*Buffalo Eddy, Nez Perce National Historical Park*

Enter Buffalo Eddy specific information here.

*Global*

The distribution of this association coincides with the range the *Bromus tectorum* Semi-natural Herbaceous Alliance as well as that of the *Pseudoroegneria spicata* Herbaceous Vegetation Association. This association is likely constrained by the range of bluebunch wheatgrass and therefore present from northern Colorado, northwestern Wyoming, Idaho, Utah and Montana.

Columbia Basin Foothill and Canyon Dry Grassland

## COMMENTS

The unique life history characteristics of *Bromus tectorum* and the altered ecological process associated with this species have promoted the spread of it and other exotic annual bromes at the expense of sagebrush shrublands and related assemblages in large parts of the western U.S. Consequently, this species tends to dominate or co-dominate primarily on sites that have been severely impacted.

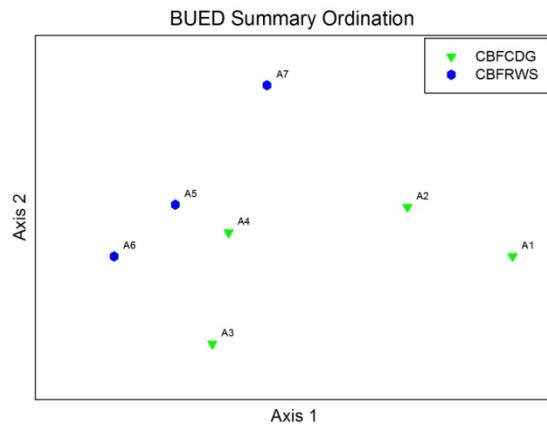
This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Buffalo Eddy, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.



**A3**

## Queen Anne's Lace Semi-natural Herbaceous Vegetation

*Daucus carota* Semi-natural Herbaceous Vegetation



### Description

The vegetation in this association is dominated by *Daucus carota*, an introduced, biennial forb species. Total vegetation cover may be highly variable from one stand to another and native species are a minor component of most stands, with low cover and diversity. Native species composition depends on the plant community that was present prior to the conversion to introduced herbaceous species. Several non-native perennial and annual forb species may also be sparse and variable across stands of this type. *Bromus tectorum* may be relatively abundant in some stands.

This association can occur across a wide range of environmental conditions in semi-arid ecosystems and is not tightly constrained by slope, aspect, soil texture, or soil depth. This association often occurs on or near sites that have been disturbed.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 2, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Bromus tectorum* (cheatgrass) V.8, *Festuca idahoensis* (Idaho fescue) V.4, *Pseudoroegneria spicata* (bluebunch wheatgrass) V.1

Forb

*Daucus carota* (Queen Anne's lace) V.50, *Amsinckia lycopsoides* (tarweed fiddleneck) V.1, *Hypericum perforatum* (common St. Johnswort) V.1, *Claytonia perfoliata* (miner's lettuce) V.<1, *Galium aparine* (stickywilly) V.<1, *Lithophragma parviflorum* (smallflower woodland-star) V.<1

Columbia Basin Foothill and Canyon Dry Grassland

## RANGE

*Buffalo Eddy, Nez Perce National Historical Park*

Enter Buffalo Eddy specific information here.

*Global*

*Daucus carota* is an invasive species in most of the lower 48 states as well as parts of Canada. It is designated a noxious weed in a few states. This association is likely to be found anywhere that *Daucus carota* has been introduced and dominates the herbaceous strata of a plant community.

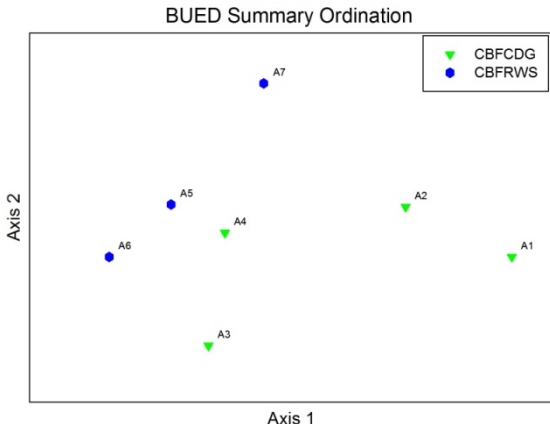
## COMMENTS

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Buffalo Eddy, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.



# Cheatgrass - Queen Anne's Lace Semi-natural Herbaceous Vegetation

*Bromus tectorum* - *Daucus carota* Semi-natural Herbaceous Vegetation



## Description

The vegetation in this association is co-dominated by two invasive species, *Daucus carota* and *Bromus tectorum*. Total vegetation cover can be highly variable. Native herbaceous species are sparse in most stands, with very low cover and diversity where present. Short-statured trees may occur sporadically in and around the edges of this assemblage. Several non-native perennial and annual forb species may also occur with low cover values and variable species composition in stands of this type. *Sisymbrium altissimum*, *Centaurea solstitialis* and *Onopordum acanthium* occur with the greatest frequency.

This association can occur across a wide range of environmental conditions in semi-arid ecosystems and is not tightly constrained by slope, aspect, soil texture, or soil depth. This association often occurs on or near sites that have been disturbed.

CONSERVATION RANK N/A

DATABASE CODE N/A

## CHARACTERISTIC SPECIES (n = 4, xx)

### Tree

*Celtis laevigata* (netleaf hackberry) IV.4, *Amelanchier alnifolia* (Saskatoon serviceberry) III.5

### Shrub

None

### Dwarf-shrub

None

### Graminoid

*Bromus tectorum* (cheatgrass) V.14

### Forb

*Daucus carota* (Queen Anne's lace) V.18, *Achillea millefolium* (common yarrow) V.2, *Amsinckia lycopsoides* (tarweed fiddleneck) V.2, (common yarrow) V.2, *Sisymbrium altissimum* (tall tumblemustard) V.1, *Onopordum acanthium* (Scotch thistle) V.<1, *Centaurea solstitialis* (yellow star-thistle) IV.5

Columbia Basin Foothill and Canyon Dry Grassland

## RANGE

*Buffalo Eddy, Nez Perce National Historical Park*

Enter Buffalo Eddy specific information here.

*Global*

*Daucus carota* is an invasive species in most of the lower 48 states as well as parts of Canada. It is designated as noxious in a few states. This association is likely to be found anywhere that *Daucus carota* dominates the herbaceous strata of the plant community.

## COMMENTS

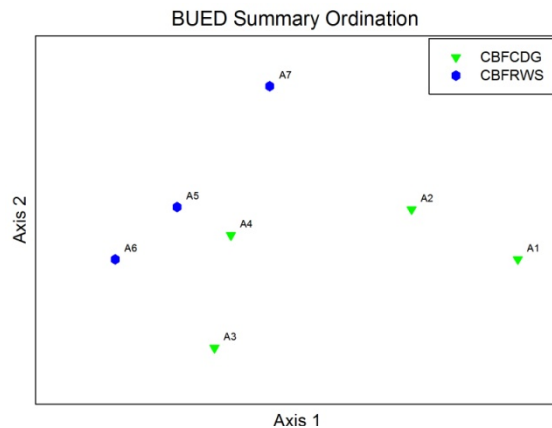
The unique life history characteristics of *Bromus tectorum* and the altered ecological process associated with this species have promoted the spread of it and other exotic annual bromes at the expense of sagebrush shrublands and related assemblages in large parts of the western U.S. Consequently, this species tends to dominate or co-dominate primarily on sites that have been severely impacted.

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Buffalo Eddy, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

**A5****Netleaf Hackberry / Lewis' Mock Orange Woodland***Celtis laevigata* var. *reticulata* / *Philadelphus lewisii* Woodland**Description**

Short *Celtis laevigata* var. *reticulata* trees form a canopy which may range from relatively open to nearly closed, with shrubby undergrowth dominated by the shrub, *Philadelphus lewisii*. The shrub layer may also contain *Rubus armeniacus*, *Rosa woodsii*, or *Rosa nutkana*. Exotic herbaceous plants are frequent in this association. *Bromus tectorum* is common and can be very abundant on recently disturbed sites. The exotic herb *Daucus carota* is the most common forb species. Associated herbaceous species are typically drier riparian species which often increase subsequent to soil disturbance. Native species may occur, but cover is very low and variability in species composition is high among stands of this type.

This is a riparian shrubland or short woodland community. This type is typically found on upper stream terraces, although it can occur on toeslopes or in the active floodplain.



CONSERVATION RANK G1

DATABASE CODE CEGL000792

**CHARACTERISTIC SPECIES** (n = 4, xx)**Tree**

*Celtis laevigata* (netleaf hackberry) V.39, *Amelanchier alnifolia* (Saskatoon serviceberry) III.2

**Shrub**

*Philadelphus lewisii* (Lewis' mock orange) IV.8

**Dwarf-shrub**

None

**Graminoid**

*Bromus tectorum* (cheatgrass) V.6, *Poa bulbosa* (bulbous bluegrass) IV.1

**Forb**

*Daucus carota* (Queen Anne's lace) V.24, *Claytonia perfoliata* (miner's lettuce) V.1, *Achillea millefolium* (common yarrow) V.<1, *Myosotis stricta* (strict forget-me-not) V.<1, *Onopordum acanthium* (Scotch thistle) IV.1

Columbia Basin Foothill Riparian Woodland and Shrubland



## RANGE

*Buffalo Eddy, Nez Perce National Historical Park*

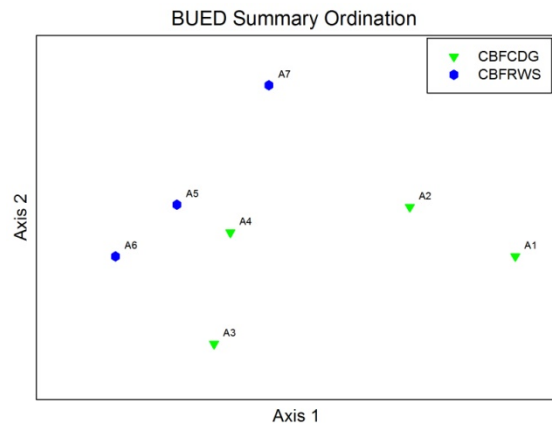
Enter Buffalo Eddy specific information here.

*Global*

This association is reported from the Hells Canyon area of the Snake River and its tributaries in Idaho, Oregon and Washington. Its occurrence elsewhere in Idaho and Montana is uncertain.

## COMMENTS

A narrow endemic association that is known only from tributary streams of the Snake River in Oregon and Washington. This riparian association appears in a region with abundant exotic plant species that invade and alter native composition and structure. Much of this range is adjacent to reservoir water. Most occurrences are or have been heavily used by livestock and native ungulates for shade and communities tend to become very weedy with exotic annuals or are invaded by the exotic shrub, *Rubus discolor*. Only isolated small pockets are in good condition.

**A6****Lewis' Mock Orange Intermittently Flooded Shrubland***Philadelphus lewisii* Intermittently Flooded Shrubland**Description**

*Philadelphus lewisii* forms patchy to dense, 2- to 5-m tall, thickets in this shrubland vegetation type. Various subdominant tall shrubs are present, most commonly *Amelanchier alnifolia*, and *Celtis laevigata* var. *reticulata*. Low to medium height shrubs (e.g., *Rosa* spp. and *Toxicodendron rydbergii*) have high constancy, but relatively low cover in this community. Total herbaceous cover varies from sparse to moderate and is inversely related to shrub canopy cover. *Pseudoroegneria spicata* and *Elymus glaucus* are often the most common native grasses, but disturbed stands have moderate cover of exotic graminoids (*Poa* spp. and *Bromus tectorum*). Various colonizing forbs, both native and exotic, especially *Claytonia perfoliata*, *Daucus carota*, *Galium aparine*, and *Cerastium arvense*, are common with low to moderate cover.

This association is restricted to low elevations and is usually found in narrow to moderate-width canyons and gorges on dry alluvial terraces or steep banks of moderate- to high-gradient intermittent and perennial streams. These sites are above the average high water line, but are occasionally scoured by flash floods or high runoff events. Soils are rocky-gravelly, well-drained alluvium ranging from deep to shallow, silty or sandy loam.

CONSERVATION RANK G2

DATABASE CODE CEGL001170

**CHARACTERISTIC SPECIES** (n = 6, xx)**Tree**

*Amelanchier alnifolia* (Saskatoon serviceberry) V.6, *Celtis laevigata* (netleaf hackberry) IV.4

**Shrub**

*Philadelphus lewisii* (Lewis' mock orange) V.15

**Dwarf-shrub**

*Toxicodendron rydbergii* (western poison ivy) V.1

**Graminoid**

*Bromus tectorum* (cheatgrass) V.1, *Pseudoroegneria spicata* (bluebunch wheatgrass) III.3

**Forb**

*Daucus carota* (Queen Anne's lace) V.30, *Claytonia perfoliata* (miner's lettuce) V.1, *Hypericum perforatum* (common St. Johnswort) V.<1, *Cerastium arvense* (field chickweed) IV.1

Columbia Basin Foothill Riparian Woodland and Shrubland

## RANGE

*Buffalo Eddy, Nez Perce National Historical Park*

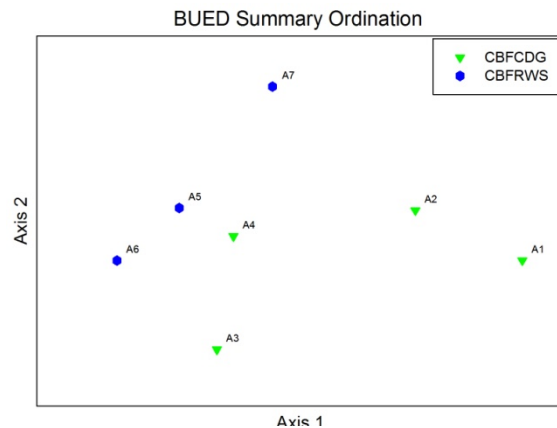
Enter Buffalo Eddy specific information here.

*Global*

This association occurs in hot dry, low-elevation river canyons in Oregon, Idaho, Montana, and Washington.

## COMMENTS

*Philadelphus lewisii* sprouts vigorously from roots after fire, cutting, or above-ground removal by floods. It also spreads quickly by suckering. On sites favorable for *Philadelphus lewisii* dominance, occasional flood disturbance is required for the species to persist. The effect of heavy cattle use on *Philadelphus lewisii* persistence is not known; however, soil disturbance by cattle promotes the invasion of weedy exotic species in this association.

**A7****Netleaf Hackberry / Mixed Grasses Woodland***Celtis laevigata* var. *reticulata* / Mixed Grasses Woodland**Description**

Short *Celtis laevigata* var. *reticulata* trees form an open canopy in this woodland association. Additional short-statured tree species are common scattered throughout the canopy and include; *Amelanchier alnifolia*, *Crataegus douglasii*, *Elaeagnus angustifolia*, and *Morus alba*. The shrub layer is very sparse and exotic herbaceous species are frequent in this association. *Bromus tectorum* and *Poa bulbosa* are common and can be very abundant on recently disturbed sites. The exotic herb *Daucus carota* is the most abundant forb species in this vegetation type. Other herbaceous species may occur with low cover and constancy and are often non-native.

These woodlands occur as relatively small stands, dispersed and clustered in valley bottoms along riparian margins, on lower slopes of river terraces near seepage lines, and on scree slopes. Aspects are often southerly, especially at higher elevations. Soils are poorly developed and derived from alluvium and colluvium with bedrock outcrops.

CONSERVATION RANK N/A

DATABASE CODE N/A

**CHARACTERISTIC SPECIES** (n = 1, xx)**Tree**

*Celtis laevigata* (netleaf hackberry) V.15, *Amelanchier alnifolia* (Saskatoon serviceberry) V.5, *Crataegus douglasii* (black hawthorn) V.2, *Elaeagnus angustifolia* (Russian olive) V.2, *Morus alba* (white mulberry) V.2

**Shrub**

None

**Dwarf-shrub**

None

**Graminoid**

*Bromus tectorum* (cheatgrass) V.5, *Poa bulbosa* (bulbous bluegrass) V.5, *Setaria viridis* (green bristlegrass) V.<1, *Sporobolus cryptandrus* (sand dropseed) V.<1

**Forb**

*Daucus carota* (Queen Anne's lace) V.2, *Cerastium arvense* (field chickweed) V.1, *Amsinckia lycopsoides* (tarweed fiddleneck) V.<1, *Claytonia perfoliata* (miner's lettuce) V.<1, *Conyza canadensis* (Canadian horseweed) V.<1, *Galium aparine* (stickywilly) V.<1, *Hypericum perforatum* (common St. Johnswort) V.<1, *Myosotis stricta* (strict forget-me-not) V.<1, *Onopordum acanthium* (Scotch thistle) V.<1, *Sisymbrium altissimum* (tall tumbled mustard) V.<1, *Vicia villosa* (winter vetch) V.<1

Columbia Basin Foothill Riparian Woodland and Shrubland

## RANGE

*Buffalo Eddy, Nez Perce National Historical Park*

Enter Buffalo Eddy specific information here.

*Global*

This association has the potential to occur in the Hells Canyon area of the Snake River and its tributaries in Idaho, Oregon and Washington. Its occurrence elsewhere in Idaho and Montana is uncertain.

## COMMENTS

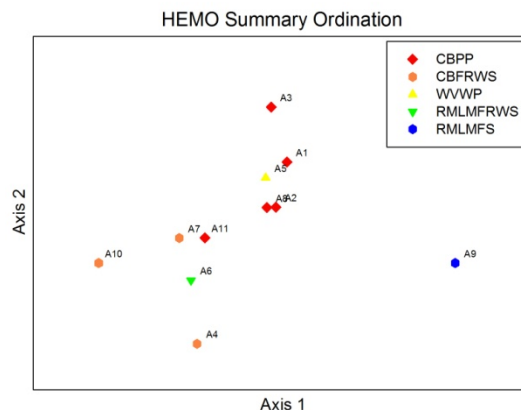
This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Buffalo Eddy, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

## HEMO Association Descriptions



### Kentucky Bluegrass – Quackgrass Semi-natural Herbaceous Vegetation

*Poa pratensis* – *Elymus repens* Semi-natural Herbaceous Vegetation



#### Description

This herbaceous vegetation type is characterized by dense stands of introduced grasses. Common grasses include; *Poa pratensis*, *Elymus repens*, *Dactylis glomerata*, *Alopecurus pratensis*, and *Bromus arvensis*. Forbs are rare and contribute very little cover to the herbaceous layer. This community is often the result of historical ornamental/agricultural plantings for lawns, pastures, hayfields, etc.

This introduced grass association can occur across a wide range of elevations. Stands typically occupy mesic meadows in the montane zone. Sites are often on elevated portions of meadows at the bottom of wide valleys. Surface topography is concave to undulating. Seasonal flooding from upstream sources is typical, and sites may be covered with standing water during runoff. Sites generally dry out in late summer. Compared to other meadow vegetation types, stands of this type can occupy a wide range of sites with a range soil moisture conditions and have few soil constraints.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 9, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Poa pratensis* (Kentucky bluegrass) V.37, *Elymus repens* (quackgrass) V.13, *Dactylis glomerata* (orchardgrass) V.3, *Alopecurus pratensis* (meadow foxtail) IV.3, *Bromus arvensis* (field brome) III.3

Forb

None

Columbia Basin Palouse Prairie



## RANGE

*Heart of the Monster, Nez Perce National Historical Park*

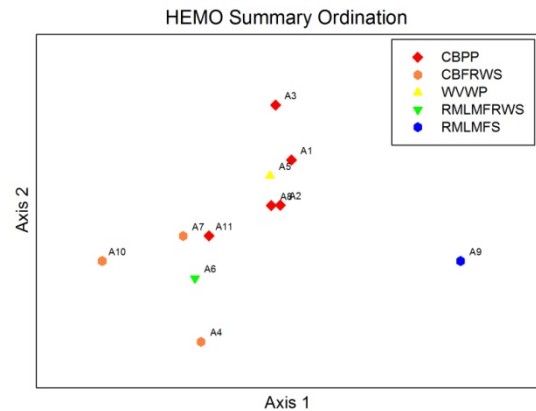
Enter Heart of the Monster specific data.

*Global*

Both dominant species in this vegetation type are widespread throughout most of the US and Canada.

## COMMENTS

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Heart of the Monster, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

**A2****Smooth Brome Semi-natural Herbaceous Vegetation***Bromus inermis* Semi-natural Herbaceous Vegetation**Description**

This community typically forms a relatively uniform grass canopy that is heavily dominated by the non-native tall grass, *Bromus inermis*. There is no distinct shrub layer, but scattered individuals may occur around the edges of this vegetation type. Other component grass species are most often non-natives and may include; *Bromus arvensis*, *Poa pratensis*, *Dactylis glomerata*, *Alopecurus pratensis* and *Agropyron cristatum*. Forbs may be diverse in this assemblage, but total cover is generally sparse.

This community is found on wet to moderately dry, open sites in plains, foothills, montane and subalpine zones with no specific constrain on aspect or elevation. Often used as a forage species in hayfields and pastures, smooth brome is fairly drought resistant and can be found on sandy and stony soils as well as those with better structures.

CONSERVATION RANK N/A

DATABASE CODE N/A

**CHARACTERISTIC SPECIES** (n = 1, xx)**Tree***Malus fusca* (Oregon crab apple) V.<1**Shrub**

None

**Dwarf-shrub**

None

**Graminoid**

*Bromus inermis* (smooth brome) V.50, *Poa pratensis* (Kentucky bluegrass) V.5, *Alopecurus pratensis* (meadow foxtail) V.<1, *Dactylis glomerata* (orchardgrass) V.<1

**Forb**

*Arabidopsis thaliana* (mouseear cress) V.<1, *Buglossoides arvensis* (corn gromwell) V.<1, *Cynoglossum officinale* (gypsyflower) V.<1, *Hypericum perforatum* (common St. Johnswort) V.<1, *Leucanthemum vulgare* (oxeye daisy) V.<1, *Myosotis stricta* (strict forget-me-not) V.<1, *Valerianella locusta* (Lewiston cornsalad) V.<1, *Verbascum thapsus* (common mullein) V.<1

Columbia Basin Palouse Prairie

## RANGE

*Heart of the Monster, Nez Perce National Historical Park*

Enter Heart of the Monster specific data.

*Global*

Introduced from Europe, *Bromus inermis* has spread across the US and southern Canada and is common on dry, disturbed sites in plains to montane zones, from BC and Alberta to New Mexico.

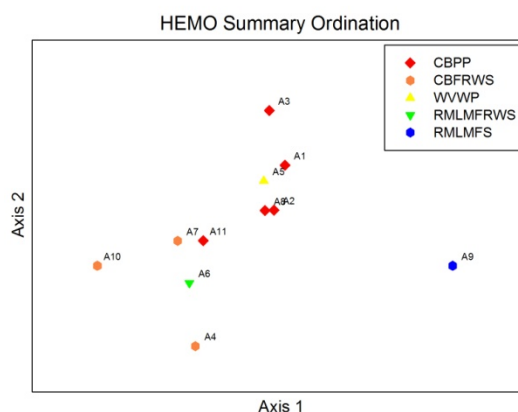
## COMMENTS

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## Kentucky Bluegrass – Orchard Grass Semi-natural Herbaceous Vegetation

*Poa pratensis* – *Dactylis glomerata* Semi-natural Herbaceous Vegetation



### Description

Stands of this herbaceous vegetation type are dominated by introduced grasses. Total vegetative cover ranges from low to moderate and *Poa pratensis* is generally the most abundant species. *Dactylis glomerata* ranges from common to co-dominant and other frequently occurring, but less abundant grasses include; *Elymus repens*, *Alopecurus pratensis*, and *Bromus inermis*. Forbs are rare and contribute very little total cover to the plant community. This assemblage is often the result of historical ornamental/agricultural plantings for lawns, pastures, hayfields, etc. The introduced grass species common to this vegetation type are competitive with native species and will likely persist for long periods of time.

This introduced grass association can occur across a wide range of elevations. Stands occupy mesic meadows generally in the montane but below the subalpine zone. Sites are often on elevated portions of meadows at the bottom of wide valleys. Surface topography is concave to undulating. Seasonal flooding from upstream sources is typical, and sites may be covered with standing water during runoff. Sites typically dry out toward the end of the growing season. Patches of this community type can occupy sites which range from mesic to very dry with no soil constraints.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 3, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Poa pratensis* (Kentucky bluegrass) V.12, *Dactylis glomerata* (orchardgrass) IV.7, *Elymus repens* (quackgrass) IV.5, *Alopecurus pratensis* (meadow foxtail) V.2, *Schedonorus phoenix* (tall fescue) IV.2, *Bromus inermis* (smooth brome) IV.1, *Festuca ovina* (sheep fescue) IV.1

Forb

*Plantago lanceolata* (narrowleaf plantain) IV.4

## RANGE

*Heart of the Monster, Nez Perce National Historical Park*

Enter Heart of the Monster specific data.

*Global*

Both species which dominate this association are widespread throughout most of the US and Canada.

**Columbia Basin Palouse Prairie**

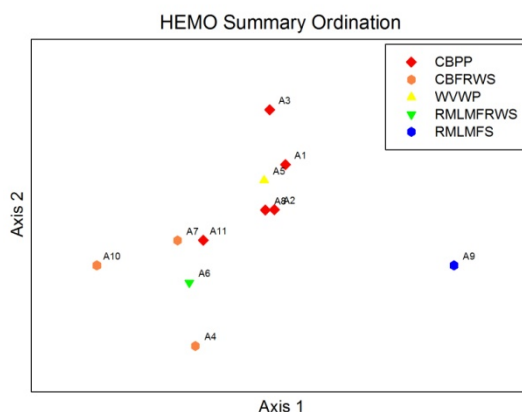
## COMMENTS

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## Black Hawthorne – Cascara Buckthorn / Common Snowberry Shrubland

*Crataegus douglasii* – *Frangula purshiana* / *Symphoricarpos albus* Shrubland



### Description

An abundance of woody species characterizes stands of this vegetation type. Total cover from trees and shrubs ranges from moderate to dense. *Crataegus douglasii* and *Frangula purshiana* dominate the tall shrub layer and form thickets over shorter shrub understories which are dominated by *Symphoricarpos albus*. *Rosa woodsii* is also generally present in the understory, but with much lower cover values. Trees occur sporadically in and around the edges of stands of this type. *Prunus domestica* and *Populus balsamifera* ssp. *trichocarpa* are among the most frequently occurring trees. The herbaceous layer may be diverse, but generally contributes very little total cover to the community. Exotic species may occur in some stands and are often indicative of past disturbance.

This association typically occurs at low elevations, on slopes of all aspects, in broad mountain valleys and canyons of low- to moderate-gradient streams and rivers. The association occupies alluvial terraces and elevated streambanks with deep silty loam soils (over cobble and gravel) on infrequently flooded sites well above the average high-water line and summer water table.

CONSERVATION RANK N/A

DATABASE CODE N/A

### CHARACTERISTIC SPECIES (n = 4, xx)

#### Tree

*Prunus domestica* (European plum) V.6, *Populus balsamifera* ssp. *trichocarpa* (black cottonwood) III.13

#### Shrub

*Symphoricarpos albus* (common snowberry) V.23, *Frangula purshiana* (Cascara buckthorn) V.17, *Crataegus douglasii* (black hawthorn) V.16, *Prunus virginiana* (chokecherry) III.4

#### Dwarf-shrub

*Rosa woodsii* (Woods' rose) V.3

#### Graminoid

*Dactylis glomerata* (orchardgrass) IV.1

#### Forb

*Hypericum perforatum* (common St. Johnswort) V.<1, *Pteridium aquilinum* (western brackenfern) IV.1



## RANGE

*Heart of the Monster, Nez Perce National Historical Park*

Enter Heart of the Monster specific data.

*Global*

The plant association has the potential to occur in the Great Plains and Palouse Dry Steppe including; eastern Oregon, eastern Washington and western Idaho.

**Columbia Basin Foothill Riparian Woodland and Shrubland**

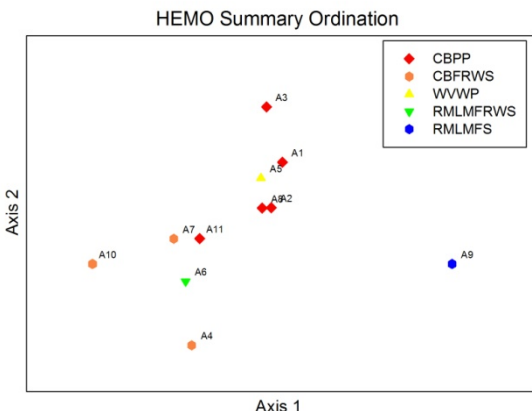
## COMMENTS

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Heart of the Monster, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

**A5**

## Small Camas – Meadow Foxtail Wet Prairie Herbaceous Vegetation

*Camassia quamash* – *Alopecurus pratensis* Wet Prairie Herbaceous Vegetation



### Description

*Alopecurus pratensis* is the dominant species in this herbaceous association, with *Camassia quamash* occurring as a sub-dominant. *Camassia* is conspicuous in spring and forms dense stands which are easily identified by an abundance of blue flowers, but it senesces early in the season and becomes a very minor visual component of the community by mid-summer. Because of its seasonal presence, low elevation, and proximity to agriculture, many exotic species are often present in *Camassia quamash* stands. Introduced grasses which commonly occur in this association in addition to *Alopecurus pratensis* include; *Dactylis glomerata*, *Schedonorus phoenix*, and *Poa pratensis*. Both white and blue forms of *Camassia quamash* may be present in a given stand. The native sedge, *Carex microptera* and the native forb *Vicia americana* also occur frequently in this herbaceous meadow type.

Arable prairies dominated by *Camassia quamash* have been converted to agriculture, and stands on scabland sites have been grazed by livestock, so most surviving remnants are degraded with exotic species. This association is found in areas of shallow soil over bedrock and appropriate sites have a perched water table or seasonal seepage. This vegetation type generally occurs on clay prairie and basalt scabland.

CONSERVATION RANK

N/A

DATABASE CODE

N/A

### CHARACTERISTIC SPECIES (n = 2, xx)

#### Tree

None

#### Shrub

None

#### Dwarf-shrub

None

#### Graminoid

*Alopecurus pratensis* (meadow foxtail) V.43, *Dactylis glomerata* (orchardgrass) V.4, *Festuca rubra* (red fescue) V.4, *Poa pratensis* (Kentucky bluegrass) V.4, *Carex microptera* (smallwing sedge) V.2, *Schedonorus phoenix* (tall fescue) III.5

#### Forb

*Camassia quamash* (small camas) V.10, *Trifolium pretense* (red clover) V.1, *Vicia americana* (American vetch) V.5

## RANGE

*Heart of the Monster, Nez Perce National Historical Park*

Enter Heart of the Monster specific data.

*Global*

This association is likely to occur in Oregon, Washington and in western Idaho, and is may be present in warmer regions of Montana as well.

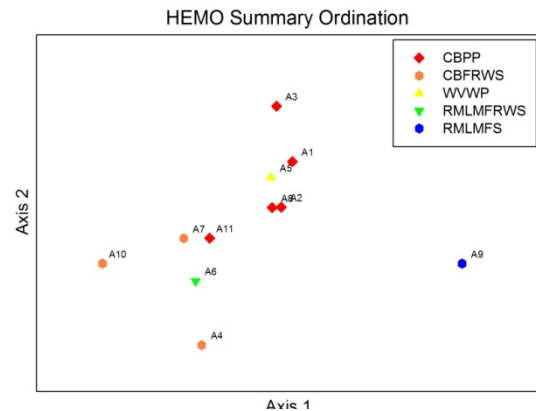
**Willamette Valley Wet Prairie**

## COMMENTS

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Heart of the Monster, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

## A6 Box-elder Seasonally Flooded Forest Alliance

*Acer negundo* Seasonally Flooded Alliance



### Description

This forest association is dominated by *Acer negundo*. The tree canopy is substantial and it is typically nearly closed. Other tree species are often present or even co-dominant. Additional tree species common to the canopy of this plant community include *Pinus ponderosa* and *Populus balsamifera* ssp. *trichocarpa*. The shrub understory of this vegetation type is well-developed. *Prunus domestica*, *Rubus armeniacus*, *Rubus laciniatus*, *Symphoricarpos albus*, and *Crataegus douglasii* are common. Herbaceous cover is variable but is usually less than 50%. Species composition also varies, although *Maianthemum stellatum* co-dominates in some local stands.

This forest association has been documented on the banks, terraces and lower canyon slopes of small intermittent or perennial streams, and is likely to occur in isolated stands in sheltered canyons as well. Stands occur on level to gently sloping sites. Aspect is not important. Soils are poorly developed and derived from alluvium or colluvium.

CONSERVATION RANK N/A

DATABASE CODE A.341

### CHARACTERISTIC SPECIES (n = 1, xx)

#### Tree

*Acer negundo* (box-elder) V.50, *Pinus ponderosa* (ponderosa pine) V.15, *Populus balsamifera* ssp. *trichocarpa* (black cottonwood) V.2, *Acer saccharinum* (silver maple) V.<1, *Prunus domestica* (European plum) V.<1

#### Shrub

*Symphoricarpos albus* (common snowberry) V.25, *Crataegus douglasii* (black hawthorn) V.5

#### Dwarf-shrub

*Rubus armeniacus* (Himalayan blackberry) V.2, *Rubus laciniatus* (cutleaf blackberry) V.<1

#### Graminoid

*Bromus inermis* (smooth brome) V.2, *Carex microptera* (smallwing sedge) V.1, *Dactylis glomerata* (orchardgrass) V.<1

#### Forb

*Maianthemum stellatum* (starry false lily of the valley) V.35, *Solidago canadensis* (Canada goldenrod) V.1, *Cynoglossum officinale* (gypsyflower) V.<1, *Pteridium aquilinum* (western brackenfern) V.<1

Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland

**RANGE**

*Heart of the Monster, Nez Perce National Historical Park*

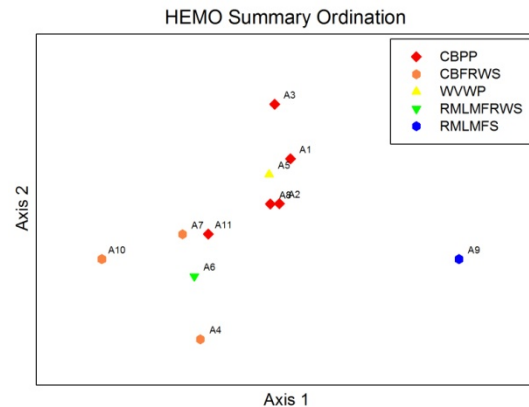
Enter Heart of the Monster specific data.

*Global*

This riparian forest grows on broad alluvial floodplains at lower elevations in the western and northern Great Plains of the United States and Canada, ranging from eastern Colorado to Wyoming, eastern Montana and Alberta. It is also documented from the Black Hills region of South Dakota and the Colorado Plateau of western Colorado and adjacent eastern Utah.

**COMMENTS**

None.

**A7****Black Cottonwood Temporarily Flooded Woodland Alliance***Populus balsamifera* ssp. *trichocarpa* Temporarily Flooded Woodland Vegetation**Description**

This woodland community has an open canopy, ranging from 15-60% cover, which is dominated by *Populus balsamifera* ssp. *trichocarpa*. Additional tree species common to the canopy of this woodland include *Acer negundo* and *Prunus domestica*. This Alliance can be quite variable in composition from one stand to another. Shrub cover is generally low and component species may include *Rubus armeniacus*, *Frangula purshiana*, *Crataegus douglasii*, and *Symphoricarpos* spp. Herbaceous cover tends to be sparse and variable, consisting of primarily mesic forbs such as *Solidago canadensis*, *Pteridium aquilinum*, and *Galium aparine*. Graminoids also range in cover and composition. Non-natives are common in disturbed areas and may include: *Poa pratensis*, *Bromus inermis*, *Dactylis glomerata*, *Alopecurus pratensis*, and *Phalaris arundinacea*.

The Black Cottonwood Temporarily Flooded Woodland Alliance is a group of low-elevation plant communities associated with streams at and below lower treeline, including permanent, intermittent and ephemeral streams with woody riparian vegetation. These woodlands generally require flooding and some gravels for reestablishment. Sites are subject to temporary flooding during spring runoff. Underlying gravels may keep the water table just below the ground surface and are favored substrates for cottonwood.

CONSERVATION RANK N/A

DATABASE CODE A.635

CHARACTERISTIC SPECIES (n = 4, xx)

**Tree**

*Populus balsamifera* ssp. *trichocarpa* (black cottonwood) V.34, *Prunus domestica* (European plum) IV.12, *Acer negundo* (box-elder) III.9

**Shrub**

*Crataegus douglasii* (black hawthorn) IV.2, *Frangula purshiana* (Cascara buckthorn) IV.2

**Dwarf-shrub**

*Rubus armeniacus* (Himalayan blackberry) V.6

**Graminoid**

*Poa pratensis* (Kentucky bluegrass) V.5, *Phalaris arundinacea* (reed canarygrass) IV.13, *Dactylis glomerata* (orchardgrass) IV.6, *Alopecurus pratensis* (meadow foxtail) III.7, *Bromus inermis* (smooth brome) III.4

**Forb**

*Solidago canadensis* (Canada goldenrod) IV.5, *Pteridium aquilinum* (western brackenfern) IV.3

Columbia Basin Foothill Riparian Woodland and Shrubland



**RANGE**

*Heart of the Monster, Nez Perce National Historical Park*

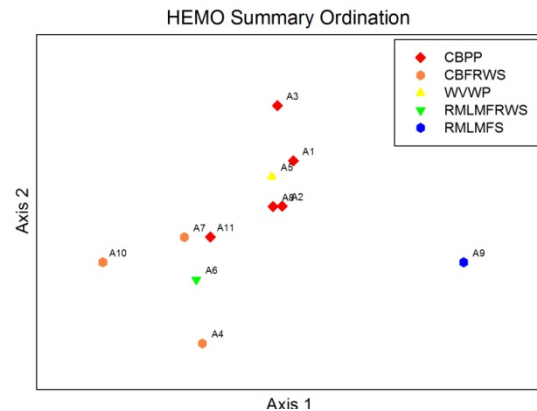
Enter Heart of the Monster specific data.

*Global*

This Alliance is found on the periphery of the northern Rockies in the Columbia River Basin, along major tributaries and the main stem of the Columbia at relatively low elevations.

**COMMENTS**

None.

**A8****Spotted Knapweed Semi-natural Herbaceous Vegetation***Centaurea stoebe* Semi-natural Herbaceous Vegetation**Description**

This association is dominated by the noxious weed, *Centaurea stoebe*, which is becoming increasingly common in disturbed areas in the western states. Once established, *Centaurea stoebe* will outcompete most native species. Consequently, other non-native species, particularly graminoids are common in this herbaceous vegetation type. Common graminoids include; *Bromus diandrus*, *Phalaris arundinacea*, *Dactylis glomerata*, *Poa pratensis*, *Elymus repens*, *Poa bulbosa*, and *Bromus tectorum*. Remnant native forbs may occur in some stands, but cover is sparse and species composition is highly variable. Tree and shrub species may occur sporadically in some stands and *Symphoricarpos albus* is the most frequently occurring woody species in stands of this vegetation type.

This association is found in dry meadows, pastures, rocky slopes, hayfields, forest clearings and on the sandy or gravelly floodplains of streams and rivers. It is not tightly constrained by slope, elevation, aspect or soil texture.

CONSERVATION RANK N/A

DATABASE CODE N/A

**CHARACTERISTIC SPECIES** (n = 1, xx)**Tree**

*Malus fusca* (Oregon crab apple) V.2, *Prunus domestica* (European plum) V.1

**Shrub**

*Symphoricarpos albus* (common snowberry) V.10, *Prunus virginiana* (chokecherry) V.1

**Dwarf-shrub**

None

**Graminoid**

*Bromus diandrus* (ripgut brome) V.10, *Bromus tectorum* (cheatgrass) V.10, *Dactylis glomerata* (orchardgrass) V.10, *Poa pratensis* (Kentucky bluegrass) V.10, *Elymus repens* (quackgrass) V.1, *Phalaris arundinacea* (reed canarygrass) V.1, *Poa bulbosa* (bulbous bluegrass) V.1, *Bromus hordeaceus* (soft brome) V.<1

**Forb**

*Centaurea stoebe* (spotted knapweed) V.25, *Lomatium dissectum* (fernleaf biscuitroot) V.5, *Potentilla erecta* (erect cinquefoil) V.5, *Achillea millefolium* (common yarrow) V.<1, *Cruciata pedemontana* (piedmont bedstraw) V.<1, *Geranium pusillum* (small geranium) V.<1, *Hypericum perforatum* (common St. Johnswort) V.<1, *Myosotis stricta* (strict forget-me-not) V.<1, *Silene latifolia* (bladder campion) V.<1, *Stellaria media* (common chickweed) V.<1, *Triteleia grandiflora* (largeflower triteleia) V.<1, *Valerianella locusta* (Lewiston cornsalad) V.<1

Columbia Basin Palouse Prairie

## RANGE

*Heart of the Monster, Nez Perce National Historical Park*

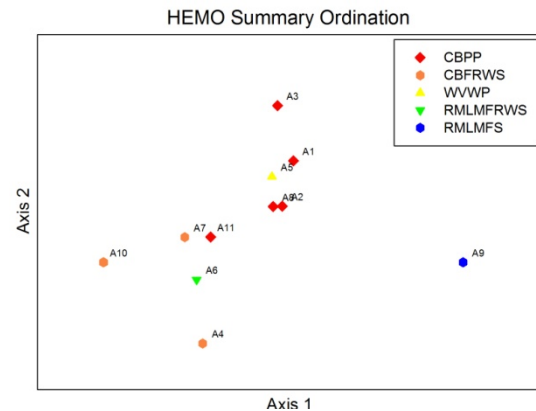
Enter Heart of the Monster specific data.

*Global*

Introduced from Eurasia, *Centaurea stoebe* is an invasive species found across most the United States and Canada.

## COMMENTS

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Heart of the Monster, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

**A9****Chokecherry – (American Plum) Shrubland***Prunus virginiana* – (*Prunus americana*) Shrubland**Description**

*Prunus virginiana* is the dominant tall shrub species in this relatively open shrubland community. Additional trees and shrubs may be common and component woody species may include; *Rhus glabra*, *Ribes* spp., *Rosa woodsii*, *Mahonia repens*, and *Toxicodendron* spp. Herbaceous species are variable in terms of both species composition and cover. Many of the most frequently occurring grass species are non-native and forb species composition includes both natives and non-natives. *Lomatium dissectum*, a native, perennial forb is generally the most abundant species in the herbaceous understory.

This association often grows at the interface between larger riparian areas and the adjacent upland, as well as on higher ridges where snow collects, where patch size is generally small and irregular. It often occupies draws, ephemeral creeks in steep narrow-bottomed canyons, and shallow ravines. It can occur on slopes below seeps and springs. Stands can also occur as small pockets on higher terraces or as narrow bands along the high-water mark of steep banks and incised channels. It may also occur at the base of cliffs adjacent to rivers. Slope varies from flat to very steep, with variable aspects, and can be associated with rock outcrops and talus. Stands are typically on very well-drained, rocky soils but occasionally have finer soil textures. Soil texture ranges from sandy loam to clay loam.

CONSERVATION RANK G4

DATABASE CODE CEGL001108

**CHARACTERISTIC SPECIES** (n = 1, xx)**Tree***Rhus glabra* (smooth sumac) V.<1**Shrub***Prunus virginiana* (chokecherry) V.10**Dwarf-shrub***Mahonia repens* (creeping barberry) V.10**Graminoid**

*Bromus arvensis* (field brome) V.2, *Poa bulbosa* (bulbous bluegrass) V.2, *Poa pratensis* (Kentucky bluegrass) V.2, *Pseudoroegneria spicata* (bluebunch wheatgrass) V.2, *Poa compressa* (Canada bluegrass) V.1

**Forb**

*Lomatium dissectum* (fernleaf biscuitroot) V.15, *Centaurea stoebe* (spotted knapweed) V.2, *Eriogonum heracleioides* (parsnipflower buckwheat) V.2, *Selaginella densa* (lesser spikemoss) V.1, *Centaurea cyanus* (garden cornflower) V.<1, *Cerastium arvense* (field chickweed) V.<1, *Collinsia parviflora* (maiden blue eyed Mary) V.<1, *Epilobium brachycarpum* (tall annual willowherb) V.<1, *Hypericum perforatum* (common St. Johnswort) V.<1,

*Myosotis stricta* (strict forget-me-not) V.<1, *Stellaria media* (common chickweed) V.<1, *Triteleia grandiflora* (largeflower triteleia) V.<1

#### RANGE

*Heart of the Monster, Nez Perce National Historical Park*

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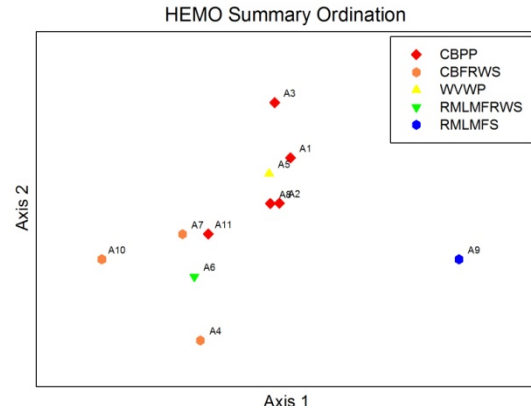
*Global*

This widespread small-patch shrubland is known from the Columbia Plateau of eastern Washington and eastern Oregon, throughout much of the western Great Plains, Rocky Mountain and interior western U.S.

**Rocky Mountain Lower Montane-Foothill Shrubland**

#### COMMENTS

Some stands on slopes are the result of recent fire that killed the overlying canopy, converting *Pinus ponderosa* / *Prunus virginiana* Forest (CEGL000192) to this *Prunus virginiana* shrubland type. In Montana, *Prunus virginiana* communities may be grazing-induced. Both *Prunus virginiana* and *Symphoricarpos occidentalis* are tolerant of fire and will usually sprout after fires and grow into even denser stands.

**A10****European Plum Semi-natural Woodland***Prunus domestica* Semi-natural Woodland**Description**

This association is dominated by a small plum-producing tree species, *Prunus domestica*, which is a non-native from Europe. This community is likely the result of ornamental tree plantings from early settlement in the area. Some occurrences may also represent the spread of this species into surrounding native communities. This vegetation type is also characterized by a variety of short tree and shrub species in the understory, including; *Symphoricarpos albus*, *Amelanchier alnifolia*, and *Crataegus douglasii*. In the dwarf-shrub layer, *Rosa canina* may be present with low cover values. The herbaceous layer is generally dominated by non- native, sometimes ornamental species, mostly a mixture of sod- or turf- forming grasses. *Dactylis glomerata*, *Poa pratensis*, and *Alopecurus pratensis* are among the most common. Forbs are typically very sparse and are often non-natives species in stands where they occur.

European plum communities are found in and adjacent to ornamental plantings and are not constrained by soil type or other environmental factors. They are often associated with early settlement and other anthropological activities.

CONSERVATION RANK N/A

DATABASE CODE N/A

**CHARACTERISTIC SPECIES** (n = 3, xx)**Tree**

*Prunus domestica* (European plum) V.42, *Amelanchier alnifolia* (Saskatoon serviceberry) IV.2

**Shrub**

*Crataegus douglasii* (black hawthorn) V.2, *Symphoricarpos albus* (common snowberry) IV.13

**Dwarf-shrub**

*Rosa canina* (dog rose) V.<1

**Graminoid**

*Dactylis glomerata* (orchardgrass) IV.5, *Alopecurus pratensis* (meadow foxtail) IV.1, *Poa pratensis* (Kentucky bluegrass) IV.1

**Forb**

*Daucus carota* (Queen Anne's lace) V.<1



**RANGE**

*Heart of the Monster, Nez Perce National Historical Park*

Enter Heart of the Monster specific data.

*Global*

*Prunus domestica* is common across much of the United States and Canada.

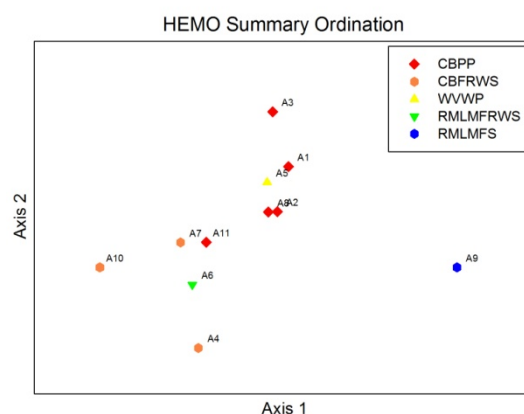
**COMMENTS**

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Heart of the Monster, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

A11

## Smooth Brome – Orchard Grass Semi-natural Herbaceous Vegetation

*Bromus inermis* – *Dactylis glomerata* Semi-natural Herbaceous Vegetation



### Description

This community typically forms a dense herbaceous layer that is heavily dominated by the non-native tall grasses *Bromus inermis* and *Dactylis glomerata*. *Robinia pseudoacacia*, occurs intermittently in stands of this type, but can be abundant where present. Other trees also occur sporadically in and around the edges of this vegetation type, though they do not contribute substantially to cover. The shrub layer ranges from sparse to moderate and *Symphoricarpos albus* is the most abundant shrub species in most stands. Other grass species are rare and are representative of the location of the patch and common graminoids in adjacent communities. Forbs diversity is typically low and cover ranges from sparse to moderate; *Daucus carota* is often the most abundant forb species in this association.

This community is found in wet to moderately dry, open sites in plains, foothills, montane and subalpine zones with no particular aspect or elevation constraints. Often used as a component in hayfields and pastures, smooth brome is fairly drought resistant and can be found on sandy and stony soils as well as those with better structures.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 2, xx)

#### Tree

*Robinia pseudoacacia* (black locust) V.35, *Prunus domestica* (European plum) V.4, *Fraxinus pennsylvanica* (green ash) III.3

#### Shrub

*Symphoricarpos albus* (common snowberry) III.13

#### Dwarf-shrub

None

#### Graminoid

*Dactylis glomerata* (orchardgrass) V.25, *Bromus inermis* (smooth brome) V.23

#### Forb

*Daucus carota* (Queen Anne's lace) V.13, *Galium aparine* (stickywilly) V.<1, *Triteleia grandiflora* (largeflower triteleia) V.<1

## RANGE

*Heart of the Monster, Nez Perce National Historical Park*

Enter Heart of the Monster specific data.

*Global*

Introduced from Europe and often planted as hay crops, both *Bromus inermis* and *Dactylis glomerata*, have spread across the US and southern Canada and are common on dry, disturbed sites in plains to montane zones, from BC and Alberta to New Mexico.

Columbia Basin Palouse Prairie

## COMMENTS

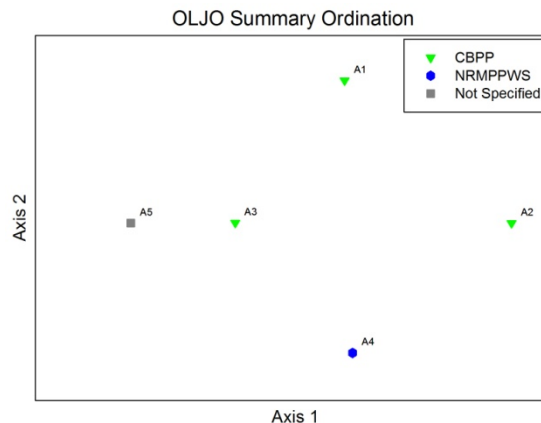
This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from the Heart of the Monster and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

## OLJO Association Descriptions



### Great Basin Wildrye – Kentucky Bluegrass Herbaceous Vegetation

*Leymus cinereus* – *Poa pratensis* Herbaceous Vegetation



#### Description

This association is a characteristically tall, moderately dense grassland dominated by *Leymus cinereus*. Other plant species are found primarily between clumps of *Leymus cinereus* or on the edges of dense stands. Scattered shrubs may be present, including *Artemisia* spp., *Chrysothamnus viscidiflorus*, *Ericameria nauseosa*, and *Symphoricarpos albus*. Associated graminoid species occurring with low cover values may include; *Festuca ovina*, *Pseudoroegneria spicata*, and *Carex* spp. In degraded stands, *Poa pratensis* may co-dominate or even dominate. Forbs are variable from one stand to another with low to moderate diversity and low total cover.

This association is found along lower elevation riparian corridors and some moderately alkaline valley bottomlands. Stands tend to be patchy and grow on mesic sites with more soil moisture than is available to the surrounding vegetation. Sites are flat to steep and occur on all aspects. Soils may range from slowly to rapidly drained, often with a shallow water table. Soil texture is variable and ranges from silty clays to deep loamy sands.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 2, xx)

#### Tree

None

#### Shrub

None

#### Dwarf-shrub

*Artemisia ludoviciana* (white sagebrush) V.1, *Artemisia dracunculus* (tarragon) V.<1, *Rosa woodsii* (Woods' rose) V.<1

#### Graminoid

*Poa pratensis* (Kentucky bluegrass) V.25, *Leymus cinereus* (basin wild rye) V.23, *Festuca ovina* (sheep fescue) V.2, *Pseudoroegneria spicata* (bluebunch wheatgrass) V.2, *Carex duriuscula* (needleleaf sedge) V.1, *Carex filifolia* (threadleaf sedge) V.1

#### Forb

*Lupinus sericeus* (silky lupine) V.2, *Achillea millefolium* (common yarrow) V.1, *Cynoglossum officinale* (gypsyflower) V.1, *Eriogonum heracleoides* (parsnipflower buckwheat) V.1, *Potentilla gracilis* (slender cinquefoil) V.1, *Geranium viscosissimum* (sticky geranium) V.<1, *Lithospermum ruderae* (western stoneseed) V.<1,

*Taraxacum officinale* (common dandelion) V.<1, *Verbascum thapsus* (common mullein) V.<1

## RANGE

*Old Chief Joseph's Gravesite, Nez Perce National Historical Park*

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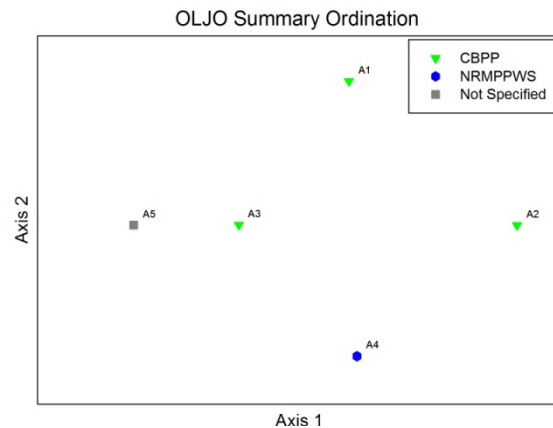
*Global*

This vegetation type is found mainly in the Great Basin and the Intermountain Region, and just reaches the western part of the Northern Great Plains. Although it occupies only a relatively small total area, it has a fairly large range.

## COMMENTS

The conservation status of associations dominated by *Leymus cinereus* have been ranked as imperiled because few high-quality sites with *Leymus cinereus* remain. This is a very widespread community type, and is found in many western states, but it is degraded throughout most of its range. This association was formerly very abundant in interior valleys, but most of these sites have been converted to agriculture. More knowledge of its distribution is needed, but it should remain a priority for conservation since most remaining sites are threatened by livestock grazing, agriculture, altered stream hydrology, and altered fire regime.

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Old Chief Joseph's Gravesite, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

**A2****Bluebunch Wheatgrass Herbaceous Vegetation***Pseudoroegneria spicata* Herbaceous Vegetation**Description**

This association is a bunchgrass-dominated grassland with minor cover of forbs and often sparse occurrences of trees and/or shrubs. *Pseudoroegneria spicata* dominates or co-dominates the plant community and *Poa pratensis* ranges from abundant to co-dominant. Other graminoids are usually present with low cover, and may include *Leymus cinereus*, *Achnatherum occidentale*, *Koeleria macrantha*, *Carex microptera*, *Calamagrostis rubescens* or any number of other locally-abundant species. On disturbed sites, the herbaceous layer is also likely to include species such as; *Bromus tectorum*, *Festuca ovina*, and *Poa bulbosa*. The common shrub species in this plant community have low total cover and may include; *Artemisia* spp., *Prunus virginiana*, *Rosa woodsii*, and *Symphoricarpos albus*. Forbs are variable in terms of species composition and proved little total cover to the plant community

Sites where this plant community occurs include ridges and slopes, occasionally alluvial fans, scree slopes, sloped rocky cliff faces, and bedrock outcrops of any aspect, although southerly and westerly aspects are most common in the northwestern part of the geographic range. The *Pseudoroegneria spicata* alliance occurs over a very broad elevational range. Stands grow on well-drained, often shallow, and frequently gravelly or rocky soils generally of loam, clay loam, silt loam, or sandy loam textural classes.

CONSERVATION RANK G2

DATABASE CODE CEGL001660

**CHARACTERISTIC SPECIES** (n = 1, xx)**Tree**

*Pinus ponderosa* (ponderosa pine) V.2, *Malus fusca* (Oregon crab apple) V.1

**Shrub**

*Prunus virginiana* (chokecherry) V.1, *Symphoricarpos albus* (common snowberry) V.1

**Dwarf-shrub**

*Artemisia ludoviciana* (white sagebrush) V.1, *Rosa woodsii* (Woods' rose) V.1

**Graminoid**

*Poa pratensis* (Kentucky bluegrass) V.15, *Pseudoroegneria spicata* (bluebunch wheatgrass) V.15, *Leymus cinereus* (basin wild rye) V.5, *Bromus tectorum* (cheatgrass) V.2, *Festuca ovina* (sheep fescue) V.2, *Poa bulbosa* (bulbous bluegrass) V.2, *Carex filifolia* (threadleaf sedge) V.1

**Forb**

*Achillea millefolium* (common yarrow) V.1, *Eriogonum heracleoides* (parsnipflower buckwheat) V.1, *Hieracium cynoglossoides* (houndstongue hawkweed) V.1, *Lithophragma parviflorum* (smallflower woodland-star) V.1, *Lupinus sericeus* (silky lupine) V.1, *Valerianella locusta* (Lewiston cornsalad) V.1, *Alyssum alyssoides* (pale



madwort) V.<1, *Antennaria anaphaloides* (pearly pussytoes) V.<1, *Collomia linearis* (tiny trumpet) V.<1, *Collinsia parviflora* (maiden blue eyed Mary) V.<1, *Cynoglossum officinale* (gypsyflower) V.1, *Draba verna* (spring draba) V.<1, *Holosteum umbellatum* (jagged chickweed) V.<1, *Lithospermum ruderae* (western stoneseed) V.<1, *Lomatium triternatum* (nineleaf biscuitroot) V.<1, *Senecio hydrophiloides* (tall groundsel) V.<1, *Sisymbrium altissimum* (tall tumbled mustard) V.<1, *Taraxacum officinale* (common dandelion) V.<1, *Triteleia grandiflora* (largeflower triteleia) V.<1

Columbia Basin Palouse Prairie

## RANGE

*Old Chief Joseph's Gravesite, Nez Perce National Historical Park*

Enter OLJO specific data.

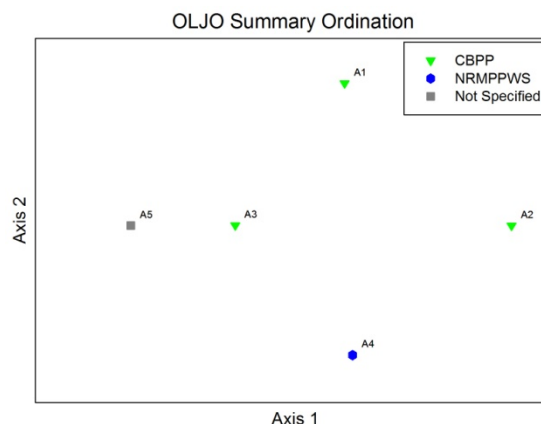
*Global*

Bluebunch wheatgrass-dominated associations occur in the Piceance Basin and Dinosaur National Park in western Colorado and the Cache Valley of northeastern Utah. Stands are reported from Fossil Butte National Monument and Grand Teton National Park in Wyoming and Rocky Mountain National Park in Colorado.

## COMMENTS

Grazing has a negative effect on this association, and it is believed that it now occupies a very small portion of the original range. The size of most occurrences is very small, most under 60 acres.

Wind appears to be an important factor in maintaining many stands of this association, by removing snow in the winter and rendering sites too dry to support shrublands.

**A3****Kentucky Bluegrass Semi-natural Herbaceous Alliance***Poa pratensis* Semi-natural Herbaceous Alliance**Description**

This semi-natural vegetation alliance is characterized by a moderate to dense herbaceous stratum that is dominated by the introduced perennial, sod-forming grass, *Poa pratensis*. Other graminoids, particularly other non-native species, also occur regularly in this vegetation type. *Festuca ovina* and *Poa bulbosa* are among the most abundant sub-dominant grasses. Shrubs may occur sporadically throughout stands of this vegetation type, but contribute very little total cover. Forbs are common to this alliance, but they are highly variable and occur at very low cover values as well. *Achillea millefolium* is generally the most abundant and frequently occurring forb in this plant community.

This association often occupies seasonally flooded swales and wet, low- to mid-elevation sites. Appropriate sites include alkaline meadows and may have long-term grazing disturbance. Sites are typically gently sloping on all aspects. Soils are mineral with dark surface horizons containing large amounts of well-decomposed organic matter. Soil texture ranges from silt to sandy loam. Water tables are often at or near the soil surface in early summer but may drop below 50 cm by late August. Arid sites receive enough moisture to support at least some wetland species.

CONSERVATION RANK N/A

DATABASE CODE A.3562

**CHARACTERISTIC SPECIES** (n = 1, xx)**Tree***Amelanchier alnifolia* (Saskatoon serviceberry) V.1**Shrub***Dasiphora fruticosa* (shrubby cinquefoil) V.<1**Dwarf-shrub***Artemisia absinthium* (absinthium) V.<1, *Rosa woodsii* (Woods' rose) V.<1**Graminoid***Poa pratensis* (Kentucky bluegrass) V.35, *Festuca ovina* (sheep fescue) V.5, *Poa bulbosa* (bulbous bluegrass) V.5, *Dactylis glomerata* (orchardgrass) V.2, *Elymus repens* (quackgrass) V.<1**Forb***Achillea millefolium* (common yarrow) V.2, *Erodium cicutarium* (redstem stork's bill) V.2, *Taraxacum officinale* (common dandelion) V.2, *Veronica arvensis* (corn speedwell) V.1, *Alyssum alyssoides* (pale madwort) V.<1, *Ceratocephala testiculata* (curvseed butterwort) V.<1, *Cynoglossum officinale* (gypsyflower) V.<1, *Draba verna* (spring draba) V.<1, *Fragaria virginiana* (Virginia strawberry) V.<1, *Galium aparine* (stickywillow) V.<1,

*Holosteum umbellatum* (jagged chickweed) V.<1, *Iris domestica* (common iris) V.<1, *Lupinus sericeus* (silky lupine) V.<1, *Myosotis stricta* (strict forget-me-not) V.<1, *Trifolium repens* (white clover) V.<1, *Verbascum thapsus* (common mullein) V.<1

Columbia Basin Palouse Prairie

## RANGE

*Old Chief Joseph's Gravesite, Nez Perce National Historical Park*

Enter OLJO specific data.

*Global*

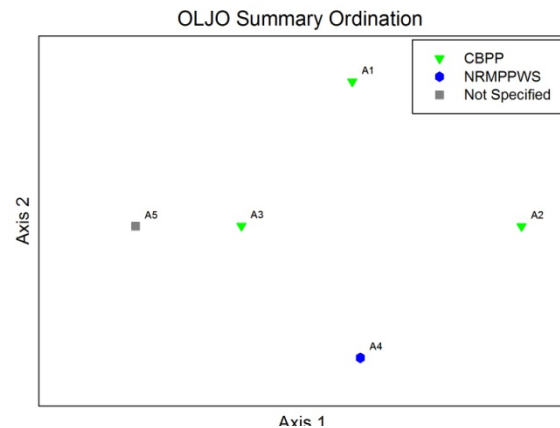
The *Poa pratensis* Semi-natural Herbaceous Alliance is reported to occur in Washington, Oregon, Montana, Wyoming, Idaho, Utah, and California, but is likely widespread in the western U.S. and northern Great Plains.

## COMMENTS

*Poa pratensis* is widespread in the western U.S. where, following disturbance, its extensive rhizome system allows it to spread and establish, outcompeting many native graminoids. It is tolerant of heavy grazing and burning and increases at the expense of less tolerant native species.

## A4 Ponderosa Pine Woodland Alliance

*Pinus ponderosa* Woodland Alliance



### Description

This woodland community type is dominated by *Pinus ponderosa* and is characterized by a relatively open tree canopy and a conspicuous herbaceous stratum. *Pinus ponderosa* is often the only tree in the canopy. Shrubs are a minor component of this woodland; *Mahonia repens*, *Artemisia ludoviciana*, and *Symphoricarpos albus* occur with the greatest frequency. The herbaceous stratum ranges from moderate to dense. *Pseudoroegneria spicata* is the generally the dominant herbaceous species unless exotics are present, in which case *Poa pratensis* may co-dominate or even dominate in some stands. Forbs may be diverse in terms of species composition, but generally contribute little total cover.

This community occurs mostly on steep southerly aspects. It is found on coarse soils derived from sandstone, porcellanate, or limestone. These include sandy alluvium, gravelly or sandy till, and loams with high stone content. Rock and mineral soil are commonly exposed.

CONSERVATION RANK N/A

DATABASE CODE A.530

CHARACTERISTIC SPECIES (n = 2, xx)

#### Tree

*Pinus ponderosa* (ponderosa pine) V.23

#### Shrub

*Symphoricarpos albus* (common snowberry) V.4

#### Dwarf-shrub

*Artemisia ludoviciana* (white sagebrush) V.2, *Mahonia repens* (creeping barberry) V.1, *Artemisia dracunculoides* (tarragon) V.<1, *Rosa woodsii* (Woods' rose) V.<1

#### Graminoid

*Poa pratensis* (Kentucky bluegrass) V.30, *Pseudoroegneria spicata* (bluebunch wheatgrass) V.10, *Bromus tectorum* (cheatgrass) V.8, *Festuca ovina* (sheep fescue) V.5, *Leymus cinereus* (basin wild rye) V.2, *Elymus caninus* (bearded wheatgrass) V.1

#### Forb

*Lupinus sericeus* (silky lupine) V.2, *Antennaria anaphaloides* (pearly pussytoes) V.1, *Eriogonum heracleioides* (parsnipflower buckwheat) V.1, *Collomia linearis* (tiny trumpet) V.<1, *Galium aparine* (stickywilly) V.<1, *Lithospermum ruderales* (western stoneseed) V.<1, *Myosotis stricta* (strict forget-me-not) V.<1

Northern Rocky Mountain Ponderosa Pine Woodland and Savanna

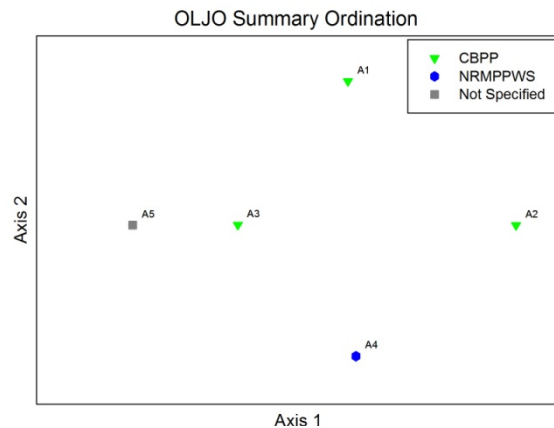
## RANGE

*Old Chief Joseph's Gravesite, Nez Perce National Historical Park*

Enter OLJO specific data.

*Global*

This ponderosa pine woodland is one of the drier ponderosa pine woodlands found in the northern Rocky Mountains, Intermountain Region, and extreme northwestern Great Plains of the United States and Canada, extending from the Black Hills of South Dakota and Wyoming west to Oregon, Washington, and British Columbia.



### Description

This woodland community has an open canopy which is dominated by introduced *Ulmus pumila* trees and has a *Poa pratensis*-dominated herbaceous understory. It is likely the result of ornamental plantings associated with early European settlement in the area. Other trees species, often non-natives, are occasionally present. The shrub layer is dominated by *Syringa vulgaris*, a non native but commonly planted ornamental species. In the dwarf-shrub layer, several species including: *Artemisia absinthium*, *Artemisia ludoviciana*, *Rosa canina*, and *Rosa woodsii*, occur with very low mean cover values. The herbaceous layer is dominated by non-native graminoids, primarily *Poa pratensis*. *Dactylis glomerata*, *Carex duriuscula*, *Festuca ovina*, and *Elymus repens* also occur frequently in the herbaceous layer of this vegetation type. Forbs generally contribute little total cover to the community, but component forbs species may be quite diverse, including both natives and non-natives.

*Ulmus pumila* is often found in abundance along railroads and in abandoned lots and on disturbed ground. The gravel along railroad beds provides ideal conditions for its growth: well-drained, nutrient poor soil, and high light conditions, and these beds provide corridors which facilitate its spread. Due to its high sunlight requirements, it seldom invades mature forests, and is often found in disturbed, open areas, as well as along transportation corridors.

CONSERVATION RANK N/A

DATABASE CODE N/A

### CHARACTERISTIC SPECIES (n = 1, xx)

#### Tree

*Ulmus pumila* (Siberian elm) V.10, *Amelanchier alnifolia* (Saskatoon serviceberry) V.1, *Juniperus chinensis* ssp. *pfitzeriana* (leatherleaf) V.<1, *Pinus ponderosa* (ponderosa pine) V.<1

#### Shrub

*Syringa vulgaris* (common lilac) V.15, *Symphoricarpos albus* (common snowberry) V.5

#### Dwarf-shrub

*Artemisia absinthium* (absinthium) V.2, *Artemisia ludoviciana* (white sagebrush) V.<1, *Rosa canina* (dog rose) V.<1, *Rosa woodsii* (Woods' rose) V.<1

#### Graminoid

*Poa pratensis* (Kentucky bluegrass) V.35, *Dactylis glomerata* (orchardgrass) V.5, *Carex duriuscula* (needleleaf sedge) V.2, *Festuca ovina* (sheep fescue) V.2, *Elymus repens* (quackgrass) V.1

#### Forb

*Penstemon procerus* (littleflower penstemon) V.2, *Antennaria anaphaloides* (pearly pussytoes) V.1, *Lupinus*



*sericeus* (silky lupine) V.1, *Achillea millefolium* (common yarrow) V.<1, *Besseyia rubra* (red besseyia) V.<1, *Cynoglossum officinale* (gypsyflower) V.<1, *Draba verna* (spring draba) V.<1, *Fragaria virginiana* (Virginia strawberry) V.<1, *Galium aparine* (stickywilly) V.<1, *Iris domestica* (common iris) V.<1, *Myosotis stricta* (strict forget-me-not) V.<1, *Potentilla arguta* (tall cinquefoil) V.<1, *Potentilla gracilis* (slender cinquefoil) V.<1, *Taraxacum officinale* (common dandelion) V.<1, *Verbascum thapsus* (common mullein) V.<1

Not Specified

## RANGE

*Old Chief Joseph's Gravesite, Nez Perce National Historical Park*

Enter OLJO specific data.

*Global*

*Ulmus pumila* and *Syringa vulgaris* are both widespread ornamental species that have either been planted or invaded across the entire extent of the United States and much of Canada.

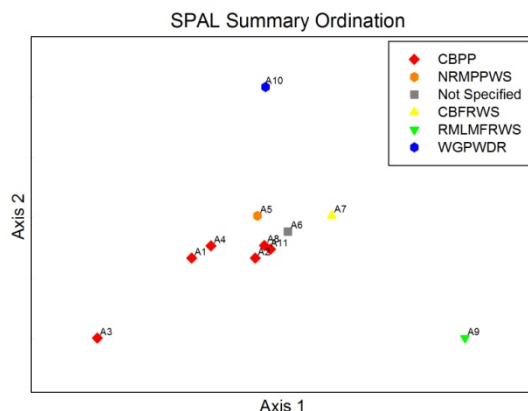
## COMMENTS

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Old Chief Joseph's Gravesite, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

## SPAL Association Descriptions

### **A1** Kentucky Bluegrass Semi-natural Herbaceous Alliance

*Poa pratensis* Semi-natural Herbaceous Alliance



#### Description

This semi-natural vegetation association is characterized by a moderate to dense herbaceous stratum that is dominated by the introduced perennial, sod-forming grass, *Poa pratensis*. Other graminoids, particularly *Poa bulbosa* and *Bromus tectorum*, also occurs regularly in this vegetation type. Non-native tree species occur sporadically and may include *Pinus nigra*, *Acer saccharinum*, and *Robinia pseudoacacia*. Component forbs include both natives and non-native species, which combined contribute very little total cover to the community. Assemblages of this type are often associated with ornamental plantings or the movement of ornamentals into surrounding native communities.

This association typically occupies seasonally flooded swales and wet, low- to mid-elevation sites. Habitats are often alkaline meadows and may have long-term grazing disturbance. Sites are typically gently sloping on all aspects. Soils are mineral with dark surface horizons containing large amounts of well-decomposed organic matter. Soil texture ranges from silt to sandy loam. Water tables are often at or near the soil surface in early summer but may drop below 50 cm by late August. Arid sites receive enough moisture to support at least some wetland species.

CONSERVATION RANK N/A

DATABASE CODE A.3562

#### CHARACTERISTIC SPECIES (n = 6, xx)

##### Tree

*Pinus nigra* (Austrian pine) III.6, *Acer saccharinum* (silver maple) III.5, *Robinia pseudoacacia* (black locust) III.3

##### Shrub

None

##### Dwarf-shrub

None

##### Graminoid

*Poa pratensis* (Kentucky bluegrass) V.47, *Poa bulbosa* (bulbous bluegrass) IV.1, *Bromus tectorum* (cheatgrass) III.4

##### Forb

*Taraxacum officinale* (common dandelion) V.1, *Veronica arvensis* (corn speedwell) V.<1, *Stellaria media* (common chickweed) V.<1, *Campanula* spp. (bellflower) IV.1

## RANGE

*Spalding, Nez Perce National Historical Park*

Enter SPAL specific data.

*Global*

This alliance has the potential to occur in limited distribution from the plains to montane regions, and likely has much associated variability. The *Poa pratensis* Semi-natural Herbaceous Alliance is reported to occur in Washington, Oregon, Montana, Wyoming, Idaho, Utah, and California, but is likely widespread in the western U.S. and northern Great Plains.

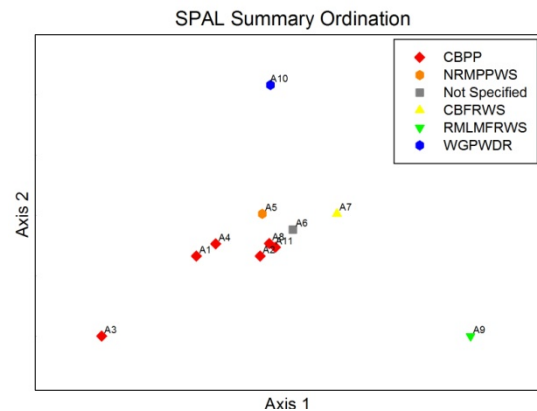
## COMMENTS

*Poa pratensis* is widespread in the western U.S. where, following disturbance, its extensive rhizome system allows it to spread and establish, outcompeting many native graminoids. It is tolerant of heavy grazing and burning and increases at the expense of less tolerant native species.

**A2**

## Great Brome Herbaceous Vegetation

*Bromus diandrus* Herbaceous Vegetation



### Description

Stands of this vegetation type are characterized by a sparse herbaceous stratum which is dominated by non-native grasses and forbs. *Bromus diandrus* is the most abundant species. Other weedy species are sparse and variable but may include; *Bromus tectorum*, *Convolvulus arvensis* and *Daucus carota*.

Because this association is an assemblage of weedy species on disturbed sites, there are likely no specific environmental constraints on its distribution.

CONSERVATION RANK G5

DATABASE CODE CEGL002906

CHARACTERISTIC SPECIES (n = 1, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Bromus diandrus* (ripgut brome) V.5, *Bromus tectorum* (cheatgrass) V.1

Forb

*Convolvulus arvensis* (field bindweed) V.1, *Daucus carota* (Queen Anne's lace) V.1, *Lamium amplexicaule* (henbit deadnettle) V.1, *Conium maculatum* (poison hemlock) V.<1, *Galium aparine* (stickywilly) V.<1, *Lactuca serriola* (prickly lettuce) V.<1, *Onopordum acanthium* (Scotch thistle) V.<1

Columbia Basin Palouse Prairie

## RANGE

*Spalding, Nez Perce National Historical Park*

Enter SPAL specific data.

*Global*

This association has only been previously documented from the Santa Monica Mountains region. However, it has been widely observed in other areas of the western U.S.

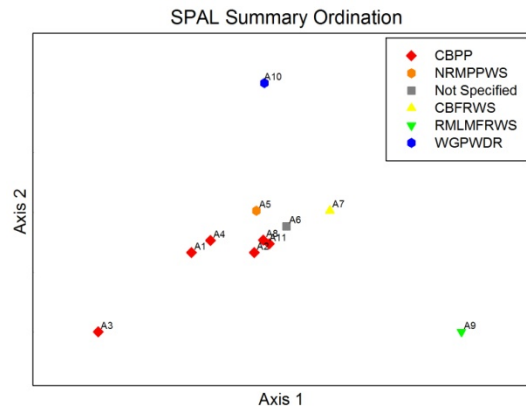
## COMMENTS

These stands are generally strongly dominated by *Bromus diandrus*, an invasive weed with low conservation value; however, some stands may have seasonally abundant natives of importance.

A3

## Bulbous Bluegrass - Kentucky Bluegrass Semi-natural Herbaceous Vegetation

*Poa bulbosa* - *Poa pratensis* Semi-natural Herbaceous Vegetation



### Description

This semi-natural plant association is characterized by a moderate to dense herbaceous stratum that is dominated by the introduced grasses, *Poa bulbosa* and *Poa pratensis*. Other introduced graminoids, particularly *Bromus inermis* and *Hordeum murinum*, also occur regularly in this vegetation type. Forbs are uncommon and contribute very little to total cover community. *Convolvulus arvensis* is generally the most abundant forb in stands of this type. Trees may occur sporadically as an artifact of ornamental plantings in the vicinity.

This association typically occupies seasonally flooded swales and wet, low- to mid-elevation sites. Appropriate habitats often include alkaline meadows and may have long-term grazing disturbance. Sites are typically gently sloping on all aspects. Soils are mineral with dark surface horizons containing large amounts of well-decomposed organic matter. Soil texture ranges from silt to sandy loam. Water tables are often at or near the soil surface in early summer but may drop below 50 cm by late August. Arid sites receive enough moisture to support at least some wetland species.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 4, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Poa bulbosa* (bulbous bluegrass) V.20, *Poa pratensis* (Kentucky bluegrass) V.20, *Bromus inermis* (smooth brome) IV.15, *Hordeum murinum* (mouse barley) IV.9, *Phleum pratense* (timothy) III.3

Forb

*Convolvulus arvensis* (field bindweed) IV.5, *Lamium amplexicaule* (henbit deadnettle) IV.1, *Valerianella locusta* (Lewiston cornsalad) III.3

Columbia Basin Palouse Prairie



## RANGE

*Spalding, Nez Perce National Historical Park*

Enter SPAL specific data.

*Global*

This association has the potential to occur in limited distribution from the plains to montane regions, and likely has much associated variability. The *Poa pratensis* Semi-natural Herbaceous Alliance is reported to occur in Washington, Oregon, Montana, Wyoming, Idaho, Utah, and California, but is likely widespread in the western U.S. and northern Great Plains.

## COMMENTS

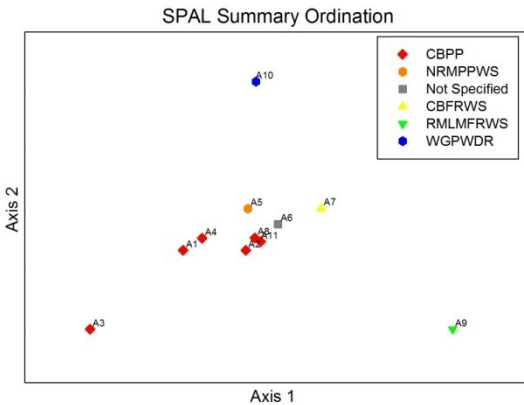
*Poa pratensis* and *Poa bulbosa* are widespread across the U.S. where, following disturbance, its extensive rhizome system allows it to spread and establish, outcompeting many native graminoids.

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Spalding and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

**A4**

## Cheatgrass Semi-natural Herbaceous Alliance

*Bromus tectorum* Semi-natural Herbaceous Alliance



### Description

The vegetation in this association is dominated by *Bromus tectorum*, an introduced, annual grass species. Total vegetation cover may be highly variable from one stand to another. Native species persist in some stands, however cover and diversity are typically low, and component native species can be quite variable depending on the plant community that was present prior to the conversion to introduced herbaceous species. Following *Bromus tectorum*, *Poa bulbosa* and *Bromus diandrus* are the most frequently occurring and abundant grasses in this community type. Several perennial and annual forb species may also occur with low cover values across stands in this association, though *Convolvulus arvensis* occurs with the greatest frequency.

This association can occur across a wide range of environmental conditions in semi-arid ecosystems and is not tightly constrained by slope, aspect, soil texture, or soil depth. This association often occurs on or near sites that have been disturbed.

CONSERVATION RANK    N/A

DATABASE CODE    A.1814

### CHARACTERISTIC SPECIES    (n = 3, xx)

#### Tree

None

#### Shrub

None

#### Dwarf-shrub

None

#### Graminoid

*Bromus tectorum* (cheatgrass) V.27, *Poa bulbosa* (bulbous bluegrass) V.8, *Bromus diandrus* (ripgut brome) IV.4

#### Forb

*Convolvulus arvensis* (field bindweed) V.2

## RANGE

*Spalding, Nez Perce National Historical Park*

Enter SPAL specific data.

*Global*

The distribution of this association coincides with the range the *Bromus tectorum* Semi-natural Herbaceous Alliance, which occurs throughout much of western North America from the western Great Plains to the intermountain and southwestern U.S.

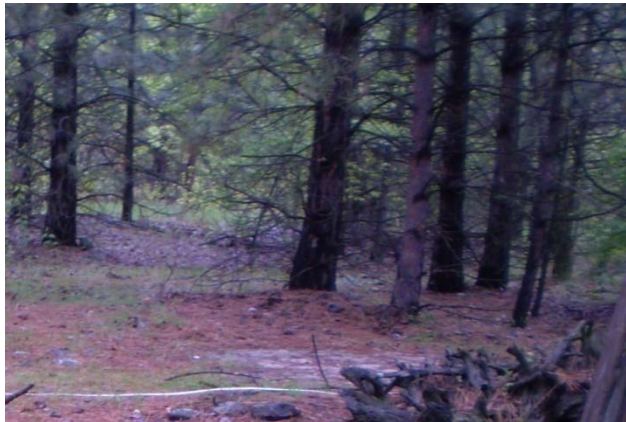
Columbia Basin Palouse Prairie

## COMMENTS

The unique life history characteristics of *Bromus tectorum* and the altered ecological process associated with this species have promoted the spread of it and other exotic annual bromes at the expense of sagebrush shrublands and related assemblages in large parts of the western U.S. Consequently, this species tends to dominate or co-dominate primarily on sites that have been severely impacted.

## A5 Ponderosa Pine Woodland Alliance

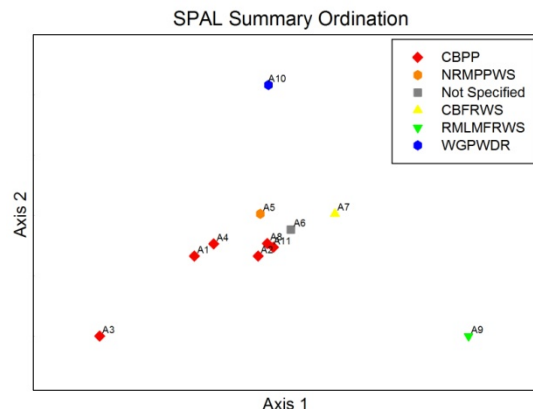
*Pinus ponderosa* Woodland Alliance



### Description

This woodland community is dominated by the tree *Pinus ponderosa*, which has a relatively open canopy. *Pinus ponderosa* is often the only tree in the overstory but other such as *Populus alba* and *Robinia pseudoacacia* may occur sporadically in some stands. Shrubs contribute very little total cover and may include; *Mahonia repens*, *Rosa* spp., *Symphoricarpos albus*, and others. The herbaceous stratum is typically moderate. Locally, *Poa bulbosa* and *Bromus diandrus* are the most abundant grass species. Forbs tend to be sparse and the introduced species, *Daucus carota* occurs with the greatest frequency.

This community occurs mostly on steep southerly aspects. It is found on coarse soils derived from sandstone, porcellanate, or limestone. These include sandy alluvium, gravelly or sandy till, and loams with high stone content. Rock and mineral soil are commonly exposed.



CONSERVATION RANK N/A

DATABASE CODE A.530

CHARACTERISTIC SPECIES (n = 2, xx)

### Tree

*Pinus ponderosa* (ponderosa pine) V.30, *Populus alba* (white poplar) III.13, *Robinia pseudoacacia* (black locust) III.5

### Shrub

None

### Dwarf-shrub

None

### Graminoid

*Poa bulbosa* (bulbous bluegrass) V.5, *Bromus diandrus* (ripgut brome) III.18

### Forb

*Daucus carota* (Queen Anne's lace) V.6, *Galium aparine* (stickywilly) V.<1

Northern Rocky Mountain Ponderosa Pine Woodland and Savanna

**RANGE**

*Spalding, Nez Perce National Historical Park*

Enter SPAL specific data.

*Global*

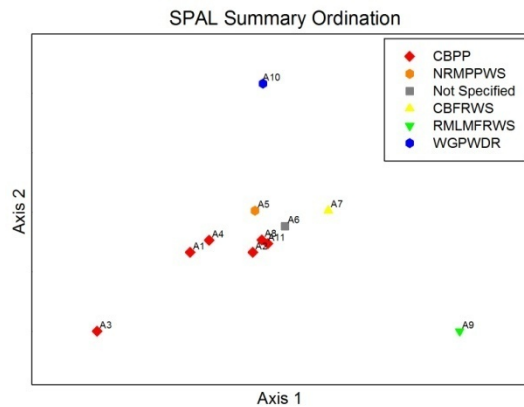
This ponderosa pine woodland is one of the drier ponderosa pine vegetation types found in the northern Rocky Mountains. It occurs in the Intermountain West, and extreme northwestern Great Plains of the United States and Canada, extending from the Black Hills of South Dakota and Wyoming west to Oregon, Washington, and British Columbia.

**COMMENTS**

None.

## A6 Silver Maple Forest (Ornamental)

*Acer saccharinum* Forest (Ornamental)



### Description

The canopy of this forest association is generally closed to nearly closed and is dominated by *Acer saccharinum*. Other vegetative strata are typically sparse and contribute very little total cover to the community. Component shrubs and herbaceous species are quite variable in terms of species composition. Locally, stands of this type are associated with ornamental plantings during historical settlement of the area or the spread of ornamentals into surrounding native communities. Other non-natives often occur in communities of this type and may include *Daucus carota* and several species of non-native grasses.

Naturally occurring communities of this type occupy temporarily flooded soils along major rivers and smaller perennial streams. Soils may be well-drained and sandy, or loamier on infrequently flooded bottomlands and levees, or deep silts on stabilized sites along larger rivers. The community may form small linear patches among other floodplain associations or be locally extensive. The structure and composition of the type is influenced by the flooding regime. This type may also be found as an ornamental/horticultural planting and water intake would be managed to promote the tree health.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 4, xx)

Tree

*Acer saccharinum* (silver maple) V.69

Shrub

None

Dwarf-shrub

None

Graminoid

None

Forb

*Daucus carota* (Queen Anne's lace) IV.1

Not Specified



## RANGE

*Spalding, Nez Perce National Historical Park*

Enter SPAL specific data.

*Global*

*Acer saccharinum* is an ornamental tree species in the west and only grows in specific locations as the climate is not ideal for the tree in the northwestern states.

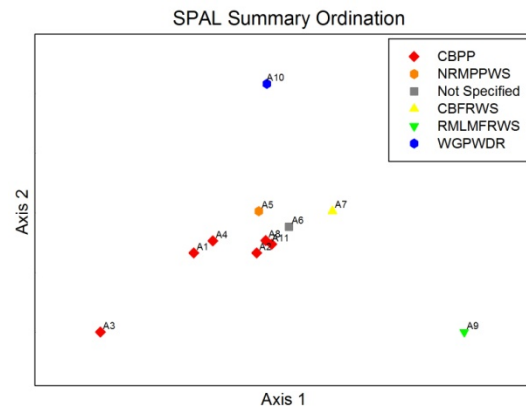
## COMMENTS

The structure and composition of the community type is influenced by the flooding regime, which is typically an annual flooding of relatively brief duration, but may be absent in dry years or extensive during flash-flood years.

This ornamental (cultural) association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Spalding, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

## A7 Black Cottonwood / Mixed Herbs Forest

*Populus balsamifera* ssp. *trichocarpa* / Mixed Herbs Forest



### Description

The canopy of this forest vegetation type ranges from open to moderately dense and is dominated by *Populus balsamifera* ssp. *trichocarpa*. *Populus angustifolia* and *Pinus ponderosa* may also occur infrequently in the overstory. Trees are generally mature and the herbaceous layer is dominated by non-native graminoid species, specifically, *Bromus tectorum* and *Phalaris arundinacea*. There are very few shrubs in communities of this vegetation type and, if present, do not form a true shrub stratum. Component forbs are often non-native and/or weedy, including species such as; *Daucus carota*, *Polygonum sachalinense*, *Cynoglossum officinale*, *Conium maculatum*, *Fragaria virginiana*, *Galium boreale*, *Geranium viscosissimum*, and *Achillea millefolium*. This association is thought to be a grazing-induced vegetation type in which grazing tolerant herbaceous species tend to increase.

This cold-deciduous riparian forest is common in low mountains and foothills. It occurs on alluvial terraces and floodplains of major and minor rivers and streams. Soils are poorly developed and loamy; many contain substantial cobble.

CONSERVATION RANK G3

DATABASE CODE CEGL000675

### CHARACTERISTIC SPECIES (n = 3, xx)

#### Tree

*Populus balsamifera* ssp. *trichocarpa* (black cottonwood) V.40, *Morus alba* (white mulberry) IV.2

#### Shrub

None

#### Dwarf-shrub

None

#### Graminoid

*Bromus tectorum* (cheatgrass) V.3, *Phalaris arundinacea* (reed canarygrass) IV.10

#### Forb

*Daucus carota* (Queen Anne's lace) V.14, *Conium maculatum* (poison hemlock) V.2, *Cynoglossum officinale* (gypsyflower) V.1, *Dipsacus fullonum* (Fuller's teasel) V.<1, *Polygonum sachalinense* (giant knotweed) IV.2

Columbia Basin Foothill Riparian Woodland and Shrubland

**RANGE**

*Spalding, Nez Perce National Historical Park*

Enter SPAL specific data.

*Global*

This association has been documented in Montana, Nevada, and Wyoming.

**COMMENTS**

None.

**A8**

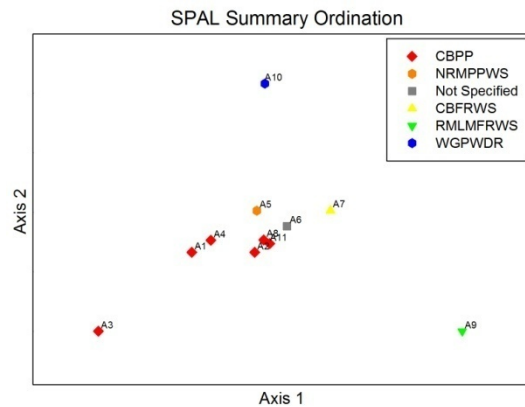
## Quackgrass Herbaceous Alliance

*Elymus repens* Herbaceous Alliance

### Description

The vegetation in this herbaceous community type is clearly dominated by *Elymus repens*, although addition non-native graminoid species are also common. Total vegetation cover may be highly variable and species diversity can differ among stands depending on the plant community that was present prior to the conversion to introduced herbaceous species. *Bromus tectorum* is the most abundant sub-dominant grass. Several perennial and annual forb species may occur in stands of this type, but total forb cover is generally sparse.

This alliance may be distributed across a wide range of environments in ecosystems with moist soils and cool climates and is not tightly constrained by slope, aspect, soil texture, or soil depth. This alliance often occurs on or near sites that have been disturbed.



CONSERVATION RANK N/A

DATABASE CODE A.2658

### CHARACTERISTIC SPECIES (n = 1, xx)

#### Tree

None

#### Shrub

None

#### Dwarf-shrub

None

#### Graminoid

*Elymus repens* (quackgrass) V.50, *Bromus tectorum* (cheatgrass) V.10, *Bromus diandrus* (ripgut brome) V.2  
*Schedonorus phoenix* (tall fescue) V.2

#### Forb

*Lamium amplexicaule* (henbit deadnettle) V.<1, *Lactuca serriola* (prickly lettuce) V.<1, *Sisymbrium altissimum* (tall tumbledmustard) V.<1, *Verbascum thapsus* (common mullein) V.<1

Columbia Basin Palouse Prairie

## RANGE

*Spalding, Nez Perce National Historical Park*

Enter SPAL specific data.

*Global*

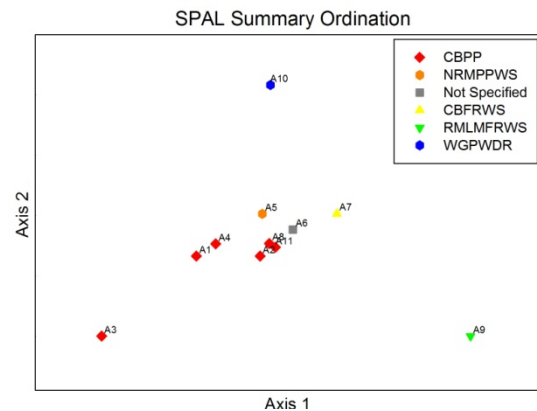
The distribution of this alliance coincides with the range of *Elymus repens*, which occurs throughout North America and Canada with exception of the extreme southeastern states.

## COMMENTS

None.

## A9 Peachleaf Willow Woodland

*Salix amygdaloides* Woodland



### Description

*Salix amygdaloides* provides a low, multi-stemmed canopy that may vary in cover from somewhat open to almost closed in this woodland community type. Other trees may be common in the canopy including *Populus balsamifera* and *Cornus sericea*. Shrubs, which may occur sporadically, include; *Ribes aureum*, *Salix exigua*, or *Symphoricarpos occidentalis*. The herbaceous stratum of this woodland may vary considerably from one stand to another depending on the hydrologic regime and past disturbance of the site. *Phalaris arundinacea* is generally the most abundant graminoid and it may provide substantial cover. Other component herbaceous species in this community type may include; *Glycyrrhiza lepidota*, *Eleocharis palustris*, *Cirsium arvense*, *Bromus inermis*, *Chenopodium album*, and *Elymus repens*.

This riparian community occurs as linear patches in a variety of locations such as backwater areas, old meander channels and wetland margins or as clumps along water courses. Soils are usually very wet, and the water table typically stays within 1 m of the soil surface during the growing season.

CONSERVATION RANK G3

DATABASE CODE C EGL000947

CHARACTERISTIC SPECIES (n = 1, xx)

Tree

*Salix amygdaloides* (peachleaf willow) V.35, *Populus balsamifera* (black cottonwood) V.5, *Cornus sericea* (redosier dogwood) V.2

Shrub

None

Dwarf-shrub

None

Graminoid

*Phalaris arundinacea* (reed canarygrass) V.50

Forb

*Cirsium arvense* (Canada thistle) V.2, *Polygonum sachalinense* (giant knotweed) V.1

Rocky Mountain Lower Montane-Foothill Riparian Woodland and Shrubland



**RANGE**

*Spalding, Nez Perce National Historical Park*

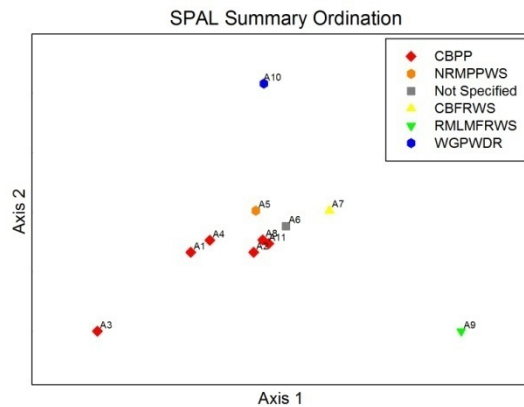
Enter SPAL specific data.

*Global*

This peachleaf willow woodland type is found in the northern Rocky Mountains, ranging from Idaho to Montana and into parts of the western Great Plains and north into southern Alberta.

**COMMENTS**

None.

**A10****Black Hawthorn – (Fireberry Hawthorn) Shrubland***Crataegus douglasii* – (*Crataegus chrysocarpa*) Shrubland**Description**

Locally, *Crataegus chrysocarpa* dominates or co-dominates the shrub layer of this tall-statured shrub community. *Prunus virginiana* is abundant in the shrub stratum and may co-dominate some stands of this vegetation type. A low to medium-height shrub layer characterized by an abundance of *Symphoricarpos albus* is present under the patchy tall-shrub stratum. The herbaceous layer is generally moderate to dense and is comprised primarily of exotic species. Forbs tend to be the most abundant herbaceous species, particularly *Daucus carota*. Other graminoids and forbs, both native and non-native, vary in terms of cover and species composition from one stand to another.

Stands of this type generally grow in mesic draws and in streamside riparian areas.

CONSERVATION RANK G2

DATABASE CODE CEGL001093

**CHARACTERISTIC SPECIES** (n = 3, xx)**Tree**

*Robinia pseudoacacia* (black locust) IV.7

**Shrub**

*Crataegus chrysocarpa* (fireberry hawthorn) V.6, *Symphoricarpos albus* (common snowberry) IV.12, *Prunus virginiana* (chokecherry) IV.7

**Dwarf-shrub**

*Rosa woodsii* (Woods' rose) IV.4

**Graminoid**

*Bromus tectorum* (cheatgrass) V.3, *Bromus diandrus* (ripgut brome) IV.2

**Forb**

*Daucus carota* (Queen Anne's lace) V.25, *Galium aparine* (stickywilly) V.2, *Claytonia perfoliata* (miner's lettuce) V.1, *Lamium amplexicaule* (henbit deadnettle) V.<1, *Conium maculatum* (poison hemlock) IV.5

Western Great Plains Wooded Draw and Ravine

**RANGE**

*Spalding, Nez Perce National Historical Park*

Enter SPAL specific data.

*Global*

This black hawthorn shrubland occurs in the northwestern Great Plains and edges of the Black Hills of the United States, ranging from Montana to western South Dakota.

**COMMENTS**

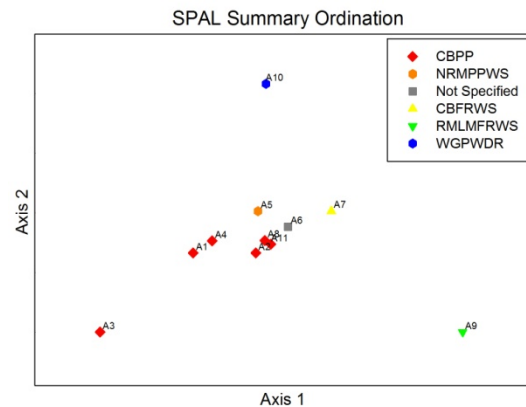
None.



**A11**

## Sheep Fescue Semi-natural Herbaceous Vegetation

*Festuca ovina* Semi-natural Herbaceous Vegetation



### Description

This herbaceous community type is strongly dominated by the introduced, perennial grass, *Festuca ovina*. If other species are present, they are often other non-native species and occur with low frequency and cover; the most common sub-dominant species is *Daucus carota*.

*Festuca ovina* prefers full sun to partial sun and moist, well-drained soils of rich to average fertility, but is tolerant of dry soils, poor soils, various soil pHs, heat, drought, and winter salt spray.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 3, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Festuca ovina* (sheep fescue) V.50

Forb

*Daucus carota* (Queen Anne's lace) V.2, *Myosotis stricta* (strict forget-me-not) V.<1

Columbia Basin Palouse Prairie

## RANGE

*Spalding, Nez Perce National Historical Park*

Enter SPAL specific data.

*Global*

*Festuca ovina* is documented with limited distribution across the U.S. but is suspected to occur at a much larger scale.

## COMMENTS

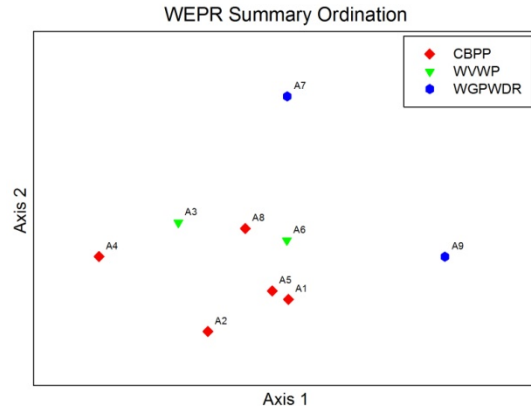
This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from the Spalding and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

## WEPR Association Descriptions



### Smooth Brome Semi-natural Herbaceous Alliance

*Bromus inermis* Semi-natural Herbaceous Alliance



#### Description

This herbaceous community type is dominated by the non-native tall grass, *Bromus inermis*. Other grass species common to this vegetation class are also often non-native and include *Bromus arvensis*, *Poa pratensis*, and *Alopecurus pratensis*. Shrubs, generally *Artemisia ludoviciana* and *Rosa woodsii*, occur sporadically around edges of this community. Forbs typically contribute little total cover to the herbaceous stratum. The most frequently-occurring forb species are *Achillea millefolium* and *Leucanthemum vulgare*.

This community is found in wet to moderately dry, open sites in plains, foothills, montane and subalpine zones with no particular aspect or elevation constraints. Often used as a forage species in hayfields and pastures, smooth brome is fairly drought resistant and can be found on sandy and stony soils as well as those with better structures.

CONSERVATION RANK N/A

DATABASE CODE A.3561

CHARACTERISTIC SPECIES (n = 3, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Bromus inermis* (smooth brome) V.40, *Poa pratensis* (Kentucky bluegrass) V.12, *Alopecurus pratensis* (meadow foxtail) V.6

Forb

*Camassia quamash* (small camas) V.2, *Achillea millefolium* (common yarrow) V.1, *Leucanthemum vulgare* (oxeye daisy) IV.2



**RANGE**

*Weippe Prairie, Nez Perce National Historical Park*

Enter WEPR specific data.

*Global*

Introduced from Europe, *Bromus inermis* has spread across the US and southern Canada and is common on dry, disturbed sites in plains to montane zones, from BC and Alberta to New Mexico.

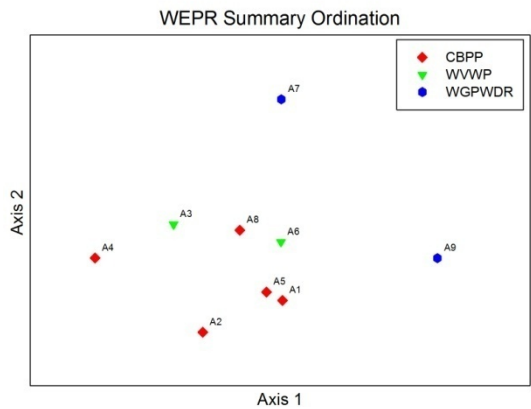
**COMMENTS**

None.



# Meadow Foxtail – Kentucky Bluegrass Semi-natural Herbaceous Vegetation

*Alopecurus pratensis* – *Poa pratensis* Semi-natural Herbaceous Vegetation



## Description

*Alopecurus pratensis* is the dominant species in this association, which is characterized by an abundance of introduced grasses. *Poa pratensis* is often sub-dominant, but abundant in this vegetation type. *Camassia quamash* likely dominated stands of this type prior to their conversion to introduced grasses. It is still conspicuous in spring across many stands and is easily identified by showy blue flowers. Because of its seasonal presence, low elevation, and proximity to agriculture, many exotic species like *Alopecurus pratensis* and *Poa pratensis* now dominate *Camassia* communities. Forb cover and species composition is highly variable, but natives still persist in many locations and may include; *Achillea millefolium*, *Potentilla gracilis*, and *Lomatium triternatum* are often present at low cover values.

Arable prairies were converted to agriculture, and those on scabland sites were grazed by livestock, so that most surviving remnant stands of *Camassia quamash* are degraded with exotic species. This association is found in areas of shallow soil over bedrock that have a perched water table or seasonal seepage. Appropriate habitat includes clay prairie and basalt scabland with a seasonally perched water table.

CONSERVATION RANK N/A

DATABASE CODE N/A

## CHARACTERISTIC SPECIES (n = 16, xx)

### Tree

None

### Shrub

None

### Dwarf-shrub

None

### Graminoid

*Alopecurus pratensis* (meadow foxtail) V.30, *Poa pratensis* (Kentucky bluegrass) V.11

### Forb

*Camassia quamash* (small camas) V.4, *Lomatium triternatum* (nineleaf biscuitroot) V.<1, *Potentilla gracilis* (slender cinquefoil) IV.3, *Achillea millefolium* (common yarrow) IV.1

Columbia Basin Palouse Prairie

## RANGE

*Weippe Prairie, Nez Perce National Historical Park*

Enter WEPR specific data.

*Global*

This association is likely distributed as small patches in western Oregon and Washington and Idaho, and is likely present in warmer regions of Montana as well.

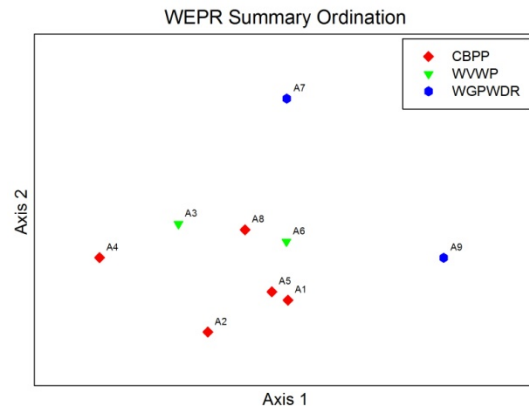
## COMMENTS

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Weippe Prairie, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

**A3**

## Small Camas Wet Prairie Herbaceous Vegetation

*Camassia quamash* Wet Prairie Herbaceous Vegetation



### Description

*Camassia quamash* dominates this wet prairie vegetation type. Other forbs also contribute cover to these plant communities. *Ranunculus alismifolius* var. *alismifolius* and *Senecio hydrophiloides* are two of the most abundant species. *Camassia* is conspicuous in spring and forms dense stands of showy blue flowers, but it becomes much less obvious during summer drought. Because of its seasonal presence, low elevation, and proximity to agriculture, many exotic species are present. Non-native grasses such as *Poa pratensis* and *Alopecurus pratensis* are abundant in many stands of this community type. Both white and blue forms of *Camassia quamash* may be present.

The habitat for *Camassia quamash* is clay prairie and basalt scabland with a seasonally perched water table. However, many arable prairies were converted to agriculture, and those on scabland sites were grazed by livestock, so that most surviving remnants are degraded with exotic species.

CONSERVATION RANK G3

DATABASE CODE CEGL003341

### CHARACTERISTIC SPECIES (n = 10, xx)

#### Tree

None

#### Shrub

None

#### Dwarf-shrub

None

#### Graminoid

*Alopecurus pratensis* (meadow foxtail) V.13, *Poa pratensis* (Kentucky bluegrass) IV.3

#### Forb

*Camassia quamash* (small camas) V.38, *Montia linearis* (narrowleaf minerslettuce) V.<1, *Ranunculus alismifolius* var. *alismifolius* (plantainleaf bettercup) IV.4, *Senecio hydrophiloides* (tall groundsel) IV.2

Willamette Valley Wet Prairie

**RANGE**

*Weippe Prairie, Nez Perce National Historical Park*

Enter WEPR specific data.

*Global*

This association is found in western Oregon and Washington as well as warmer climates in Montana and Idaho.

**COMMENTS**

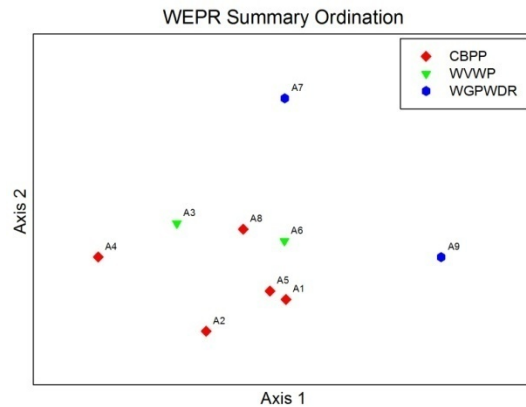
None.



**A4**

## Meadow Foxtail Semi-natural Herbaceous Vegetation

*Alopecurus pratensis* Semi-natural Herbaceous Vegetation



### Description

*Alopecurus pratensis* dominates this dense herbaceous community type. *Camassia* is sub-dominant, but it is conspicuous in spring when its showy blue flowers are visually prevalent; it is much less obvious with onset of summer drought. Because of its seasonal presence, low elevation, and proximity to agriculture, many exotic species have the potential to occur in stands of this community type. Additional graminoid and forb species tend to be sparse in terms of cover and variable in terms of species composition. Species richness of this vegetation type is usually low. Both white and blue forms of *Camassia quamash* may be present.

Arable prairies were converted to agriculture, and those on scabland sites were grazed by livestock, so that most surviving remnant stands of *Camassia quamash* are degraded with exotic species. This association is found in areas of shallow soil over bedrock that have a perched water table or seasonal seepage. Appropriate habitat includes clay prairie and basalt scabland with a seasonally perched water table.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 2, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Alopecurus pratensis* (meadow foxtail) V.75

Forb

*Camassia quamash* (small camas) V.26, *Taraxacum officinale* (common dandelion) V.<1

Columbia Basin Palouse Prairie



## RANGE

*Weippe Prairie, Nez Perce National Historical Park*

Enter WEPR specific data.

*Global*

This association is likely found in eastern Oregon and Washington and western Idaho, and is likely present in warmer regions of Montana as well.

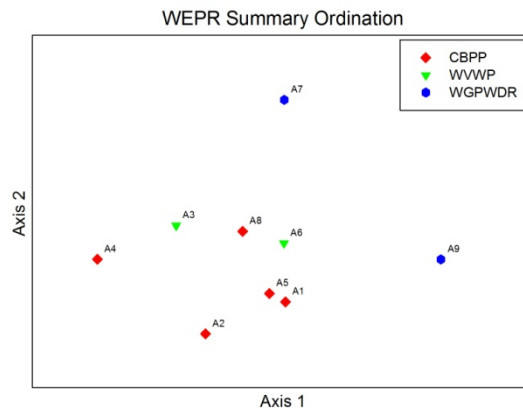
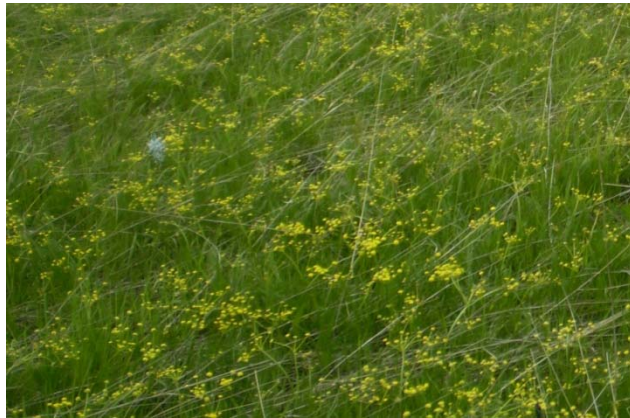
## COMMENTS

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## Kentucky Bluegrass – Quackgrass Semi-natural Herbaceous Vegetation

*Poa pratensis* – *Elymus repens* Semi-natural Herbaceous Vegetation



### Description

This community type is characterized by a moderate to dense herbaceous stratum which is dominated by introduced grasses. Abundant grasses include *Poa pratensis*, *Elymus repens*, and *Alopecurus pratensis*. Forbs are highly variable and typically contribute very little cover layer to most stand of this type. *Camassia quamash* is generally the most abundant forb species, however, *Lomatium triternatum*, may be locally abundant in some stands as well.

This introduced grass association can occur across a range of elevations. Stands occupy mesic meadows generally in the montane but below the subalpine zone. Sites are often on elevated portions of meadows at the bottom of wide valleys. Surface topography is concave to undulating. Seasonal flooding from upstream sources is typical, and sites may be covered with standing water during runoff. Sites typically dry out by the end of summer.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 2, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Poa pratensis* (Kentucky bluegrass) V.15, *Elymus repens* (quackgrass) V.14, *Alopecurus pratensis* (meadow foxtail) V.13

Forb

*Camassia quamash* (small camas) V.3, *Leucanthemum vulgare* (oxeye daisy) V.1, *Achillea millefolium* (common yarrow) V.<1, *Collomia linearis* (tiny trumpet) V.<1, *Draba verna* (spring draba) V.<1, *Lomatium triternatum* (nineleaf biscuitroot) III.18, *Sidalcea oregana* (Oregon checkerbloom) III.3

Columbia Basin Palouse Prairie

## RANGE

*Weippe Prairie, Nez Perce National Historical Park*

Enter WEPR specific data.

*Global*

Both dominant species in this association are widespread throughout most of the US and Canada.

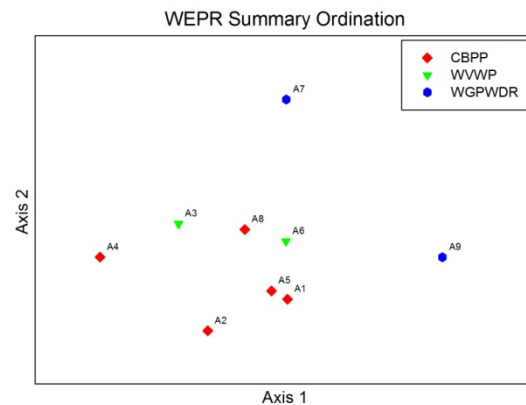
## COMMENTS

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**A6**

## Small Camas - Meadow Foxtail Wet Prairie Herbaceous Vegetation

*Camassia quamash* - *Alopecurus pratensis* Wet Prairie Herbaceous Vegetation



### Description

This association is characterized by a dense herbaceous stratum with an occasional shrub canopy. *Alopecurus pratensis* and *Poa pratensis* are the dominant herbaceous species in the community. *Camassia quamash* is conspicuous in spring in this vegetation type and forms visually prevalent patches of showy blue flowers, but it senesces with the onset of summer drought. *Crataegus douglasii* may occur sporadically in patches throughout the community or it may form an open canopy near the transition zones from this community type to one more strongly dominated by tall shrubs. Additional graminoids are sparse. Forbs may be diverse and can contribute substantial cover to the herbaceous stratum. In addition to *Camassia quamash*, common forbs may include a combination of both native and non-native species such as; *Potentilla gracilis*, *Collomia linearis*, *Polygonum bistortoides*, *Lomatium triternatum*, *Tanacetum vulgare*, and *Achillea millefolium*.

This association is found in areas of shallow soil over bedrock that have a perched water table or seasonal seepage. Appropriate habitat includes clay prairie and basalt scabland with a seasonally perched water table.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 4, xx)

Tree

None

Shrub

*Crataegus douglasii* (black hawthorn) V.19

Dwarf-shrub

None

Graminoid

*Alopecurus pratensis* (meadow foxtail) V.18, *Poa pratensis* (Kentucky bluegrass) V.16, *Carex duriuscula* (needleleaf sedge) IV.1

Forb

*Camassia quamash* (small camas) V.9, *Potentilla gracilis* (slender cinquefoil) V.6, *Collomia linearis* (tiny trumpet) V.4, *Polygonum bistortoides* (American bistort) V.3, *Lomatium triternatum* (nineleaf biscuitroot) V.2, *Achillea millefolium* (common yarrow) V.1, *Collinsia parviflora* (maiden blue eyed Mary) V.<1, *Taraxacum officinale* (common dandelion) V.<1, *Tanacetum vulgare* (common tansy) IV.1

Willamette Valley Wet Prairie

## RANGE

*Weippe Prairie, Nez Perce National Historical Park*

Enter WEPR specific data.

*Global*

This association is likely found in eastern Oregon and Washington and western Idaho, and is likely present in warmer regions of Montana as well.

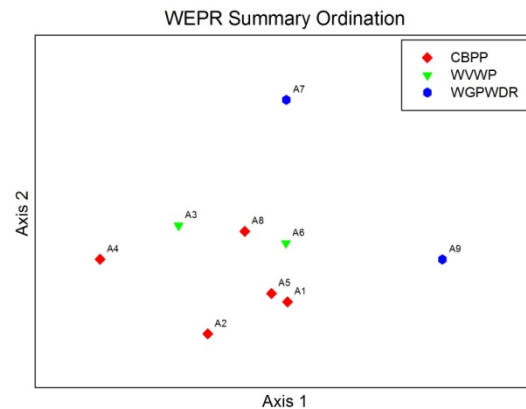
## COMMENTS

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A7

## Black Hawthorn / American Bistort Shrub Herbaceous Vegetation

*Crataegus douglasii* / *Polygonum bistortoides* Shrub Herbaceous Vegetation



### Description

This tall shrub association is dominated by *Crataegus douglasii*, which forms a canopy ranging from open to nearly closed. The understory is a moderate to dense herbaceous layer of mixed graminoids and forbs. Forbs are more abundant than graminoids and *Polygonum bistortoides* is generally the dominant understory species. *Camassia quamash*, *Lomatium triternatum*, *Potentilla gracilis*, and *Ranunculus* spp. also range from common to abundant in the herbaceous layer. Graminoids in this vegetation type may include *Alopecurus pratensis* and *Carex* spp.

Stands of this type grow in mesic draws and on higher surfaces in streamside riparian areas.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 2, xx)

Tree

None

Shrub

*Crataegus douglasii* (black hawthorn) V.15

Dwarf-shrub

None

Graminoid

*Alopecurus pratensis* (meadow foxtail) V.2, *Carex aquatilis* (water sedge) V.2, *Luzula campestris* (field woodrush) V.1, *Carex microptera* (smallwing sedge) V.<1, *Carex utriculata* (Northern Territory sedge) III.8

Forb

*Polygonum bistortoides* (American bistort) V.14, *Camassia quamash* (small camas) V.10, *Ranunculus orthorhynchus* (straightbeak buttercup) V.8, *Lomatium triternatum* (nineleaf biscuitroot) V.5, *Potentilla gracilis* (slender cinquefoil) V.2, *Ranunculus alismifolius* var. *alismifolius* (plantainleaf bettercup) V.2, *Senecio hydrophiloides* (tall groundsel) V.2, *Achillea millefolium* (common yarrow) V.1, *Collomia linearis* (tiny trumpet) V.<1, *Montia linearis* (narrowleaf minerslettuce) V.<1, *Taraxacum officinale* (common dandelion) V.<1, *Tauschia tenuissima* (Leiberg's umbrellawort) V.<1

Western Great Plains Wooded Draw and Ravine



## RANGE

*Weippe Prairie, Nez Perce National Historical Park*

Enter WEPR specific data.

*Global*

Black hawthorn shrublands occur in the northwestern Great Plains and edges of the Black Hills of the United States, ranging from Montana to western South Dakota.

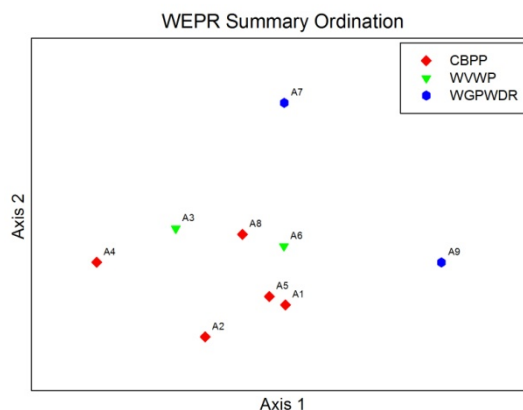
## COMMENTS

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## Plantainleaf Buttercup Temporarily Flooded Herbaceous Vegetation

*Ranunculus alismifolius* Temporarily Flooded Herbaceous Vegetation



### Description

Stands of this localized vegetation type are dominated by the low growing forb, *Ranunculus alismifolius* var. *alismifolius*. This species along with other forbs and graminoids form a moderate to dense herbaceous stratum. Trees and shrubs generally do not occur in stands of this community type. Other herbaceous species may be abundant and diverse. Common graminoids may include several introduced grasses and native sedges. *Camassia quamash* is conspicuous in the spring and several other, mostly native forbs are minor components of this vegetation type. Past grazing disturbance may facilitate the formation of stands of this community.

This association is found in moist depressions at high elevations. Sites supporting this type are often located along streams or around seeps. Soils are silts or clays and have high water tables.

CONSERVATION RANK N/A

DATABASE CODE N/A

### CHARACTERISTIC SPECIES (n = 6, xx)

#### Tree

None

#### Shrub

None

#### Dwarf-shrub

None

#### Graminoid

*Alopecurus pratensis* (meadow foxtail) V.10, *Carex praticola* (meadow sedge) V.6, *Alopecurus geniculatus* (water foxtail) V.5, *Agrostis stolonifera* (creeping bentgrass) V.2, *Carex aquatilis* (water sedge) IV.2

#### Forb

*Ranunculus alismifolius* var. *alismifolius* (plantainleaf bettercup) V.26, *Camassia quamash* (small camas) V.4, *Lomatium triternatum* (nineleaf biscuitroot) V.<1, *Montia linearis* (narrowleaf minerslettuce) V.<1, *Rorippa curvisiliqua* (curvepod yellowcress) V.<1

Columbia Basin Palouse Prairie

## RANGE

*Weippe Prairie, Nez Perce National Historical Park*

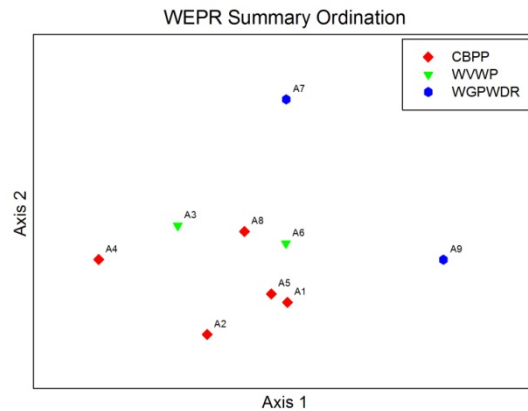
Enter WEPR specific data.

*Global*

Communities dominated by *Ranunculus alismifolius* have been described only from the Wyoming Range in western Wyoming but may also occur in similar communities in Montana and Idaho.

## COMMENTS

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Weippe Prairie, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

**A9****Black Hawthorn – (Fireberry Hawthorn) Shrubland***Crataegus douglasii* – (*Crataegus chrysocarpa*) Shrubland**Description**

*Crataegus douglasii* dominates the tall shrub layer of this association. The canopy is generally dense, though open patches may occur. A low to medium-height shrub layer, which is characteristic of this association regionally, is generally absent from local stands. The herbaceous layer ranges from moderate to dense; graminoids and forbs both provide substantial cover. The most abundant grasses in this community type are introduced species and include; *Poa pratensis*, *Alopecurus pratensis*, and *Agrostis stolonifera*. Forb species composition is reflective of wet sites and may include; *Hydrophyllum capitatum*, *Heracleum maximum*, *Ranunculus uncinatus*, *Nemophila breviflora*, *Urtica dioica*, and *Osmorhiza berteroi* are common.

Stands of this type grow in mesic draws and on higher surfaces in streamside riparian areas.

CONSERVATION RANK G2

DATABASE CODE C EGL001093

**CHARACTERISTIC SPECIES** (n = 2, xx)**Tree**

None

**Shrub***Crataegus douglasii* (black hawthorn) V.75**Dwarf-shrub**

None

**Graminoid**

*Poa pratensis* (Kentucky bluegrass) V.10, *Alopecurus pratensis* (meadow foxtail) V.5, *Agrostis stolonifera* (creeping bentgrass) III.3

**Forb**

*Hydrophyllum capitatum* (ballhead waterleaf) V.8, *Osmorhiza berteroi* (sweetcicely) V.8, *Ranunculus uncinatus* (woodland buttercup) V.4, *Nemophila breviflora* (basin nemophila) V.2, *Urtica dioica* (stinging nettle) V.1, *Delphinium distichum* (twospike larkspur) V.<1, *Heracleum maximum* (common cowparsnip) III.3

Western Great Plains Wooded Draw and Ravine

**RANGE**

*Weippe Prairie, Nez Perce National Historical Park*

Enter WEPR specific data.

*Global*

This black hawthorn shrubland occurs in the northwestern Great Plains and edges of the Black Hills of the United States, ranging from Montana to western South Dakota.

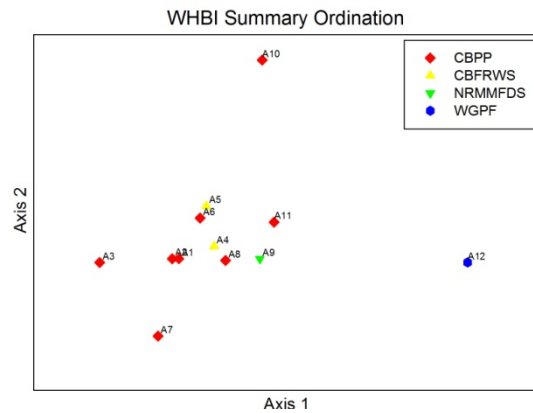
**COMMENTS**

None.

## WHBI Association Descriptions

### **A1** Medusahead Semi-natural Herbaceous Vegetation

*Taeniatherum caput-medusae* Semi-natural Herbaceous Vegetation



#### Description

This low-statured herbaceous community is strongly dominated by the aggressive winter annual, *Taeniatherum caput-medusae*. Total vegetation cover is moderate and other non-native species provide additional sparse cover. There is no shrub layer although individuals may occur sporadically along the edges of the disturbed areas typically occupied by this vegetation type. Remnant native species may be present with high variability in species composition and low cover. Other weedy species in this community type commonly include *Convolvulus arvensis* and *Bromus tectorum*.

*Taeniatherum caput-medusae* has been introduced from Eurasia and is predominantly found on semi-arid rangelands. Disturbance plays a large role in the introduction and spread of *Taeniatherum caput-medusae*. A combination of overgrazing, drought, and fire may all contribute to its pattern of occurrence across the landscape.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 8, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Taeniatherum caput-medusae* (medusahead) V.40, *Bromus tectorum* (cheatgrass) V.5

Forb

*Convolvulus arvensis* (field bindweed) V.11



## RANGE

*White Bird Battlefield, Nez Perce National Historical Park*

Enter WHBI specific data.

*Global*

Communities dominated by this exotic rangeland species has been documented primarily in semi-arid rangelands across the northwestern U.S.

## COMMENTS

Medusahead is extremely competitive and has been known to crowd other undesirable species, including cheatgrass.

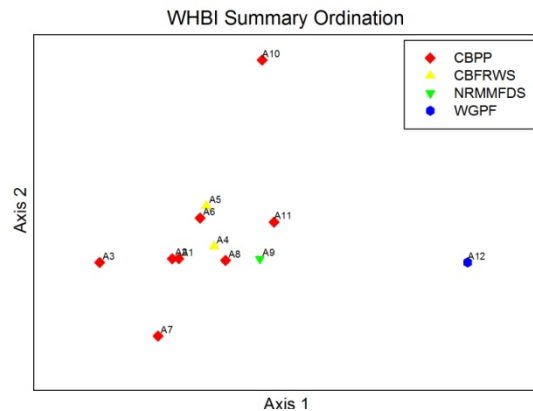
This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from the White Bird Battlefield and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.



## A2

# Bluebunch Wheatgrass Palouse Herbaceous Vegetation

*Pseudoroegneria spicata* Palouse Herbaceous Vegetation



### Description

This association is a bunchgrass grassland with little total forb cover and sporadic occurrences of individual trees and/or shrubs. *Pseudoroegneria spicata* dominates the moderate herbaceous stratum, while other native graminoids vary in terms of species composition and are usually present with low cover. Common species may include; *Leymus cinereus*, *Achnatherum occidentale*, *Koeleria macrantha*, *Carex microptera*, and/or *Calamagrostis rubescens*. On disturbed sites, component grasses are likely to be introduced species such as; *Poa pratensis*, *Bromus tectorum*, *Festuca ovina*, and *Poa bulbosa*. Forbs composition is highly variable from one stand to another, but weedy species such as; *Hypericum perforatum*, *Centaurea solstitialis*, and *Convolvulus arvensis* occur with the greatest frequency.

Sites where this plant community occurs include ridges and slopes, occasionally alluvial fans, scree slopes, sloped rocky cliff faces, and bedrock outcrops of any aspect, although southerly and westerly aspects are most common in the northwestern part of the geographic range. This vegetation type can grow over a very broad elevational range. Stands grow on well-drained, often shallow, and frequently gravelly or rocky soils generally of loam, clay loam, silt loam, or sandy loam textural classes.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 13, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Pseudoroegneria spicata* (bluebunch wheatgrass) V.27, *Bromus tectorum* (cheatgrass) V.9

Forb

*Centaurea solstitialis* (yellow star-thistle) V.2, *Convolvulus arvensis* (field bindweed) IV.4, *Hypericum perforatum* (common St. Johnswort) IV.1

## RANGE

*White Bird Battlefield, Nez Perce National Historical Park*

Enter WHBI specific data.

*Global*

This association occurs in Piceance Basin and Dinosaur National Park in western Colorado and the Cache Valley of northeastern Utah. Stands are reported from Fossil Butte National Monument and Grand Teton National Park in Wyoming and Rocky Mountain National Park in Colorado.

## COMMENTS

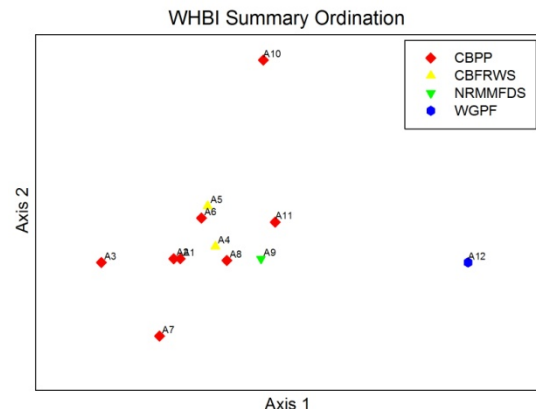
Grazing has a negative effect on this association, and it is believed that it now occupies a very small portion of its original range. The size of most occurrences is very small, most under 60 acres.

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from the White Bird Battlefield and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

**A3**

## Cheatgrass Semi-natural Herbaceous Alliance

*Bromus tectorum* Semi-natural Herbaceous Alliance



### Description

The vegetation in this alliance is dominated by *Bromus tectorum*, an introduced, annual grass species. Total vegetation cover may be highly variable. Native species persist in some stands, however cover and diversity are typically low, and component native species can be quite variable depending on the plant community that was present prior to the conversion to introduced herbaceous species. *Aristida purpurea* is the most frequently occurring and abundant native grass in this community type, although many other native grass species may occur with sparse cover and variable species composition as well. Several non-native grasses and forbs may occur in stands of this vegetation type. *Sisymbrium altissimum*, *Taeniatherum caput-medusae*, *Convolvulus arvensis*, and *Lactuca serriola* occur with the greatest frequency.

This alliance can occur across a wide range of environmental conditions in semi-arid ecosystems and is not tightly constrained by slope, aspect, soil texture, or soil depth. This association often occurs on or near sites that have been disturbed.

CONSERVATION RANK N/A

DATABASE CODE A.1814

### CHARACTERISTIC SPECIES (n = 7, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Bromus tectorum* (cheatgrass) V.19, *Taeniatherum caput-medusae* (medusahead) IV.6, *Aristida purpurea* (purple threeawn) III.4

Forb

*Convolvulus arvensis* (field bindweed) V.12, *Sisymbrium altissimum* (tall tumbled mustard) V.<1, *Lactuca serriola* (prickly lettuce) IV.2, *Hypericum perforatum* (common St. Johnswort) IV.1, *Valerianella locusta* (Lewiston cornsalad) III.2

## RANGE

*White Bird Battlefield, Nez Perce National Historical Park*

Enter WHBI specific data.

*Global*

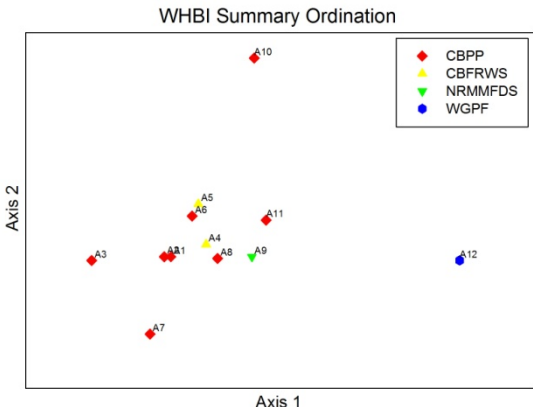
The range the *Bromus tectorum* Semi-natural Herbaceous Alliance covers much of western North America from the western Great Plains to the Intermountain and southwestern U.S.

## COMMENTS

The unique life history characteristics of *Bromus tectorum* and the altered ecological process associated with this species have promoted the spread of it and other exotic annual bromes at the expense of sagebrush shrublands and related assemblages in large parts of the western U.S. Consequently, this species tends to dominate or co-dominate primarily on sites that have been severely impacted.

**A4**    **(Netleaf hackberry) / Queen Anne's Lace Woodland**

(*Celtis laevigata*) / *Daucus carota* Woodland



Description

Short *Celtis laevigata* trees, form a relatively open and somewhat patchy canopy in this woodland community type. Shorter-statured shrubs are sparse and a moderate herbaceous stratum is dominated by non-native species. *Daucus carota* is the most abundant herbaceous species. Other common herbaceous exotics include; *Bromus tectorum*, *Bromus diandrus*, *Poa bulbosa*, *Taeniatherum caput-medusae*, and *Convolvulus arvensis*. These exotics can be more abundant on recently disturbed sites. Native herbaceous species may occur with low cover and constancy and contribute very little to total cover to the plant community.

These woodlands occur as numerous relatively small stands, dispersed and clustered in valley bottoms along riparian margins, on lower slopes of river terraces near seepage lines, and on scree slopes. Aspects are often southerly, especially at higher elevations. Soils are poorly developed and derived from alluvium and colluvium with bedrock outcrops.

CONSERVATION RANK    N/A

DATABASE CODE    N/A

CHARACTERISTIC SPECIES    (n = 6, xx)

Tree

*Celtis laevigata* (netleaf hackberry) III.11

Shrub

None

Dwarf-shrub

None

Graminoid

*Bromus diandrus* (ripgut brome) IV.5, *Taeniatherum caput-medusae* (medusahead) III.4, *Bromus tectorum* (cheatgrass) III.3, *Poa bulbosa* (bulbous bluegrass) III.3

Forb

*Daucus carota* (Queen Anne's lace) V.25, *Convolvulus arvensis* (field bindweed) IV.4

Columbia Basin Foothill Riparian Woodland and Shrubland



## RANGE

*White Bird Battlefield, Nez Perce National Historical Park*

Enter WHBI specific data.

*Global*

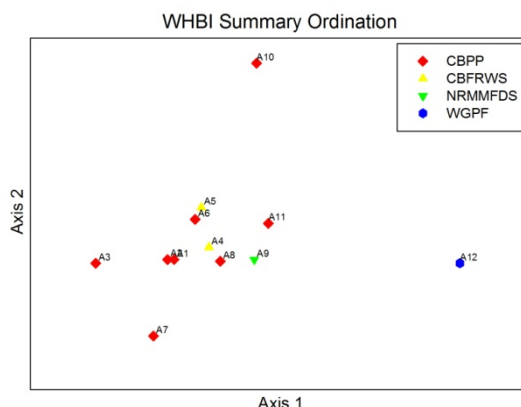
Similar associations have been reported from the Hells Canyon area of the Snake River and its tributaries in Idaho, Oregon and Washington. Distributions in Idaho and Montana are uncertain.

## COMMENTS

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from the White Bird Battlefield, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

## Black Cottonwood - (Sour Cherry, European Plum) Woodland

*Populus balsamifera* ssp. *trichocarpa* – *Prunus (cerasus, domestica)* Woodland



### Description

This woodland community type is characterized by an open canopy, which is dominated by *Populus balsamifera* ssp. *trichocarpa*. The canopy of this woodland type is generally mixed in terms of species composition and additional tree species which range from common to abundant include; *Prunus domestica*, *Prunus cerasus*, and *Celtis laevigata*. Shrub cover is generally low and *Rosa canina* is the only species which occurs with high constancy. The herbaceous stratum tends to consist primarily of exotic grasses including; *Bromus diandrus*, *Dactylis glomerata*, *Poa palustris*, *Bromus tectorum*, and *Poa pratensis*. Most of the woody and herbaceous species common to this woodland vegetation class are indicative of ornamental/agricultural plantings associated with early settlements.

Black cottonwood associations are associated with streams at and below lower treeline, including permanent, intermittent and ephemeral streams with woody riparian vegetation. These woodlands generally require flooding and some gravels for reestablishment. Sites are subject to temporary flooding during spring runoff. Underlying gravels may keep the water table just below the ground surface and are favored substrates for cottonwood. This type may also occur in supplementally irrigated areas such as homesteads and pastureland.

CONSERVATION RANK N/A

DATABASE CODE N/A

### CHARACTERISTIC SPECIES (n = 4, xx)

#### Tree

*Prunus cerasus* (sour cherry) V.21, *Populus balsamifera* ssp. *trichocarpa* (black cottonwood) IV.15, *Prunus domestica* (European plum) IV.9, *Celtis laevigata* (netleaf hackberry) III.2

#### Shrub

None

#### Dwarf-shrub

*Rosa canina* (dog rose) IV.1

#### Graminoid

*Bromus diandrus* (ripgut brome) IV.15, *Dactylis glomerata* (orchardgrass) IV.2, *Poa palustris* (fowl bluegrass) IV.1, *Bromus tectorum* (cheatgrass) III.8, *Poa pratensis* (Kentucky bluegrass) III.4

#### Forb

*Cynoglossum officinale* (gypsyflower) IV.1

## RANGE

*White Bird Battlefield, Nez Perce National Historical Park*

Enter WHBI specific data.

*Global*

This woodland type is found on the periphery of the northern Rockies in the Columbia River Basin, along major tributaries and the main stem of the Columbia at relatively low elevations.

## COMMENTS

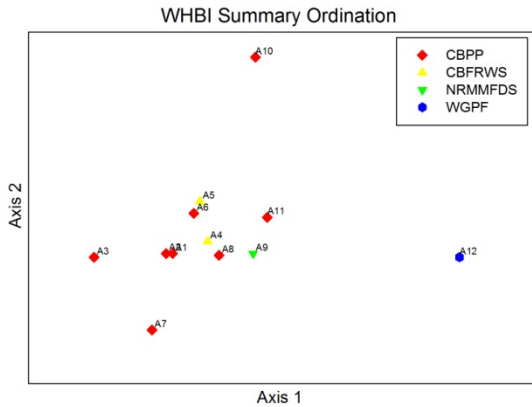
This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from the White Bird Battlefield, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.



**A6**

## Quackgrass Herbaceous Alliance

*Elymus repens* Herbaceous Alliance



### Description

This vegetation class is characterized by a sparse to moderate herbaceous stratum which is dominated by *Elymus repens*. Quackgrass is a perennial bunchgrass from the Mediterranean. Other non-native grasses are common to this vegetation type; *Taeniatherum caput-medusae* and *Bromus tectorum* are the most common. Forbs are sparse and tend to be non-native as well. Natives are generally outcompeted in this vegetation type and, when present contribute very little to the total cover of the community.

This introduced grassland generally persists because it is aggressive, difficult to control, and is well suited to the cooler, often moist conditions of most rangelands across the US. Consequently, stands can occur in a wide variety of anthropogenically-disturbed habitats, especially crops, rangeland, pasture, lawns, and home gardens.

CONSERVATION RANK N/A

DATABASE CODE A.2658

### CHARACTERISTIC SPECIES (n = 7, xx)

#### Tree

None

#### Shrub

None

#### Dwarf-shrub

None

#### Graminoid

*Elymus repens* (quackgrass) V.15, *Taeniatherum caput-medusae* (medusahead) IV.7, *Bromus tectorum* (cheatgrass) III.4

#### Forb

*Convolvulus arvensis* (field bindweed) V.2, *Lactuca serriola* (prickly lettuce) V.1

## RANGE

*White Bird Battlefield, Nez Perce National Historical Park*

Enter WHBI specific data.

*Global*

Introduced from the Mediterranean area, quackgrass is common across much of North America, where it has adapted well to moist soils and cooler climates.

## COMMENTS

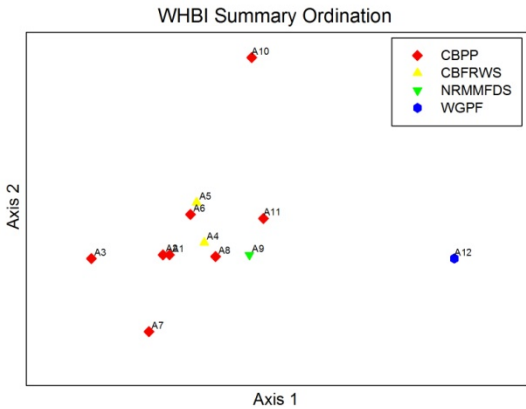
Quackgrass is difficult to control and is known for its ability to reduce productivity in crops, rangeland, and pasture.



A7

# Yellow Star-thistle – Field Bindweed Semi-natural Herbaceous Vegetation

*Centaurea solstitialis* – *Convolvulus arvensis* Semi-natural Herbaceous Vegetation



## Description

This herbaceous community has a moderate herbaceous stratum that is co-dominated by the introduced forbs *Centaurea solstitialis* and *Convolvulus arvensis*. Trees and shrubs usually only occur as scattered individuals when present. Additional grasses and forbs common to this community type also tend to be non-native and weedy. The most abundant sub-dominant grass species is *Taeniatherum caput-medusae*, which is often associated with disturbed areas. *Bromus tectorum* and *Valerianella locusta* are also range from common to locally abundant in many stands of this type.

This association is not limited by soil type, climate, topography, or precipitation, and is usually associated with roadsides and other disturbed areas.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 9, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Taeniatherum caput-medusae* (medusahead) IV.5, *Bromus tectorum* (cheatgrass) IV.4

Forb

*Centaurea solstitialis* (yellow star-thistle) V.18, *Convolvulus arvensis* (field bindweed) V.11, *Valerianella locusta* (Lewiston cornsalad) III.4

Columbia Basin Palouse Prairie



## RANGE

*White Bird Battlefield, Nez Perce National Historical Park*

Enter WHBI specific data.

*Global*

Yellow star-thistle was introduced from Europe and has spread across montane rangelands throughout the western U.S.

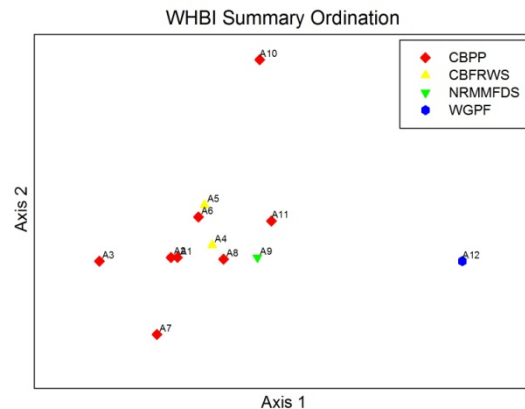
## COMMENTS

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from the White Bird Battlefield, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

**A8**

## Whitetop Semi-natural Herbaceous Vegetation

*Cardaria draba* Semi-natural Herbaceous Vegetation



### Description

This herbaceous community is characterized by a moderate to dense herbaceous layer that is dominated by *Cardaria draba*. *Cardaria draba* is an introduced forb that is considered noxious in many states. Other species common to this community also tend to be non-native. *Taeniatherum caput-medusae* and *Bromus tectorum* are the most common grasses and occur in most stands with low cover values. Additional forbs are sparse in terms of cover and combined tend to have low species richness. *Convolvulus arvensis* and *Dipsacus fullonum* are among the most frequently occurring species.

This association is common on alkaline, disturbed soils but has relatively few other limiting factors. Communities like this one tend to result from severe and/or repeated disturbance.

CONSERVATION RANK N/A

DATABASE CODE N/A

### CHARACTERISTIC SPECIES (n = 3, xx)

#### Tree

None

#### Shrub

None

#### Dwarf-shrub

None

#### Graminoid

*Taeniatherum caput-medusae* (medusahead) V.5, *Bromus tectorum* (cheatgrass) IV.1

#### Forb

*Cardaria draba* (whitetop) V.42, *Dipsacus fullonum* (Fuller's teasel) V.1, *Galium aparine* (stickywilly) V.<1, *Convolvulus arvensis* (field bindweed) IV.4

## RANGE

*White Bird Battlefield, Nez Perce National Historical Park*

Enter WHBI specific data.

*Global*

This weed-dominated community is likely to occur as small patches throughout the range of whitetop, which is most of the United States and Canada.

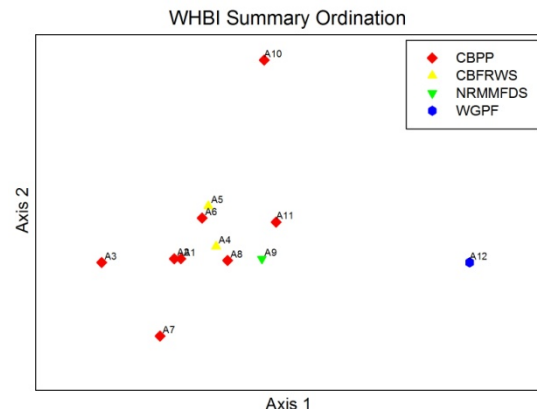
Columbia Basin Palouse Prairie

## COMMENTS

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from the White Bird Battlefield, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

## A9 Common Snowberry Shrubland

*Symphoricarpos albus* Shrubland



### Description

This shrubland association is characterized by a moderate to dense shrub canopy dominated by *Symphoricarpos albus*. The height of this canopy is generally 1 m or less. Immature or browsed forms of *Amelanchier alnifolia* are occasionally present. Other shrub species include; *Crataegus douglasii*, *Rosa canina*, and *Mahonia repens*. The herbaceous layer is typically sparse and species composition can be highly variable from one stand to another. *Galium* spp., *Phleum pratense*, *Fragaria virginiana*, *Lithophragma parviflorum*, and *Achillea millefolium* are some of the most frequently occurring understory species. In areas which have been disturbed, a number of invasive species may be present or even abundant in the herbaceous layer. *Bromus arvensis* and *Centaurea solstitialis* are conspicuous in some stands.

This association is found primarily on flat to gentle benches with south aspects but may also occur on valley floors, alluvial terraces, ridges, and slopes. Most sites are situated on glacial-fluvial or till deposits. The soils tend to be well-drained silt, sand, or clay loams with a negligible amount of rock. There is moderate cover of litter and duff, and low bare soil exposure.

CONSERVATION RANK G4

DATABASE CODE CEGL005890

CHARACTERISTIC SPECIES (n = 2, xx)

Tree

None

Shrub

*Symphoricarpos albus* (common snowberry) V.43, *Crataegus douglasii* (black hawthorn) V.1

Dwarf-shrub

*Rosa canina* (dog rose) V.2

Graminoid

*Bromus arvensis* (field brome) V.6

Forb

*Achillea millefolium* (common yarrow) V.1, *Galium aparine* (stickywilly) V.1, *Hypericum perforatum* (common St. Johnswort) V.1, *Dipsacus fullonum* (Fuller's teasel) V.<1, *Linum lewisii* (Lewis flax) V.<1, *Lithophragma parviflorum* (smallflower woodland-star) V.<1, *Plantago lanceolata* (narrowleaf plantain) V.<1, *Centaurea solstitialis* (yellow star-thistle) III.3

Northern Rocky Mountain Montane-Foothill Deciduous Shrubland

**RANGE**

*White Bird Battlefield, Nez Perce National Historical Park*

Enter WHBI specific data.

*Global*

The association was described from the west side of the Continental Divide in Glacier National Park. Montana, United States, but its range is likely more widespread across the Intermountain region.

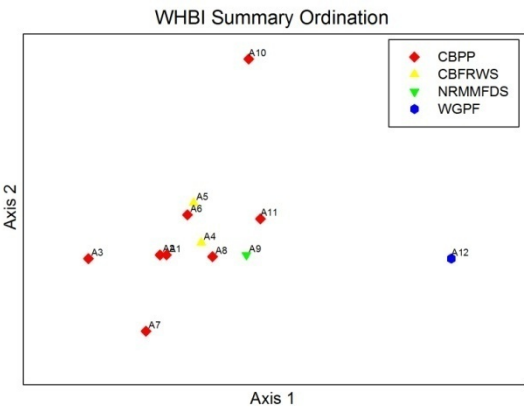
**COMMENTS**

None.

A10

## Meadow Foxtail Semi-natural Herbaceous Vegetation

*Alopecurus pratensis* Semi-natural Herbaceous Vegetation



Description

*Alopecurus pratensis* is the dominant species in this herbaceous association, and *Poa pratensis* may co-dominate some stands. Other introduced grasses may be also be locally abundant, specifically *Bromus inermis* and *Bromus arvensis*. Forb cover is generally sparse and species composition can be variable but *Thlaspi arvense* and *Cruciata pedemontana* regularly occur at low cover values. Trees and shrubs are generally absent and other herbaceous species are often non-native.

Arable prairies that were converted to agriculture or pastureland now often appear as degraded areas with substantial exotic species cover. This association is found in areas of shallow soil over bedrock that has a perched water table or seasonal seepage. Soils are highly variable for this association.

CONSERVATION RANK    N/A

DATABASE CODE    N/A

CHARACTERISTIC SPECIES    (n = 4, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Alopecurus pratensis* (meadow foxtail) IV.24, *Bromus arvensis* (field brome) IV.1, *Poa pratensis* (Kentucky bluegrass) III.15, *Bromus inermis* (smooth brome) III.9

Forb

*Cruciata pedemontana* (piedmont bedstraw) IV.1, *Thlaspi arvense* (field pennycress) IV.1



## RANGE

*White Bird Battlefield, Nez Perce National Historical Park*

Enter WHBI specific data.

*Global*

This association is likely found from the central states, north into Canada and Alaska in areas with cool temperatures and available moisture.

Columbia Basin Palouse Prairie

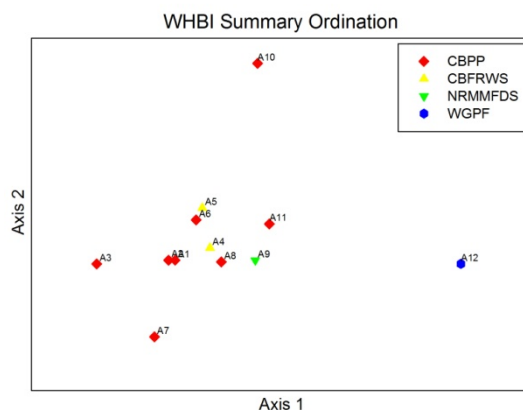
## COMMENTS

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from White Bird Battlefield, and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.



## (Canada Thistle, Leafy Spurge, Sweetclover species) – Mixed Forbs Herbaceous Alliance

(*Cirsium arvense*, *Euphorbia esula*, *Melilotus* spp.) Mixed Forbs Herbaceous Alliance



### Description

This community type represents disturbed areas that support noxious/invasive weed combinations of one type or another. *Cirsium arvense* is the most characteristic species of this alliance across its range, but locally *Dipsacus fullonum* is co-dominant or even dominant in some stands. Other non-natives may be locally abundant and species composition is highly variable from one stand to another. *Phalaris arundinacea* is the only other species with notable constancy values at this location; it likely occurs in areas with slightly higher water content, along a ditch or seep. Native species are sparse and variable and native species composition likely reflects plant communities which were present prior to conversion to non-natives.

Both dominant species are widely distributed across the United States, with *Dipsacus fullonum* most notably located in moist sites, along irrigation ditches, canals, and other disturbances.

CONSERVATION RANK N/A

DATABASE CODE A.3564

CHARACTERISTIC SPECIES (n = 3, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

*Phalaris arundinacea* (redd canarygrass) IV.7

Forb

*Dipsacus fullonum* (Fuller's teasel) V.25, *Cirsium arvense* (Canada thistle) V.11

Columbia Basin Palouse Prairie

**RANGE**

*White Bird Battlefield, Nez Perce National Historical Park*

Enter WHBI specific data.

*Global*

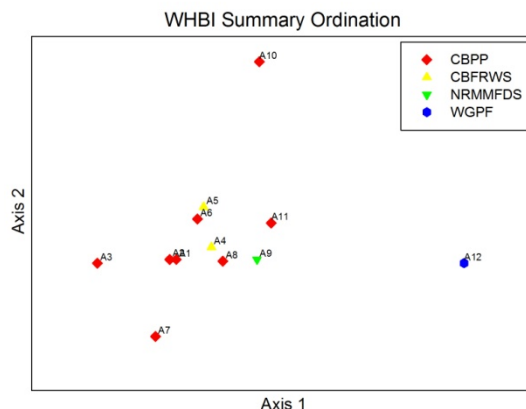
This weedy association is likely present as patches across the range of the abundant component species. Most are found across the U.S. and Canada.

**COMMENTS**

None.

## A12 Broadleaf Cattail Marsh

*Typha (latifolia, angustifolia)* Western Herbaceous Vegetation



### Description

This community is dominated by hydrophytic macrophytes, particularly *Typha latifolia*. *Typha latifolia* often forms a dense, near-monotypic stand, almost to the exclusion of other species. Other species typical of wetlands may be found with very sparse cover in this community; among these are shallower water emergents such as *Carex* spp., *Eleocharis* spp., *Glyceria* spp., *Juncus balticus*, and *Veronica* spp. Trace amounts of graminoids like *Agrostis stolonifera*, *Beckmannia syzigachne*, *Hordeum jubatum*, *Muhlenbergia asperifolia*, and *Phalaris arundinacea* may also be present. Weedy species may invade some stands and can include; *Dipsacus fullonum*, *Cirsium arvense*, and *Daucus carota*.

This widespread community type is found along streams, rivers, canals, and the banks of ponds and lakes. Elevations range from near sea level to 2000 m. Sites are nearly level. The soil is saturated or flooded for much of the year from freshwater sources such as springs or streams. The alluvial soils have variable textures ranging from sand to clay and usually with a high organic content.

CONSERVATION RANK G5

DATABASE CODE CEGL002010

CHARACTERISTIC SPECIES (n = 2, xx)

Tree

None

Shrub

None

Dwarf-shrub

None

Graminoid

None

Forb

*Typha latifolia* (broadleaf cattail) V.50, *Dipsacus fullonum* (Fuller's teasel) III.3

## RANGE

*White Bird Battlefield, Nez Perce National Historical Park*

Enter WHBI specific data.

*Global*

This association is widely distributed, occurring across the western United States and western Great Plains.

## COMMENTS

This association is dependent on flooding and high water tables from flowing freshwater sources, such as streams and seeps, and does not grow well in alkaline or stagnant water. Disturbance greatly increases the total number of species present. *Typha* spp. produce abundant wind-dispersed seeds that allow them to colonize wet bare soil sites quickly and to survive under wet conditions

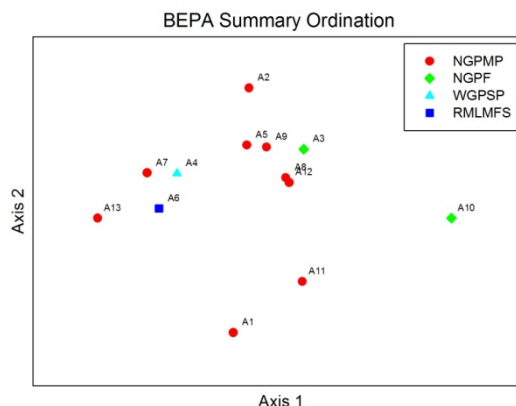
This community is a common element found in many wetland systems, but has received little attention. Consequently, the diagnostic features and species of this community are not well known.

# BEPA Plant Association Descriptions



## Crested Wheatgrass – Alfalfa Semi-natural Herbaceous Vegetation

*Agropyron cristatum* – *Medicago sativa* Semi-natural Herbaceous Vegetation



### Description

This herbaceous plant community is characterized by an abundance of introduced species with moderate total cover. The dominant species in this vegetation type is generally *Agropyron cristatum*, a perennial bunchgrass, however, *Medicago sativa*, a perennial forb, may co-dominate or even dominate some stands. Native species persist in some stands, however cover and diversity are typically low, and component native species can be quite variable depending on the plant community that was present prior to the conversion to hay production and/or introduced grasses. Several grass species, such as *Poa pratensis*, *Hesperostipa comata*, *Pascopyrum smithii*, *Koeleria macrantha*, and *Nassella viridula* are often present with low cover. *Artemisia frigida* is the most frequently occurring and native shrub in this community type. Additional forb species are common and typically include *Taraxacum officinale*, *Alyssum alyssoides*, *Tragopogon dubius*, and *Selaginella densa*.

This association can occur across a wide range of environmental conditions in semi-arid ecosystems and is not tightly constrained by slope, aspect, soil texture, or soil depth. Stands can occur in and adjacent to a wide variety of human-disturbed habitats, including highway rights-of-way, hay fields, revegetation projects, etc.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 2, xx)

Tree

None

Shrub

None

Dwarf-shrub

*Artemisia frigida* (prairie sagewort) V.<1

Graminoid

*Agropyron cristatum* (crested wheatgrass) V.35, *Poa pratensis* (Kentucky bluegrass) V.8, *Hesperostipa comata* (needle and thread) V.5, *Koeleria macrantha* (prairie Junegrass) V.1, *Nassella viridula* (green needlegrass) V.1, *Pascopyrum smithii* (western wheatgrass) V.1



## Northwestern Great Plains Mixedgrass Prairie

### Forb

*Medicago sativa* (alfalfa) V.20, *Taraxacum officinale* (common dandelion) V.1, *Alyssum alyssoides* (pale madwort) V.<1, *Tragopogon dubius* (yellow salsify) V.<1, *Selaginella densa* (lesser spikemoss) III.5

### RANGE

*Bear Paw Battlefield, Nez Perce National Historical Park*

Enter Bear Paw specific data.

*Global*

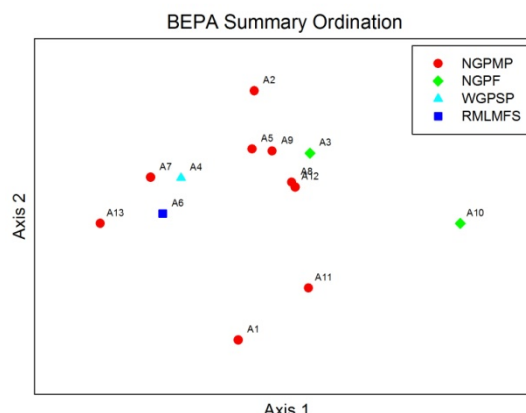
The Crested Wheatgrass Semi-natural Herbaceous Alliance is found in Utah, Montana, Wyoming, Idaho, and North and South Dakota, and in Canada in Manitoba and Saskatchewan. Alfalfa, originally from Asia, is present across the globe.

### COMMENTS

*Agropyron cristatum* has been planted into pastures and rangelands to improve forage production and is well suited to the cold, semi-arid conditions of the Great Basin, northwestern Great Plains and higher elevation rangelands in more southern latitudes, facilitating its persistence and occasional spread.

*Medicago sativa* is consumed by most herbivores and omnivores, including all classes of livestock and big game animals. It is also valued for rehabilitation of overgrazed ranges in part because it begins growth early and retains green succulence later than grasses. It has been recommended for improvement of both wildlife habitat and livestock ranges in many areas, especially in the drier western states.

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from Bear Paw Battlefield and related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.



### Description

This semi-natural plant association is characterized by a moderate to dense herbaceous stratum that is dominated by the introduced perennial, sod-forming grass, *Poa pratensis*. Other graminoids, particularly *Pascopyrum smithii*, also occur regularly in this vegetation type. Forbs common to this association include *Solidago mollis*, *Selaginella densa*, *Vicia americana*, and *Achillea millefolium* as well as others at very low cover.

This association typically occupies seasonally flooded swales and wet, low- to mid-elevation sites. Appropriate sites often include alkaline meadows and may have long-term grazing disturbance. Slopes are typically gentle and this association may occur on all aspects. Soils are mineral with dark surface horizons containing large amounts of well-decomposed organic matter. Soil texture ranges from silt to sandy loam. Water tables are often at or near the soil surface in early summer but may drop below 50 cm by late August. Arid sites receive enough moisture to support at least some wetland species.

CONSERVATION RANK N/A

DATABASE CODE N/A

### CHARACTERISTIC SPECIES (n = 8, xx)

#### Tree

None

#### Shrub

None

#### Dwarf-shrub

*Artemisia ludoviciana* (white sagebrush) V.5, *Artemisia frigida* (prairie sagewort) IV.1

#### Graminoid

*Poa pratensis* (Kentucky bluegrass) V.46, *Pascopyrum smithii* (western wheatgrass) V.8, *Bromus arvensis* (field brome) IV.3

#### Forb

*Solidago mollis* (velvety goldenrod) V.4, *Vicia americana* (American vetch) V.2, *Symphyotrichum falcatum* (white prairie aster) IV.4, *Selaginella densa* (lesser spikemoss) IV.3, *Achillea millefolium* (common yarrow) IV.2, *Sphaeralcea coccinea* (scarlet globemallow) IV.1, *Tragopogon dubius* (yellow salsify) IV.1

## RANGE

*Bear Paw Battlefield, Nez Perce National Historical Park*

Enter Bear Paw specific data.

*Global*

This association has the potential to occur in limited distribution from low-lying plains to montane regions, and likely has much associated variability. The *Poa pratensis* Semi-natural Herbaceous Alliance is reported to occur in Washington, Oregon, Montana, Wyoming, Idaho, Utah, and California, but is likely widespread in the western U.S. and northern Great Plains.

## COMMENTS

*Poa pratensis* is widespread in the western U.S. where, following disturbance, its extensive rhizome system allows it to spread and establish, outcompeting many native graminoids. It is tolerant of heavy grazing and burning and increases at the expense of less tolerant native species.

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from the Bear Paw Battlefield and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

**A3**

## Western Snowberry Shrubland

*Symphoricarpos occidentalis* Shrubland

### Description

Throughout its range this community is dominated by *Symphoricarpos occidentalis*, a shrub species approximately 1 m tall. Shrub cover is typically greater than 50%, and in places it can approach 100%. These shrubs form dense clumps that exclude most other species. Herbaceous species and smaller shrubs are most abundant at the edges of this community and in gaps between the clumps of taller shrubs where the shading is less complete. *Rosa woodsii* and *Artemisia ludoviciana* are typical smaller shrubs. Common graminoids include *Pascopyrum smithii*, *Nassella viridula*, and the non-native, *Poa pratensis*. *Achillea millefolium*, *Galium boreale*, and *Solidago* spp. are common forbs of this community.

This community is found in mesic swales, depressions, ravines and floodplains. Some examples of this community experience intermittent and brief flooding. The soils are fertile and well-drained to imperfectly drained silts and loams. The upper soil horizon is usually deep, although a thin layer of sand may be present if there has been recent flooding.

CONSERVATION RANK G4

DATABASE CODE C EGL001131

CHARACTERISTIC SPECIES (n = 7, xx)

Tree

None

Shrub

*Symphoricarpos occidentalis* (western snowberry) V.48

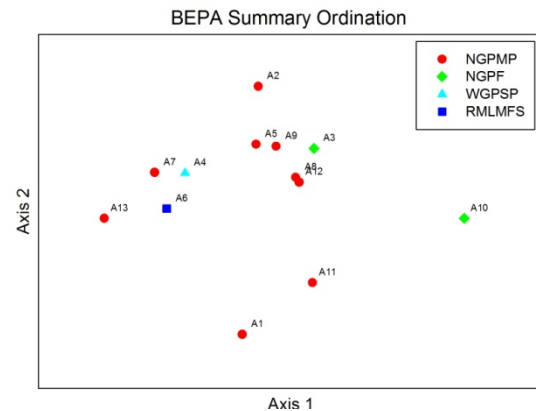
Dwarf-shrub

*Rosa woodsii* (Woods' rose) V.3, *Artemisia ludoviciana* (white sagebrush) IV.2

Graminoid

*Poa pratensis* (Kentucky bluegrass) V.15, *Pascopyrum smithii* (western wheatgrass) V.7, *Nassella viridula* (green needlegrass) IV.1

Forb

*Solidago mollis* (velvety goldenrod) IV.3

## RANGE

*Bear Paw Battlefield, Nez Perce National Historical Park*

Enter Bear Paw specific data.

*Global*

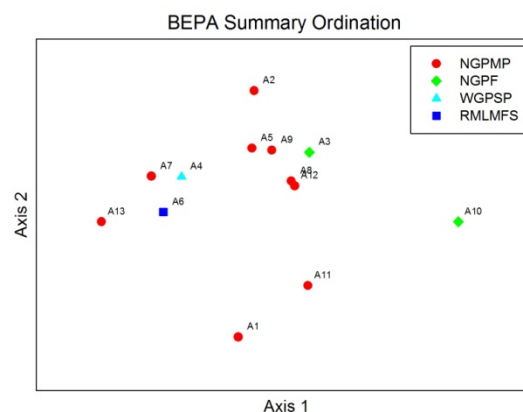
This shrubland association is found in the western tallgrass prairie, the northern Great Plains, and in the foothills of the northern Rocky Mountains of the United States and Canada.

## COMMENTS

This vegetation type is common throughout the northern Great Plains. Historically, it probably occurred with small patch sizes. It has been observed to grow out from forest or woodland edges and tends to shade out understory grasses. Western snowberry is tolerant of both grazing and fire and is under no threat from human activities. Many examples the community type are somewhat weedy (i.e. addition of Kentucky bluegrass); thus the type is not demonstrably secure.

## Plains Silver Sagebrush / Needle-and-Thread Shrub Herbaceous Vegetation

*Artemisia cana* spp. *cana* / *Hesperostipa comata* Shrub Herbaceous Vegetation



### Description

*Artemisia cana* is the dominant shrub in this vegetation type with moderate canopy cover; *Artemisia frigida* is the only other shrub/subshrub with greater than 50% constancy, but its cover is very low. A number of graminoids have high constancy including; *Hesperostipa comata*, *Koeleria macrantha*, *Elymus lanceolatus*, *Nassella viridula*, and *Pascopyrum smithii*, but typically *Hesperostipa comata* exhibits highest constancy and cover values. *Poa pratensis* can be locally abundant on certain disturbed sites. Forbs constitute an insignificant component, occurring in trace amounts; those with the highest constancy are *Sphaeralcea coccinea*, *Pedimelum argophyllum*, *Achillea millefolium*, *Symphyotrichum falcatum*, *Vicia americana*, and *Selaginella densa*. This association is hypothesized to represent the driest environment capable of supporting *Artemisia cana*.

This association type is found on benches to gently inclined slopes of rolling prairie, steeper ravine slopes, and all manner of topography in the vicinity of breaklands. It occurs on various parent materials but mostly well-drained, often sandy, glacial drift. The ground cover is highly variable with some sites having an expanse of *Selaginella densa* and lichens, while others have predominately litter and trace amounts of *Selaginella densa*.

CONSERVATION RANK G3

DATABASE CODE CEGL001553

CHARACTERISTIC SPECIES (n = 4, xx)

Tree

None

Shrub

None

Dwarf-shrub

*Artemisia cana* (plains silver sagebrush) V.20, *Artemisia frigida* (prairie sagewort) V.2

Graminoid

*Poa pratensis* (Kentucky bluegrass) V.16, *Hesperostipa comata* (needle and thread) V.7, *Koeleria macrantha* (prairie Junegrass) V.3, *Elymus lanceolatus* (thickspike wheatgrass) IV.10, *Nassella viridula* (green needlegrass) IV.8, *Pascopyrum smithii* (western wheatgrass) III.3, *Bromus arvensis* (field brome) III.2

Forb



## Western Great Plains Sand Prairie

*Selaginella densa* (lesser spikemoss) V.8, *Symphyotrichum falcatum* (white prairie aster) V.2, *Vicia americana* (American vetch) V.2, *Medicago sativa* (alfalfa) V.<1, *Tragopogon dubius* (yellow salsify) V.<1, *Achillea millefolium* (common yarrow) IV.2, *Pedimelum argophyllum* (silverleaf Indian breadroot) IV.1, *Taraxacum officinale* (common dandelion) IV.1

### RANGE

*Bear Paw Battlefield, Nez Perce National Historical Park*

Enter Bear Paw specific data.

*Global*

This association is well-documented from Montana, Alberta, Canada, and a very similar type occurs in Wyoming, and is expected in northwestern North Dakota and Saskatchewan.

### COMMENTS

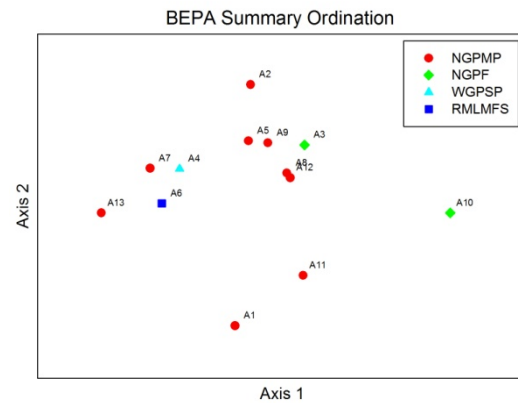
This small-patch type currently has a narrowly circumscribed geographic distribution. Habitats with the potential to support this type appear to be relatively abundant, but the type itself is comparatively uncommon. Though embedded in primarily agricultural landscapes, this landform also occurs in breakland and badland environments less desirable for agriculture, thus lessening the chances of this uncommon type being converted to agriculture.



A5

## Western Wheatgrass – Kentucky Bluegrass Herbaceous Vegetation

*Pascopyrum smithii* - *Poa pratensis* Herbaceous Vegetation



### Description

The vegetation cover of this herbaceous community tends to be moderate to high, with almost the entire canopy comprised of graminoids. The dominant native species are *Pascopyrum smithii* and *Nassella viridula*. Other common grasses are *Hesperostipa comata* and *Poa pratensis*, with *Poa pratensis* often contributing a substantial amount of cover in most stands. Cheatgrasses (*Bromus arvensis*, *Bromus tectorum*) are present in many stands and contribute substantial cover in some. The forbs *Symphyotrichum falcatum*, *Astragalus* spp., *Achillea millefolium*, *Sphaeralcea coccinea*, and *Vicia americana* are also typical of this community. *Artemisia cana* ssp. *cana* cover ranges from absent to moderate, as the presence and abundance of this shrub is quite variable across the community type. Stands with denser shrubs are transitional to shrub-herbaceous vegetation.

This community is found at the bottom of narrow valleys, on stream terraces, and on rolling uplands of any aspect. Soils are fine-textured (clays, silty clays, clay loams, or rarely loams), well-drained, and well-developed. The parent material is typically siltstone or mixed sedimentary rock.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 4, xx)

Tree

None

Shrub

None

Dwarf-shrub

*Artemisia cana* (silver sagebrush) III.6

Graminoid

*Pascopyrum smithii* (western wheatgrass) V.39, *Poa pratensis* (Kentucky bluegrass) V.23, *Nassella viridula* (green needlegrass) V.2, *Bromus arvensis* (field brome) IV.9, *Bromus tectorum* (cheatgrass) III.3, *Hesperostipa comata* (needle and thread) III.3

Forb

*Sphaeralcea coccinea* (scarlet globemallow) V.1

## RANGE

*Bear Paw Battlefield, Nez Perce National Historical Park*

Enter Bear Paw specific data.

*Global*

The western wheatgrass – needlegrass- co-dominated community is common across much of the northern Great Plains of the United States and possibly extends into Canada. The range of this community type where Kentucky bluegrass has been introduced and co-dominates the herbaceous layer is likely limited within the range of the greater native community type.

## COMMENTS

*Poa pratensis* is widespread in the western U.S. where, following disturbance, its extensive rhizome system allows it to spread and establish, outcompeting many native graminoids. It is tolerant of heavy grazing and burning and increases at the expense of less tolerant native species.

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from the Bear Paw Battlefield and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.

## A6

## Fringed Sagebrush Dwarf-shrubland Alliance

*Artemisia frigida* Dwarf-shrubland Alliance

## Description

This association has sparse to moderately dense vegetation and is characterized by the presence of *Artemisia frigida*. The other characteristic species are perennial graminoids: *Bouteloua gracilis*, *Pascopyrum smithii*, *Hesperostipa comata*, *Koeleria macrantha*, and *Carex inops*, which are often abundant. Additional common dwarf-shrubs include *Krascheninnikovia lanata*. Forb abundance ranges from sparse to moderate and the forb component is often composed of low-growing species. Species composition is often diverse, and may include *Selaginella densa*, *Taraxacum officinale*, *Phlox hoodii*, *Tragopogon dubius*, *Sphaeralcea coccinea*, and *Allium cernuum*.

This shrubland is typically found on exposed, wind-blown sites. Appropriate sites range from flat to moderately steep on all aspects. Various amounts of bedrock, large and small rocks, and bare soil characterize the majority of the ground surface, with sparse to low cover of litter. Soils are shallow, rapidly drained and range from coarse sand and sandy loam to sandy clay loam and sandy clay.

CONSERVATION RANK N/A

DATABASE CODE A.2565

## CHARACTERISTIC SPECIES (n = 1, xx)

## Tree

None

## Shrub

None

## Dwarf-shrub

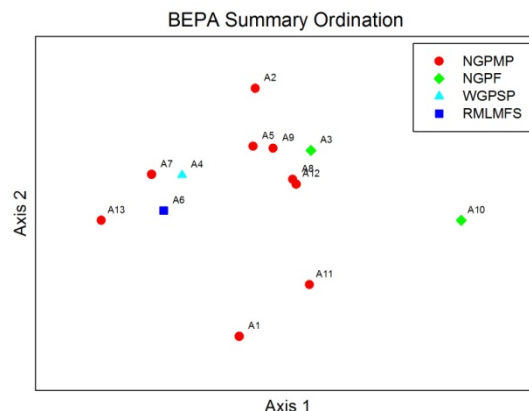
*Artemisia frigida* (prairie sagewort) V.15, *Krascheninnikovia lanata* (winterfat) V.<1

## Graminoid

*Bouteloua gracilis* (blue grama) V.10, *Hesperostipa comata* (needle and thread) V.10, *Koeleria macrantha* (prairie Junegrass) V.10, *Bromus arvensis* (field brome) V.5, *Pascopyrum smithii* (western wheatgrass) V.5, *Carex inops* (long-stolon sedge) V.1

## Forb

*Selaginella densa* (lesser spikemoss) V.15, *Sphaeralcea coccinea* (scarlet globemallow) V.5, *Taraxacum officinale* (common dandelion) V.2, *Phlox hoodii* (Hood's phlox) V.1, *Tragopogon dubius* (yellow salsify) V.1, *Agoseris glauca* (pale agoseris) V.<1, *Allium cernuum* (nodding onion) V.<1, *Antennaria parvifolia* (small-leaf



## Rocky Mountain Lower Montane-Foothill Shrubland

pussytoes) V.<1, *Astragalus missouriensis* (Missouri milkvetch) V.<1, *Erysimum inconspicuum* (shy wallflower) V.<1, *Linum rigidum* (stiffstem flax) V.<1, *Machaeranthera pinnatifida* (lacy tansyaster) V.<1, *Medicago sativa* (alfalfa) V.<1, *Musineon divaricatum* (leafy wildparsley) V.<1, *Orobanche fasciculata* (clustered broomrape) V.<1, *Plantago patagonica* (woolly plantain) V.<1, *Vicia americana* (American vetch) V.<1

### RANGE

*Bear Paw Battlefield, Nez Perce National Historical Park*

Enter Bear Paw specific data.

*Global*

This dwarf-shrubland is found from the Colorado Plateau to the western slope of the Rocky Mountains.

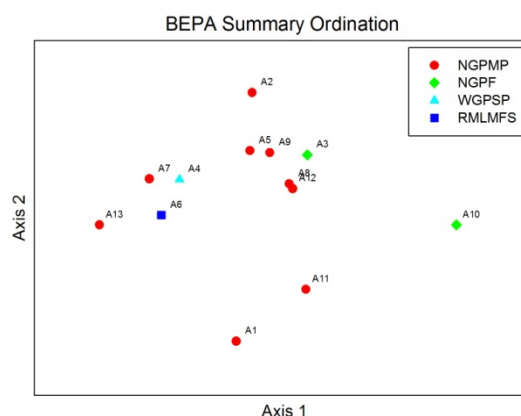
### COMMENTS

None.



## Western Wheatgrass – Needle-and-Thread Central Mixedgrass Herbaceous Vegetation

*Pascopyrum smithii* - *Hesperostipa comata* Central Mixedgrass Herbaceous Vegetation



### Description

The dominant species in this herbaceous vegetation type are *Pascopyrum smithii* and *Hesperostipa comata*. Total vegetative cover may range from moderately open to dense. Other graminoids which may be present to abundant are *Koeleria macrantha*, *Nassella viridula* as well as non-native species such as *Poa pratensis* and *Bromus arvensis*. Common forbs include; *Selaginella densa*, *Vicia americana*, *Symphyotrichum falcatum*, *Sphaeralcea coccinea*, *Pedimelum argophyllum*, and *Tragopogon dubius*. Shrubs are sparse in this community. Scattered *Artemisia frigida* and *Krascheninnikovia lanata* may be present.

This community occurs on many different topographic and soil types. It can be present on upland slopes, ridgetops, plateaus, stream terraces, and rolling hills. The soils are fine- to medium-textured (clay to sandy loam) and moderately deep to deep. They are derived from a variety of materials across this community's range.

CONSERVATION RANK G4

DATABASE CODE CEGL002034

### CHARACTERISTIC SPECIES (n = 8, xx)

#### Tree

None

#### Shrub

None

#### Dwarf-shrub

*Artemisia frigida* (prairie sagewort) V.3, *Krascheninnikovia lanata* (winterfat) IV.1

#### Graminoid

*Hesperostipa comata* (needle and thread) V.18, *Poa pratensis* (Kentucky bluegrass) V.12, *Pascopyrum smithii* (western wheatgrass) V.8, *Bromus arvensis* (field brome) V.3, *Koeleria macrantha* (prairie Junegrass) V.1, *Nassella viridula* (green needlegrass) IV.2

#### Forb

*Selaginella densa* (lesser spikemoss) V.17, *Pedimelum argophyllum* (silverleaf Indian breadroot) V.8, *Symphyotrichum falcatum* (white prairie aster) V.4, *Sphaeralcea coccinea* (scarlet globemallow) V.1, *Taraxacum officinale* (common dandelion) V.1, *Tragopogon dubius* (yellow salsify) V.1, *Vicia americana* (American vetch)



## Northwestern Great Plains Mixedgrass Prairie

V.1, *Antennaria parvifolia* (small-leaf pussytoes) V.<1, *Astragalus drummondii* (Drummond's milkvetch) V.<1, *Erysimum inconspicuum* (shy wallflower) V.<1, *Tragopogon dubius* (yellow salsify) V.<1, *Phlox hoodii* (Hood's phlox) IV.2, *Achillea millefolium* (common yarrow) IV.1, *Heterotheca villosa* (hairy false goldenaster) IV.1

### RANGE

*Bear Paw Battlefield, Nez Perce National Historical Park*

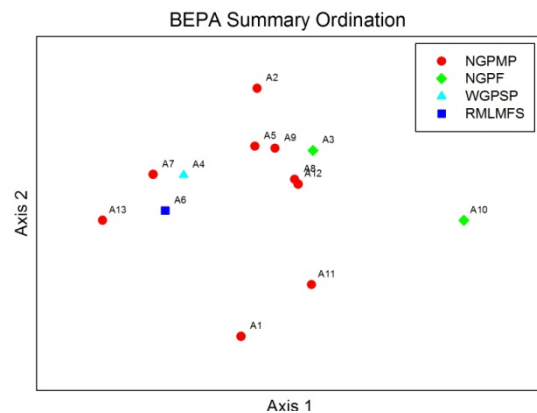
Enter Bear Paw specific data.

*Global*

This mixedgrass prairie community type is found throughout the north-central Great Plains of the United States and into Canada, ranging from Manitoba to northern Nebraska.

### COMMENTS

None.

**A8****Smooth Brome Semi-natural Herbaceous Alliance***Bromus inermis* Semi-natural Herbaceous Alliance**Description**

This herbaceous community is typically characterized by a graminoid layer which is strongly dominated by the non-native tall grass, *Bromus inermis*. The shrub layer is usually absent, though *Artemisia ludoviciana* and *Rosa woodsii* may be present with low cover values around the edges of grass patches. Other grass species are most often non-native and include; *Bromus arvensis*, *Poa pratensis*, and *Agropyron cristatum*. The forb component is generally depauperate with low species richness and cover values. The most widespread forb species are *Solidago mollis* and *Medicago sativa*.

This community is found in wet to moderately dry, open sites in plains, foothills, montane and subalpine zones with no particular aspect or elevation constraints. Often used as a component in hayfields and pastures, smooth brome is fairly drought resistant and can be found on sandy and stony soils as well as those with better structures.

CONSERVATION RANK N/A

DATABASE CODE A.3561

**CHARACTERISTIC SPECIES** (n = 3, xx)**Tree**

None

**Shrub**

None

**Dwarf-shrub***Artemisia ludoviciana* (white sagebrush) IV.1, *Rosa woodsii* (Woods' rose) IV.1**Graminoid**

*Bromus inermis* (smooth brome) V.53, *Poa pratensis* (Kentucky bluegrass) V.15, *Bromus arvensis* (field brome) V.1, *Agropyron cristatum* (crested wheatgrass) IV.1

**Forb***Solidago mollis* (velvety goldenrod) V.1, *Medicago sativa* (alfalfa) IV.1

**RANGE**

*Bear Paw Battlefield, Nez Perce National Historical Park*

Enter Bear Paw specific data.

*Global*

Introduced from Europe, *Bromus inermis* has spread across the US and southern Canada and is common on dry, disturbed sites in plains to montane zones, from BC and Alberta to New Mexico.

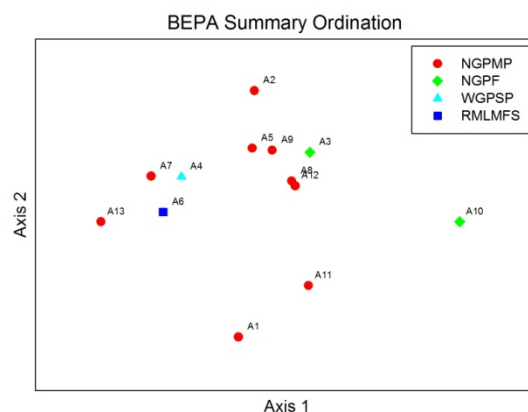
**COMMENTS**

None.



## Kentucky Bluegrass – Field Brome Semi-natural Herbaceous Vegetation

*Poa pratensis* - *Bromus arvensis* Semi-natural Herbaceous Vegetation



### Description

This semi-natural plant association is characterized by a moderate to dense herbaceous stratum that is dominated by the introduced graminoid, *Bromus arvensis*. The sod-forming grass, *Poa pratensis* is generally abundant and may co-dominate some stands. Other grasses common in this community type include *Pascopyrum smithii*, *Nassella viridula*, *Agropyron cristatum*, and *Hesperostipa comata*. Forbs in this association are highly variable in terms of species composition and tend to occur with very low cover.

This association typically occupies seasonally flooded swales and wet, low- to mid-elevation sites. Appropriate sites are often alkaline meadows and may have long-term grazing disturbance. Sloping are generally gentle and this vegetation type may occur on all aspects. Soils are mineral with dark surface horizons containing large amounts of well-decomposed organic matter. Soil texture ranges from silt to sandy loam. Water tables are often at or near the soil surface in early summer but may drop significantly by late summer.

CONSERVATION RANK N/A

DATABASE CODE N/A

CHARACTERISTIC SPECIES (n = 1, xx)

Tree

None

Shrub

None

Dwarf-shrub

*Artemisia frigida* (prairie sagewort) V.1

Graminoid

*Bromus arvensis* (field brome) V.35, *Poa pratensis* (Kentucky bluegrass) V.25, *Nassella viridula* (green needlegrass) V.5, *Agropyron cristatum* (crested wheatgrass) V.2, *Pascopyrum smithii* (western wheatgrass) V.2, *Hesperostipa comata* (needle and thread) V.1

Forb

*Symphotrichum falcatum* (white prairie aster) V.1, *Astragalus drummondii* (Drommond's milkvetch) V.<1, *Liatris punctata* (dotted blazing star) V.<1, *Medicago sativa* (alfalfa) V.<1, *Solidago mollis* (velvety goldenrod)

## Northwestern Great Plains Mixedgrass Prairie

V.<1, *Sphaeralcea coccinea* (scarlet globemallow) V.<1, *Taraxacum officinale* (common dandelion) V.<1, *Thlaspi arvense* (field pennycress) V.<1, *Tragopogon dubius* (yellow salsify) V.<1, *Vicia americana* (American vetch) V.<1

### RANGE

*Bear Paw Battlefield, Nez Perce National Historical Park*

Enter Bear Paw specific data.

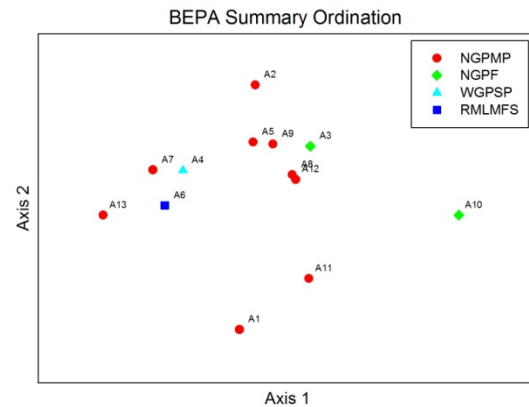
*Global*

This association has the potential to occur in limited distribution from the plains to montane regions, and likely has much associated variability. The *Poa pratensis* Semi-natural Herbaceous Alliance is reported to occur in Washington, Oregon, Montana, Wyoming, Idaho, Utah, and California, but is likely widespread across the western U.S. and northern Great Plains.

### COMMENTS

*Poa pratensis* is widespread in the western U.S. where, following disturbance, its extensive rhizome system allows it to spread and establish, outcompeting many native graminoids. It is tolerant of heavy grazing and burning and increases at the expense of less tolerant native species.

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from the Bear Paw Battlefield and on related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.



### Description

This mesic community type is dominated by *Salix exigua*, with a canopy layer that is generally between 2 and 4 m tall. Tree saplings and other willows may occasionally be present. Several other shrub species, usually in much lower abundance than *Salix exigua*, may occur; common species include; *Rosa woodsii*, *Symphoricarpos occidentalis* and various other upland and lowland species. The species in the shrub layer do not form a closed canopy, allowing significant light to reach the ground layer. However, average stem density may be moderate to high. There are often patches where the shrub layer is absent. Herbaceous cover is sparse to moderate and the composition of the herbaceous layer can vary greatly. Species which are often found in this community are *Juncus balticus*, *Phalaris arundinacea*, *Poa pratensis*, *Solidago canadensis* as well the invasive, *Cirsium arvense*.

The type is common on low alluvial bars that are subject to repeated flooding. The parent material is alluvial sand, although silt, clay, or gravel may be present. Soils are poorly stratified and generally consist of a thin layer of sandy loam at the surface overlying deep deposits of sand, gravel, or cobble. Rock fragments are extensive. These well-drained soils provide good aeration and rapid movement of water through the profile.

CONSERVATION RANK G5

DATABASE CODE CEG001197

CHARACTERISTIC SPECIES (n = 5, xx)

#### Tree

None

#### Shrub

*Salix exigua* (coyote willow or narrowleaf willow) V.50, *Symphoricarpos occidentalis* (western snowberry) IV.6

#### Dwarf-shrub

*Rosa woodsii* (Woods' rose) V.2

#### Graminoid

*Phalaris arundinacea* (reed canarygrass) V.2, *Poa pratensis* (Kentucky bluegrass) IV.5, *Juncus balticus* (Baltic rush) III.2

#### Forb

*Solidago canadensis* (Canada goldenrod) V.3, *Cirsium arvense* (Canada thistle) IV.1



## RANGE

*Bear Paw Battlefield, Nez Perce National Historical Park*

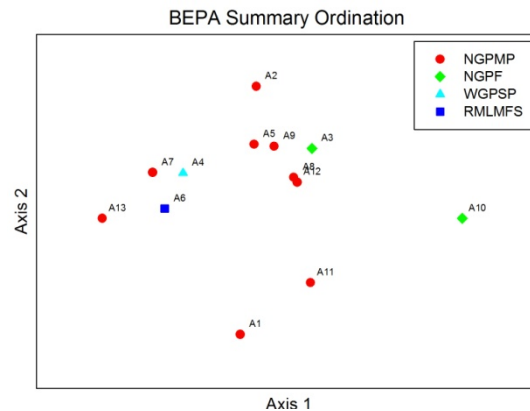
Enter Bear Paw specific data.

*Global*

This willow shrubland community is found along rivers and streams at lower elevations throughout the western United States and Great Plains, ranging sporadically from Oklahoma northwest to the Dakotas and Manitoba, into the Rocky Mountains of Colorado, Wyoming, Montana and Idaho, west to Washington, and south to the Rio Grande, and northern New Mexico.

## COMMENTS

This community type originates after high flow events that create new deposits or scour existing alluvial material and create new areas on which it can develop. Once established, without further flooding disturbance and sediment deposition, this community may not exist for more than 10-20 years before it is replaced by a later seral stage.



### Description

This vegetation class is characterized by a moderate to dense herbaceous layer which is strongly dominated by *Agropyron cristatum*. Crested wheatgrass is a perennial bunchgrass from the plains of Siberia and it is often considered to be a naturalized species. It forms nearly monotypic stands with very little species diversity. Other non-native herbaceous species may occur in this community as well, especially in areas with soil disturbance, but they generally contribute very little total cover. Native species, which may be present sporadically with very low cover values, include the shrubs *Symphoricarpos occidentalis* and *Rosa woodsii*, and grasses such as *Poa pratensis*, *Bromus arvensis*, *Hesperostipa comata*, and *Nassella viridula*. Forbs are highly variable and contribute very little to the total cover of the community.

This introduced grassland generally occurs because it has been planted into rangelands and pastures to improve forage production and it is well suited to the cold, semi-arid conditions of higher elevation rangelands. Consequently, stands can occur in a wide variety of anthropogenically -disturbed habitats, including highway rights-of-way, revegetation projects, fire scars, etc. and its distribution does not appear to be tightly constrained by soil texture/depth, topography, or moisture availability.

CONSERVATION RANK N/A

DATABASE CODE N/A

### CHARACTERISTIC SPECIES (n = 2, xx)

#### Tree

None

#### Shrub

*Symphoricarpos occidentalis* (western snowberry) III.8

#### Dwarf-shrub

*Rosa woodsii* (Woods' rose) V.1

#### Graminoid

*Agropyron cristatum* (crested wheatgrass) V.25, *Poa pratensis* (Kentucky bluegrass) V.8, *Bromus arvensis* (field brome) V.3, *Hesperostipa comata* (needle and thread) V.1, *Nassella viridula* (green needlegrass) V.1

#### Forb

*Medicago sativa* (alfalfa) V.2, *Sphaeralcea coccinea* (scarlet globemallow) V.1, *Taraxacum officinale* (common

dandelion) V.<1, *Tragopogon dubius* (yellow salsify) V.<1, *Thermopsis rhombifolia* (prairie thermopsis) III.8, *Selaginella densa* (lesser spikemoss) III.3

## RANGE

*Bear Paw Battlefield, Nez Perce National Historical Park*

Enter Bear Paw specific data.

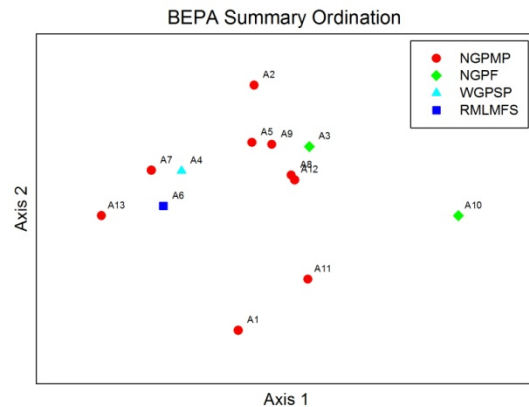
*Global*

The Crested Wheatgrass Semi-natural Herbaceous Alliance is found in Utah, Montana, Wyoming, Idaho, and North and South Dakota, and in Canada in Manitoba and Saskatchewan.

## COMMENTS

*Agropyron cristatum* has been planted into pastures and rangelands to improve forage production and is well suited to the cold, semi-arid conditions of the Great Basin, northwestern Great Plains and higher elevation rangeland in more southern latitudes, facilitating its persistence and spread. As crested wheatgrass becomes abundant in the herbaceous understory, native species, including sagebrush, decline in importance, eventually resulting in monotypic crested wheatgrass stands. The persistence and competitive advantage of crested wheatgrass over native species appears to be a function of very high propagule pressure.

This association was not recognized in the National Vegetation Classification (NVC) and had not been documented or described by NatureServe (2011) at the time this document was produced. Therefore, the plant community description is based on limited data from the Bear Paw Battlefield and related plant communities that have been previously described. The descriptions provided herein may vary slightly from similar plant communities found elsewhere due to the local scale at which data were collected and the lack of a published standard in the NVC.



### Description

This vegetation class is characterized by a moderate to dense herbaceous layer which is strongly dominated by *Elymus repens*. Quackgrass is a perennial bunchgrass from the Mediterranean. It may occur with other native and non-native graminoids species including; *Carex duriuscula*, *Agropyron cristatum*, *Poa pratensis*, *Carex pellita*, and *Pascopyrum smithii*, but stands tend to have very little species diversity. Native shrubs may be present, but occur sporadically with very low cover values and include; *Symphoricarpos occidentalis*, *Artemisia ludoviciana* and *Rosa woodsii*. Forbs may include both native and non-native species such as *Cirsium arvense*, *Glycyrrhiza lepidota*, *Symphyotrichum falcatum*, *Polygonum amphibium*, and *Rumex* sp. However, forbs are highly variable in terms of species composition and contribute very little to the total cover of the community.

This introduced grassland generally occurs because the dominant species is aggressive, difficult to control, and well suited to the cooler, often moist conditions of most rangelands across the US. Consequently, stands can occur in a wide variety of anthropogenically-disturbed habitats, especially cropland, rangeland, pasture, lawns, and home gardens.

CONSERVATION RANK N/A

DATABASE CODE A.2658

### CHARACTERISTIC SPECIES (n = 1, xx )

#### Tree

None

#### Shrub

*Symphoricarpos occidentalis* (western snowberry) V.<1

#### Dwarf-shrub

*Artemisia ludoviciana* (white sagebrush) V.<1, *Rosa woodsii* (Woods' rose) V.<1

#### Graminoid

*Elymus repens* (quackgrass) V.35, *Carex duriuscula* (needleleaf sedge) V.15, *Poa pratensis* (Kentucky bluegrass) V.15, *Pascopyrum smithii* (western wheatgrass) V.10, *Agropyron cristatum* (crested wheatgrass) V.5, *Carex pellita* (woolly sedge) V.2

#### Forb

*Cirsium arvense* (Canada thistle) V.1, *Polygonum amphibium* (water knotweed) V.1, *Asclepias* spp. (milkweed)

## Northwestern Great Plains Mixedgrass Prairie

V.<1, *Glycyrrhiza lepidota* (American licorice) V.<1, *Rumex crispus* (curly dock) V.<1, *Rumex salicifolius* (willow dock) V.<1, *Symphyotrichum falcatum* (white prairie aster) V.<1

### RANGE

*Bear Paw Battlefield, Nez Perce National Historical Park*

Enter Bear Paw specific data.

*Global*

Introduced from the Mediterranean area, quackgrass is common across much of North America, where it has adapted well to moist soils and cooler climates.

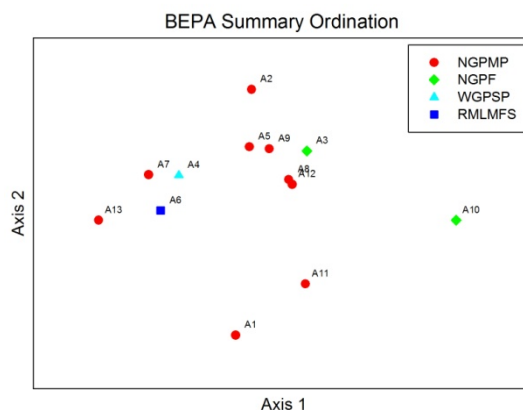
### COMMENTS

Quackgrass is difficult to control and is known for its ability to reduce productivity in crops, rangeland, and pasture.



## Needle-and-Thread – Blue Grama – Threadleaf Sedge Herbaceous Vegetation

*Hesperostipa comata* – *Bouteloua gracilis* – *Carex filifolia* Herbaceous Vegetation



### Description

The vegetation of this community type is dominated by moderately dense graminoids. *Hesperostipa comata* is the tallest of the dominant species, with the rhizomatous graminoids, *Bouteloua gracilis* and *Carex filifolia*, occurring as the other two co-dominant species. *Koeleria macrantha* cover increases on degraded sites. *Pascopyrum smithii* is consistently present. *Nassella viridula*, *Muhlenbergia cuspidata*, and *Elymus lanceolatus* may also be locally abundant. For woody species, subshrub forms (*Artemisia frigida*, *Gutierrezia sarothrae*, *Rosa arkansana*) have the highest constancy but their total cover is very low, except on overgrazed sites. Cover values for forbs are low throughout the range of the type (the exception being *Selaginella densa*). Geographic setting does influence forb composition to some degree. *Sphaeralcea coccinea*, *Phlox hoodii*, *Pediomelum argophyllum*, *Tetrameuris acaulis*, *Symphotrichum falcatum*, *Heterotheca villosa*, *Gaura coccinea*, *Lygodesmia juncea*, and *Opuntia polyacantha*, all have the potential to occur in this vegetation type.

Stands occur on flat to rolling topography with deep sandy loam to loam soils. They are typically associated with uplands, though they may also occur lower in the landscape, such as coulee and draw bottoms, if soils are sufficiently coarse.

CONSERVATION RANK G5

DATABASE CODE Cegl002037

CHARACTERISTIC SPECIES (n = 4, xx)

Tree

None

Shrub

None

Dwarf-shrub

*Artemisia frigida* (prairie sandwort) V.2

Graminoid

*Hesperostipa comata* (needle and thread) V.18, *Elymus lanceolatus* (thickspike wheatgrass) V.5, *Carex filifolia* (threadleaf sedge) V.4, *Muhlenbergia cuspidata* (plains muhly) V.1, *Bouteloua gracilis* (blue grama) IV.6, *Pascopyrum smithii* (western wheatgrass) IV.3, *Koeleria macrantha* (prairie Junegrass) IV.2, *Nassella viridula* (green needlegrass) IV.1

**Forb**

*Pedimelum argophyllum* (silverleaf Indian breadroot) V.8, *Phlox hoodii* (Hood's phlox) V.5, *Selaginella densa* (lesser spikemoss) IV.7, *Sphaeralcea coccinea* (scarlet globemallow) IV.1, *Symphyotrichum falcatum* (white prairie aster) IV.1, *Tetraneuris acaulis* (stemless four-nerve daisy) IV.1

**RANGE**

*Bear Paw Battlefield, Nez Perce National Historical Park*

Enter Bear Paw specific data.

*Global*

This needlegrass - grama grass prairie community type is common in the northern and central Great Plains of the United States and Canada, ranging from Manitoba west to Alberta, south to Kansas and possibly into Colorado.

**COMMENTS**

This association could be considered one of the most common plant associations in the Northern Great Plains. It often occurs in a matrix or large patch pattern and can be frequently found dominating entire landscapes.



## Appendix E - Plant Species List for NEPE

[Source: UCBN 2008]

Family	Scientific Name	Common Name
_Unassigned Plantae	Cucgiruyn ubttbys	CHICORY
Alismataceae	Alisma plantago-aquatica	American waterplantain
Apiaceae	Anthriscus caucalis	burr chervil
Apiaceae	Conium maculatum	POISON HEMLOCK
Apiaceae	Daucus carota	QUEEN ANNE'S LACE
Apiaceae	Heracleum maximum	common cowparsnip, cow parsnip, cowparsnip
Apiaceae	Lomatium bicolor var. leptocarpum	Wasatch desert parsley, Wasatch desertparsley, Wasatch lomatium
Apiaceae	Lomatium cous	cous biscuitroot, Cous' biscuitroot, cous-root desert-parsley
Apiaceae	Lomatium dissectum	chocolate-tips, desert parsley, fernleaf biscuitroot
Apiaceae	Lomatium macrocarpum	Desert parsley
Apiaceae	Lomatium serpentinum	sweetscented biscuitroot
Apiaceae	Lomatium triternatum	nineleaf biscuitroot
Apiaceae	Lomatium triternatum var. anomalum	broadnineleaf biscuitroot
Apiaceae	Perideridia gairdneri	common yampah, Gardner's yampah, Indian caraway
Apiaceae	Sium suave	common waterparsnip, hemlock waterparsnip, hemlock water-parsnip
Apiaceae	Tauschia tenuissima	Leiberg's umbrellawort
Araliaceae	Hedera helix	English ivy
Lemnaceae	Lemna minor	common duckweed, least duckweed, lesser duckweed
Asteraceae	Achillea millefolium	Western Yarrow, Yarrow
Asteraceae	Ambrosia trifida	Ragweed
Asteraceae	Antennaria lanata	woolly pussytoes
Asteraceae	Antennaria parvifolia	Pussy-toes
Asteraceae	Anthemis cotula	chamomile, dog fennel, dogfennel
Asteraceae	Arctium minus	bardane, beggar's button, burdock
Asteraceae	Arnica cordifolia	Arnica
Asteraceae	Arnica fulgens	Arnica
Asteraceae	Artemisia cana	Sagebrush
Asteraceae	Artemisia douglasiana	Douglas' mugwort, Douglas' sagewort
Asteraceae	Artemisia frigida	Pasture sage, Pasture sagebrush
Asteraceae	Artemisia ludoviciana	Prairie sagebrush
Asteraceae	Balsamorhiza sagittata	ARROWLEAF BALSAMROOT
Asteraceae	Brickellia microphylla	littleleaf brickellbush
Asteraceae	Carduus nutans	Musk thistle

<b>Family</b>	<b>Scientific Name</b>	<b>Common Name</b>
Asteraceae	<i>Centaurea biebersteinii</i>	spotted knapweed
Asteraceae	<i>Centaurea cyanus</i>	bachelor's button, cornflower, garden cornflower
Asteraceae	<i>Centaurea solstitialis</i>	YELLOW STAR-THISTLE, YELLOW STAR-THISTLE
Asteraceae	<i>Chaenactis douglasii</i>	DOUGLAS CHOENACTIS
Asteraceae	<i>Chondrilla juncea</i>	hogbite, rush skeletonweed, skeletonweed
Asteraceae	<i>Chrysopsis villosa</i>	Golden aster
Asteraceae	<i>Chrysothamnus nauseosus</i>	RUBBER RABBITBRUSH
Asteraceae	<i>Chrysothamnus viscidiflorus</i>	Douglas rabbitbrush, Douglas' rabbitbrush, green rabbitbrush
Asteraceae	<i>Cichorium intybus</i>	CHICORY
Asteraceae	<i>Cirsium arvense</i>	Canada thistle
Asteraceae	<i>Cirsium scariosum</i>	Elk thistle
Asteraceae	<i>Cirsium undulatum</i>	gray thistle, wavyleaf thistle, wavy-leaf thistle
Asteraceae	<i>Cirsium vulgare</i>	BULL THISTLE
Asteraceae	<i>Conyza canadensis</i>	Canada horseweed, Canadian horseweed, horseweed
Asteraceae	<i>Crepis atriobarba</i>	hawksbeard, slender hawksbeard
Asteraceae	<i>Crepis intermedia</i>	gray hawksbeard, limestone hawksbeard
Asteraceae	<i>Ericameria nauseosa</i>	goldenbush, rubber rabbitbrush
Asteraceae	<i>Erigeron corymbosus</i>	longleaf fleabane
Asteraceae	<i>Erigeron engelmannii</i>	Plains daisy
Asteraceae	<i>Erigeron strigosus</i>	Fleabane
Asteraceae	<i>Gaillardia aristata</i>	Blanket flower
Asteraceae	<i>Gnaphalium palustre</i>	cudweed, lowland cudweed, marsh everlasting
Asteraceae	<i>Grindelia squarrosa</i>	CURLEY CUP GUMWEED, Curly cup gumplant
Asteraceae	<i>Gutierrezia sarothrae</i>	Matchbrush
Asteraceae	<i>Haplopappus armerioides</i>	Goldenweed
Asteraceae	<i>Haplopappus spinulosus</i>	cutleaf ironplant, ironplant, lacy tansyaster
Asteraceae	<i>Helianthella uniflora</i>	oneflower helianthella
Asteraceae	<i>Helianthus annuus</i>	COMMON SUNFLOWER
Asteraceae	<i>Helianthus giganteus</i>	giant sunflower
Asteraceae	<i>Hieracium aurantiacum</i>	orange hawkweed
Asteraceae	<i>Hieracium cynoglossoides</i>	houndstongue hawkweed
Asteraceae	<i>Lactuca serriola</i>	PRICKLY LETTUCE
Asteraceae	<i>Leucanthemum vulgare</i>	oxeye daisy, ox-eye daisy, oxeyedaisy
Asteraceae	<i>Liatis punctata</i>	Gayfeather, Gay-feather
Asteraceae	<i>Logfia arvensis</i>	field cottonrose

<b>Family</b>	<b>Scientific Name</b>	<b>Common Name</b>
Asteraceae	<i>Lygodesma juncea</i>	Skeleton-weed, rush-pink
Asteraceae	<i>Madia glomerata</i>	cluster tarweed, mountain tarplant, mountain tarweed
Asteraceae	<i>Madia gracilis</i>	grassy tarweed, slender tarweed
Asteraceae	<i>Matricaria discoidea</i>	disc mayweed, pineapple weed, pineappleweed
Asteraceae	<i>Onopordum acanthium</i>	SCOTCH THISTLE
Asteraceae	<i>Packera cana</i>	woolly groundsel
Asteraceae	<i>Ratibida columnifera</i>	Prairie coneflower, prairie coneflower (upright), prairieconeflower
Asteraceae	<i>Rudbeckia occidentalis</i>	western coneflower
Asteraceae	<i>Senecio hydrophiloides</i>	tall groundsel, tall groundwel
Asteraceae	<i>Senecio integerrimus</i>	lambstongue groundsel, lambstongue ragwort, lamb-tongue ragwort
Asteraceae	<i>Solidago canadensis</i>	Canada goldenrod, Canadian goldenrod, common goldenrod
Asteraceae	<i>Solidago missouriensis</i>	Low goldenrod
Asteraceae	<i>Solidago rigida</i>	Stiff goldenrod
Asteraceae	<i>Symphyotrichum lanceolatum</i> ssp. <i>hesperium</i>	white panicle aster
Asteraceae	<i>Symphyotrichum spathulatum</i> var. <i>intermedium</i>	larger western mountain aster
Asteraceae	<i>Tanacetum vulgare</i>	common tansy, garden tansy, tansy
Asteraceae	<i>Taraxacum officinale</i>	COMMON DANDELION
Asteraceae	<i>Tragopogon dubius</i>	SALSIFY GOATS BEARD
Asteraceae	<i>Tragopogon pratensis</i>	Salsify
Asteraceae	<i>Wyethia amplexicaulis</i>	mule-ears, mulesear wyethia, mule'sear wyethia
Asteraceae	<i>Xanthium strumarium</i>	cocklebur, cocklebur, common cocklebur
Campanulaceae	<i>Campanula rotundifolia</i>	Bellflower, Harebell
Campanulaceae	<i>Downingia elegans</i>	elegant calicoflower
Campanulaceae	<i>Triodanis perfoliata</i>	Venus' looking glass
Brassicaceae	<i>Alyssum alyssoides</i>	ALYSSUM
Brassicaceae	<i>Arabidopsis thaliana</i>	mouseear cress, mouse-ear cress
Brassicaceae	<i>Arabis glabra</i>	tower rockcress, tower-mustard
Brassicaceae	<i>Barbarea orthoceras</i>	American yellowrocket, erectpod wintercress, wintercress
Brassicaceae	<i>Camelina microcarpa</i>	false flax, littlepod false flax, little-pod false flax
Brassicaceae	<i>Capsella bursa-pastoris</i>	SHEPARD'S PURSE
Brassicaceae	<i>Cardaria draba</i>	Hoary Cress
Brassicaceae	<i>Descurainia incana</i> ssp.	mountain tansy mustard, mountain

Family	Scientific Name	Common Name
	incisa	tansymustard
Brassicaceae	Descurainia pinnata	TANSY MUSTARD
Brassicaceae	Draba verna	spring draba, spring Whitlowgrass
Brassicaceae	Erysimum capitatum var. capitatum	plains wallflower, prairie rocket, sanddune wallflower
Brassicaceae	Lepidium perfoliatum	PEPPERWEED
Brassicaceae	Lepidium virginicum	peppergrass, poorman pepperweed, poorman's pepper
Brassicaceae	Rorippa nasturtium-aquaticum	WATER CRESS
Brassicaceae	Sisymbrium altissimum	TUMBLE MUSTARD
Brassicaceae	Sisymbrium officinale	hairypod hedgemustard, hedge mustard, hedge tumbledustard
Brassicaceae	Thelypodium laciniatum	cutleaf thelypody
Brassicaceae	Thlaspi arvense	FIELD PENNY CRESS. penny-cress mustard
Amaranthaceae	Amaranthus retroflexus	careless weed, Pigweed, redroot amaranth
Cactaceae	Coryphantha vivipara	Prickly pear
Cactaceae	Mammillaria vivipara	Pincushion cactus
Cactaceae	Opuntia polyacantha	Prickly pear
Caryophyllaceae	Arenaria congesta	Sandwort
Caryophyllaceae	Arenaria serpyllifolia	thymeleaf sandwort
Caryophyllaceae	Cerastium arvense	Chickweed, mouse-ear chickweed
Caryophyllaceae	Cerastium glomeratum	sticky chickweed
Caryophyllaceae	Dianthus armeria	GRASS PINK
Caryophyllaceae	Holosteum umbellatum	jagged chickweed
Caryophyllaceae	Lychnis alba	Bladder campion
Caryophyllaceae	Lychnis coronaria	rose campion
Caryophyllaceae	Silene antirrhina	catchfly, sleepy campion, sleepy catchfly
Caryophyllaceae	Silene latifolia ssp. alba	bladder campion, bladder-campion, evening lychnis
Caryophyllaceae	Silene spaldingii	Spalding's silene
Caryophyllaceae	Stellaria calycantha	northern chickweed, northern starwort
Caryophyllaceae	Stellaria media	chickweed, common chickweed, nodding chickweed
Chenopodiaceae	Chenopodium album	LAMBSQUARTER
Chenopodiaceae	Kochia scoparia	common kochia, fireweed, kochia
Chenopodiaceae	Krascheninnikovia lanata	winterfat
Chenopodiaceae	Salsola kali	prickly Russian thistle, russian thistle, tumbleweed
Portulacaceae	Claytonia arenicola	sand springbeauty
Portulacaceae	Claytonia perfoliata	miners lettuce, miner's lettuce, minerslettuce
Portulacaceae	Montia linearis	narrowleaf Indianlettuce, narrowleaf minerslettuce, narrowleaf miner'slettuce

<b>Family</b>	<b>Scientific Name</b>	<b>Common Name</b>
Portulacaceae	Montia perfoliata	MINER'S LETTUCE
Portulacaceae	Portulaca oleracea	akulikuli-kula, common purslane, duckweed
Cornaceae	Cornus stolonifera	red-osier dogwood
Cyperaceae	Carex angustata	common meadow sedge, widefruit sedge
Cyperaceae	Carex aquatilis	water sedge
Cyperaceae	Carex athrostachya	slenderbeak sedge, slender-beak sedge
Cyperaceae	Carex duriuscula	needleleaf sedge, spike-rush sedge
Cyperaceae	Carex filifolia	threadleaf sedge
Cyperaceae	Carex microptera	ovalhead sedge, smallwing sedge
Cyperaceae	Carex pachystachya	chamisso sedge, thickhead sedge
Cyperaceae	Carex pellita	woolly sedge
Cyperaceae	Carex praticola	meadow sedge, northern meadow sedge
Cyperaceae	Carex utriculata	Northwest Territory sedge
Cyperaceae	Carex vulpinoidea	common fox sedge, fox sedge
Cyperaceae	Eleocharis bolanderi	Bolander's spikerush
Cyperaceae	Eleocharis palustris	common spikerush, creeping spikerush, spikesedge
Cyperaceae	Schoenoplectus tabernaemontani	great bulrush, softstem bulrush, soft-stem bulrush
Cyperaceae	Scirpus acutus	hardstem bulrush
Poaceae	Achnatherum hymenoides	Indian ricegrass
Poaceae	Achnatherum occidentale	western needlegrass
Poaceae	Aegilops cylindrica	GOAT GRASS
Poaceae	Agropyron cristatum	crested wheat grass, crested wheatgrass
Poaceae	Agropyron dasystachyum	Thickspike wheatgrass
Poaceae	Agropyron desertorum	clustered wheat grass, desert wheatgrass
Poaceae	Agropyron spicatum	Bluebunch wheatgrass
Poaceae	Agrostis exarata	spike bentgrass
Poaceae	Agrostis gigantea	black bent, redtop, water bentgrass
Poaceae	Agrostis scabra	rough bent, rough bentgrass, ticklegrass
Poaceae	Agrostis stolonifera	carpet bentgrass, creeping bent, creeping bentgrass
Poaceae	Alopecurus aequalis	short foxtail, shortawn foxtail, short-awn meadow-foxtail
Poaceae	Alopecurus geniculatus	marsh meadow-foxtail, water foxtail
Poaceae	Alopecurus pratensis	field meadow-foxtail, meadow foxtail
Poaceae	Andropogon scoparius	Little bluestem
Poaceae	Apera interrupta	dense silkybent, dense silky-bent, silky bentgrass
Poaceae	Aristida longiseta	RED THREEAWN
Poaceae	Avena fatua	flaxgrass, oatgrass, wheat oats

<b>Family</b>	<b>Scientific Name</b>	<b>Common Name</b>
Poaceae	<i>Bouteloua curtipendula</i>	sideoats grama
Poaceae	<i>Bouteloua gracilis</i>	blue grama
Poaceae	<i>Bromus briziformis</i>	rattlesnake brome
Poaceae	<i>Bromus ciliatus</i>	fringed brome
Poaceae	<i>Bromus hordeaceus</i> ssp. <i>hordeaceus</i>	downy brome, soft brome
Poaceae	<i>Bromus inermis</i>	awnless brome, smooth brome
Poaceae	<i>Bromus japonicus</i>	JAPANESE BROME
Poaceae	<i>Bromus mollis</i>	SOFT CHESS
Poaceae	<i>Bromus rigidus</i>	RIPGUT BROME
Poaceae	<i>Bromus sterilis</i>	barren brome, poverty brome, sterile brome
Poaceae	<i>Bromus tectorum</i>	CHEAT GRASS, CHEATGRASS, DOWNY BROME
Poaceae	<i>Buchloe dactyloides</i>	buffalograss
Poaceae	<i>Calamagrostis montanensis</i>	plains reedgrass
Poaceae	<i>Cynosurus echinatus</i>	DOGTAIL
Poaceae	<i>Dactylis glomerata</i>	ORCHARD GRASS
Poaceae	<i>Danthonia californica</i>	California oatgrass
Poaceae	<i>Deschampsia caespitosa</i>	tufted hairgrass
Poaceae	<i>Deschampsia danthonioides</i>	annual hairgrass
Poaceae	<i>Dichanthelium acuminatum</i> var. <i>fasciculatum</i>	Huachuca panic, tapered rosette grass, western panicgrass
Poaceae	<i>Digitaria sanguinalis</i>	crabgrass, hairy crab grass, hairy crabgrass
Poaceae	<i>Echinochloa crusgalli</i>	Barnyard grass
Poaceae	<i>Elymus caninus</i>	Slender wheatgrass
Poaceae	<i>Elymus repens</i>	quackgrass
Poaceae	<i>Festuca altaica</i>	Altai fescue, rough fescue
Poaceae	<i>Festuca idahoensis</i>	Idaho fescue
Poaceae	<i>Festuca ovina</i>	sheep fescue
Poaceae	<i>Festuca rubra</i>	RED FISCUE
Poaceae	<i>Glyceria occidentalis</i>	northwestern mannagrass, western mannagrass
Poaceae	<i>Hordeum jubatum</i>	FOXTAIL BARLEY
Poaceae	<i>Hordeum leporinum</i>	Charming barley
Poaceae	<i>Hordeum murinum</i>	Foxtail barley
Poaceae	<i>Koeleria macrantha</i>	junegrass, prairie Junegrass
Poaceae	<i>Leymus cinereus</i>	Giant wildrye
Poaceae	<i>Lolium arundinaceum</i>	<i>Lolium arundinaceum</i> , tall fescue
Poaceae	<i>Lolium perenne</i>	Italian ryegrass, perennial rye grass,

Family	Scientific Name	Common Name
		perennial ryegrass
Poaceae	Miscanthus sinensis	Chinese silvergrass, eulalia
Poaceae	Nardus stricta	Matgrass
Poaceae	Nassella viridula	green needlegrass
Poaceae	Panicum capillare	annual witchgrass, common panic grass, common witchgrass
Poaceae	Panicum scribnerianum	Scribner witchgrass
Poaceae	Pascopyrum smithii	pubescent wheatgrass, western wheatgrass
Poaceae	Phalaris arundinacea	REED CANARY GRASS
Poaceae	Phleum pratense	COMMON TIMOTHY, TIMOTHY
Poaceae	Poa annua	ANNUAL BLUEGRASS
Poaceae	Poa bulbosa	BULBOUS POA
Poaceae	Poa compressa	CANADA BLUEGRASS
Poaceae	Poa cusickii	Cusick's bluegrass
Poaceae	Poa nemoralis ssp. interior	inland bluegrass
Poaceae	Poa pratensis	KENTUCKY BLUEGRASS
Poaceae	Poa secunda	big bluegrass, Sandberg bluegrass, Sandberg's bluegrass
Poaceae	Polypogon monspeliensis	Annual beardgrass
Poaceae	Psathyrostachys juncea	Russian wildrye, Russian-wild rye
Poaceae	Pseudoroegneria spicata	bluebunch wheatgrass, bluebunch-wheat grass
Poaceae	Secale cereale	cereal rye, common rye, Cultivated annual rye
Poaceae	Setaria viridis	bottle grass, green bristle grass, green bristlegrass
Poaceae	Sitanion hystrix	SQUIRREL TAIL
Poaceae	Sorghum halepense	Johnsongrass
Poaceae	Sporobolus cryptandrus	sand dropseed
Poaceae	Stipa comata	Needle and thread
Poaceae	Taeniatherum caput-medusae	medusahead, medusahead rye
Poaceae	Thinopyrum intermedium	intermediate wheatgrass
Poaceae	Thinopyrum ponticum	Wheatgrass
Poaceae	Ventenata dubia	North Africa grass, ventenata
Poaceae	Vulpia myuros	foxtail fescue, rattail fescue, rat-tail fescue
Caprifoliaceae	Kolkwitzia amabilis	beautybush
Caprifoliaceae	Lonicera japonica	Honeysuckle
Caprifoliaceae	Sambucus cerulea	BLUE ELDERBERRY, BLUEBERRY ELDER
Caprifoliaceae	Sambucus nigra ssp. cerulea	blue elderberry, elderberry
Caprifoliaceae	Symphoricarpos albus	COMMON SNOWBERRY



<b>Family</b>	<b>Scientific Name</b>	<b>Common Name</b>
Caprifoliaceae	Symphoricarpos occidentalis	Snowberry
Dipsacaceae	Dipsacus fullonum	Common Teasel
Dipsacaceae	Dipsacus sylvestris	TEASEL
Valerianaceae	Plectritis macrocera	longhorn plectritis, white cornsalad
Valerianaceae	Valerianella locusta	European corn-salad
Equisetaceae	Equisetum arvense	field horsetail, scouring rush, western horsetail
Equisetaceae	Equisetum fluviatile	WATER HORSETAIL
Equisetaceae	Equisetum hyemale	horsetail, scouring horsetail, scouringrush
Monotropaceae	Monotropa hypopithys	many-flower Indian-pipe, pinesap
Fabaceae	Astragalus bisulcatus	Loco weed
Fabaceae	Astragalus canadensis	Milkvetch
Fabaceae	Astragalus crassicaulus	Buffalo plum locoweed
Fabaceae	Astragalus drummondii	Loco weed
Fabaceae	Astragalus gilviflorus	Loco weed
Fabaceae	Astragalus inflexus	bent milkvetch
Fabaceae	Astragalus pectinatus	Loco weed
Fabaceae	Gleditsia triacanthos	common honeylocust, Honey locust, honeylocust
Fabaceae	Glycyrrhiza lepidota	Licorice root
Fabaceae	Lotus purshianus	SPANISH CLOVER
Fabaceae	Lotus unifoliolatus var. unifoliolatus	American bird's-foot trefoil, American bird's-foot-trefoil, prairie trefoil
Fabaceae	Lupinus arbustus ssp. pseudoparviflorus	false lupine, longspur lupine
Fabaceae	Lupinus sericeus	Pursh's silky lupine, silky lupine
Fabaceae	Lupinus wyethi	Prairie lupine, Prairie, silvery lupine
Fabaceae	Medicago lupulina	black medic, black medic clover, black medick
Fabaceae	Medicago sativa	ALFALFA, MEDIC
Fabaceae	Melilotus alba	White sweet clover
Fabaceae	Melilotus officinalis	YELLOW SWEET CLOVER, YELLOW SWEETCLOVER
Fabaceae	Pedimelum argophyllum	silverleaf Indian breadroot, silverleaf scurfpea
Fabaceae	Petalostemon candidus	
Fabaceae	Petalostemon purpureus	Purple prairie clover
Fabaceae	Psoralea tenuiflorum	scurfpea, slimflower scurfpea
Fabaceae	Robinia hispida	bristly locust, rose acacia, roseacacia
Fabaceae	Robinia pseudoacacia	BLACK LOCUST
Fabaceae	Thermopsis rhombifolia	False lupine
Fabaceae	Trifolium aureum	golden clover
Fabaceae	Trifolium beckwithii	Red clover

<b>Family</b>	<b>Scientific Name</b>	<b>Common Name</b>
Fabaceae	<i>Trifolium campestre</i>	Field (Big-hop) clover, field clover, large hop clover
Fabaceae	<i>Trifolium plumosum</i>	plumed clover
Fabaceae	<i>Trifolium pratense</i>	RED CLOVER
Fabaceae	<i>Trifolium repens</i>	Dutch clover, ladino clover, white clover
Fabaceae	<i>Vicia americana</i>	American deervetch, american purple vetch, American vetch
Fabaceae	<i>Vicia angustifolia</i>	garden vetch
Fabaceae	<i>Vicia sativa</i>	Vetch
Fabaceae	<i>Vicia villosa</i>	HAIRY VETCH, WOLLY VETCH, WOOLY VETCH
Betulaceae	<i>Alnus rhombifolia</i>	WHITE ALDER
Betulaceae	<i>Betula pendula</i>	European white birch
Apocynaceae	<i>Vinca major</i>	bigleaf periwinkle, greater periwinkle, periwinkle
Asclepiadaceae	<i>Asclepias speciosa</i>	SHOWY MILKWEED
Gentianaceae	<i>Frasera albicaulis</i>	whitestem elkweed, whitestem fraseria
Gentianaceae	<i>Gentiana calycosa</i>	mountain bog gentian, Rainier pleated gentian
Geraniaceae	<i>Erodium cicutarium</i>	CRANIES BILL, Purple filaree, REDSTEM FILAREE
Geraniaceae	<i>Geranium maculatum</i>	Wild geranium
Geraniaceae	<i>Geranium pusillum</i>	small geranium, small-flower crane's-bill
Platanaceae	<i>Platanus hybrida</i>	London planetree
Juncaceae	<i>Juncus acuminatus</i>	sharp-fruit rush, tapertip rush
Juncaceae	<i>Juncus articulatus</i>	jointed rush, jointleaf rush
Juncaceae	<i>Juncus bufonius</i>	toad rush
Juncaceae	<i>Juncus effusus</i>	common rush, lamp rush
Juncaceae	<i>Juncus ensifolius</i>	swordleaf rush, three-stamened rush
Juncaceae	<i>Juncus tenuis</i>	field rush, path rush, poverty rush
Juncaceae	<i>Luzula campestris</i>	field woodrush
Boraginaceae	<i>Amsinckia lycopoides</i>	bugloss fiddleneck, tarweed fiddleneck
Boraginaceae	<i>Amsinckia menziesii</i> var. <i>menziesii</i>	Menzies' fiddleneck, rigid fiddleneck
Boraginaceae	<i>Amsinckia retrorsa</i>	Fiddleneck tarweed, Harvest Fiddleneck
Boraginaceae	<i>Amsinckia tessellata</i>	bristly fiddleneck, western fiddleneck
Boraginaceae	<i>Asperugo procumbens</i>	Catchweed
Boraginaceae	<i>Buglossoides arvensis</i>	corn gromwell, corn-gromwell, field gromwell
Boraginaceae	<i>Cryptantha torreyana</i>	Torrey's cat's-eye, Torreys cryptantha, Torrey's cryptantha
Boraginaceae	<i>Cynoglossum officinale</i>	COMMON HOUND'S TONGUE, HOUND'S TONGUE
Boraginaceae	<i>Lithospermum ruderales</i>	Gromwell, PUCCOON

<b>Family</b>	<b>Scientific Name</b>	<b>Common Name</b>
Boraginaceae	Myosotis discolor	changing forget-me-not, yellowandblue forget-me-not
Boraginaceae	Myosotis stricta	strict forget me not, strict forget-me-not
Lamiaceae	Agastache urticifolia	horsemint giant hyssop, nettleleaf giant hyssop
Lamiaceae	Lamium amplexicaule	HENBIT
Lamiaceae	Lamium purpureum	purple deadnettle, red deadnettle
Lamiaceae	Leonurus cardiaca	common motherwort, motherwort
Lamiaceae	Lycopus americanus	American bugleweed, American water horehound, American waterhorehound
Lamiaceae	Marrubium vulgare	HOREHOUND
Lamiaceae	Melissa officinalis	Lemon balm
Lamiaceae	Mentha arvensis	field mint, wild mint
Lamiaceae	Mentha spicata	bush mint (spearmint), spearmint
Lamiaceae	Monarda bradburiana	Wild bergamot
Lamiaceae	Nepeta cataria	catmint, catnip, catwort
Lamiaceae	Physostegia parviflora	false dragonhead, western false dragonhead
Lamiaceae	Prunella vulgaris	common selfheal, heal all, healall
Lamiaceae	Scutellaria angustifolia	NARROW LEAVED SKULLCAP
Verbenaceae	Verbena bracteata	Wooly verbena
Agavaceae	Yucca glauca	beargrass, Great Plains yucca, small soapweed
Iridaceae	Olsynium douglasii var. douglasii	Douglas' blue-eyed grass, Douglas' grasswidow
Iridaceae	Sisyrinchium idahoense	Blue-eyed grass
Iridaceae	Sisyrinchium montanum	Blue-eyed grass
Liliaceae	Allium cernuum	nodding onion
Liliaceae	Brodiaea douglasii	
Liliaceae	Calochortus macrocarpus var. maculosus	Nez Perce mariposa lily
Liliaceae	Camassia quamash	common camas, small camas
Liliaceae	Fritillaria pudica	yellow bells, yellow fritillary, yellow missionbells
Liliaceae	Triteleia grandiflora	largeflower triteleia
Liliaceae	Zigadenus gramineus	Death camas
Liliaceae	Zigadenus paniculatus	Death camas
Liliaceae	Zigadenus venenosus	death camas, meadow deathcamas
Linaceae	Linum perenne	BLUEFLAX
Linaceae	Linum usitatissimum	common flax, cultivated flax
Malvaceae	Malva neglecta	COMMON MALLOW
Malvaceae	Sidalcea oregana	Oregon checkerbloom, Oregon checkermallow
Malvaceae	Sphaeralcea coccinea	Scarlet false mallow, globe mallow

Family	Scientific Name	Common Name
Onagraceae	Epilobium brachycarpum	autumn willowherb, autumn willowweed, tall annual willowherb
Onagraceae	Epilobium ciliatum ssp. ciliatum	coast willowweed, fringed willowherb
Onagraceae	Gaura coccinea	scarlet beeblossom, scarlet gaura, Scarlet guara
Onagraceae	Gaura mollis	velvetweed
Onagraceae	Oenothera biennis	Evening-primrose
Onagraceae	Oenothera nuttallii	Evening primrose
Onagraceae	Oenothera pallida	White-stemmed primrose
Potamogetonaceae	Potamogeton illinoensis	Illinois pondweed
Fumariaceae	Dicentra eximia	Bleeding heart
Cupressaceae	Juniperus chinensis ssp. pfitzeriana	Pfitzer's juniper
Cupressaceae	Juniperus communis	common juniper, dwarf juniper
Cupressaceae	Juniperus occidentalis	Juniper
Cupressaceae	Juniperus sabina ssp. tamariscifolia	
Cupressaceae	Juniperus virginiana	Juniper
Cupressaceae	Platycladus orientalis	oriental arborvitae
Pinaceae	Abies concolor	WHITE FIR
Pinaceae	Picea engelmannii	ENGLEMAN SPRUCE
Pinaceae	Picea glauca	WHITE SPRUCE
Pinaceae	Picea pungens	BLUE SPRUCE
Pinaceae	Picea pungens ssp. glauca	
Pinaceae	Pinus contorta	lodgepole pine, scrub pine, shore pine
Pinaceae	Pinus nigra	AUSTRIAN PINE
Pinaceae	Pinus ponderosa	PONDEROSA PINE
Pinaceae	Pinus sylvestris	SCOTCH PINE
Pinaceae	Pseudotsuga menziesii	DOUGLAS FIR
Pinaceae	Tsuga heterophylla	pacific hemlock, west coast hemlock, western hemlock
Taxodiaceae	Sequoiadendron giganteum	GIANT SEQUOIA
Plantaginaceae	Plantago eriopoda	Fuzzy plantain
Plantaginaceae	Plantago lanceolata	buckhorn plantain, english plantain, lanceleaf Indianwheat
Plantaginaceae	Plantago major	Broad-leaved plantain
Plantaginaceae	Plantago patagonica	Indian wheat
Polygonaceae	Eriogonum heracleoides	parsnipflower buckwheat, Wyeth eriogonum, Wyeth's buckwheat
Polygonaceae	Eriogonum niveum	snow buckwheat
Polygonaceae	Eriogonum strictum	Blue Mountain buckwheat

<b>Family</b>	<b>Scientific Name</b>	<b>Common Name</b>
Polygonaceae	<i>Polygonum amphibium</i>	water knotweed, water smartweed
Polygonaceae	<i>Polygonum aviculare</i>	Knotweed
Polygonaceae	<i>Polygonum bistortoides</i>	American bistort
Polygonaceae	<i>Polygonum coccineum</i>	longroot smartweed
Polygonaceae	<i>Polygonum convolvulus</i>	Ivy bindweed
Polygonaceae	<i>Polygonum douglasii</i>	Douglas knotweed, Douglas' knotweed
Polygonaceae	<i>Polygonum lapathifolium</i>	curltop ladythumb, curlytop knotweed, curlytop smartweed
Polygonaceae	<i>Polygonum majus</i>	
Polygonaceae	<i>Polygonum polygaloides</i> ssp. <i>confertiflorum</i>	denseflower knotweed, fruitleaf knotweed, fruitleaf knowweed
Polygonaceae	<i>Polygonum punctatum</i>	smartweed
Polygonaceae	<i>Polygonum sachalinense</i>	giant knotweed
Polygonaceae	<i>Rumex acetosella</i>	RED SORREL
Polygonaceae	<i>Rumex crispus</i>	CURLY DOC
Polygonaceae	<i>Rumex salicifolius</i>	willow dock
Dryopteridaceae	<i>Woodsia oregana</i>	Oregon cliff fern, Oregon woodsia, western cliff fern
Pteridaceae	<i>Cheilanthes feei</i>	fee lipfern, Fee's lipfern, slender lip fern
Primulaceae	<i>Androsace occidentalis</i>	western rock jasmine, western rockjasmine, western rock-jasmine
Berberidaceae	<i>Mahonia repens</i>	Creeping Oregon grape
Ranunculaceae	<i>Clematis columbiana</i>	Columbian virgin's-bower, rock clematis
Ranunculaceae	<i>Clematis ligusticifolia</i>	virgins bower, virginsbower, virgin'sbower
Ranunculaceae	<i>Delphinium distichum</i>	twospike larkspur
Ranunculaceae	<i>Delphinium nuttallianum</i>	LARKSPUR
Ranunculaceae	<i>Ranunculus alismifolius</i> var. <i>alismifolius</i>	plantainleaf buttercup
Ranunculaceae	<i>Ranunculus aquatilis</i>	water buttercup, whitewater crowfoot
Ranunculaceae	<i>Ranunculus arvensis</i>	FIELD BUTTERCUP
Ranunculaceae	<i>Ranunculus flammula</i>	greater creeping spearwort, spearwort buttercup
Ranunculaceae	<i>Ranunculus orthorhynchus</i>	straightbeak buttercup
Ranunculaceae	<i>Ranunculus sceleratus</i>	BLISTER BUTTERCUP
Ranunculaceae	<i>Ranunculus uncinatus</i>	hooked buttercup, woodland buttercup
Elaeagnaceae	<i>Elaeagnus angustifolia</i>	RUSSIAN OLIVE
Rhamnaceae	<i>Frangula purshiana</i>	Cascara
Vitaceae	<i>Parthenocissus quinquefolia</i>	American ivy, fiveleaved ivy, Virginia creeper
Crassulaceae	<i>Sedum leibergii</i>	Leiberg stonecrop
Grossulariaceae	<i>Ribes aureum</i>	golden currant
Grossulariaceae	<i>Ribes niveum</i>	SNOW GOOSEBERRY

<b>Family</b>	<b>Scientific Name</b>	<b>Common Name</b>
Grossulariaceae	<i>Ribes velutinum</i>	desert gooseberry
Hydrangeaceae	<i>Philadelphus lewisii</i>	Mock Orange, Syringa
Rosaceae	<i>Amelanchier alnifolia</i>	SERVICE BERRY
Rosaceae	<i>Crataegus columbiana</i>	columbia hawthorn
Rosaceae	<i>Crataegus douglasii</i>	BLACK HAWTHORN
Rosaceae	<i>Crataegus laevigata</i>	smooth hawthorn
Rosaceae	<i>Dasiphora floribunda</i>	Potentilla
Rosaceae	<i>Fragaria virginiana</i>	thickleaved wild strawberry, Virginia strawberry, wild strawberry
Rosaceae	<i>Geum macrophyllum</i>	largeleaf avens, large-leaf avens
Rosaceae	<i>Geum triflorum</i>	PRAIRIE SMOKE
Rosaceae	<i>Holodiscus discolor</i>	creambush oceanspray, hillside oceanspray, oceanspray
Rosaceae	<i>Malus fusca</i>	Oregon crabapple
Rosaceae	<i>Physocarpus malvaceus</i>	mallow ninebark
Rosaceae	<i>Potentilla erecta</i>	erect cinquefoil
Rosaceae	<i>Potentilla gracilis</i>	graceful cinquefoil, northwest cinquefoil, slender cinquefoil
Rosaceae	<i>Potentilla recta</i>	roughfruit cinquefoil, sulfur (or erect) cinquefoil, sulfur cinquefoil
Rosaceae	<i>Prunus armeniaca</i>	apricot
Rosaceae	<i>Prunus cerasus</i>	SOUR CHERRY
Rosaceae	<i>Prunus domestica</i>	CULTIVATED PLUM
Rosaceae	<i>Prunus virginiana</i>	COMMON CHOKECHERRY
Rosaceae	<i>Purshia tridentata</i>	antelope bitterbrush
Rosaceae	<i>Rosa acicularis</i>	prickly rose
Rosaceae	<i>Rosa arkansana</i>	Arkansas rose, prairie rose, prairie wildrose
Rosaceae	<i>Rosa canina</i>	DOG ROSE
Rosaceae	<i>Rosa woodsii</i>	WOOD'S ROSE
Rosaceae	<i>Rubus discolor</i>	Blackberry
Rosaceae	<i>Rubus laciniatus</i>	Evergreen blackberry
Rosaceae	<i>Rubus leucodermis</i>	western raspberry, western raspberry, whitebark raspberry
Rosaceae	<i>Rubus nigerrimus</i>	dark raspberry
Rosaceae	<i>Rubus parviflorus</i>	thimbleberry, western thimbleberry
Rosaceae	<i>Sanguisorba minor</i>	SMALL BURNET
Saxifragaceae	<i>Heuchera cylindrica</i>	roundleaf alumroot
Saxifragaceae	<i>Heuchera parviflora</i>	Penny cress
Saxifragaceae	<i>Lithophragma glabrum</i>	bulbous woodlandstar, bulbous woodlandstar, smooth woodlandstar
Saxifragaceae	<i>Lithophragma parviflorum</i>	WOODLAND STAR
Rubiaceae	<i>Cruciata pedemontana</i>	piedmont bedstraw

<b>Family</b>	<b>Scientific Name</b>	<b>Common Name</b>
Rubiaceae	Galium aparine	BEDSTRAW
Rubiaceae	Galium boreale	northern bedstraw
Salicaceae	Populus alba	WHITE POPLAR
Salicaceae	Populus deltoides	common cottonwood, cottonwood, eastern cottonwood
Salicaceae	Populus nigra	black cottonwood, black poplar, Lombardy poplar
Salicaceae	Populus nigra ssp. italica	
Salicaceae	Populus trichocarpa	BLACK COTTONWOOD, Cottonwood
Salicaceae	Salix alba	golden willow, white willow
Salicaceae	Salix exigua	COYOTE WILLOW
Salicaceae	Salix exigua ssp. melanopsis	Dark sandbar willow
Santalaceae	Comandra pallida	False toad-flax
Aceraceae	Acer negundo	ashleaf maple, box elder, boxelder
Aceraceae	Acer platanoides	NORWAY MAPLE
Aceraceae	Acer platanoides var. schwedleri	
Aceraceae	Acer rubrum	RED MAPLE
Aceraceae	Acer saccharinum	SILVER MAPLE
Anacardiaceae	Rhus glabra	SMOOTH SUMAC, SUMAC
Anacardiaceae	Rhus radicans	POISON OAK
Anacardiaceae	Toxicodendron rydbergii	poison ivy, W. Poison ivy, western poison ivy
Simaroubaceae	Ailanthus altissima	AILANTHUS
Zygophyllaceae	Tribulus terrestris	bullhead, caltrop, goathead
Oleaceae	Ligustrum vulgare	European privet, wild privet
Oleaceae	Syringa vulgaris	common lilac
Orobanchaceae	Orobanche fasciculata	Broomrape
Scrophulariaceae	Besseyia rubra	red besseyia, red kittentail
Scrophulariaceae	Besseyia wyomingensis	Kittentail
Scrophulariaceae	Castilleja cusickii	Cusick's Indian paintbrush, Cusick's paintbrush
Scrophulariaceae	Castilleja tenuis	hairy Indian paintbrush, slender paintbrush
Scrophulariaceae	Collinsia parviflora	blue-eyed Mary, littleflower collinsia, maiden blue eyed Mary
Scrophulariaceae	Linaria dalmatica	Dalmatian toadflax, Dalmation toadflax
Scrophulariaceae	Linaria vulgaris	butter and eggs, butterandeggs, flaxweed
Scrophulariaceae	Mimulus guttatus	YELLOW MONKEY-FLOWER
Scrophulariaceae	Penstemon albidus	Beardtongue
Scrophulariaceae	Penstemon deustus	Scorched penstemon
Scrophulariaceae	Penstemon glandulosus	stickystem penstemon
Scrophulariaceae	Penstemon globosus	globe penstemon
Scrophulariaceae	Penstemon nitidus	Beardtongue



<b>Family</b>	<b>Scientific Name</b>	<b>Common Name</b>
Scrophulariaceae	Penstemon palmeri	Palmer penstemon, Palmer's penstemon
Scrophulariaceae	Penstemon procerus	littleflower penstemon, pincushion beardtongue
Scrophulariaceae	Penstemon triphyllus	Riggin's penstemon
Scrophulariaceae	Tonella floribunda	LARGE-FLOWERED TONELLA
Scrophulariaceae	Verbascum blattaria	MOTH MULLEIN
Scrophulariaceae	Verbascum thapsus	FLANNEL MULLEIN
Scrophulariaceae	Veronica anagallis-aquatica	blue water speedwell, water speedwell
Scrophulariaceae	Veronica scutellata	grassleaf speedwell, grass-leaf speedwell, marsh speedwell
Convolvulaceae	Convolvulus arvensis	FIELD BINDWEED, MORNING GLORY
Hydrophyllaceae	Hydrophyllum capitatum	ballhead waterleaf
Hydrophyllaceae	Nemophila breviflora	baby blueeyes, basin nemophila, Great Basin blue-eyes
Hydrophyllaceae	Phacelia hastata	silverleaf phacelia, silver-leaf scorpion-weed, spearhead phacelia
Hydrophyllaceae	Phacelia heterophylla	Scorpion weed
Hydrophyllaceae	Phacelia linearis	Threadleaf, narrowleaf
Polemoniaceae	Collomia linearis	narrowleaf mountaintrumpet, narrow-leaf mountain-trumpet, slenderleaf collomia
Polemoniaceae	Navarretia intertexta	needleleaf navarretia, needle-leaf pincushion-plant
Polemoniaceae	Phlox colubrina	Snake River phlox
Polemoniaceae	Phlox gracilis	slender phlox
Polemoniaceae	Phlox idahonis	Clearwater phlox
Polemoniaceae	Phlox longifolia	longleaf phlox
Solanaceae	Solanum dulcamara	bitter nightshade, bittersweet nightshade, blue nightshade
Solanaceae	Solanum elaeagnifolium	Silverleaf Nightshade
Solanaceae	Solanum triflorum	cutleaf nightshade, cut-leaf nightshade
Clusiaceae	Hypericum perforatum	GOATWEED, KLAMATH WEED GOAT WEED
Sparganiaceae	Sparganium angustifolium	narrowleaf burr reed, narrowleaf burreed, narrowleaf bur-reed
Typhaceae	Typha latifolia	COMMON CAT-TAIL
Cannabaceae	Humulus lupulus	common hop, common hops, hops
Moraceae	Morus alba	WHITE MULBERRY
Ulmaceae	Celtis occidentalis	common hackberry, hackberry, western hackberry
Ulmaceae	Celtis reticulata	NETLEAF HACKBERRY
Ulmaceae	Ulmus pumila	SIBERIAN ELM
Urticaceae	Urtica dioica	STINGING NETTLE
Urticaceae	Urtica dioica ssp.	hoary stinging nettle, slim nettle, stinging

<b>Family</b>	<b>Scientific Name</b>	<b>Common Name</b>
	holosericea	nettle
Cucurbitaceae	Echinocystis lobata	wild balsamapple, wild cucumber, wild mock cucumber
Loasaceae	Mentzelia albicaulis	WHITE-STEMMED MEENTZELIA
Tamaricaceae	Tamarix ramosissima	salt cedar, saltcedar, salt-cedar
Violaceae	Viola arvensis	WILD PANSY
Violaceae	Viola nuttallii	Nuttall violet, Nuttall's violet, yellow prairie violet

## Appendix F - Photo Interpretation Mapping Conventions and Visual Key

### *Nez Perce National Historical Park - Map Units*

This appendix describes the map units for the Nez Perce National Historical Park (NEPE) Vegetation Inventory Project. Its purpose is to:

- Describe the vegetation of each map unit;
- Provide a representative ground photograph/image for each map unit;
- Describe the link between each map unit and the revised U.S. National Vegetation Classification System (NVCS);
- Provide visual examples of each map unit with digital overhead images and delineated overlays.

The map units for NEPE were based on a combination of NVCS plant associations, unique plant stands (i.e., Park Specials), the limitations of the digital imagery, and land use/land cover classes. The vegetation described in this section reflects the classification designed specifically for this project. Non-vegetated and land-use map units are not described in this key but polygon distribution maps are provided. For more information on the development of the mapping convention for NEPE please reference the mapping sections of this report and the digital information (i.e., lookup tables, metadata, etc.) included on the project DVD.

This key uses the physiognomic grouping of each map unit starting with forest and woodland types. Each map unit is fully described by a variety of characteristics and features: (1) common species characteristic of the individual map classes; (2) the NVCS crosswalk (if applicable) to associations and/or alliance(s); (3) a description of the mapping concept, (4) a representative ground photograph; (4) a distribution map for each mapping unit across the study area; and (5) an imagery snapshot with representative polygon outlines on the 2011 National Agriculture Imagery Program (NAIP) true-color basemap. Many of the map unit descriptions rely on the vegetation classification plot data collected in 2010. The sample ground photographs were taken during the 2010 classification plot data collection or during the 2011 accuracy assessment by Northwest Management, Inc. (NMI) field crews.

<b>Map Code</b>	<b><i>Acer negundo</i> Seasonally Flooded Forest Alliance</b>
<b>ACNE</b>	<b>Box-elder Seasonally Flooded Forest Alliance</b>

### Common Species

*Acer negundo*, *Acer saccharinum*, *Crataegus douglasii*, *Prunus domestica*, *Symphoricarpos albus*, *Rubus discolor*, *Maianthemum stellatum*, *Solidago canadensis*, *Bromus inermis*, *Carex microptera*

### NVCS Alliance

- *Acer negundo* Seasonally Flooded Forest Alliance

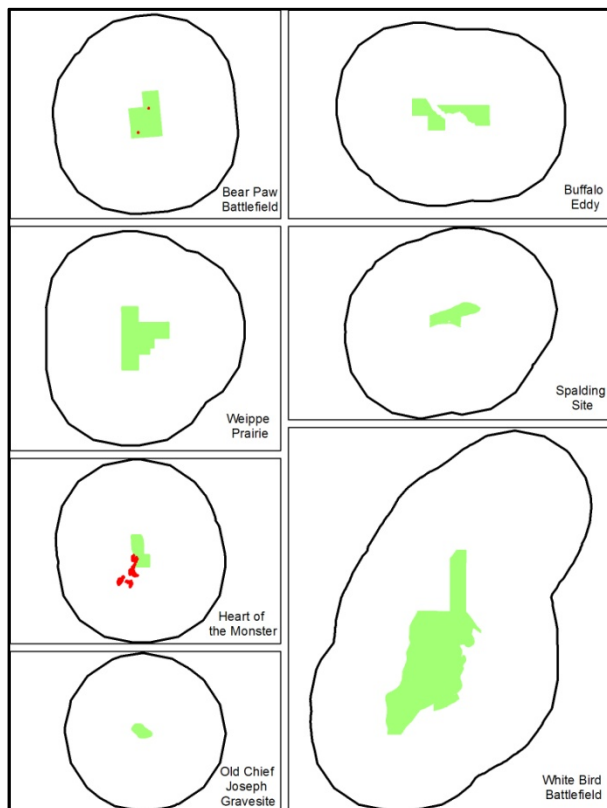
### Description

Box-elder trees occur along the floodplain of Clearwater River in HEMO and as scattered individual trees in BEPA. Emphasis was placed on distinguishing the various large deciduous trees in NEPE instead of grouping them into broader mapping units and specifically this map class was used to help separate the three species of *Acer* established within NEPE sites. Although box-elder trees were identified they did not occur in large enough stands to be considered a representative plant association. Vegetation in this map unit was characterized by dense to closed tree canopies in riparian habitat and open, individual trees on mesic upland sites. Mapping was based primarily on box-elder tree known occurrences. On the 2011 National Agriculture Imagery Program ortho-photography, box-elder trees exhibited a light green, coarse signature surrounded by maintained lawns and the river in HEMO and upland prairie grasses in BEPA. It is likely that some confusion exists in the mapping between this type and the black cottonwood, black locust, and peachleaf willow map units.

### Representative Ground Photo



### Range and Distribution



### Photo Signature Example



<b>Map Code</b>	<b><i>Acer platanoides</i> Planted Woodland Alliance</b>
<b>ACPL</b>	<b>Norway Maple Planted Woodland Alliance</b>

### Common Species

*Acer platanoides*, *Poa pratensis*, *Robinia pseudoacacia*,  
*Picea pungens*, *Taraxacum officinale*, *Plantago major*

### NVCS Alliance

- *Acer platanoides* Planted Woodland Alliance

### Description

Norway maple trees occur within the picnic grounds and cemetery in SPAL. Eemphasis was placed on distinguishing the various large deciduous trees throughout NEPE instead of grouping them into broader mapping units. Based on verification efforts this alliance was added to the classification to help separate the three species of *Acer* trees. Although the Norway maple trees were identified they did not occur in large enough stands to consider them a representative plant association. Vegetation in this map unit was characterized by dense to closed tree canopies of Norway maple with a lawn-like herbaceous layer consisting of Kentucky bluegrass. Mapping was based primarily on Norway maple known occurrences. On the 2011 National Agriculture Imagery Program ortho-photography, Norway maple trees exhibited a dark green, coarse signature surrounded by maintained lawns, other deciduous trees, and roads. It is likely that some confusion exists in the mapping between this type and the black cottonwood, silver maple, box-elder, and peachleaf willow map units.

### Representative Ground Photo



### Range and Distribution



### Photo Signature Example





<b>Map Code</b>	<b><i>Acer saccharinum</i> Forest (Ornamental)</b>
<b>ACSA</b>	<b>Silver Maple Forest (Ornamental)</b>

### Common Species

*Acer saccharinum*, *Acer platanoides*, *Fraxinus pennsylvanica*, *Robinia pseudoacacia*, *Prunus virginiana*, *Syringa vulgaris*, *Poa pratensis* *Elymus repens*, *Conium maculatum*

### NVCS Association

- *Acer saccharinum* Forest (Ornamental)

### Description

Silver maple trees occur in the picnic area in SPAL as a result of past plantings. The introduction of these native trees outside typical distribution was addressed by adding ornamental to the proposed association and map class name. Effort was made during the mapping to separate all three of the *Acer* tree species within NEPE and this class was added to identify those areas with mature silver maple trees. Vegetation in this map unit was characterized by dense to closed tree canopies of mature silver maple trees (and other minor deciduous tree species and short conifers) with a lawn-like herbaceous layer consisting of Kentucky bluegrass. Mapping was based primarily on silver maple known occurrences. On the 2011 National Agriculture Imagery Program ortho-photography, Norway maple trees exhibited a light green, coarse signature surrounded by maintained lawns. It is likely that some confusion exists in the mapping between this type and the black cottonwood, black locust, and Norway maple map units.

### Representative Ground Photo



### Range and Distribution



### Photo Signature Example



<b>Map Code</b>	<b><i>Celtis laevigata</i> var. <i>reticulata</i> Woodland Alliance</b>
<b>CELA</b>	<b>Netleaf Hackberry Woodland Alliance</b>

### Common Species

*Celtis laevigata* var. *reticulata*, *Philadelphus lewisii*, *Rubus discolor*, *Salix exigua*, *Amelanchier alnifolia*, *Anthriscus caucalis*, *Cirsium arvense*, *Bromus tectorum*, *Poa bulbosa*, *Pseudoroegneria spicata*

### NVCS Associations

- (*Celtis laevigata*) / *Anthriscus caucalis* Woodland
- *Celtis laevigata* var. *reticulata* / Mixed Grasses Woodland
- *Celtis laevigata* var. *reticulata* / *Philadelphus lewisii* Woodland

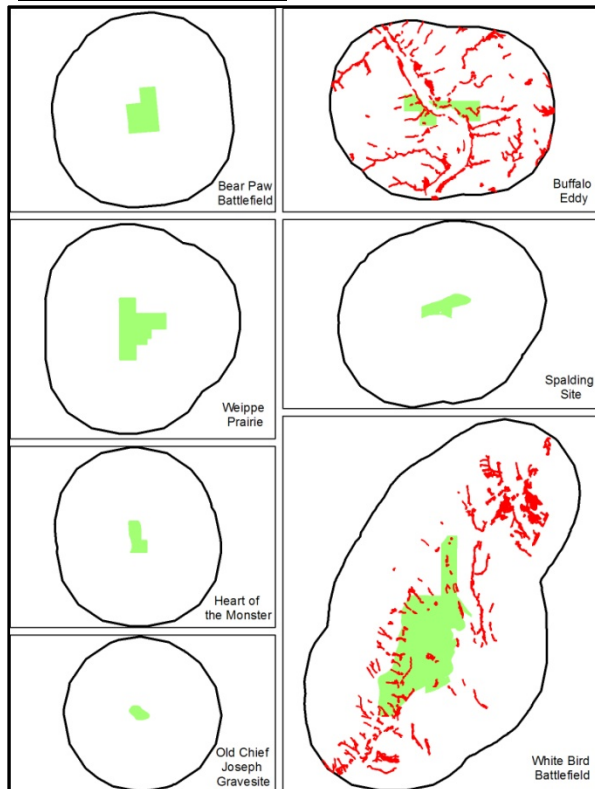
### Description

Netleaf hackberry trees are common in the BUED and WHBI units as dense riparian woodlands and scattered individual upland trees. Most netleaf hackberry occurred on mesic sites with various herbaceous and shrub understories. Non-native and weedy herbaceous species were commonly associated with this map class. On the 2011 National Agriculture Imagery Program ortho-photography, netleaf hackberry trees exhibited a blue-green, pebbly signature surrounded by mesic grasslands. It is likely that some confusion exists in the mapping between this type and the hawthorn shrubland, black locust woodland, and box-elder woodland map units.

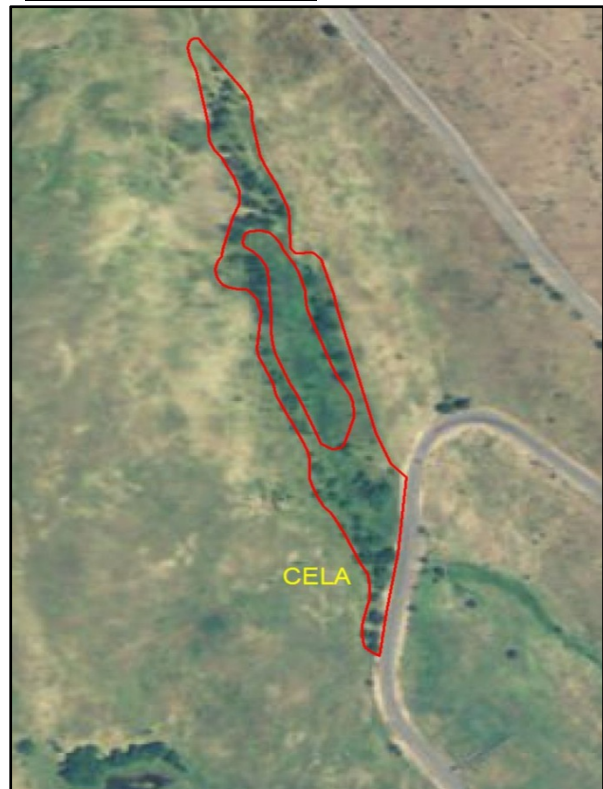
### Representative Ground Photo



### Range and Distribution



### Photo Signature Example





<b>Map Unit</b>	<b><i>Elaeagnus angustifolia</i> Semi-natural Woodland Stand</b>
<b>ELAN</b>	<b>Russian-olive Semi-natural Woodland Stand</b>

### Common Species

*Elaeagnus angustifolia*, *Rhus glabra*, *Sambucus cerulea*, *Syringa vulgaris*, *Rubus discolor*, *Prunus cerasus*, *Prunus domestica*, *Bromus tectorum*, *Poa pratensis*

### NVCS Alliance

- *Elaeagnus angustifolia* Semi- natural Woodland Alliance

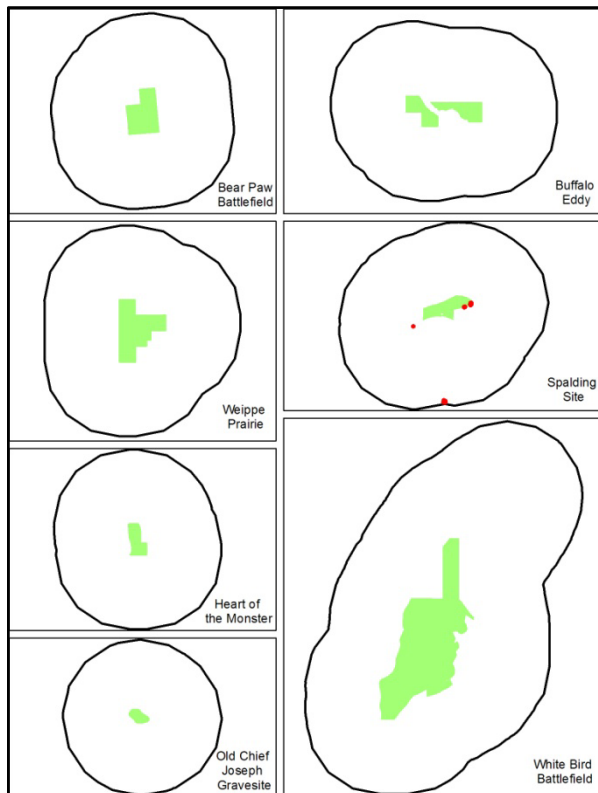
### Description

Russian-olive trees were rare in the study area and occurred in SPAL; one Russian-olive tree was documented in BUED along the Snake River. Due to Russian-olive invasive tendency, an emphasis was placed on mapping patches and individuals and separating them from the other tree map classes. Based on verification efforts the *Elaeagnus angustifolia* Semi- natural Woodland Alliance was added to the classification to provide more detail and assist with management efforts. Russian-olive trees exhibited a very distinct pale, blue-green signature and individual trees could be discerned on the 2009 and 2011 NAIP imagery.

### Representative Ground Photo



### Range and Distribution



### Photo Signature Example



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**Map Unit  
MXCON**

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**Mixed Conifer Woodland Complex****Representative Ground Photo****Common Species**

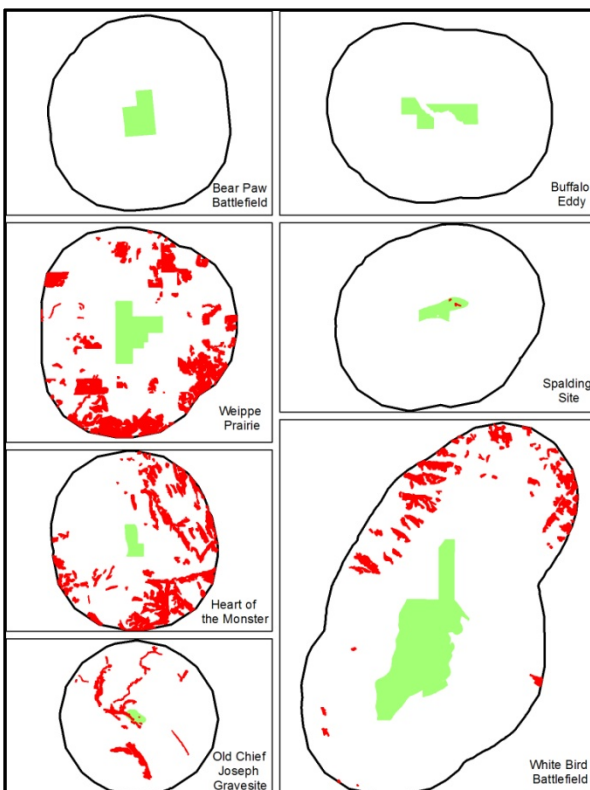
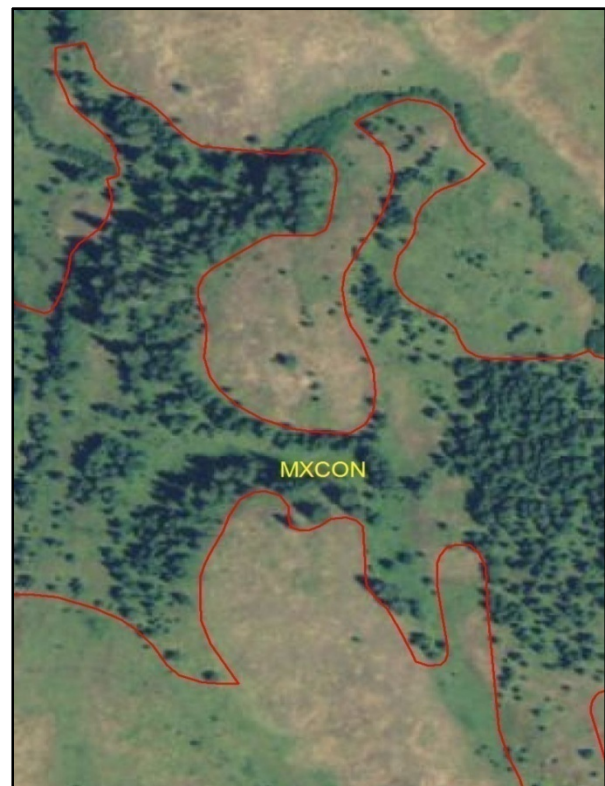
*Pinus ponderosa*, *Pseudotsuga menziesii*,  
*Calamagrostis rubescens*, *Symphoricarpos* spp.,  
*Festuca idahoensis*, *Pseudoroegneria spicata*,  
Unknown conifer species

**NVCS Alliance**

- [No Alliance – Park Special]

**Description**

Mixed conifer woodlands occur in the environs of HEMO, SPAL, WEPR, and WHBI on mountain slopes, benches, foothills, and ridges. Likely dominants include ponderosa pine and Douglas-fir trees although other conifer species may be locally abundant. Since no ground data were collected outside of the NEPE unit boundaries this generic map class was used for mapping attribution. On the 2011 NAIP ortho-imagery this signature was distinct and appeared as raised, dark green spots (conifer trees) interspersed with tan or brown splotches (grasses) on dry sites and smooth dark (mesic grasses and shrubs) on more mesic sites in the canopy openings. More field and ground-based data in the project environs would likely place polygons of this type into an existing NVC plant association or vegetation alliance.

**Range and Distribution****Photo Signature Example**



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**Map Unit  
MXRIP**

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**Mixed Deciduous Riparian Woodland Complex****Common Species**

*Acer negundo*, *Populus balsamifera* ssp. *trichocarpa*,  
*Populus* spp., *Platanus occidentalis*, *Salix*  
*amygdaloides*, *Sambucus cerulea*, *Elaeagnus*  
*angustifolia*, *Crataegus douglasii*, *Rhus glabra*,  
*Mahonia aquifolium*, *Poa pratensis*, *Leymus cinereus*,  
*Phalaris arundinacea*, *Conium maculatum*,  
Unknown riparian trees

**NVCS Alliance**

- [No Alliance – Park Special]

**Description**

Mixed deciduous trees in riparian habitat occurred throughout the environs in all NEPE unit project areas, except for BEPA, growing adjacent to creeks, streams, and rivers. Since no ground data collection efforts were conducted in the environs outside of the NPS-managed NEPE units, separating individual tree species on the 2011 NAIP imagery was not viable. Instead this map unit was added to delineate mixed riparian stands from upland deciduous and conifer trees. The mixed riparian deciduous trees were mapped from a diagnostic photo signature consisting of a coarse light green color that differed from the darker green colors of upland deciduous and pointier/conical conifer trees. It is likely that some confusion exists in the mapping between this type and the other woodland and forest map units. More ground-truthing would greatly improve the accuracy and distribution of this type and would match polygons of this type with corresponding NVC associations and alliances.

**Representative Ground Photo****Range and Distribution****Photo Signature Example**

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**Map Unit  
MXWD**

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**Mixed Deciduous Upland Woodland Complex****Common Species**

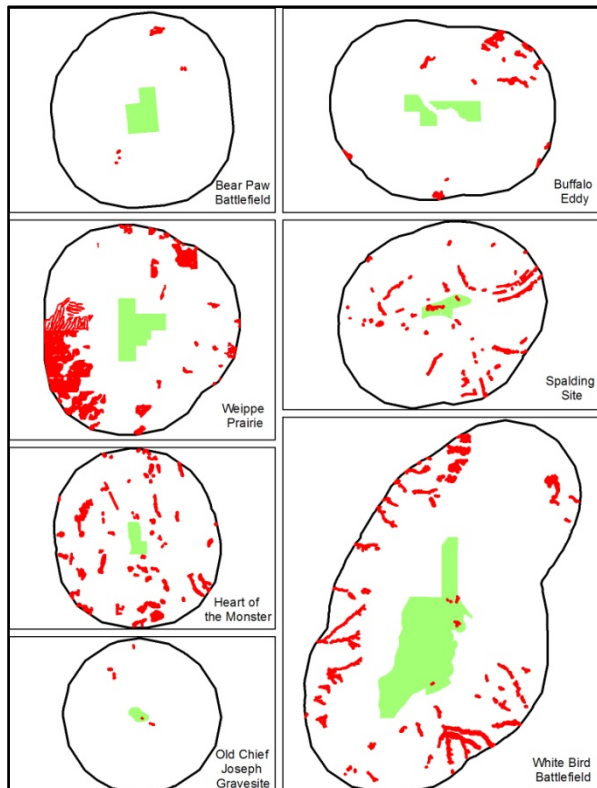
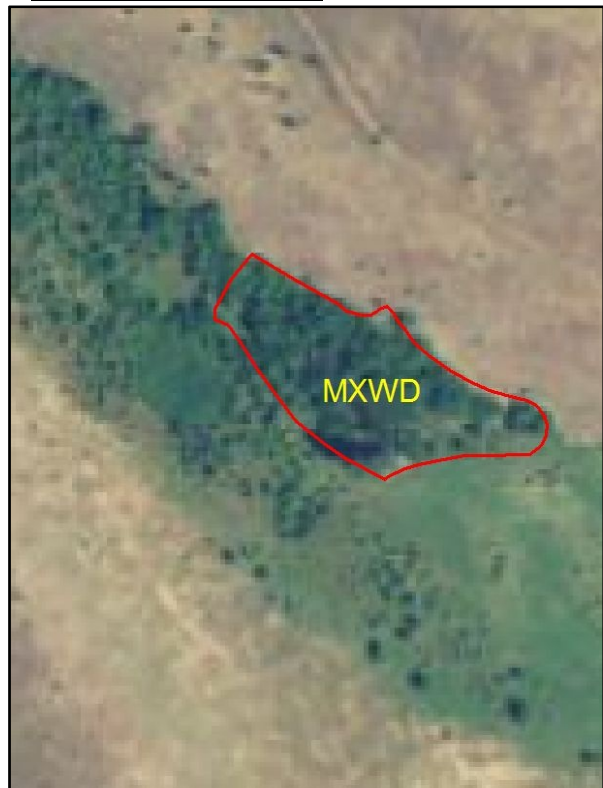
*Populus tremuloides*, *Quercus* spp., *Acer saccharinum*, *Acer platanoides*, *Fraxinus pennsylvanica*, *Robinia pseudoacacia*, *Celtis laevigata* var. *reticulata*, *Philadelphus lewisii*, *Rubus discolor*, *Salix exigua*, *Amelanchier alnifolia*, unknown deciduous tree and tall shrub species

**NVCS Alliance**

- [No Alliance – Park Special]

**Description**

All NEPE sites supported mixed stands of deciduous trees and this map class was used to separate these woodlands from similar mixed riparian types in the environs and other on-site NVC classified deciduous woodlands and forests. Included in the MXWD map unit are stands of quaking aspen on mountains slopes and various other locally abundant native deciduous trees including hackberry and maples established on private land. In addition the MXWD map class was used to label small pockets of woodlands located within the NEPE site boundaries that were too small to classify. Included are some semi-natural plantings of fruit trees, oaks, and other ornamental trees. In these settings the deciduous trees were mapped from known locations and by obvious photo signatures consisting of a coarse, green color that differed from the darker conifer trees. It is likely that some confusion exists in the mapping between this type and the other forest and woodland map units. More ground-truthing outside of NEPE-managed land would greatly improve the accuracy and distribution of this map unit and may allow matching of individual polygons to existing NVC plant associations and vegetation alliances.

**Representative Ground Photo****Range and Distribution****Photo Signature Example**



<b>Map Unit</b>	<b><i>Pinus ponderosa</i> Woodland Alliance</b>
<b>PIPO</b>	<b>Ponderosa Pine Woodland Alliance</b>

### Common Species

*Pinus ponderosa*, *Pseudotsuga menziesii*,  
*Calamagrostis rubescens*, *Rhus glabra*, *Rosa woodsii*,  
*Symphoricarpos oreophilus*, *Festuca idahoensis*,  
*Pseudoroegneria spicata*, *Daucus carota*, *Lupinus*  
*sericeous*, *Artemisia ludoviciana*, *Poa pratensis*,  
*Bromus* spp.

### NVCS Alliance

- *Pinus ponderosa* Woodland Alliance

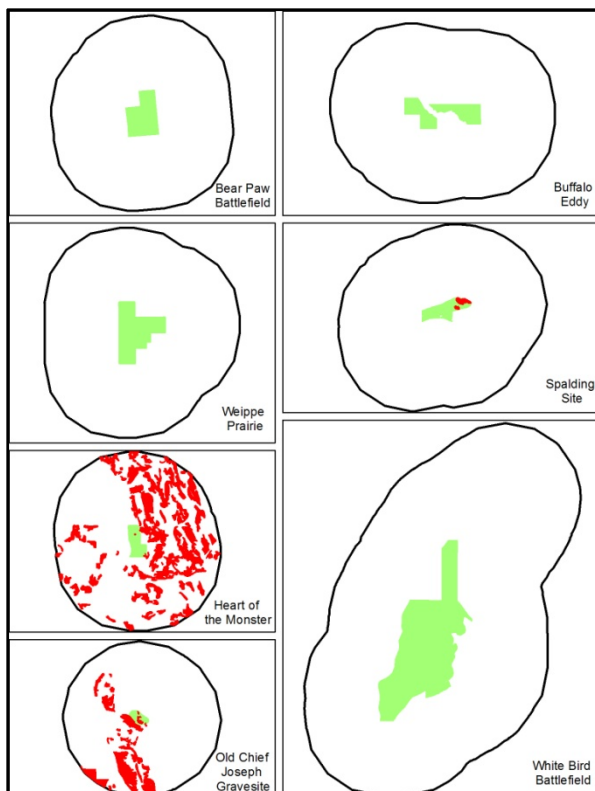
### Description

Ponderosa pine woodlands within NEPE were documented in SPAL, HEMO, and OLJO and may occur in the surrounding environs of the remaining NEPE sites. The understory species composition varied among the NEPE units and the alliance level was used to classify the type since no representative plant association could be determined. On the 2011 NAIP ortho-imagery this signature appeared as raised, dark olive-green spots (pine trees) interspersed with tan or brown splotches (grasses) in the canopy openings. The mixed conifer map unit may have been confused with this type during the mapping and other small, unmapped stands may exist.

### Representative Ground Photo



### Range and Distribution



### Photo Signature Example



<b>Map Unit</b>	<b><i>Populus balsamifera</i> ssp. <i>trichocarpa</i> Temporarily Flooded Forest Alliance</b>
<b>POBA</b>	<b>Black Cottonwood Temporarily Flooded Forest Alliance</b>

### Common Species

*Populus balsamifera* ssp. *trichocarpa*, *Acer negundo*,  
*Juglans nigra*, *Morus alba*, *Celtis reticulata*,  
*Rosa* spp., *Rubus discolor*, *Symphoricarpos albus*,  
*Prunus domestica*, *Salix exigua*, *Dactylis glomerata*,  
*Bromus inermis*, *Poa pratensis*, *Phalaris arundinacea*

### NVCS Associations

- *Populus balsamifera* ssp. *trichocarpa* Temporarily Flooded Woodland Alliance
- *Populus balsamifera* ssp. *trichocarpa* / Mixed Herbs Forest
- *Populus balsamifera* ssp. *trichocarpa* - *Prunus* (*cerasus*, *domestica*) Woodland

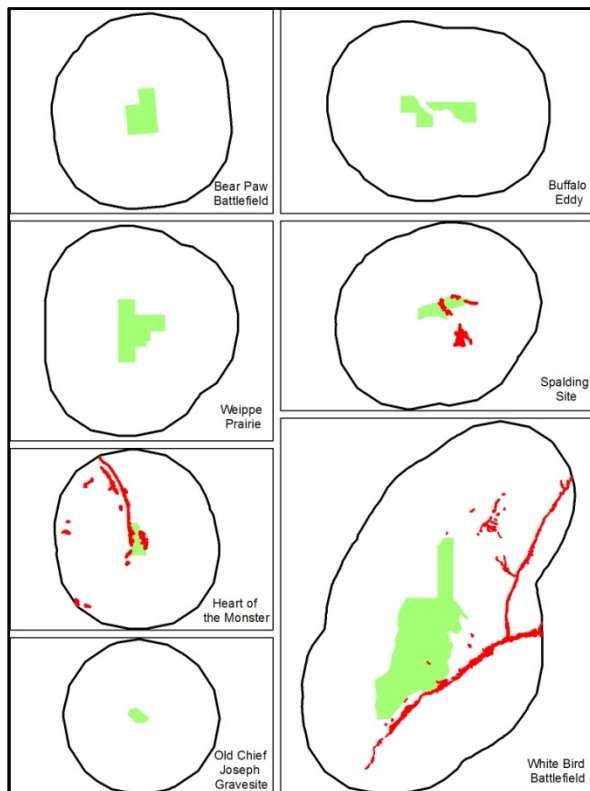
### Representative Ground Photo



### Description

Black cottonwood forest stands formed thin, linear bands adjacent to some of the streams and creeks in SPAL, HEMO, and WHBI occurring on floodplain terraces. Understory species varied by NEPE site with HEMO and SPAL supporting more shrubs and WHBI more grasses. The mapping signature for this unit includes both large cottonwood trees appearing as dark green spots and smaller saplings appearing shorter and lighter in color on the NAIP imagery. It is likely that some confusion exists in the mapping between this type and the other riparian woodland map units including peachleaf willow and hackberry woodlands.

### Range and Distribution



### Photo Signature Example





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<b>Map Unit</b>	<b><i>Prunus domestica</i> Semi-natural Woodland</b>
<b>PRDO</b>	<b>European Plum Semi- natural Woodland</b>

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### Common Species

*Prunus domestica*, *Robinia pseudoacacia*, *Populus balsamifera* ssp. *trichocarpa*, *Pinus ponderosa*, *Acer saccharinum*, *Rosa* spp., *Amelanchier alnifolia*, *Poa pratensis*, *Symphoricarpos albus*, *Poa pratensis*, *Bromus inermis*, *Daucus carota*, *Cirsium arvense*

### NVCS Associations

- *Prunus domestica* Semi-natural Woodland

### Representative Ground Photo



### Description

European or domesticated plum trees were common in HEMO as intentional introductions or seed dispersal from nearby stands. European plums also occurred in WHBI but either occurred in conjunction with taller black cottonwoods or as individual trees too small to map. Within HEMO, this type supported mixed shrub and small tree species in the canopy and a mixed understory consisting of non-native grasses and some weedy forbs. On the NAIP 2011 imagery the PRDO map unit appeared as coarse, dark green splotches surrounded by tan and light green grasslands. Most of the polygons included in this map unit were attributed based on known locations from ground-truthing efforts. It is likely that more polygons of this type occur in the project environs, presently labeled as MXWD or MXRIP. Also other small stands of PRDO in HEMO may have been confused in the mapping with the ROPS and POBA map units.

### Range and Distribution



### Photo Signature Example





<b>Map Code</b>	<b><i>Robinia pseudoacacia</i> Semi-natural Woodland Stand</b>
<b>ROPS</b>	<b>Black Locust Semi-natural Woodland Stand</b>

### Common Species

*Robinia pseudoacacia*, *Acer platanoides*,  
*Elaeagnus angustifolia*, *Celtis reticulata*, *Poa*  
*pratensis*, *Cirsium arvense*, *Bromus tectorum*,  
*Convolvulus arvensis*

### NVCS Association

-*Robinia pseudoacacia* Semi-natural Forest

### Representative Ground Photo



### Description

Black locust trees were common in and along the landscaped grounds of HEMO and SPAL. Emphasis was placed on distinguishing the various large deciduous trees throughout NEPE instead of grouping them into broader mapping units. Based on verification efforts this map class was added to help separate black locust trees from silver maple, Norway maple, and other planted tree species. Although the black locust trees were identified they did not occur in large enough stands to consider as a representative plant association. Vegetation in this map unit was characterized by open tree canopies with either a Kentucky bluegrass herbaceous layer in landscaped areas or a mix of other non-native grasses in more natural settings. Mapping of this type was based primarily on black locust tree known occurrences. On the 2011 NAIP ortho-photography, black locust trees exhibited a smooth, light green signature. It is likely that some confusion exists in the mapping between this type and the black cottonwood, Norway maple, and silver maple-elm map units.



<b>Map Code</b>	<b><i>Salix amygdaloides</i> Woodland</b>
<b>SAAM</b>	<b>Peachleaf Willow Woodland</b>

### Common Species

*Salix amygdaloides*, *Populus balsamifera* ssp. *trichocarpa*, *Salix alba*, *Cornus stolonifera*, *Phalaris arundinacea*, *Polygonum sachalinense*, *Cirsium arvense*

### NVCS Association

-*Salix amygdaloides* Woodland

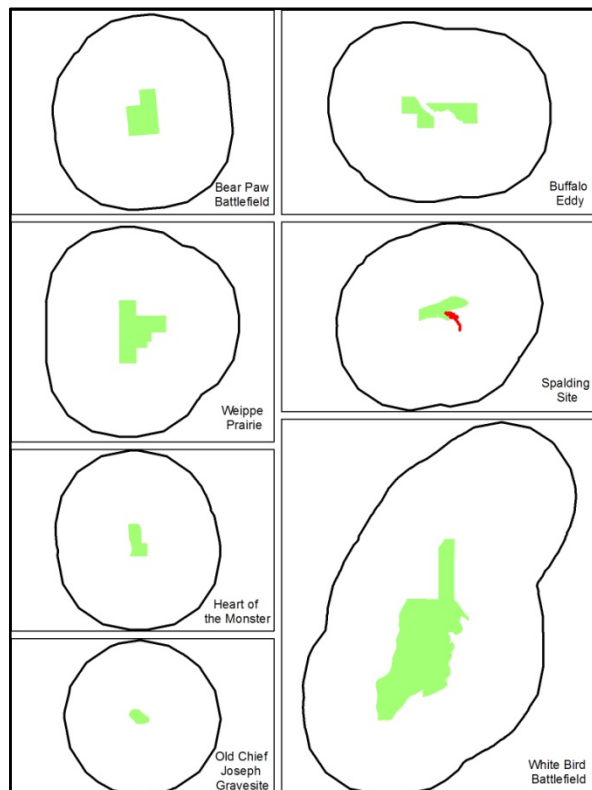
### Description

Peachleaf willow trees in association with understory mesic grasses and shrubs occur in the riparian corridor adjacent to Lapwai Creek in SPAL. Peachleaf willow trees occurred on riparian creekbanks and terraces and the species composition of this community varied with some areas supporting black cottonwood trees that appeared similar on the NAIP imagery which may have led to some confusion in the mapping; additional undocumented peachleaf willow stands likely occur in the environs. Small thickets of reed canarygrass and other willow shrubs often occurred in the canopy openings. On the imagery this type exhibited slightly smaller trees than the cottonwood stands and exhibited a representative dark green, textured signature.

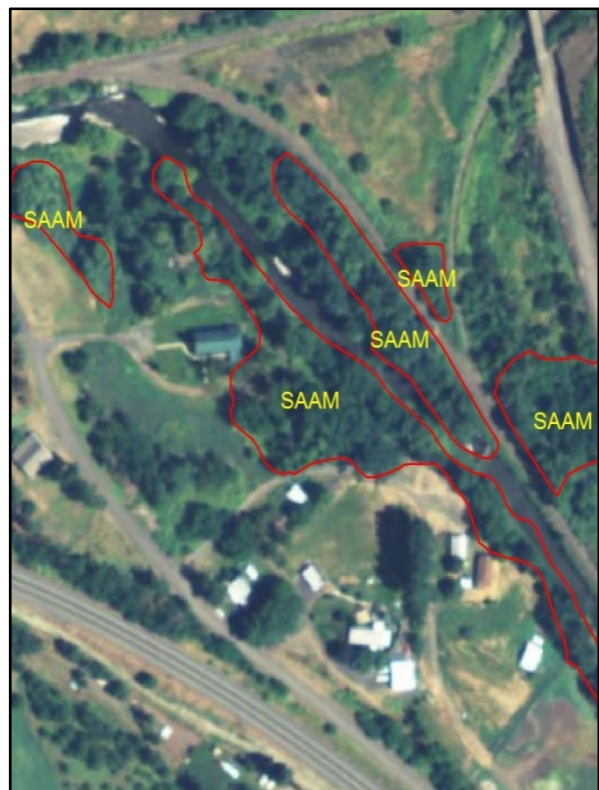
### Representative Ground Photo



### Range and Distribution



### Photo Signature Example





<b>Map Unit</b>	<b><i>Ulmus pumila</i> / <i>Syringa vulgaris</i> Semi-natural Woodland</b>
<b>ULPU</b>	<b>Siberian Elm / Common Lilac Semi-natural Woodland</b>

### Common Species

*Ulmus pumila*, *Pinus ponderosa*, *Rosa woodsii*,  
*Syringa vulgaris*, *Amelanchier alnifolia*, *Acer*  
*platanoides*, *Poa pratensis*, *Dactylis glomerata*

### NVCS Association

- [No Association – Park Special]

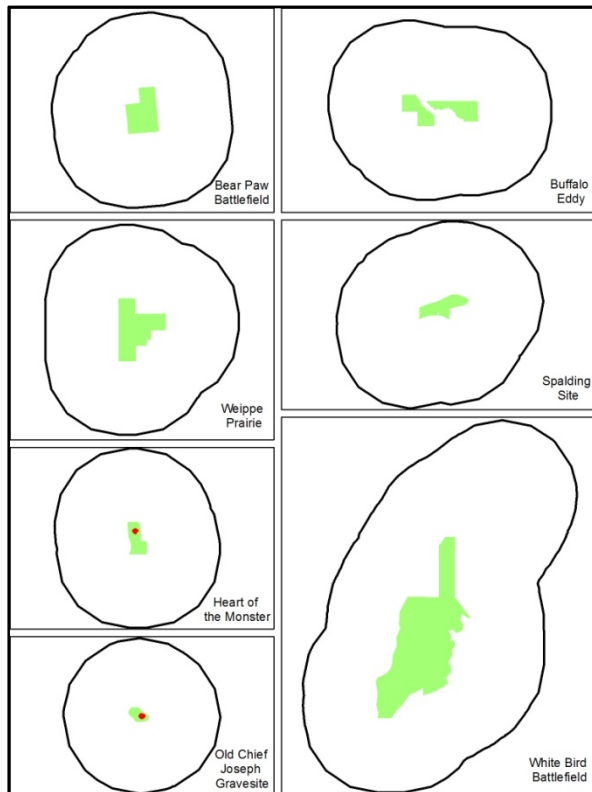
### Description

Siberian elm woodlands occur in the former fields and manicured areas around Old Chief Joseph's gravesite in OLJO and near the Heart of the Monster formation in HEMO. Additional stands of this woodland type likely occur in the environs but were not mapped due to lack of ground data. Siberian elm occurred as small saplings with a mixture of tall shrubs including lilacs and serviceberries and non-native grasses and forbs in the understory. Trees of this type resembled the hackberry type on the imagery and some confusion likely occurred between this type and the other deciduous forest and woodland map units; the signature of this map unit was roughened and light green on the NAIP imagery.

### Representative Ground Photo



### Range and Distribution



### Photo Signature Example



## Shrublands

<b>Map Unit</b>	<b><i>Amelanchier alnifolia</i> Shrubland Stand</b>
<b>AMAL</b>	<b>Saskatoon serviceberry Shrubland Stand</b>

### Common Species

*Amelanchier alnifolia*, *Celtis reticulata*, *Philadelphus lewisii*, *Symphoricarpos occidentalis*, *Rosa woodsii*, *Anthemis cotula*, *Anthriscus caucalis*

### NVCS Associations

- [No Association – Park Special]

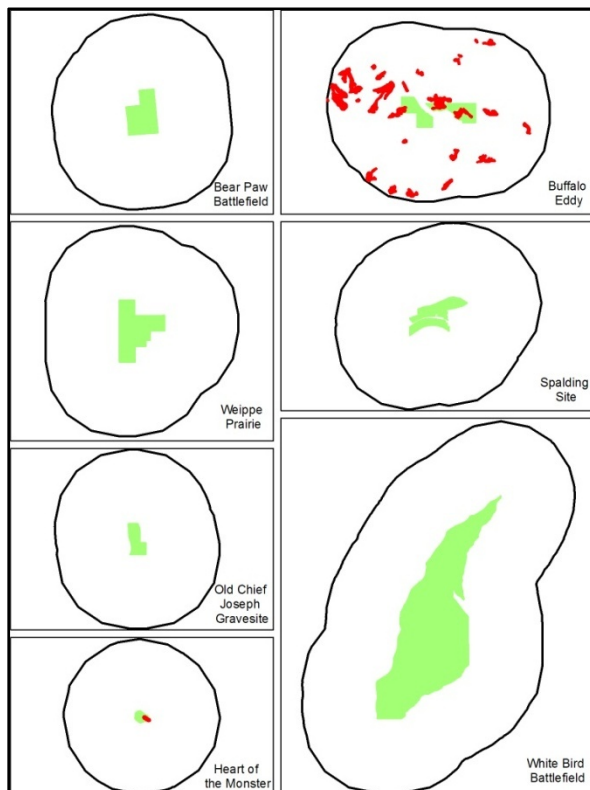
### Representative Ground Photo



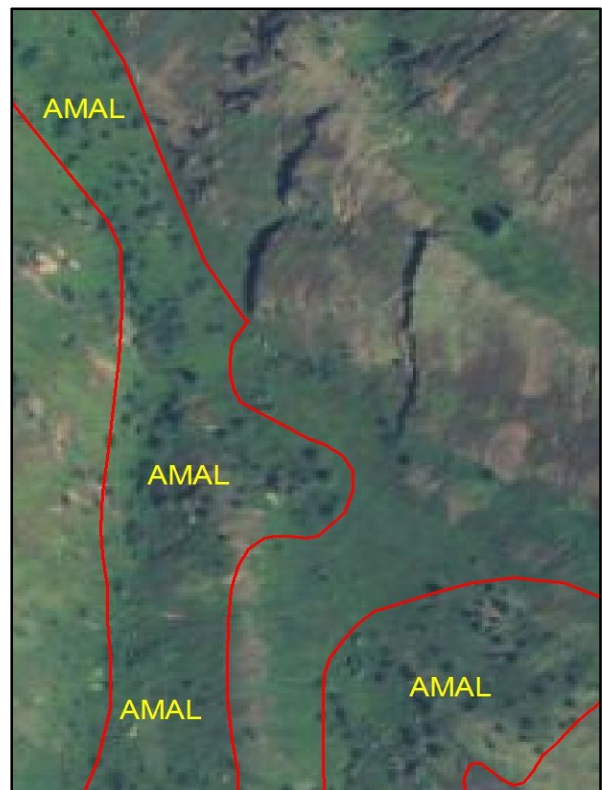
### Description

Saskatoon serviceberry shrublands occurred within BUED and OLJO although more of this type likely occurs in the project environs. Within BUED serviceberry shrubs were tall and widely distributed in low cover with a dense understory of shorter shrubs and forbs. Within OLJO, serviceberry shrubs were mixed with other shrub species around the gravesite marker. The tall shrub with broad canopy serviceberry growth form created obvious green to gray dots on the NAIP imagery surrounded by bright green mesic understory. Patches of serviceberry may have been mapped in the environs as MXSHB and in BUED as part of the PHLE map unit.

### Range and Distribution



### Photo Signature Example





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**Map Unit    *Artemisia cana* ssp. *cana* / *Hesperostipa comata* Shrub Herbaceous Vegetation**  
**ARCA/HECO Plains Silver Sagebrush / Needle-and-Thread Shrub Herbaceous Vegetation**

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**Common Species**

*Artemisia cana*, *Rosa arkansana*, *Krashennikovia lanata*, *Hesperostipa comata*, *Poa pratensis*, *Achillea millefolium*, *Artemisia frigida*

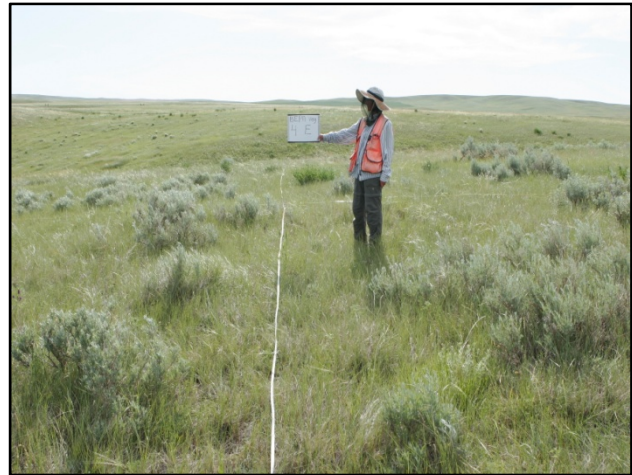
**NVCS Associations**

- *Artemisia cana* ssp. *cana* / *Hesperostipa comata*  
 Shrub Herbaceous Vegetation

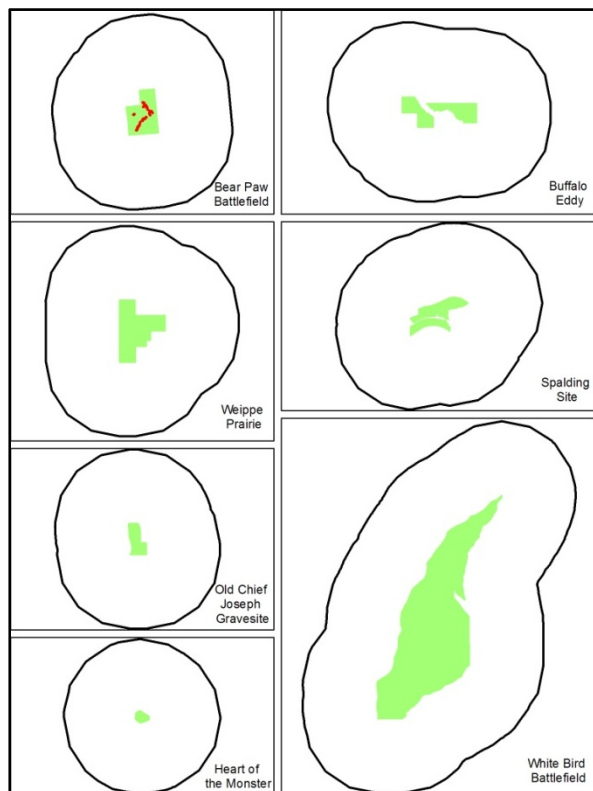
**Description**

Silver sagebrush is a minor component of the upland prairie in BEPA occurring along bluffs and low slopes above Snake Creek. Silver sagebrush shrubs are low growing and widely spaced. A mix of native and non-native grasses and forbs, especially needle-and-thread grass, were associated with this type. The low-growing nature of ARCA/HECO created a smooth gray signature that was slightly more mottled than the surrounding grasslands. ARCA/HECO and ARFR map units were similar in appearance and some confusion may have occurred between these types during the mapping.

**Representative Ground Photo**



**Range and Distribution**



**Photo Signature Example**



<b>Map Unit</b>	<b><i>Artemisia frigida</i> Dwarf-shrubland Alliance</b>
<b>ARFR</b>	<b>Fringed Sagebrush Dwarf-shrubland Alliance</b>

### Common Species

*Artemisia frigida*, *Artemisia cana*, *Rosa arkansana*,  
*Bouteloua gracilis*, *Hesperostipa comata*, *Poa*  
*pratensis*, *Achillea millefolium*

### NVCS Association

- *Artemisia frigida* Dwarf-shrubland Alliance

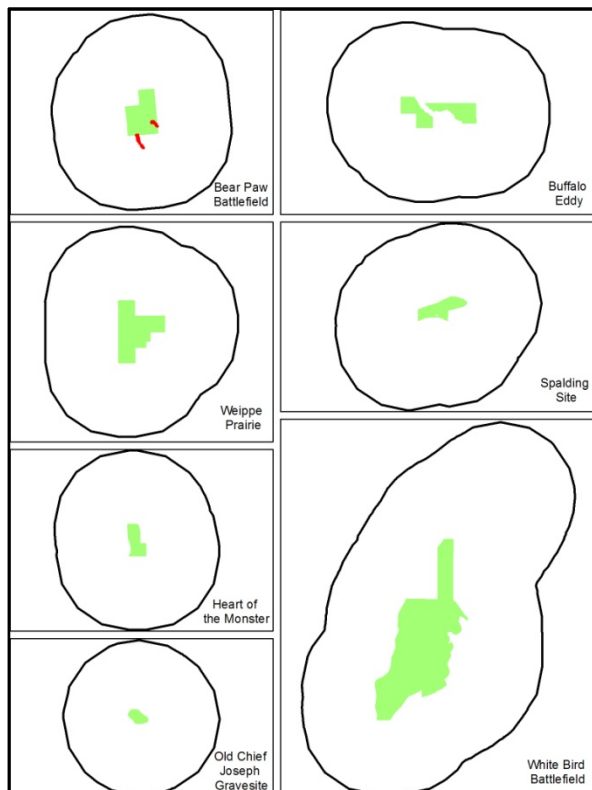
### Representative Ground Photo



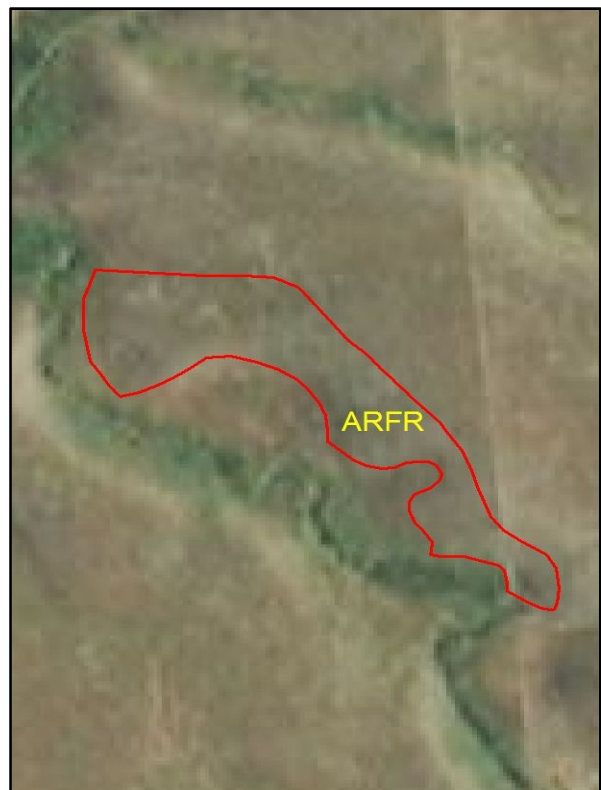
### Description

Fringed sagebrush is a minor component of the upland prairie in BEPA occurring along low slopes and bluffs above Snake Creek. Fringed sagebrush dwarf-shrubs are very low growing and evenly spaced among the associated grasses. A mix of native and non-native grasses and forbs were associated with this type. The low-growing stature of ARFR created a smooth gray signature that was slightly more mottled than the surrounding grasslands. ARFR and ARCA/HECO map units were similar in appearance and some confusion may have occurred between these types during the mapping.

### Range and Distribution



### Photo Signature Example





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**Map Unit**     *Artemisia* spp. – *Chrysothamnus* spp. Mixed Shrubland Stand  
**ART-CHR**     Sagebrush – Rabbitbrush Mixed Shrubland Stand

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**Common Species**

Unknown sagebrush species  
Unknown rabbitbrush species  
Unknown grass species

**NVCS Association**

- [No Association – Park Special]

**Representative Ground Photo**



**Description**

The ART-CHR map unit was created for polygons in the environs of BUED and OLJO that were gray-green and shrubby in appearance on the NAIP imagery. The shrubs also appeared to be evergreen, low-growing, and occurred on dry slopes and flats. Within OLJO this map unit occurred on dry slopes east of Wallowa Lake and within BUED occurred east of the river on exposed geologic and badland-like formations. The dominant species likely varies between the two sites with candidates including short sagebrush species like silver or fringed sagebrush and low-growing yellow rabbitbrush and/or snakeweed. In addition to these locations a small stand of rubber rabbitbrush was also documented near the SPAL visitor center. The polygons of this shrub type exhibited a bumpy grey appearance on the 2011 NAIP ortho-imagery with either a tan (dry grasses) or white (exposed geology) undertone. More ground-truthing outside of NEPE units would greatly improve the accuracy and distribution of this map unit and may allow for matching individual polygons to existing NVC plant associations and vegetation alliances.

**Range and Distribution**



**Photo Signature Example**



**Map Unit  
CRDO**

***Crataegus douglasii* Shrubland Alliance  
Black Hawthorn Shrubland Alliance**

**Common Species**

*Crataegus douglasii*, *Crataegus chrysocarpa*,  
*Symphoricarpos albus*, *Rosa woodsii*, *Amelanchier*  
*alnifolia*, *Prunus* spp., *Frangula purshiana*, *Poa*  
*pratensis*, *Alopecurus pratensis*, *Anthriscus caucalis*,  
*Camassia quamash*, *Ranunculus uncinatus*

**NVCS Association**

- Crataegus douglasii* – (*Crataegus chrysocarpa*)  
Shrubland
- Crataegus douglasii* - *Frangula purshiana* /  
*Symphoricarpos albus* Shrubland
- *Crataegus douglasii* / *Polygonum bistortoides* Shrub  
Herbaceous Vegetation

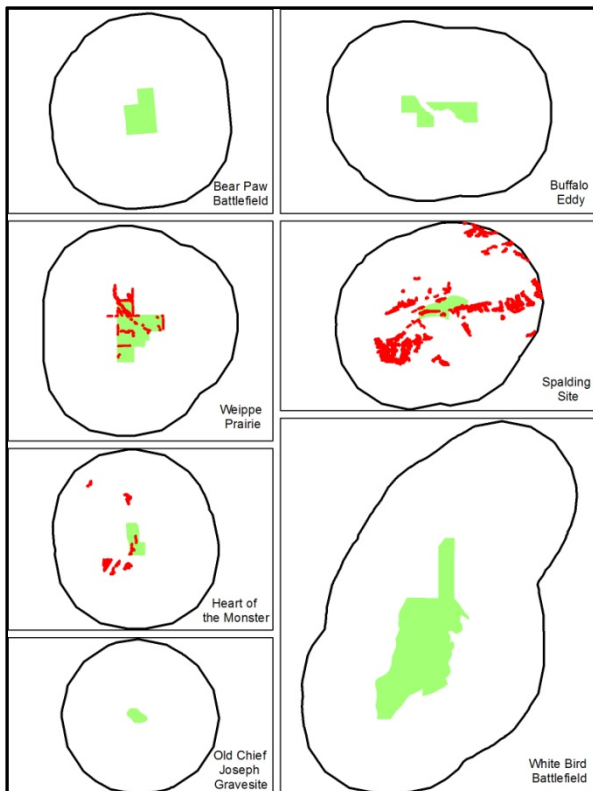
**Representative Ground Photo**



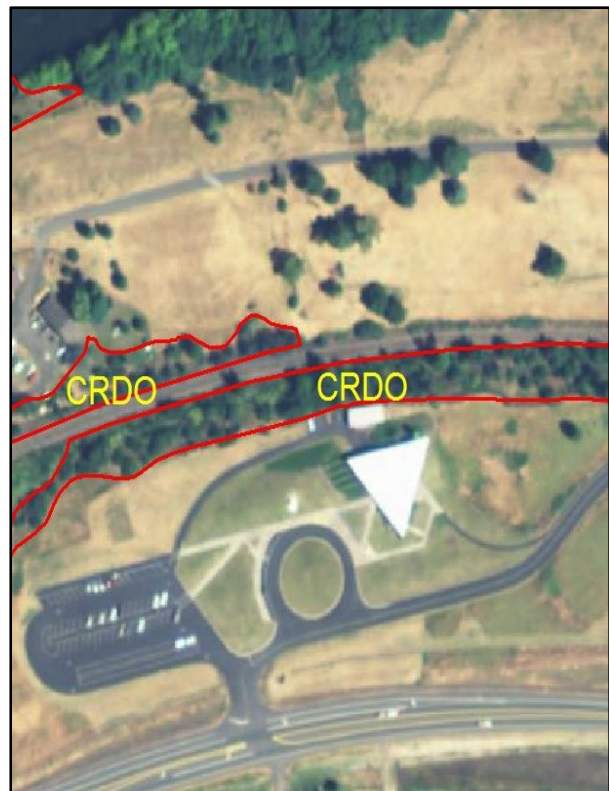
**Description**

Two species of hawthorn occur in NEPE sites. Black hawthorn tall shrubs became established along fencelines and adjacent to Jim Ford Creek in WEPR. Black hawthorn occurs in HEMO as small stands in the riparian corridor of Clearwater River and on other mesic sites. Within SPAL fireberry hawthorn was the characteristic tall shrub species occurring in linear bands and large patches. The understory composition varied by location and was mostly comprised of mixed short shrubs and grasses. Within WEPR camas and plantainleaf buttercups occurred in association with the fireberry hawthorn shrubs. Polygons of this tall shrub type exhibited a dark green color and were rough in texture. Tall hawthorn shrubs appeared similar to trees on the 2011 NAIP ortho-imagery and some confusion in the mapping may exist with the deciduous woodland map units.

**Range and Distribution**



**Photo Signature Example**





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## Map Unit      Mixed Deciduous Shrubland Complex

### MXSHB

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#### Common Species

*Crataegus douglasii*, *Crataegus chrysocarpa*, *Salix exigua*, *Salix* spp. *Amelanchier alnifolia*, *Shepherdia argentea*, *Prunus* spp., *Frangula purshiana*, *Celtis reticulata*, *Philadelphus lewisii*, *Rhus* spp., Unknown tall deciduous shrubs

#### NVCS Association

- [No Association – Park Special]

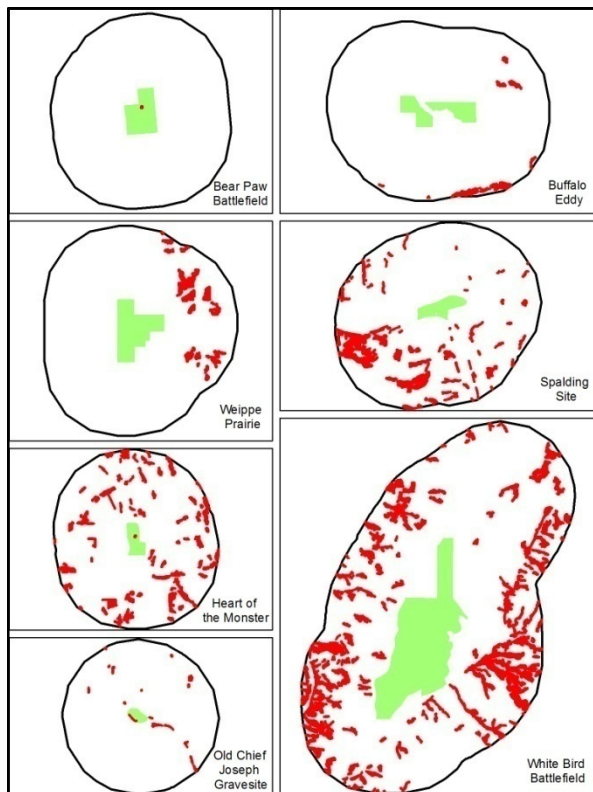
#### Description

All NEPE sites support mixed stands of deciduous shrubs; this map class was used to separate these shrublands from shorter deciduous shrubs, evergreen shrubs, and taller deciduous woodlands in the environs. Included in the MXSHB map unit are stands of Lewis' mock orange, hawthorn, sumac, short netleaf hackberry trees on upland sites, chokecherry, plum, and willow on mesic sites and small stands of shrubs too small to map e.g., buffaloberry in BEPA. In the environs the MXSHB map unit exhibited an obvious photo signature consisting of a pebbly, green color that differed from the larger and darker deciduous trees. It is likely that some confusion exists in the mapping between this type and the SSHB map unit and short stands of the deciduous woodland map units. More ground-truthing outside of NEPE sites would greatly improve the accuracy and distribution of this map unit and may allow for the matching individual polygons to existing NVC plant associations and vegetation alliances.

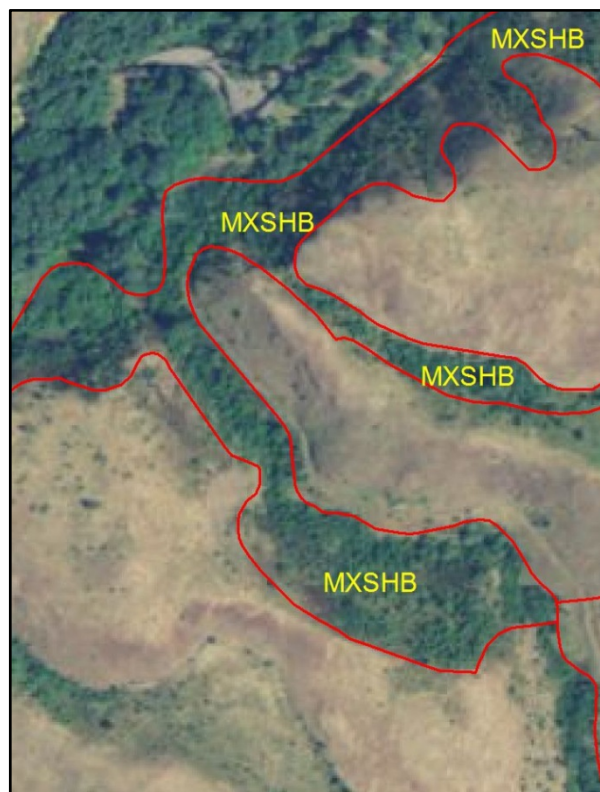
#### Representative Ground Photo



#### Range and Distribution



#### Photo Signature Example



**Map Unit  
PHLE**

***Philadelphus lewisii* Intermittently Flooded Shrubland  
Lewis' Mock Orange / Intermittently Flooded Shrubland**

**Common Species**

*Philadelphus lewisii*, *Rosa woodsii*, *Physocarpus malvaceus*, *Sambucus cerulea*, *Amelanchier alnifolia*, *Pseudoroegneria spicata*, *Bromus tectorum*, *Poa cusickii*, *Festuca idahoensis*, *Anthriscus caucalis*

**NVCS Association**

- *Philadelphus lewisii* / *Pseudoroegneria spicata*  
Shrubland

**Representative Ground Photos**

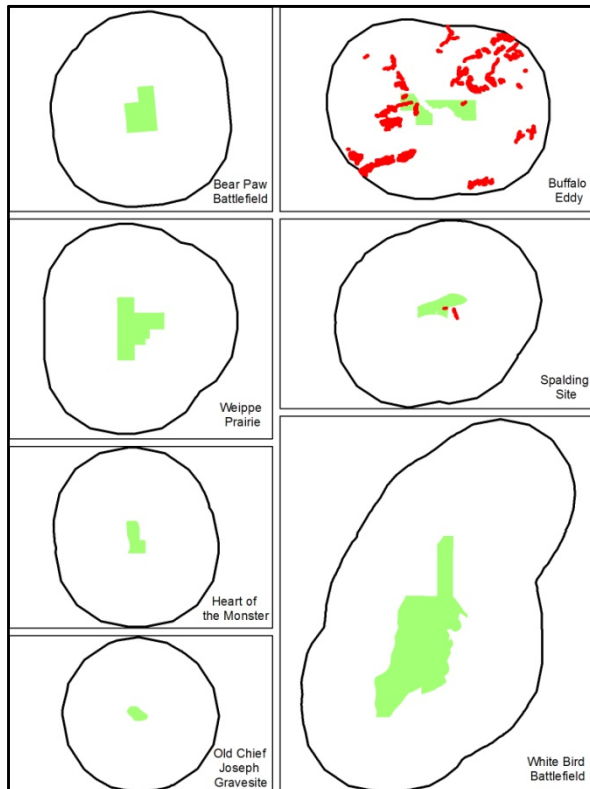


**Description**

Lewis' mock orange is a common shrub species in BUED established on mountain and canyon slopes and rare in SPAL established on riparian sites along Lapwai Creek. Within BUED this map unit supports grass species in the understory and at SPAL PHLE was associated with short shrubs and tall mesic grasses. Lewis' mock orange often mixed with or occurred adjacent to serviceberry shrub map units and some confusion may have occurred between the two species in BUED and with other deciduous shrubs in SPAL. This map unit is characterized by small to medium-size shrubs exhibiting a mottled, olive-green signature.

**Range and Distribution**

**Photo Signature Example**





<b>Map Unit</b>	<b><i>Salix exigua</i> Temporarily Flooded Shrubland</b>
<b>SAEX</b>	<b>Coyote Willow Temporarily Flooded Shrubland</b>

### Common Species

*Salix exigua*, *Salix amygdaloides*, *Rosa woodsii*, *Symphoricarpos occidentalis*, *Juncus balticus*, *Poa pratensis*, *Carex utriculata*, *Phalaris arundinacea*, *Solidago canadensis*

### NVCS Association

-*Salix exigua* Temporarily Flooded Shrubland

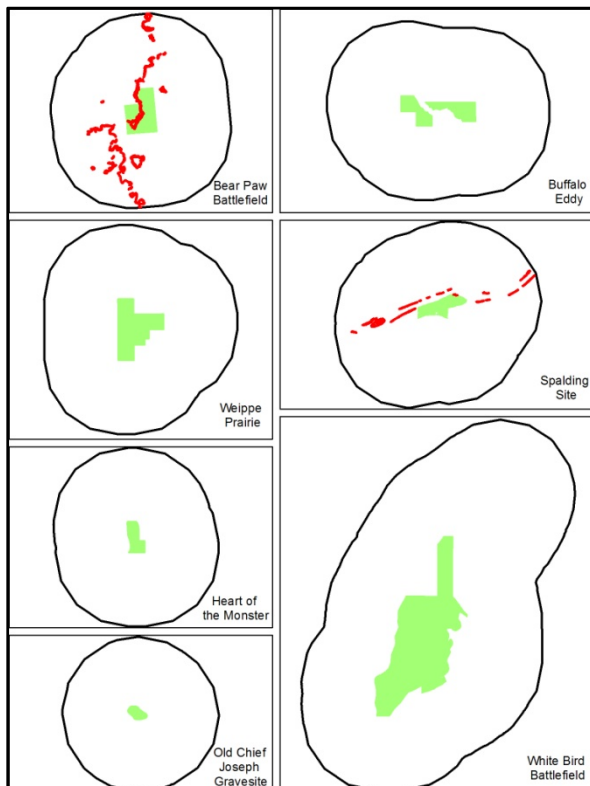
### Representative Ground Photos



### Description

Coyote willow tall shrubs formed linear bands in riparian habitats along Snake Creek in BEPA and along the Clearwater River in SPAL. Coyote willow tall shrubs within NEPE varied in density from thick stands with little understory to open stands with mixes of wetland and upland graminoids in the herbaceous layer. Coyote willow shrubs appeared as light green pebbles against a smooth tan to green understory signature on the NAIP imagery.

### Range and Distribution



### Photo Signature Example



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<b>Map Unit</b> <b>SSHB</b>	<b>Mixed Deciduous Short Shrub Complex</b>
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**Common Species**

*Symphoricarpos albus*, *Symphoricarpos occidentalis*,  
*Rosa* spp., *Rhus* spp., *Philadelphus lewisii*,  
 Unknown short shrub species

**NVCS Association**

- [No Association – Park Special

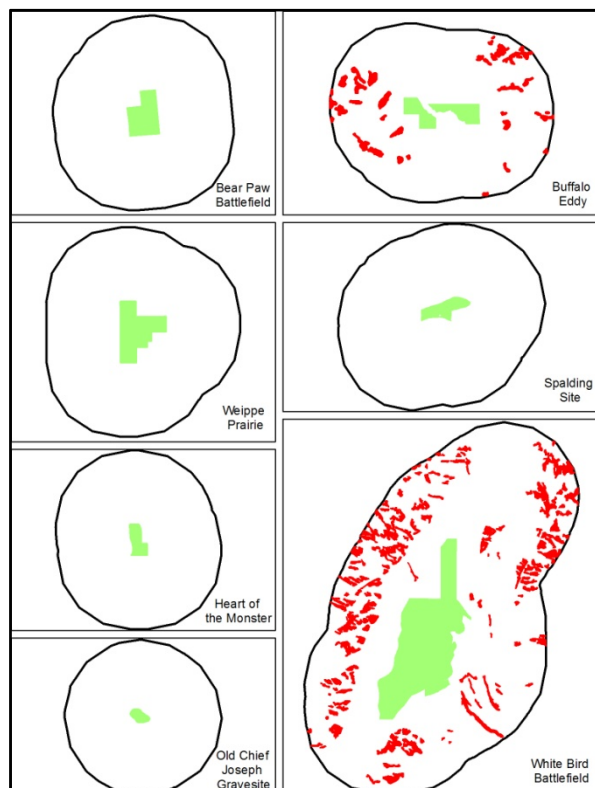
**Description**

Mountain and canyon slopes in the environs of BUED and WHBI supported large dense patches of unknown short shrubs on private lands. This map class was used to separate these short deciduous shrublands from the taller deciduous shrubs, evergreen shrubs, and deciduous woodlands in the environs. Included in the SSHB map unit are stands of western and common snowberry, rose, sumac, short chokecherry, and willow. The SSHB map unit exhibited an obvious photo signature consisting of smooth, green color that differed from the coarser MXSHB map unit. Some confusion exists in the mapping between this type and the MXHB map unit. More ground-truthing outside of NEPE units would greatly improve the accuracy and distribution of this map unit and may allow for matching individual polygons to existing NVC plant associations and vegetation alliances.

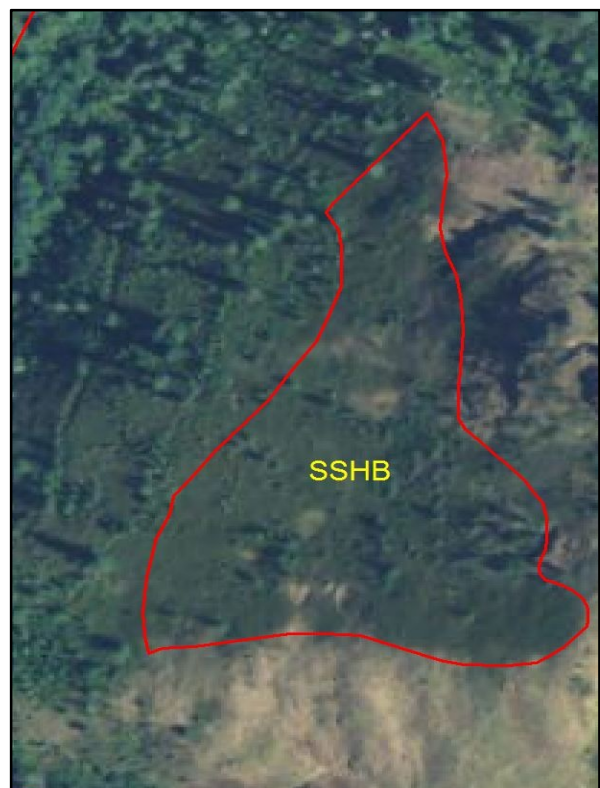
**Representative Ground Photos**



**Range and Distribution**



**Photo Signature Example**





<b>Map Unit</b>	<b><i>Symphoricarpos albus</i> Shrubland</b>
<b>SYAL</b>	<b>Common Snowberry Shrubland</b>

### Common Species

*Symphoricarpos albus*, *Amelanchier alnifolia*,  
*Crataegus columbia*, *Rosa canina*, *Bromus*  
*japonicus*, *Galium aparine*

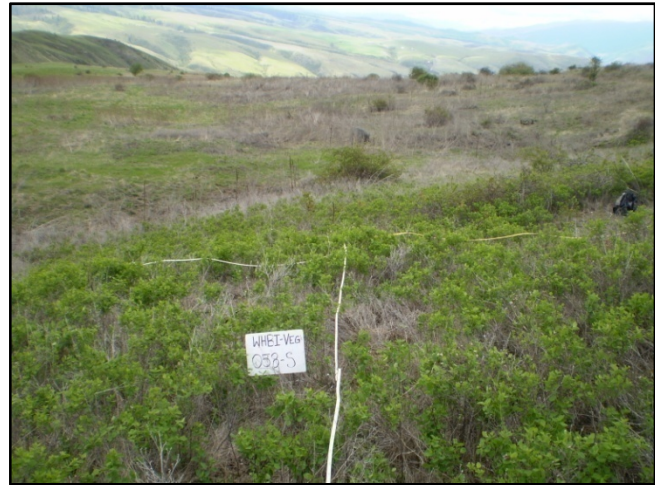
### NVCS Association

- *Symphoricarpos albus* Shrubland

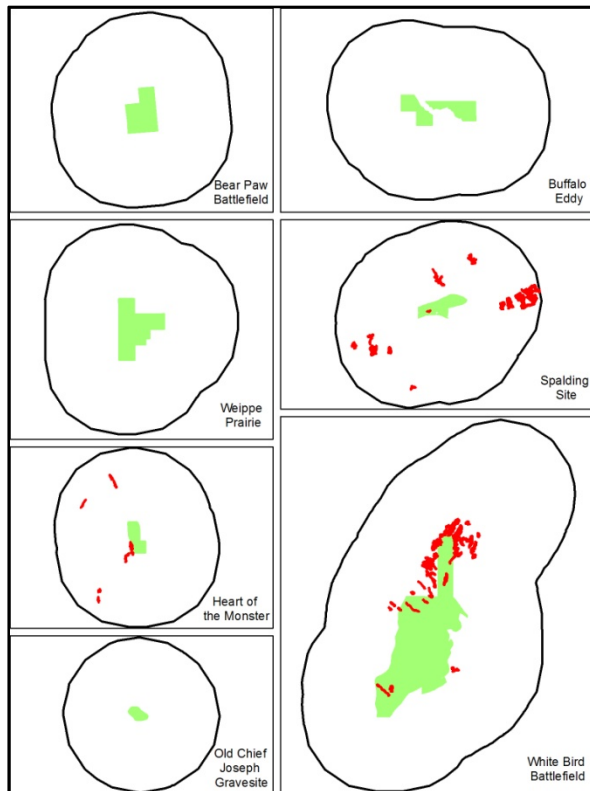
### Description

Common snowberry is a common short shrub occurring within HEMO, SPAL, and WHBI in draws, depressions, and mesic soils. SYAL occurs in homogenous patches with little understory. SYAL was characterized by short shrubs that exhibit a smooth, dark green signature on the 2011 NAIP imagery. Due to the similarity of signatures this map unit may have been confused with PHAR and other mesic herbaceous vegetation types and more SYAL likely occurs in the environs and was mapped as SSHB.

### Representative Ground Photos



### Range and Distribution



### Photo Signature Example



<b>Map Unit</b>	<b><i>Symphoricarpos occidentalis</i> Shrubland</b>
<b>SYOC</b>	<b>Western Snowberry Shrubland</b>

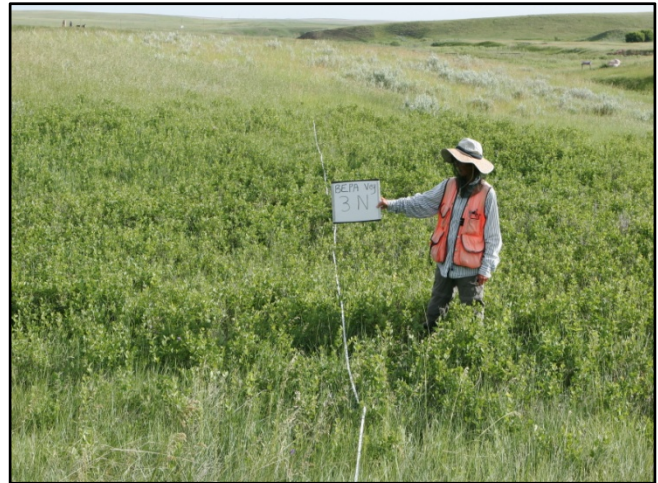
### Common Species

*Symphoricarpos occidentalis*, *Rosa woodsii*,  
*Pascopyrum smithii*, *Poa pratensis*, *Solidago* spp.,  
*Artemisia ludoviciana*

### NVCS Associations

-*Symphoricarpos oreophilus* Shrubland

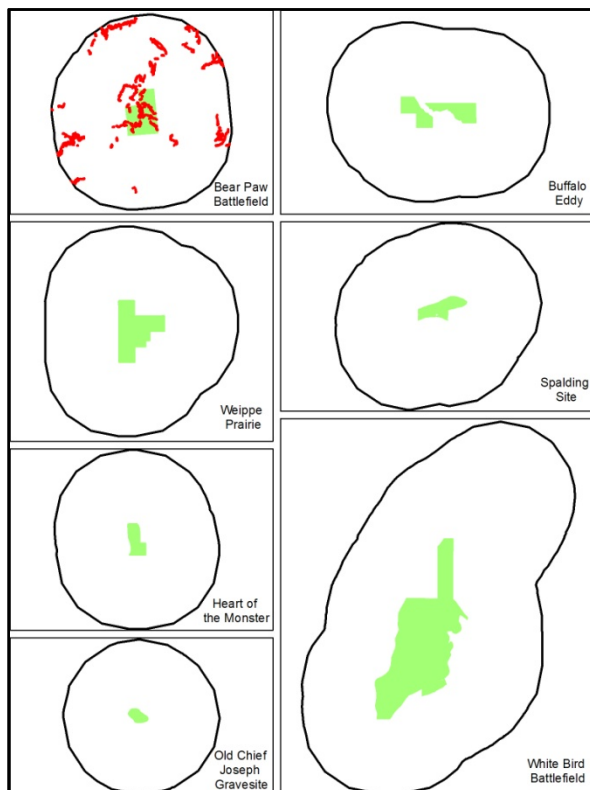
### Representative Ground Photos



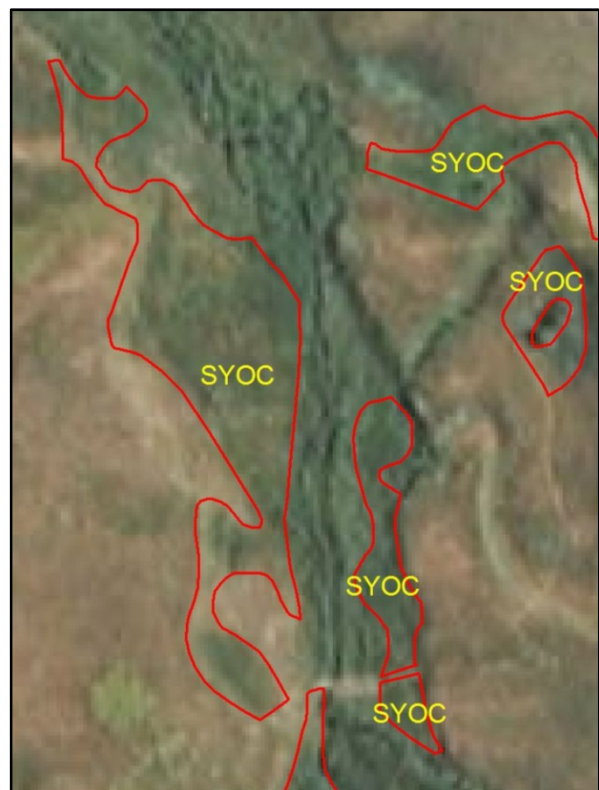
### Description

Western snowberry occurred in BEPA in draws, depressions, and on mesic soils. SYOC tended to form homogenous patches with little understory. SYOC was characterized by short shrubs that exhibit a smooth, olive-green signature on the 2011 NAIP imagery. Due to the similarity of signatures this map unit may have been confused with the SAEX and more SYOC occurs in the environs.

### Range and Distribution



### Photo Signature Example





## Herbaceous Vegetation

<b>Map Unit</b>	<b><i>Agropyron cristatum</i> - <i>Bromus tectorum</i> Semi-natural Herbaceous Vegetation</b>
<b>AGCR</b>	<b>Crested Wheatgrass / Cheatgrass Semi-natural Herbaceous Vegetation</b>

### Common Species

*Agropyron cristatum*, *Poa pratensis*, *Bromus tectorum*, *Hesperostipa comata*, *Selaginella densa*, *Medicago sativa*, *Rosa woodsii*

### NVCS Association

-*Agropyron cristatum* Semi- natural Herbaceous Vegetation

-*Agropyron cristatum* - *Medicago sativa* Semi-natural Herbaceous Vegetation

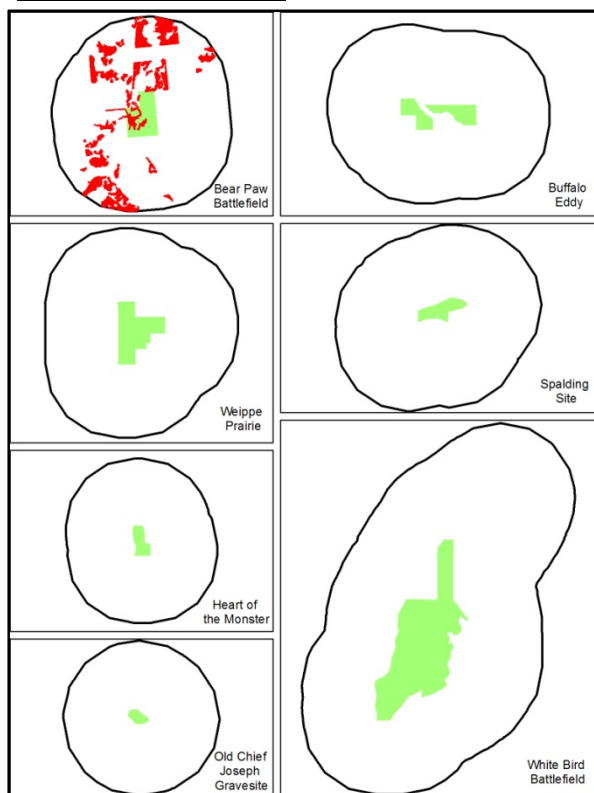
### Representative Ground Photo



### Description

AGCR characterizes pasture and previously cultivated lands that were seeded with crested wheatgrass, a non-native bunchgrass, in and around BEPA. Planted stands occurred throughout the BEPA project area on dry ridges, hilltops, terraces and other flat areas. On the 2011 NAIP imagery crested wheatgrass usually exhibited a light brown-tan color and old agricultural tillage lines were sometimes apparent. Polygons delineating this map unit likely include areas with high cheatgrass cover and possibly some pockets of native grasses.

### Range and Distribution



### Photo Signature Example



**Map Unit  
ALPR**

***Alopecurus pratensis* Semi-natural Herbaceous Vegetation  
Meadow Foxtail Semi-natural Herbaceous Vegetation**

**Common Species**

*Alopecurus pratensis*, *Poa pratensis*,  
*Camassia quamash*, *Ranunculus alismifolius*, *Vicia*  
*americana*, *Potentilla gracilis*, *Carex uticulata*,  
*Bromus inermis*, *Achillea millifolium*

**NVCS Association**

- Alopecurus pratensis* Semi-natural Herbaceous Vegetation
- Alopecurus pratensis* - *Poa pratensis* Semi-natural Herbaceous Vegetation

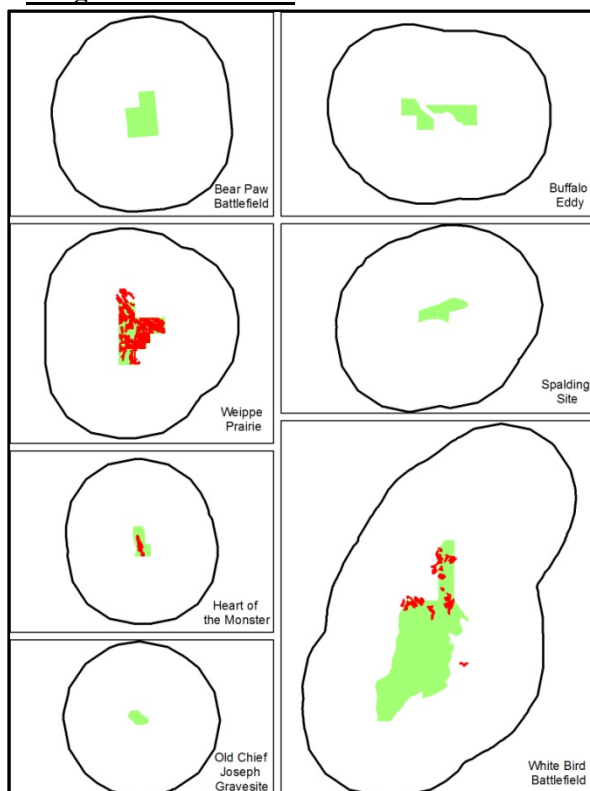
**Description**

Meadow foxtail grasslands established on mesic sites in the north section of WHBI, across all of WEPR, and in the south central portion of HEMO. The ALPR map unit represents sites that were seeded with meadow foxtail following development activities, planted for pasture and hay, or represent escaped stands that have invaded native grasslands. On the 2011 NAIP ortho-imagery the meadow foxtail map unit was characterized by a light green to gray signature with heavy mottling (appearing as circles and lines in some areas). Polygons of ALPR include small inclusions of other grassland and herbaceous types and additional ground-truthing work could be performed to better differentiate this type from areas where it mixes with the similar CAQU, RAAL, POPR, and BRIN map units.

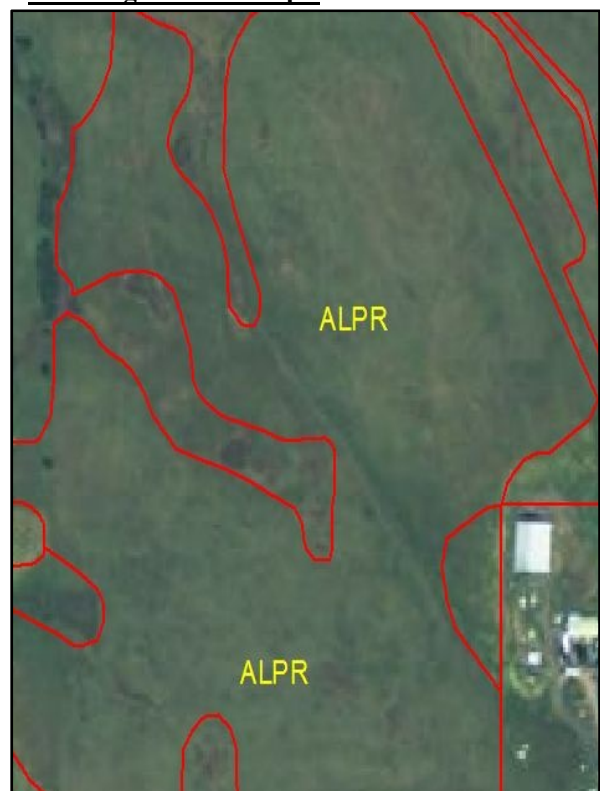
**Representative Ground Photo**



**Range and Distribution**



**Photo Signature Example**





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**Map Unit**  
**ANCA*****Anthriscus caucalis* Semi-natural Herbaceous Vegetation**  
**Bur Chervil Semi-natural Herbaceous Vegetation**

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**Representative Ground Photo****Common Species**

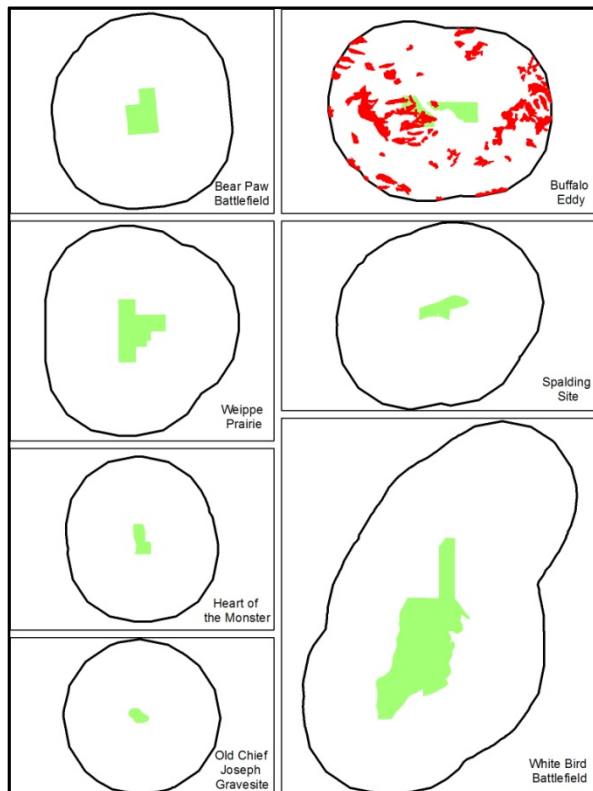
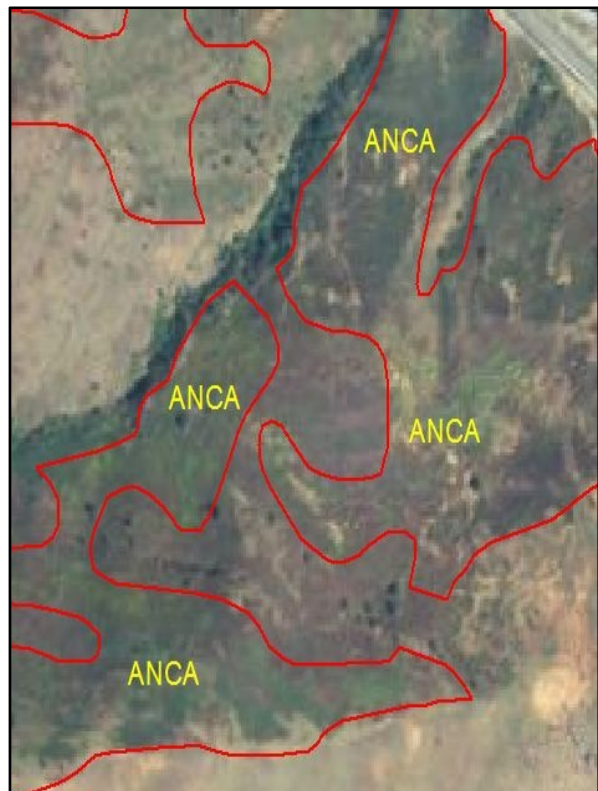
*Anthriscus caucalis*, *Festuca idahoensis*,  
*Hypericum perforatum*, *Bromus tectorum*,  
*Amelanchier alnifolia*, *Celtis reticulata*, *Philadelphus*  
*lewisii*, *Symphoricarpos occidentalis*, *Rosa woodsii*

**NVCS Association**

-*Anthriscus caucalis* Semi-natural Herbaceous  
Vegetation

**Description**

The bur chervil map unit occurs on mesic mountain slopes in BUED on both sides of the Snake River. Bur chervil was initially mis-identified as Queen Anne's lace (*Daucus carota*) during the classification plot data collection but was later corrected to bur chervil during the AA field work. Stands established in BUED occurred primarily on mesic north-facing slopes, often mixing with short serviceberry and Lewis' mock orange shrubs. On the 2011 NAIP ortho-imagery the bur chervil map unit was characterized by dark brown color with mottled greens and tans caused by inclusions of other semi-natural forbs and grasses.

**Range and Distribution****Photo Signature Example**

<b>Map Unit</b>	<b><i>Bromus diandrus</i> Herbaceous Vegetation</b>
<b>BRDI</b>	<b>Great Brome Herbaceous Vegetation</b>

### Common Species

*Bromus diandrus*, *Bromus inermis*, *Poa pratensis*,  
*Bromus rigidus*, *Daucus carota*, *Convolvulus arvensis*

### NVCS Association

-*Bromus diandrus* Herbaceous Vegetation

### Description

The great brome map unit represents planted grassland around the NEPE facilities in SPAL and in the southern environs. Polygons of this type represent sites that were seeded with great brome following development activities, planted for pasture and hay, or represent escaped stands that have invaded native grasslands. On the 2011 NAIP ortho-imagery the great brome map unit was characterized by a smooth, brown-gray signature with heavy mottling caused by dead grass and inclusions of other grassland types. More polygons of great brome stands may occur outside of SPAL and more ground-truthing work could be performed in the environs to help differentiate this type from the similar BRIN and MXGRS map units.

### Representative Ground Photo



### Range and Distribution



### Photo Signature Example





**Map Unit  
BRIN**

***Bromus inermis* Semi-natural Herbaceous Alliance  
Smooth Brome Semi-natural Herbaceous Alliance**

**Common Species**

*Bromus inermis*, *Poa pratensis*, *Bromus japonicus*,  
*Dactylis glomerata*, *Myosotis stricta*, *Camassia*  
*quamash*, *Medicago sativa*, *Anthriscus caucalis*

**NVCS Alliance**

-*Bromus inermis* Semi-natural Herbaceous Alliance

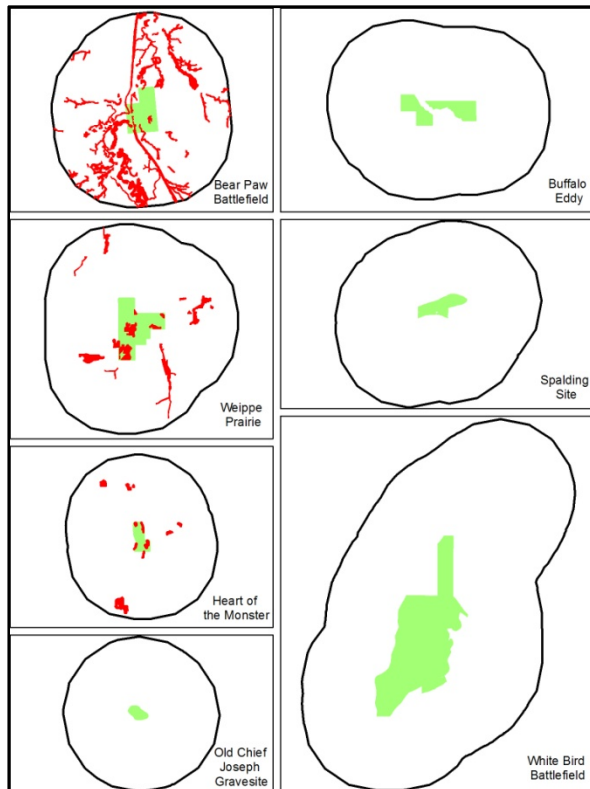
**Description**

The smooth brome map unit represents mesic planted or escaped grassland stands established in former fields and pastures of BEPA, WEPR, and HEMO. Polygons of this type represent sites that were seeded with smooth brome following development activities, planted for pasture and hay, or represent escaped stands that have invaded native grasslands. On the 2011 NAIP ortho-imagery the smooth brome map unit was characterized by a smooth, dark green color. Polygons of smooth brome stands may also include small inclusions of other grassland and herbaceous types and more ground-truthing work could be performed in the environs to help differentiate this type from the other brome and the mixed grassland map units.

**Representative Ground Photo**



**Range and Distribution**



**Photo Signature Example**



<b>Map Unit</b>	<b><i>Bromus tectorum</i> Semi-natural Herbaceous Alliance</b>
<b>BRTE</b>	<b>Cheatgrass Semi-natural Herbaceous Alliance</b>

### Common Species

*Bromus tectorum*, *Anthriscus caucalis*,  
*Pseudoroegneria spicata*, *Taeniatherum caput-medusae*, *Festuca ovina*, *Poa pratensis*, *Poa bulbosa*,  
*Convolvulus arvensis*, *Achillea millefolium*

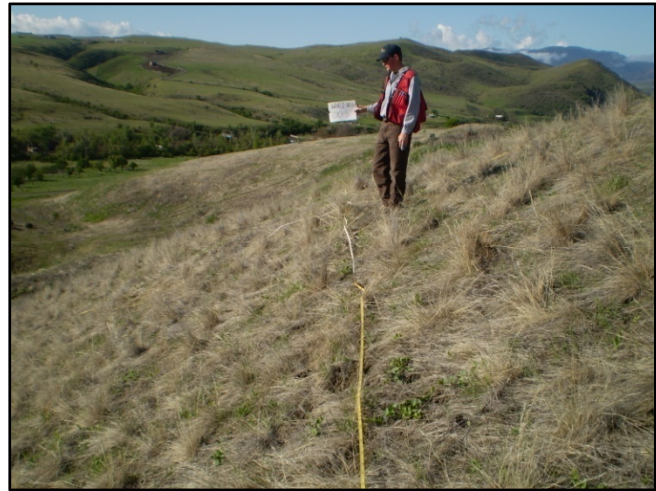
### NVCS Alliance and Associations

- Bromus tectorum* Semi-natural Herbaceous Alliance
- Bromus tectorum* - *Anthriscus caucalis* Semi-natural Herbaceous Vegetation
- Bromus tectorum* – *Pseudoroegneria spicata* Semi-natural Herbaceous Vegetation

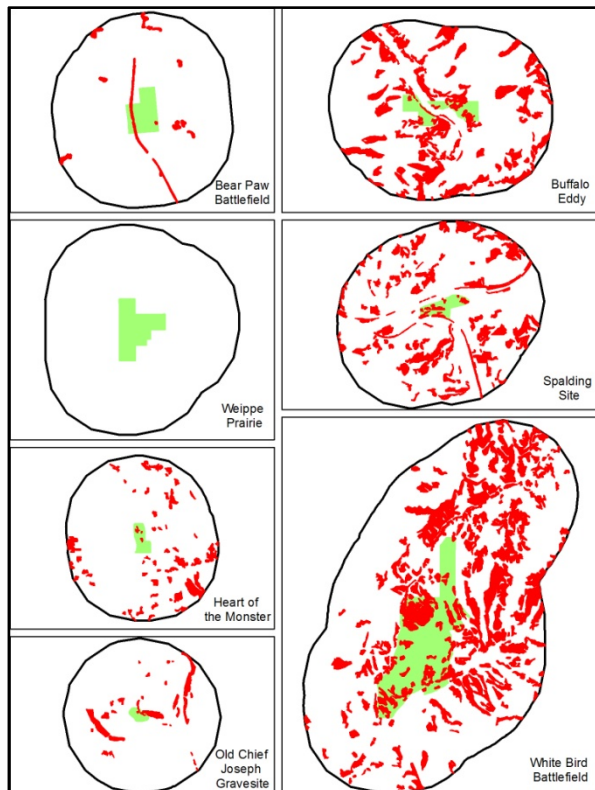
### Description

The invasive non-native annual cheatgrass occurred in all NEPE sites except WEPR. Across NEPE the BRTE map unit was interpreted to map dry and disturbed mountain and hill slopes, ridges, road ditches, and fallow fields supporting nearly monotypic stands of cheatgrass or semi-natural associations with bluebunch wheatgrass and bur chervil. Cheatgrass commonly occurred in the environs of HEMO, WHBI, BUED, and SPAL as a result of past agricultural and ranching operations. Stands of cheatgrass ranged from dense and tall on floodplains to low or sparse cover on dry sites in mountain slopes, on alluvial fans, and on hillslopes. On the NAIP imagery stands of cheatgrass with moderate cover (>20%) had a characteristic smooth tan color. Some confusion may exist in the mapping between the BRTE, AGCR, and TACA map units.

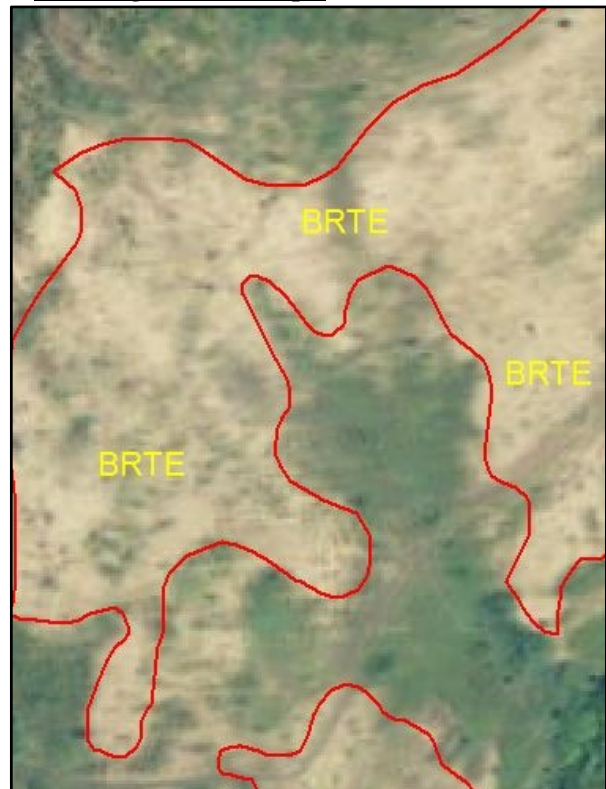
### Representative Ground Photo



### Range and Distribution



### Photo Signature Example





<b>Map Unit</b>	<b><i>Cardaria draba</i> Semi-natural Herbaceous Vegetation</b>
<b>CADR</b>	<b>Whitetop Semi-natural Herbaceous Vegetation</b>

### Common Species

*Cardaria draba*, *Bromus tectorum*, *Taeniatherum caput-medusae*, *Bromus japonicus*, *Brodiaea douglasii*, *Thlaspi arvense*, *Convolvulus arvensis*

### NVCS Association

-*Cardaria draba* Semi-natural Herbaceous Vegetation

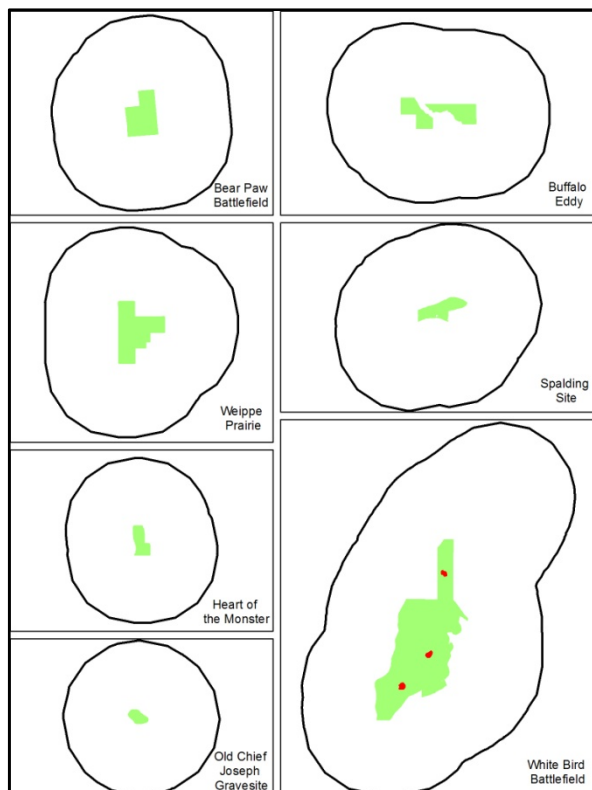
### Description

Whitetop stands were part of the weedy, non-native mosaic of herbaceous vegetation established within WHBI. Additional non-native herbaceous types were mapped separately using the CESO-COAR, BRTE, POPR, TACA, and WEED map units and some confusion likely exists in the mapping between these similar types. CADR polygons were limited in size to three small polygons where whitetop was known to dominate the vegetation. Sites mapped in CADR were grazed in the past and/or were disturbed by seeding or fire events. On the 2011 NAIP imagery, stands of CADR with sufficient cover (>20%) exhibited a characteristic coarse green color and were very mottled with associated tans and browns representing dead/dormant grasses and weedy map units.

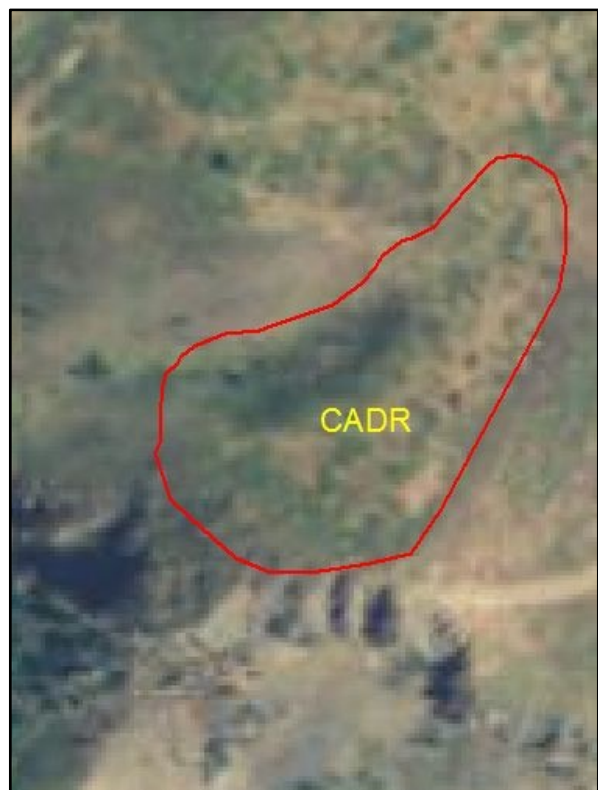
### Representative Ground Photo



### Range and Distribution



### Photo Signature Example



<b>Map Unit</b>	<b><i>Camassia quamash</i>) Seasonally Flooded Herbaceous Alliance</b>
<b>CAQU</b>	<b>Camas (Cusick's, Small) Flooded Herbaceous Alliance</b>

### Common Species

*Camassia quamash*, *Alopecurus pratensis*, *Poa pratensis*, *Ranunculus alismifolius*, *Vicia americana*, *Potentilla gracilis*, *Carex uticulata*, *Bromus inermis*

### NVCS Associations

- Camassia quamash* – *Alopecurus pratensis*  
Wet Prairie Herbaceous Vegetation
- Camassia quamash* Wet Prairie Herbaceous  
Vegetation

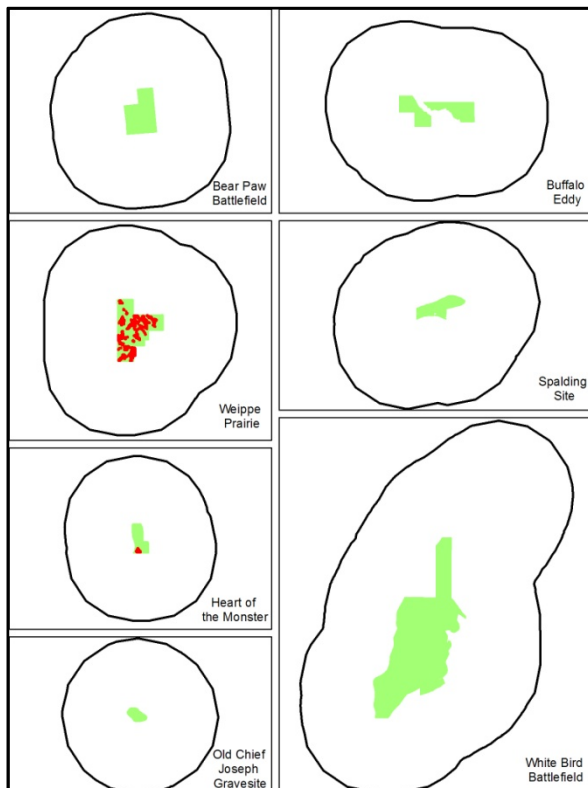
### Description

The CAQU map unit is widespread in the mesic upland prairie within WEPR and occurred in the southwest corner of HEMO. In both locations purple-flowering camas plants were established with Kentucky bluegrass and meadow foxtail. Camas plants and bulbs were an important food source to the Nez Perce Tribe and their presence indicates a relatively intact and healthy prairie ecosystem. Yellow plantain buttercup often mixed with camas in WEPR forming a striking wildflower prairie mosaic. Associated grasses and forbs included slender cinquefoil, American vetch, and Northwest Territory sedge. The photo signature for this map unit appeared smooth and green with brown streaks due to the lack of shrubs and the presence of wet soils.

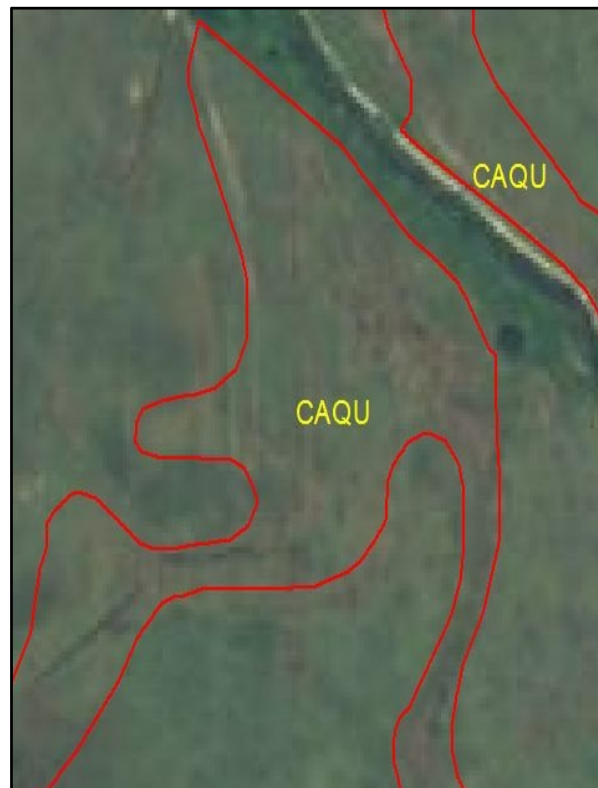
### Representative Ground Photo



### Range and Distribution



### Photo Signature Example





<b>Map Unit</b>	<b><i>Centaurea solstitialis</i> - <i>Convolvulus arvensis</i> Semi-natural Herbaceous Vegetation</b>
<b>CESO-COAR</b>	<b>Yellow Star-thistle - Field Bindweed Semi-natural Herbaceous Vegetation</b>

### Common Species

*Centaurea solstitialis*, *Convolvulus arvensis*, *Bromus tectorum*, *Bromus japonicus*, *Taeniatherum caput-medusae*, *Pseudoroegneria spicata*, *Valerianella locusta*, *Hypericum perforatum*

### NVCS Association

-*Centaurea solstitialis* –*Convolvulus arvensis*  
Semi-natural Herbaceous Vegetation

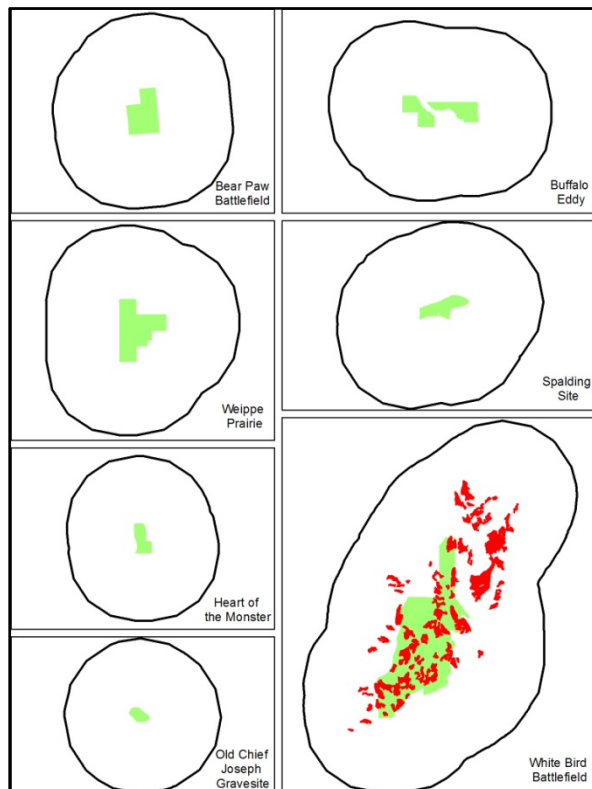
### Description

The CESO-COAR map unit was common within WHBI on uplands as an element of a non-native herbaceous mosaic consisting of cheatgrass, Canada thistle, medusahead grass, Kentucky bluegrass, and other non-native forb species. Other areas including BUED and SAPL supported smaller populations of yellow star-thistle which were not large enough to map. Other non-native herbaceous types were mapped separately using the CADR, BRTE, POPR, TACA and WEED map units and some confusion likely exists in the mapping between similar types. CESO-COAR polygons were characterized as dry areas of dominant or dead grass with individual yellow star-thistle plants and trailing field bindweed vines. Sites with CESO-COAR were grazed in the past and/or where disturbed by past seeding or fire events. On the 2011 NAIP imagery stands of CESO-COAR with sufficient cover (>20%) had a characteristic smooth green color and were very mottled with associated tans and browns representing dead/dominant grasses and other weedy map units.

### Representative Ground Photo



### Range and Distribution



### Photo Signature Example



<b>Map Unit</b>	<b><i>Centaurea stoebe</i> Semi-natural Herbaceous Vegetation</b>
<b>CEST</b>	<b>Spotted Knapweed Semi-natural Herbaceous Vegetation</b>

### Common Species

*Centaurea stoebe*, *Bromus tectorum*, *Poa pratensis*, *Prunus* spp., *Symphoricarpos albus*, *Centaurea biebersteinii*, *Potentilla erecta*

### NVCS Association

-*Centaurea stoebe* Semi-natural Herbaceous Vegetation

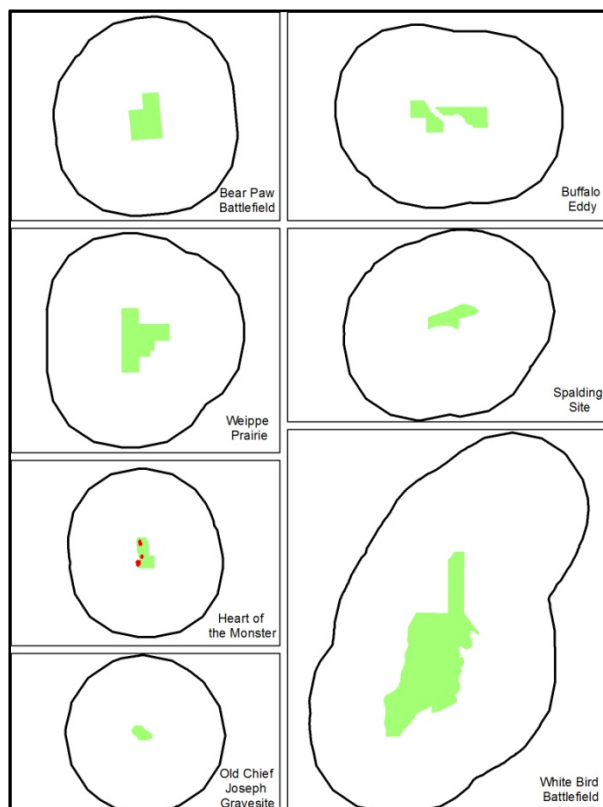
### Representative Ground Photo



### Description

A few polygons of spotted knapweed occurred in HEMO adjacent to the riparian shrublands that line Clearwater River banks. Other areas including WHBI and SAPL supported individual spotted knapweed plants or small patches which were not large enough to map. On the NAIP imagery stands of CEST had moderate cover with a characteristic coarse tan and brown color. Additional sites with CEST likely occur in the NEPE environs mapped as MXGRS.

### Range and Distribution



### Photo Signature Example





<b>Map Unit</b>	<b><i>Elymus repens</i> Herbaceous Alliance</b>
<b>ELRE</b>	<b>Quackgrass Herbaceous Alliance</b>

### Common Species

*Elymus repens*, *Poa pratensis*, *Festuca ovina*,  
*Taeniatherum caput-medusae*, *Pascopyrum smithii*,  
*Convolvulus arvensis*, *Lactua serriola*, *Achillea*  
*millefolium*

### NVCS Alliance

-*Elymus repens* Herbaceous Alliance

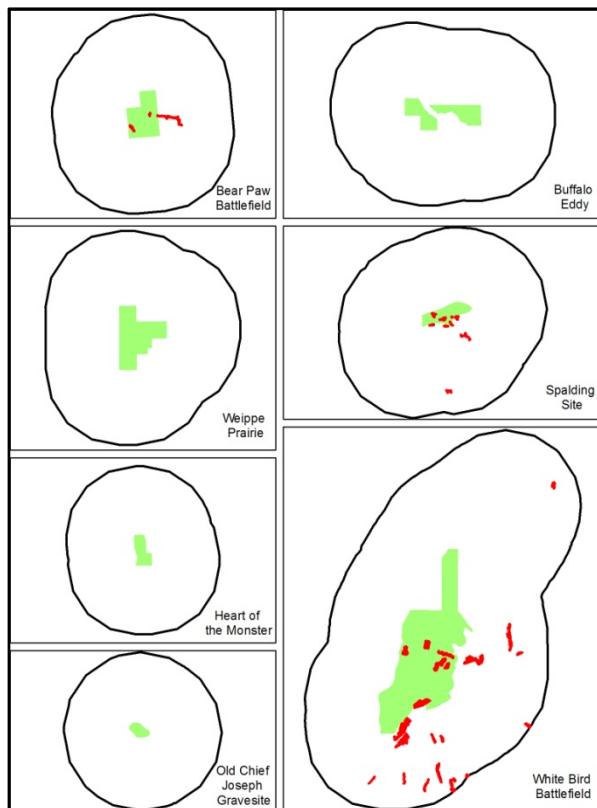
### Description

Quackgrass is a common species of mesic sites in BEPA, SPAL and WHBI. Polygons of this unit likely represent seeding with quackgrass following development activities, planted for pasture and hay, or represent escaped stands that have invaded native grasslands. On the 2011 NAIP ortho-imagery the ELRE map unit was characterized by a light green to tan signature with heavy mottling (appearing as squares due to herbicide treatment in some areas). Polygons of ELRE may also include small inclusions of other grassland and herbaceous types and more ground-truthing could be performed, especially in the environs to help differentiate it from the similar BRIN and MXGRS map units.

### Representative Ground Photo



### Range and Distribution



### Photo Signature Example



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**Map Unit  
FEOV*****Festuca ovina* Semi-natural Herbaceous Vegetation  
Sheep Fescue Semi-natural Herbaceous Vegetation**

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**Common Species**

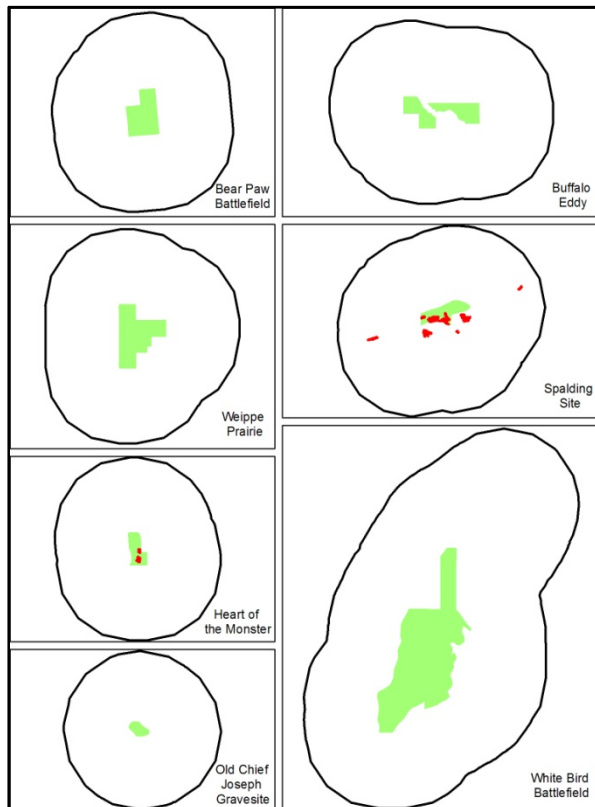
*Festuca ovina*, *Bromus inermis*, *Rosa woodsii*,  
*Daucus carota*, *Poa pratensis*

**NVCS Association**

-*Festuca ovina* Semi-natural Herbaceous Vegetation

**Representative Ground Photo****Description**

Sheep fescue was a common lawn grass of maintained settings in SPAL and HEMO. FEOV was on slightly drier areas than similar lawns of Kentucky bluegrass. In the SPAL environs, FEOV occurred in road/railroad ditches, residential lawns, and agricultural pens and arenas. Sheep fescue was seeded in many locations in the past and spread into other areas. Polygons of this map unit were characterized by a very smooth, light tan signature and may include small inclusions of mottled to blotchy greens resulting from inclusions of weedy forbs and other grass species.

**Range and Distribution****Photo Signature Example**



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**Map Unit**  
**LECI-POPR**

***Leymus cinereus* - *Poa pratensis* Herbaceous Vegetation**  
**Great Basin Wildrye - Kentucky Bluegrass Herbaceous Vegetation**

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**Common Species**

*Leymus cinereus*, *Poa pratensis*, *Lupinus sericeous*, *Rosa woodsii*, scattered *Juniper* spp., and *Pinus ponderosa* seedlings.

**NVCS Association**

-*Leymus cinereus* - *Poa pratensis* Herbaceous Vegetation

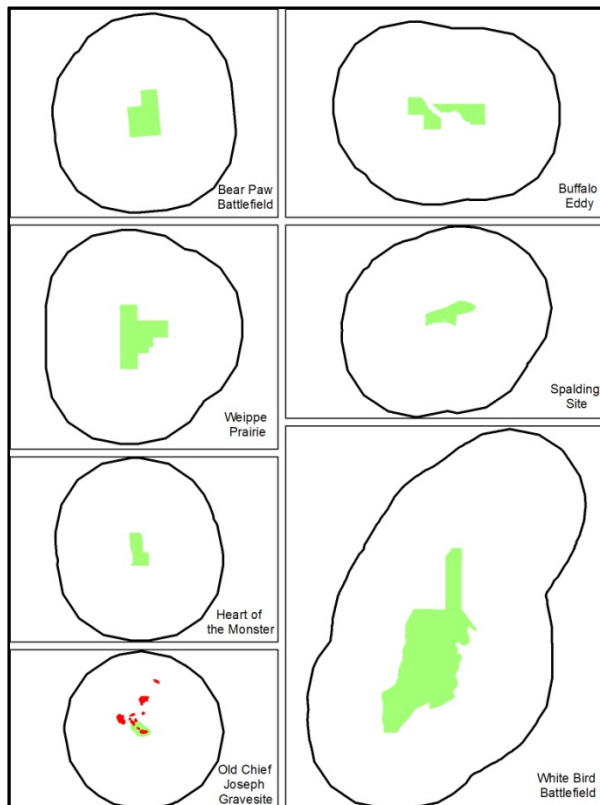
**Representative Ground Photo**



**Description**

Great Basin wildrye is an important native grass species that likely covered large mesic sites in the NEPE sites prior to widespread farming and ranching activity. Great Basin wildrye occurred in OLJO near the gravesite where it formed a dense grassland type with Kentucky bluegrass. On the 2011 NAIP imagery the Great Basin wildrye exhibited a characteristic lime green color that was rough and patchy with undertones of browns and tans relating to cheatgrass and other non-native grasses. Additional stands of this type likely occurs in the project environs where it was mapped as part of the MXGRS mapping unit.

**Range and Distribution**



**Photo Signature Example**



**Map Unit  
MEDW**

**Dry Mixed Herbaceous Vegetation Complex**

**Common Species**

*Pascopyrum smithii*, *Poa pratensis*, *Hesperostipa comata* ssp. *comata*, *Krashennikovia lanata*, *Artemisia cana*, *Symphoricarpos occidentalis*, *Selaginella densa*, *Artemisia frigida*

**NVCS Association**

- Hesperostipa comata* - *Bouteloua gracilis* - *Carex filifolia* Herbaceous Vegetation
- Pascopyrum smithii* - *Hesperostipa comata* Central Mixedgrass Herbaceous Vegetation
- Pascopyrum smithii* - *Poa pratensis* Herbaceous Vegetation

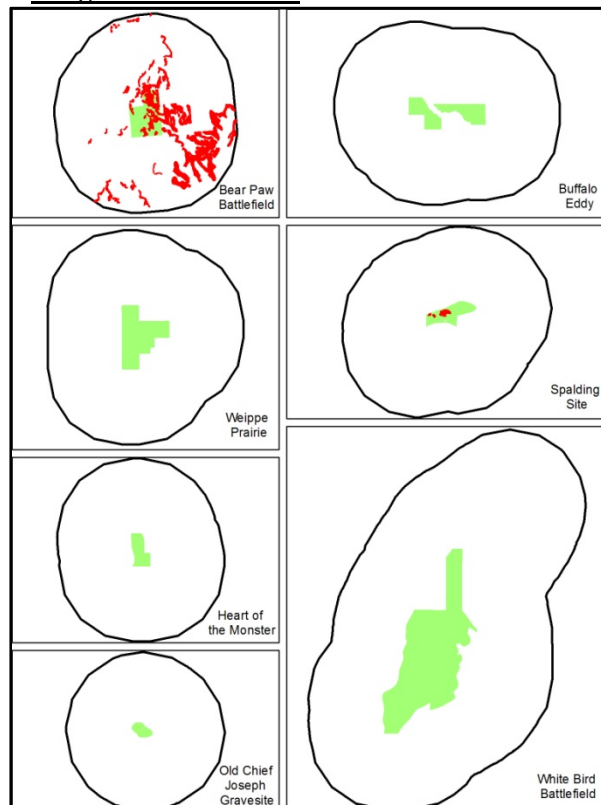
**Description**

The dry meadow map unit represents upland grasslands with moderate to high cover of native grasses, specifically western wheatgrass associated with Kentucky bluegrass in SPAL (may represent restoration efforts) and native prairie sites in BEPA characterized by western wheatgrass, needle-and-thread, blue grama, and threadleaf sedge. Polygons of this type typically occurred on dry, wind-blown terraces, benches, and rolling-meadows. Non-native cheatgrass and Kentucky bluegrass were sometimes present. The density of native grasses varied greatly from sparse communities on sandy/silty soils to denser stands on loams and other established/deep soil types. On the ortho-imagery this map unit appeared as a mottled, smooth signature due to the lack of shrubs and varied in color from brown to light tan.

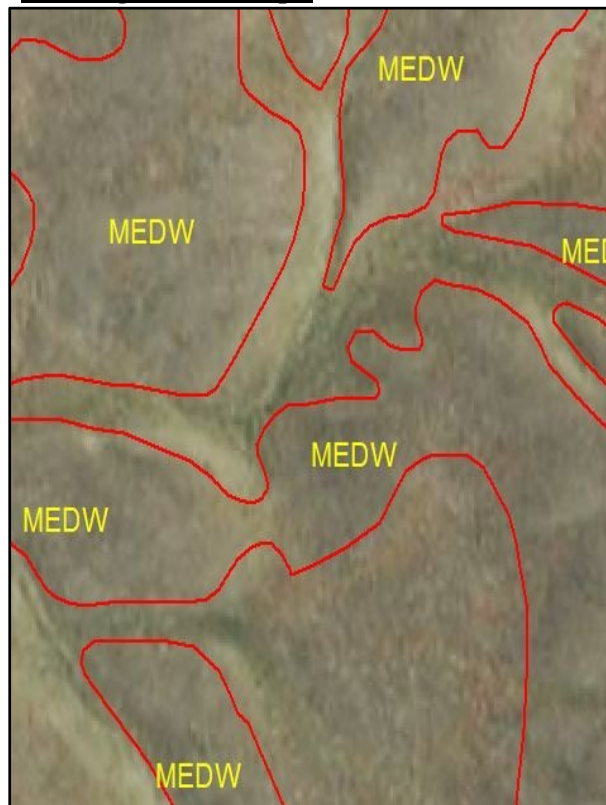
**Representative Ground Photo**



**Range and Distribution**



**Photo Signature Example**





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**Map Unit  
MXGRS**

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**Mixed Planted and Semi-natural Grassland Complex****Representative Ground Photo****Common Species**

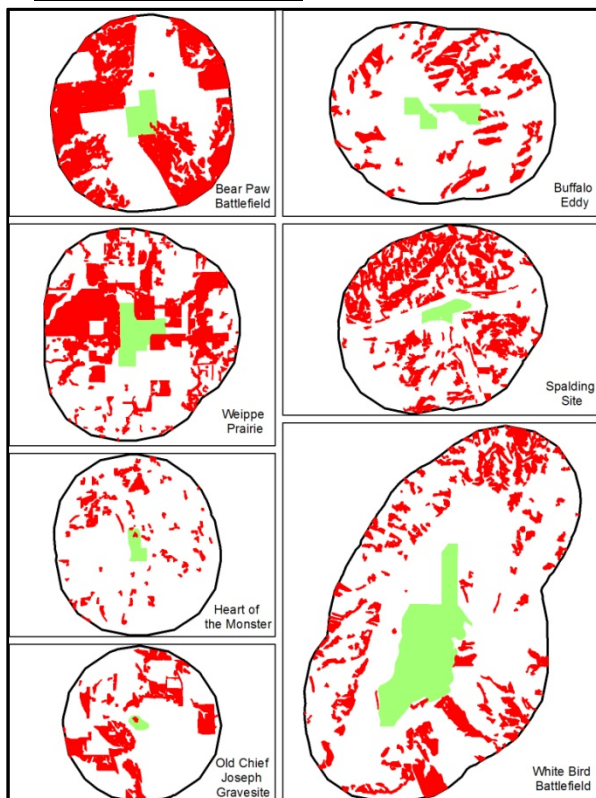
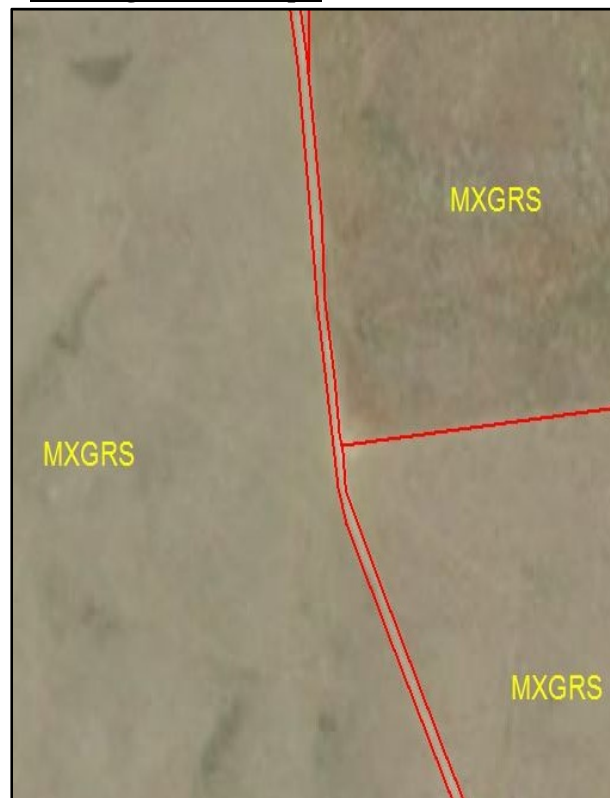
*Bromus tectorum*, *Poa pratensis*, *Pascopyrum smithii*,  
*Agropyron* spp. *Bromus japonicus*, *Bromus inermis*,  
*Pseudoroegneria spicata*, *Festuca idahoensis*,  
Unknown Graminoid Species

**NVCS Association**

-[No Association – Park Special]

**Description**

This map unit represents grasslands with unknown dominants located in the project environs for all seven NEPE sites. Polygons of the MXGRS map unit likely trend from mixes of non-native cheatgrass and crested wheatgrass with some native bluebunch wheatgrass on dry sites to smooth brome and Kentucky bluegrass with some native western wheatgrass in more mesic areas. A vast majority of the MXGRS polygons have been affected in the past by ranching, farming, grazing cattle, horses, and sheep, or have been planted/seeded for pasture hay. Some patches of native grasslands likely exist within this type especially on the difficult-to-access mountain and canyon slopes surrounding BUED and WHBI but were not sufficiently large to map or were not recognizable on the 2011 NAIP imagery. Based on similar studies the presence of non-native wheatgrasses and cheatgrass usually exhibits a dark brown-tan (mocha) color and non-native bluegrasses and smooth brome exhibit a darker green color similar to the grassland patterns found outside of the NEPE sites. No classification data were collected in these areas and more ground-truthing would greatly aid in classifying them into appropriate NVCS associations and alliances.

**Range and Distribution****Photo Signature Example**

<b>Map Unit</b>	<b><i>Phalaris arundinacea</i> Western Herbaceous Vegetation</b>
<b>PHAR</b>	<b>Reed Canarygrass Western Herbaceous Vegetation</b>

### Common Species

*Phalaris arundinacea*, *Rubus armeniacus*,  
*Dipsacus fullonum*, *Urtica dioica*,  
*Bromus tectorum*, *Rumex crispus*,  
*Thinopyrum ponticum*, *Cirsium arvense*

### NVCS Association

-*Phalaris arundinacea* Western Herbaceous Vegetation

### Description

Reed canarygrass addresses small linear stands of this wetland grassland occurring during the AA in SPAL and WEPR. The sites supporting PHAR in SPAL were located along the major streams and were interspersed with black cottonwood and peachleaf willow trees in low cover. Within WEPE a small drainage along the southeast boundary supported the PHAR map unit. On the NAIP imagery stands of pure reed canarygrass with high cover (> 50%) exhibited characteristic smooth, bright green color and sparse stands were light green and contained white and gray mottles representing exposed soil. Due to the close similarity with the POPR and BRIN map units some overlap in mapping likely exists between the three mesic grass types.

### Representative Ground Photo



### Range and Distribution



### Photo Signature Example





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**Map Unit** *Poa bulbosa* - *Poa pratensis* Semi-natural Herbaceous Vegetation  
**POBU** Bulbous Bluegrass - Kentucky Bluegrass Semi-natural Herbaceous Vegetation

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**Common Species**

*Poa bulbosa*, *Poa pratensis*, *Bromus inermis*,

**NVCS Alliance**

-*Poa bulbosa* - *Poa pratensis* Semi-natural Herbaceous Vegetation

**Representative Ground Photo**



**Description**

Bulbous bluegrass was mapped in SPAL and HEMO where it occurred in both maintained lawns and abandoned agricultural fields. Both bulbous and Kentucky bluegrass were seeded in the past in HEMO and SPAL, around the visitor center, cemetery, and the Heart of the Monster formation and the two species mix leading to some confusion in the mapping. The POBU map unit also likely occurs in the project environs but lack of ground data makes it impossible to accurately map POBU outside of NEPE. Polygons of this map unit were characterized by a very smooth, light green signature with many inclusions of mottled tans, to blotchy greens resulting from dryness and mowing patterns.

**Range and Distribution**



**Photo Signature Example**



<b>Map Unit</b>	<b><i>Poa pratensis</i> Semi-natural Herbaceous Alliance</b>
<b>POPR</b>	<b>Kentucky Bluegrass Semi-natural Herbaceous Alliance</b>

### Common Species

*Poa pratensis*, *Elymus repens*, *Bromus tectorum*, *Pascopyrum smithii*, *Bromus japonicus*, *Taraxacum officinale*, *Convolvulus arvensis*, *Sisymbrium altissimum*, *Vicia americana*

### NVCS Alliance

-*Poa pratensis* Semi-natural Herbaceous Alliance

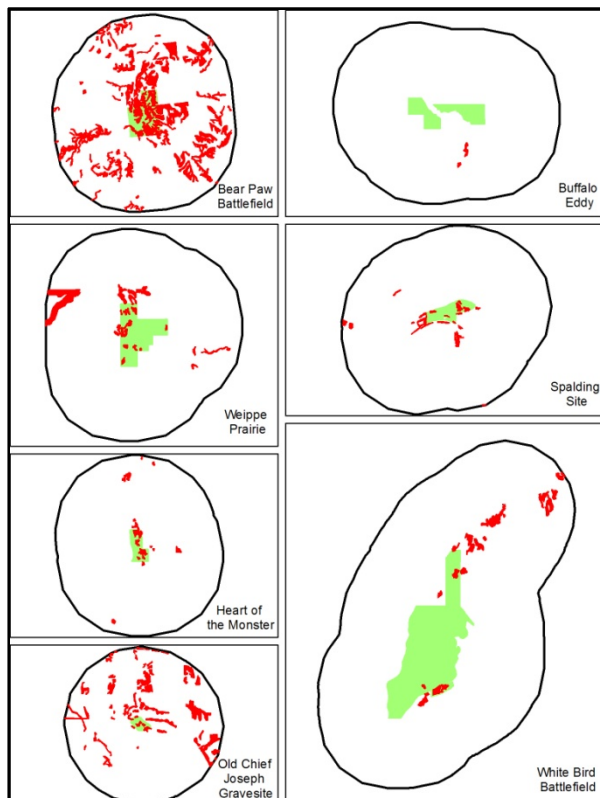
### Description

This perennial rhizomatous graminoid type represents monotypic mowed lawns in SPAL and HEMO and former seeded fields and disturbed areas at the remaining five NEPE sites. Outside of NEPE, POPR occurred in road ditches, residential lawns, and agricultural pastures. Kentucky bluegrass was seeded in some of these locations in the past and then spread to other areas. Polygons of this map unit were characterized by a very smooth, light green signature and may include small inclusions of mottled tans, to blotchy greens resulting from dryness and mowing/grazing patterns.

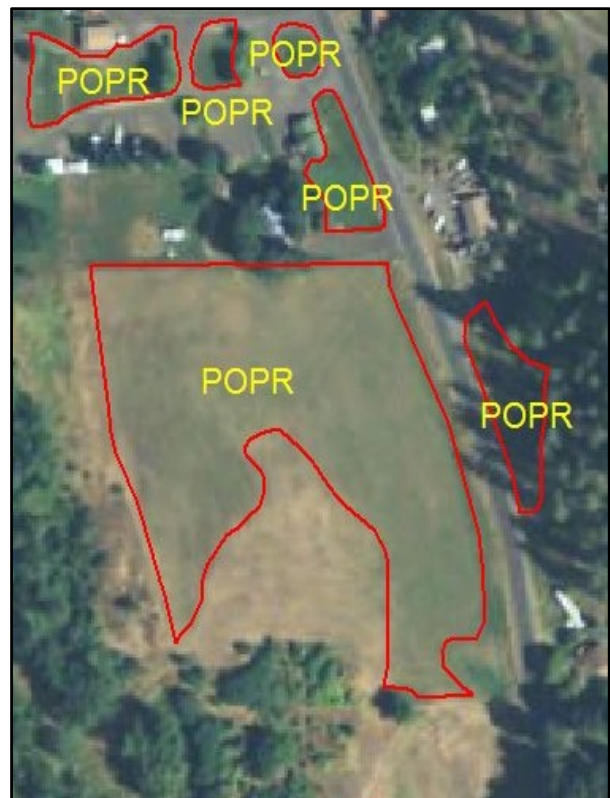
### Representative Ground Photos



### Range and Distribution



### Photo Signature Example





**Map Unit  
PSSP**

***Pseudoroegneria spicata* Herbaceous Vegetation  
Bluebunch Wheatgrass Herbaceous Vegetation**

**Common Species**

*Pseudoroegneria spicata*, *Festuca idahoensis*,  
*Calamagrostis rubescens*, *Rosa woodsii*, *Achillea*  
*millefolium*, *Convolvulus arvensis*, *Melilotus officinalis*,  
*Hypericum perforatum*

**NVCS Associations**

-*Pseudoroegneria spicata* Herbaceous Alliance  
-*Festuca idahoensis* - *Pseudoroegneria spicata*  
Herbaceous Vegetation

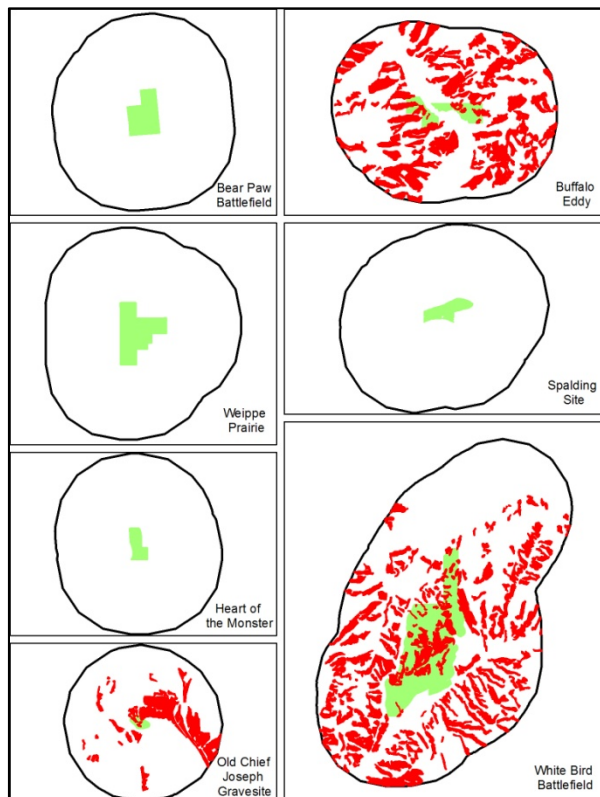
**Description**

Bluebunch wheatgrass individually or without Idaho fescue was a common upland grassland throughout natural settings of BUED, OLJO, and WHBI on mountain slopes and upper bench areas. Stands were somewhat patchy in distribution and were often mixed with short- or dwarf-shrubs and a variety of forbs. Non-native species, including Kentucky bluegrass sometimes occurred in low cover. The density of PSSP varied from sparse on thin soils to moderately dense on loams and deep soils. The photo-signature for this map unit appeared smooth and mottled (swirled) due to the lack of shrubs and varied in color from brown, to light tan, and gray depending on soil color.

**Representative Ground Photo**



**Range and Distribution**



**Photo Signature Example**



**Map Unit  
RAAL**

***Ranunculus alismifolius* Temporarily Flooded Herbaceous Vegetation  
Plantainleaf Buttercup Temporarily Flooded Herbaceous Vegetation**

**Common Species**

*Ranunculus alismifolius*, *Alopecurus pratensis*, *Camassia quamash*, *Carex utriculata*, *Carex praticola*, *Agrostis stolonifera*

-*Ranunculus alismifolius* Temporarily Flooded  
Herbaceous Vegetation

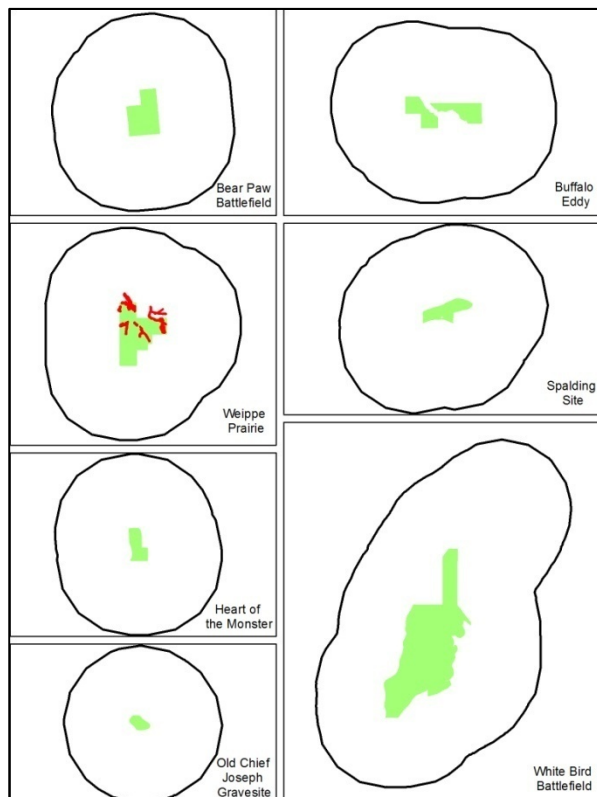
**Representative Ground Photo**



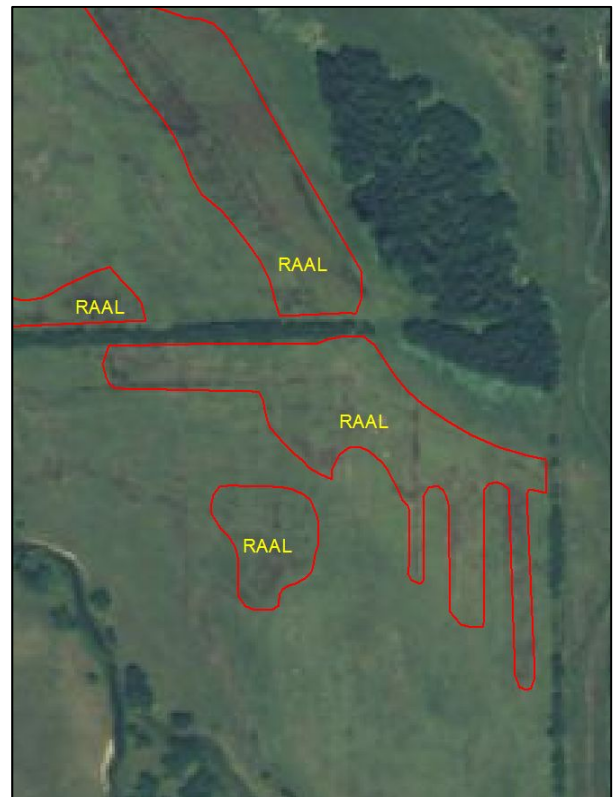
**Description**

The RAAL map unit occurred within WEPR as somewhat linear bands surrounded by mesic grasslands. Yellow plantain buttercup often mixed with purple camas plants forming a striking wildflower prairie mosaic when in bloom. Associated grass species varied by location but among the most common were meadow foxtail, smooth brome, and Kentucky bluegrass. The photo-signature for this map unit appeared smooth and green with brown streaks due to the lack of shrubs and the presence of wet soils.

**Range and Distribution**



**Photo Signature Example**





<b>Map Unit</b>	<b><i>Taeniatherum caput-medusae</i> Semi-natural Herbaceous Vegetation</b>
<b>TACA</b>	<b>Medusahead Semi-natural Herbaceous Vegetation</b>

### Common Species

*Taeniatherum caput-medusae*, *Bromus tectorum*, *Poa pratensis*, *Convolvulus arvensis*, *Dipsacus fullonum*, *Lactuca serriola*, *Centaurea solstitialis*

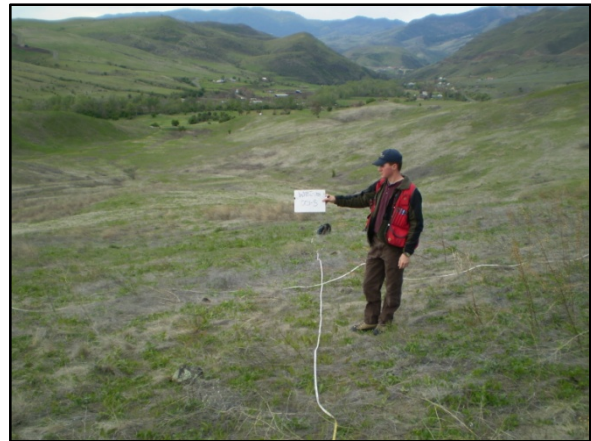
### NVCS Alliance and Association

-*Taeniatherum caput-medusae* Semi-natural Herbaceous Vegetation

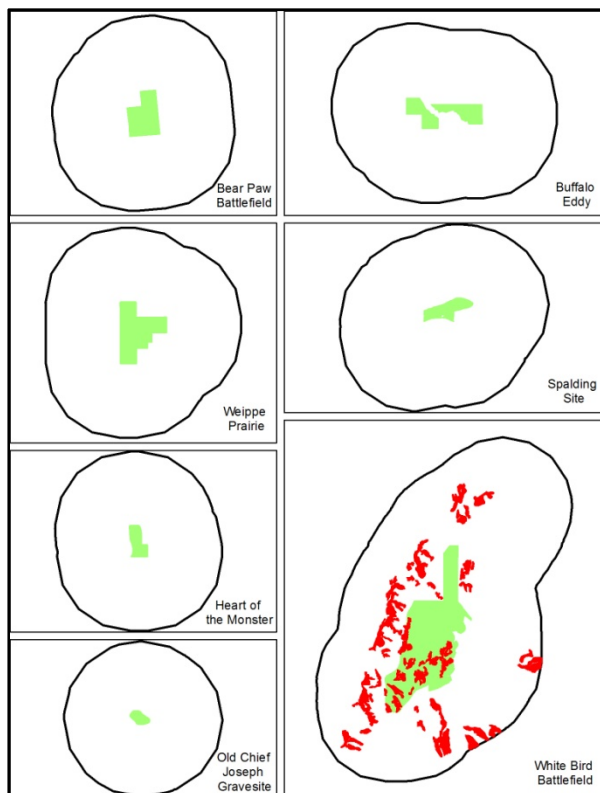
### Description

The invasive non-native medusahead grass occurred in nearly monotypic stands on broad plains, rolling hills, and slopes of WHBI. Grasslands of TACA included a few other non-native grasses and some weedy forb species in low cover. The TACA map unit was common in the central portions of WHBI and was established on previously burned sites, fields, pastures, and in the environs around agricultural and ranching operations. Stands of medusahead grass ranged from dense cover on more developed soils to low or sparse cover on rocky or disturbed soils. On the NAIP imagery stands of cheatgrass with moderate cover (>20%) had a characteristic smooth, bright tan color and there may have been some confusion of the TACA map unit with cheatgrass and the other weedy herbaceous vegetation classes of WHBI.

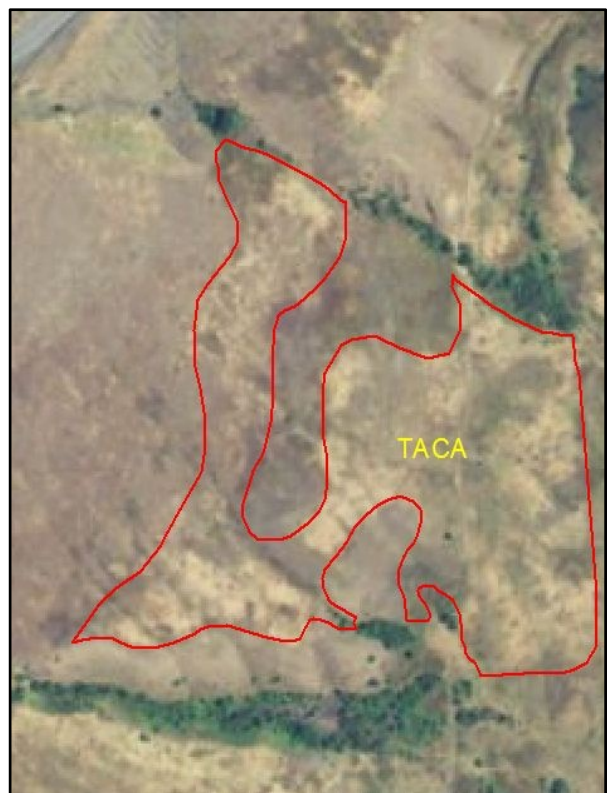
### Representative Ground Photo



### Range and Distribution



### Photo Signature Example



<b>Map Unit</b>	<b><i>Typha (latifolia, angustifolia)</i> Western Herbaceous Vegetation</b>
<b>TYLA</b>	<b>Broadleaf Cattail Marsh</b>

### Common Species

*Typha latifolia*, *Dipsacus fullonum*, *Bromus japonicus*,  
*Rosa canina*, *Rosa woodsii*

### NVCS Association

-*Typha (latifolia, angustifolia)* Western Herbaceous  
Vegetation

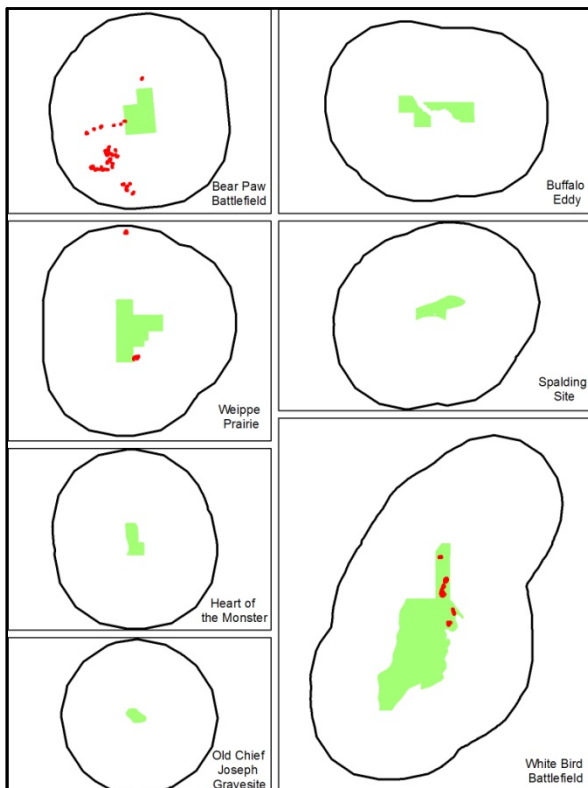
### Representative Ground Photo



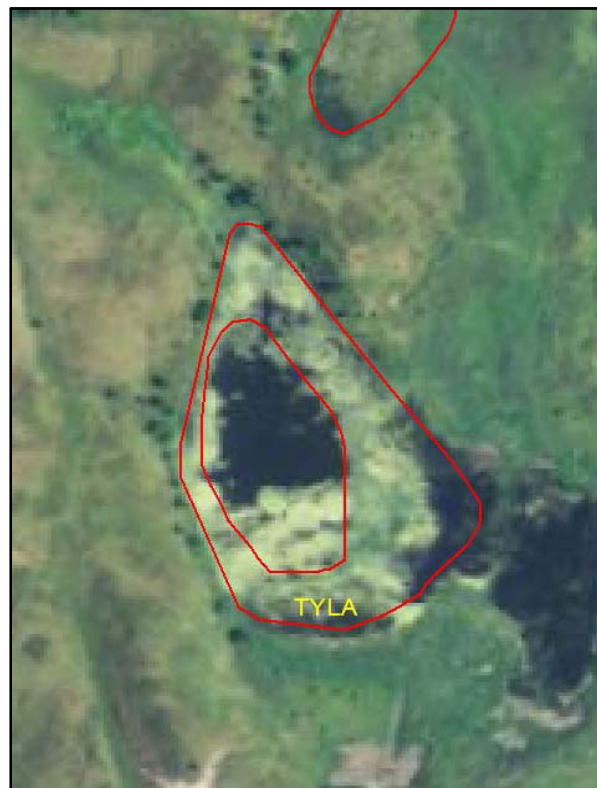
### Description

Cattail marsh occurred within NEPE at WHBI but other obvious cattail stands occurred in the environs of BEPA, SPAL and WEPR. The TYLA map unit was mainly associated with pond margins and standing water of seeps and springs. Cattails formed thick mats with little diversity and few associated species; based on the field data all of the cattail stands in NEPE were identified as *Typha latifolia*. On the NAIP imagery this type was mapped partially by its landscape position on pond edges and partially by its characteristic smooth, mottled, light green color with white and blue streaks (water).

### Range and Distribution



### Photo Signature Example





<b>Map Unit</b>	<b>Mixed Weedy Semi-natural Herbaceous Vegetation Complex</b>
<b>WEED</b>	<b>(<i>Cirsium arvense</i>, <i>Euphorbia esula</i>, <i>Melilotus</i> spp.) - Mixed Forbs Herbaceous Alliance</b>

### Common Species

*Cirsium arvense*, *Convolvulus arvensis*, *Poa pratensis*, *Bromus tectorum*, *Lactuca serriola*, *Dipsacus fullonum*, *Hypericum perforatum*

### NVCS Association

-(*Cirsium arvense*, *Euphorbia esula*, *Melilotus* spp.) - Mixed Forbs Herbaceous Alliance

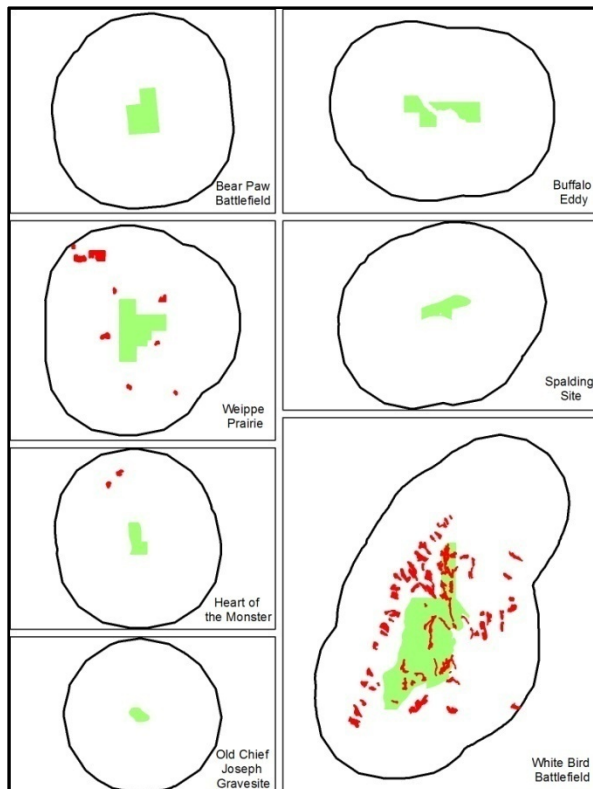
### Description

The mixed weedy herbaceous complex unit was identified in WHBI due to stands of Canada thistle. The remaining non-native species listed in this alliance were either not observed (leafy spurge) or were minor components (yellow sweatclover). However other non-native invasive forbs not listed in this NVC alliance were present in abundance in WHBI. The species were mapped within an individual semi-natural map unit (CESO-COAR and CADR) or were included in this map unit (specifically teasel and St. John's wort). The WEED map unit was also used to attribute disturbed areas in the environs of WEPR and HEMO that likely contain early successional annual vegetation or patches of non-native forbs. Since classification plot data were not collected in the environs the exact species composition is unknown. More ground-truthing (with permission from the landowners) would allow for better classification and description of this type outside of WHBI. On the NAIP imagery stands of weedy vegetation with sufficient cover (>20%) had a characteristic smooth, mottled dark green color.

### Representative Ground Photo



### Range and Distribution



### Photo Signature Example



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<b>Map Unit</b> <b>CUTB</b>	<b>Cut Bank Sparse Vegetation</b>
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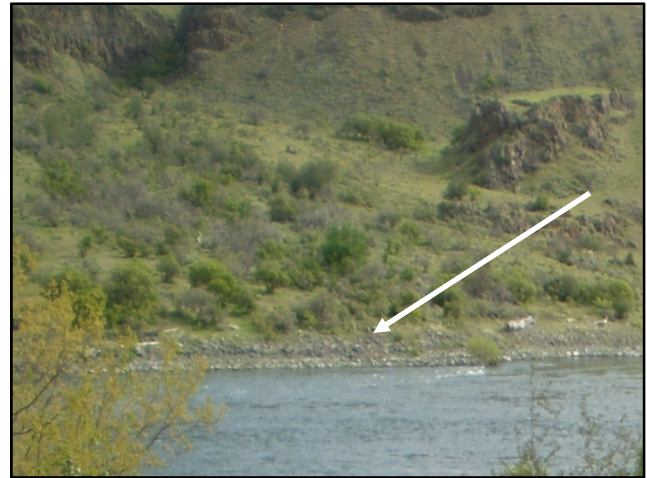
**Common Species**

*Salix exigua*, *Bromus tectorum*,  
unknown riparian species

**NVCS Association**

-[No Association – Park Special]

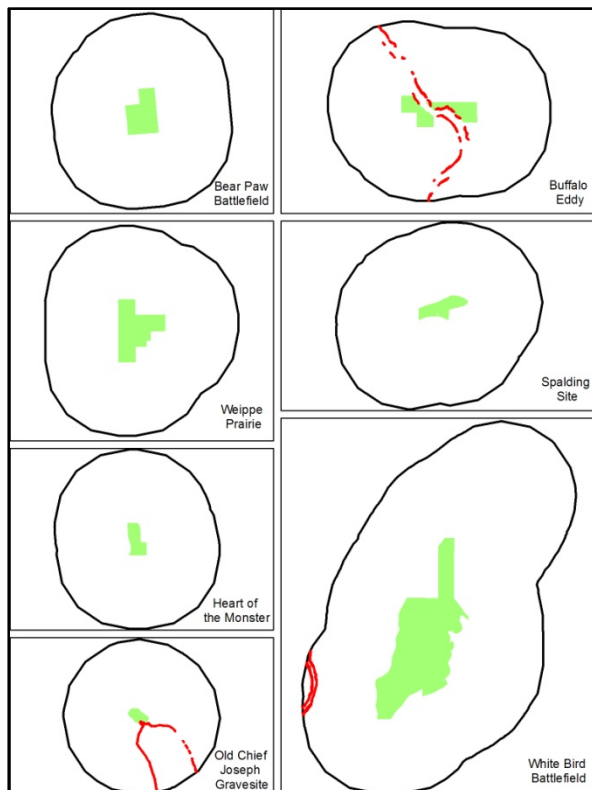
**Photo Signature Example**



**Description**

Sparsely vegetated streambanks were common along the Snake River in BUED, the Wallowa Lake in OLJO, and the Salmon River in WHBI. This type was used to map riverine and lacustrine features where the vegetation appeared to have less than 10% cover. Features in this map unit vary in size and vegetation establishment due to flooding and sustained low water levels. The CUTB map unit included geologic formations, cobbles, flats, and eroding stream banks. On the NAIP 2011 imagery the streambanks appeared as mostly long smooth bands that varied in color from white-to-gray-to-brown.

**Range and Distribution**



**Photo Signature Example**





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**Map Unit      Gravel Bar Sparse Vegetation**  
**GBAR**

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**Common Species**

*Salix exigua*, *Bromus tectorum*,  
 Seasonal weeds and unknown riparian species

**NVCS Association**

-[No Association – Park Special]

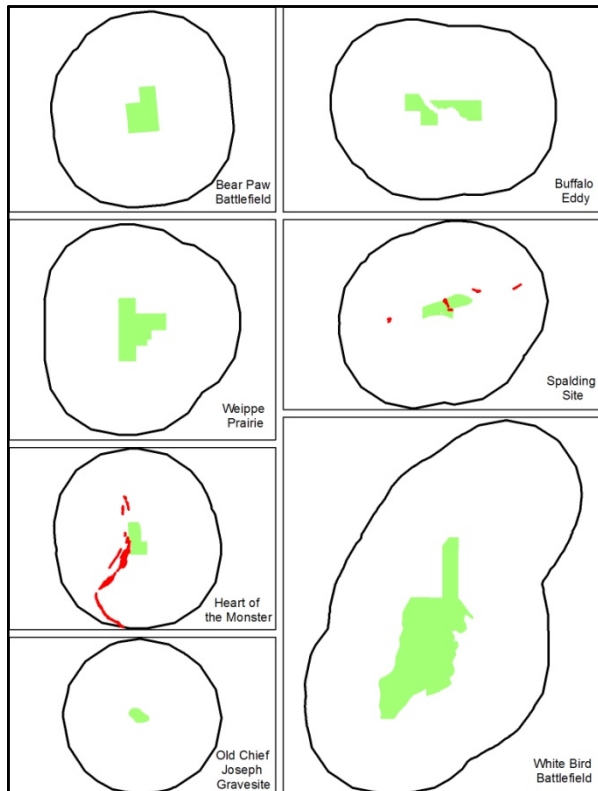
**Representative Ground Photo**



**Description**

Gravel bars were a sparsely vegetated feature in NEPE, associated with the Lapwai Creek/Clearwater River confluence in SPAL and the Clearwater River in HEMO. GBAR was used to delineate areas of either exposed gravel or rocky sand that were exposed on the NAIP 2011 imagery. Features in this map unit vary in size and vegetation establishment due to flooding and sustained low water levels. In most cases polygons of this type were unvegetated but some annual herbaceous species may become rapidly established. On the ortho-imagery this type appeared as a coarse, white to grey color.

**Range and Distribution**



**Photo Signature Example**



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<b>Map Unit</b> <b>ROCK</b>	<b>Rock Outcrop Sparse Vegetation</b>
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**Common Species**

*Pseudoroegneria spicata*, *Festuca idahoensis*, *Poa pratensis*, *Bromus tectorum*, Unknown Species

**NVCS Association**

- [No Association – Park Special]

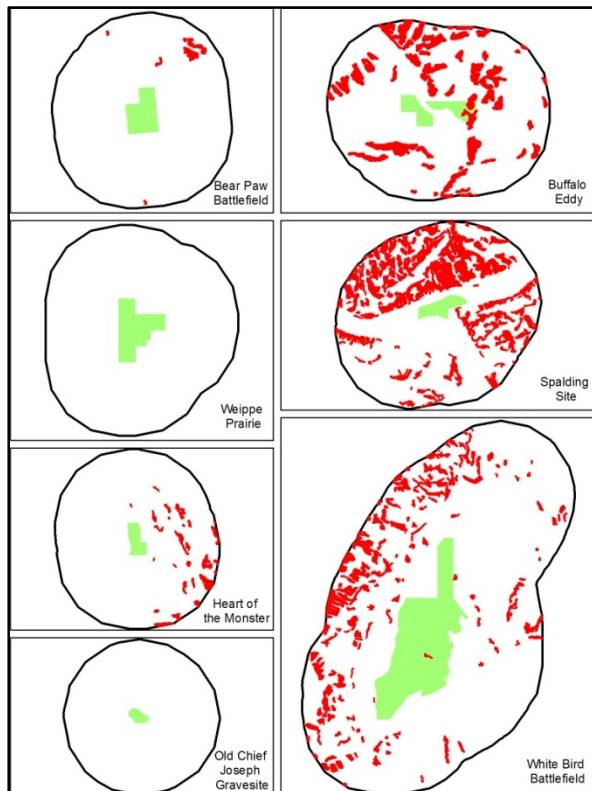
**Description**

The Rock Outcrop Sparse Vegetation map unit was added to NEPE to delineate mostly barren areas that represent outcrops, ridges, and other natural, exposed geologic formations in BEPA, BUED, HEMO, SPAL, and WHBI. In contrast the BARE land-use type was used when rock was exposed due to road cuts, building sites or other man-made disturbance. Vegetation cover for this map unit varied greatly depending on the weathering of the rock and the presence of cracks and benches to support soil formation. In most cases the vegetation cover was below 10% although small inclusions with greater cover may occur. Vegetation on these rock outcrops also varied with bluebunch wheatgrass and cheatgrass the most prevalent. When vegetation cover of characteristic species consistently reached 10% or greater other vegetated map classes were used for the delineation and attribution. On the ortho-imagery this type usually exhibited a brown or tan color representing the exposed bedrock.

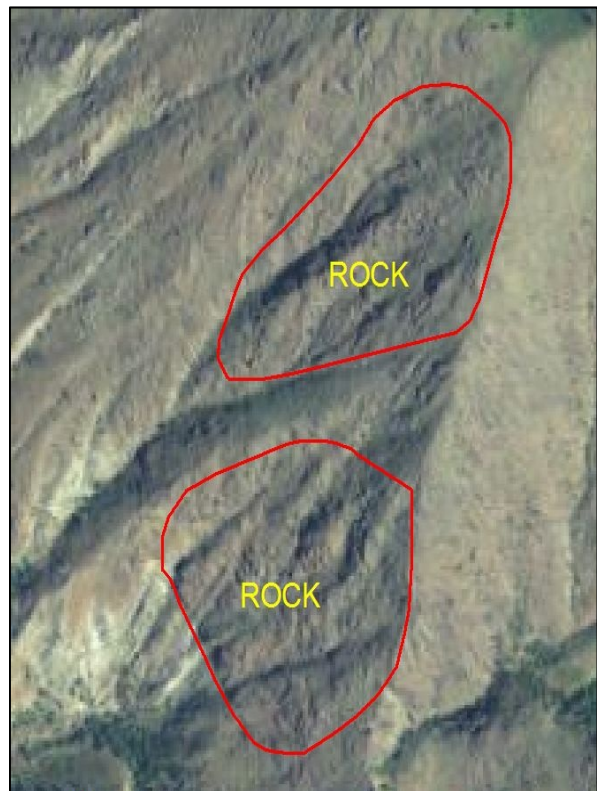
**Representative Ground Photo**



**Range and Distribution**



**Photo Signature Example**





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**Map Unit**     *Talus slope*  
**TALS**

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**Common Species**

*Pseudoroegneria spicata*, *Festuca idahoensis*, *Poa pratensis*, *Bromus tectorum*, Unknown Species

**NVCS Association**

- [No Association – Park Special]

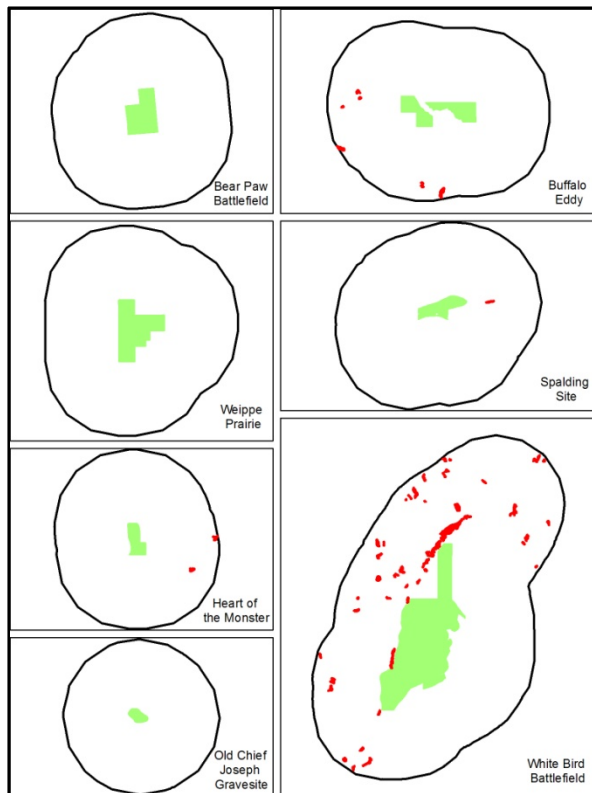
**Representative Ground Photo**



**Description**

Talus slopes were common in the environs of BUED, HEMO, and WHBI. Polygons of this type exhibited a coarse, dark brown or black signature due to deposits of cobbles and rocks. Most of the polygons in this map class likely represent barren or unvegetated sites although some patches have less than 10% cover of herbaceous vegetation. When vegetation does occur common species include bluebunch wheatgrass in natural settings and cheatgrass in more disturbed locations.

**Range and Distribution**

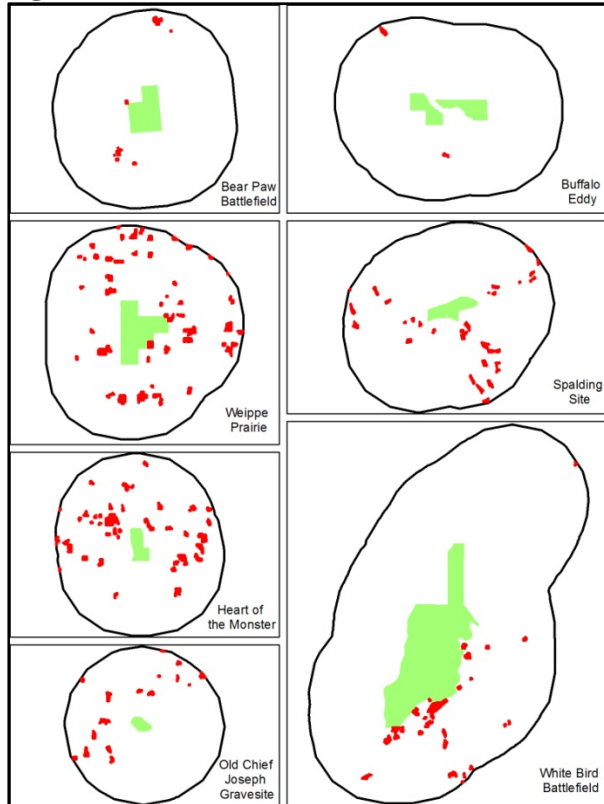


**Photo Signature Example**

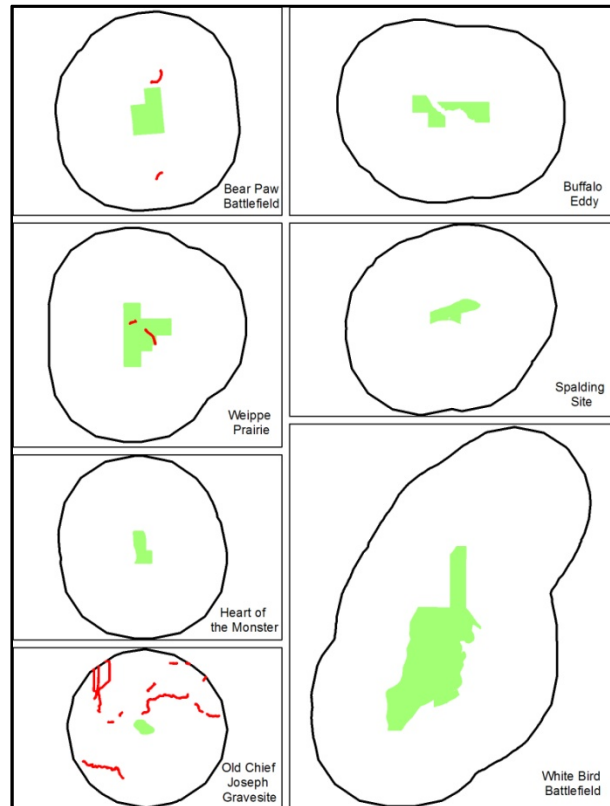


## LAND COVER – LAND USE

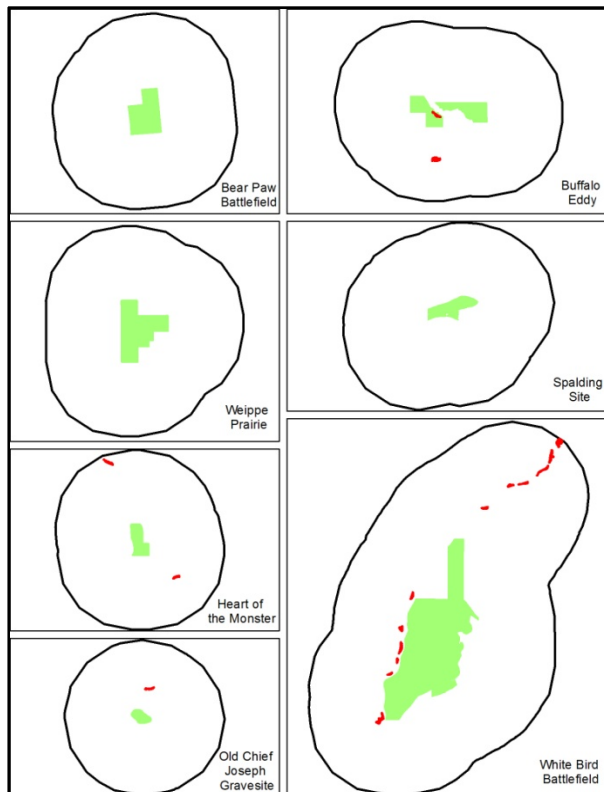
### Agricultural Business



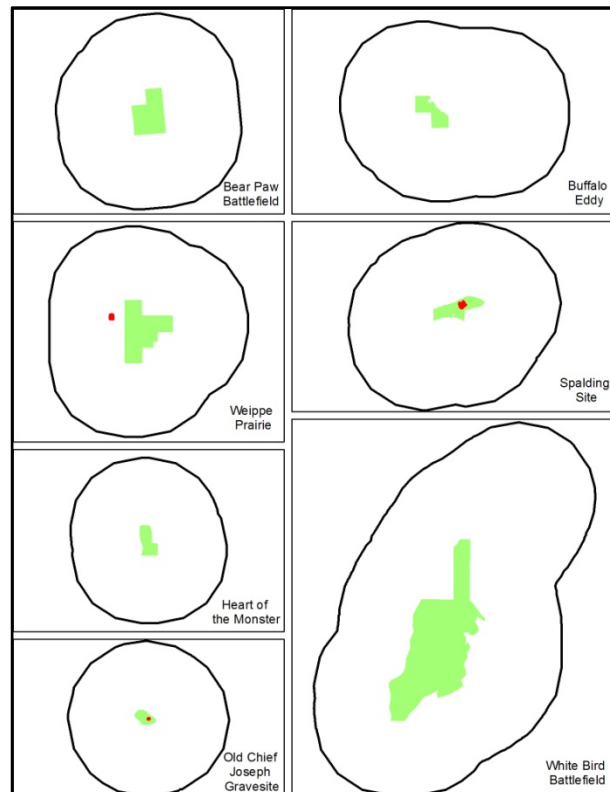
### Canal/Ditch



### Bare Rock / Sand / Other Bare Ground

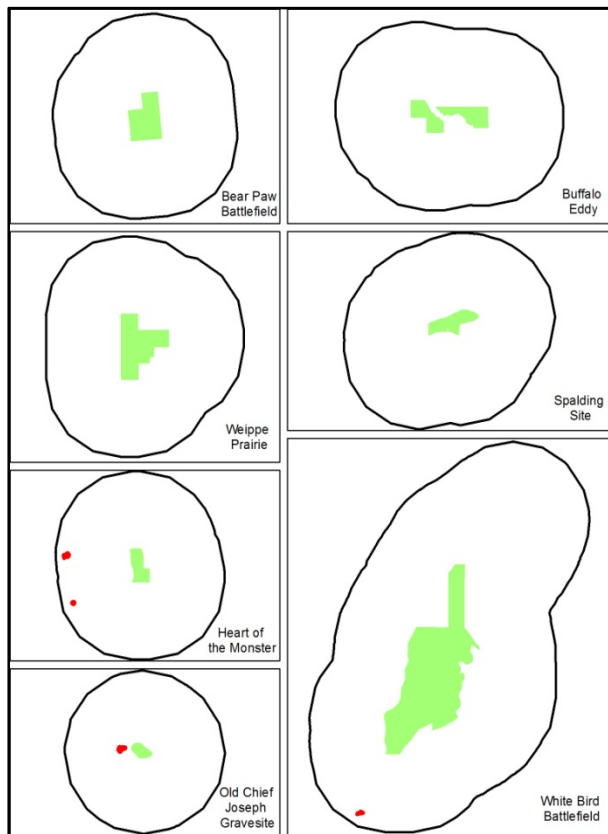


### Cemeteries

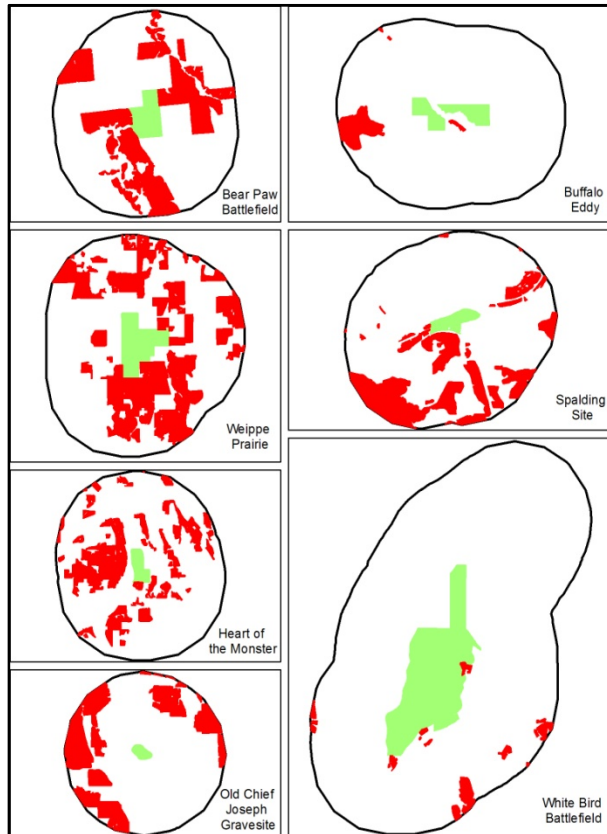




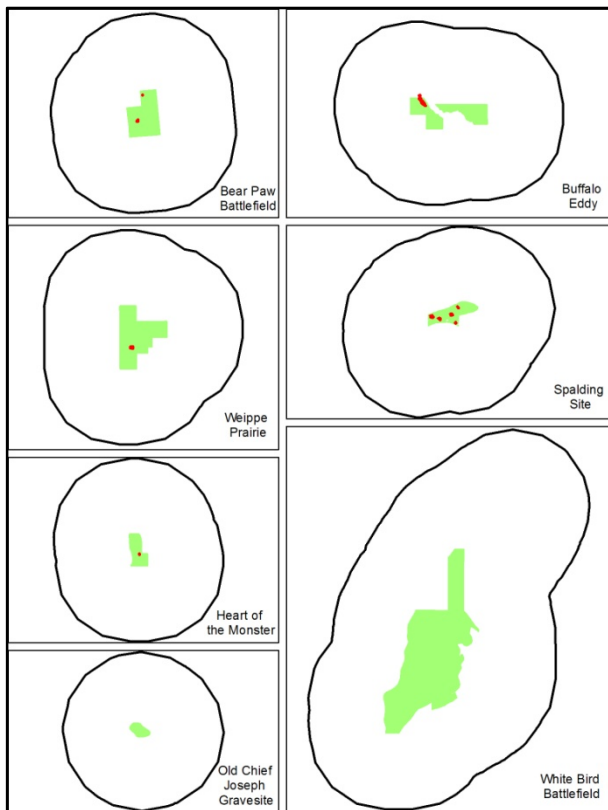
## Communications and Utilities



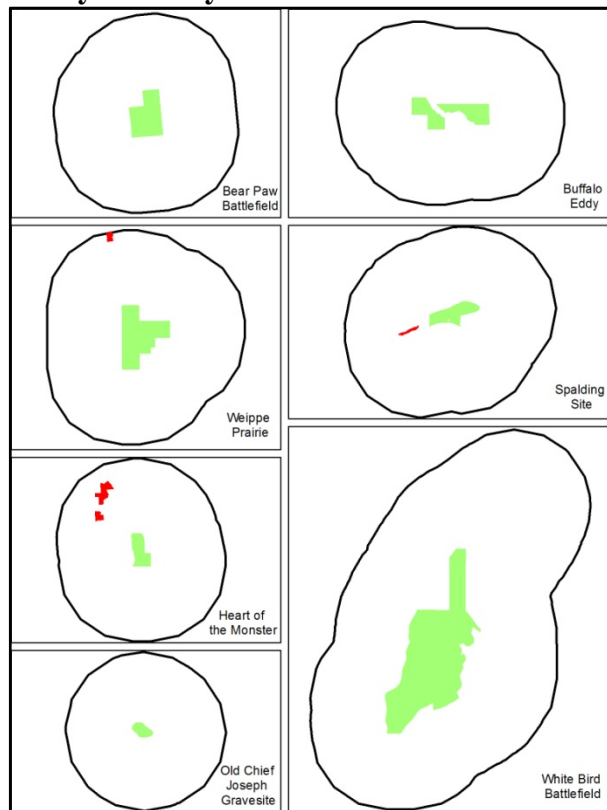
## Planted / Cultivated



## Facilities



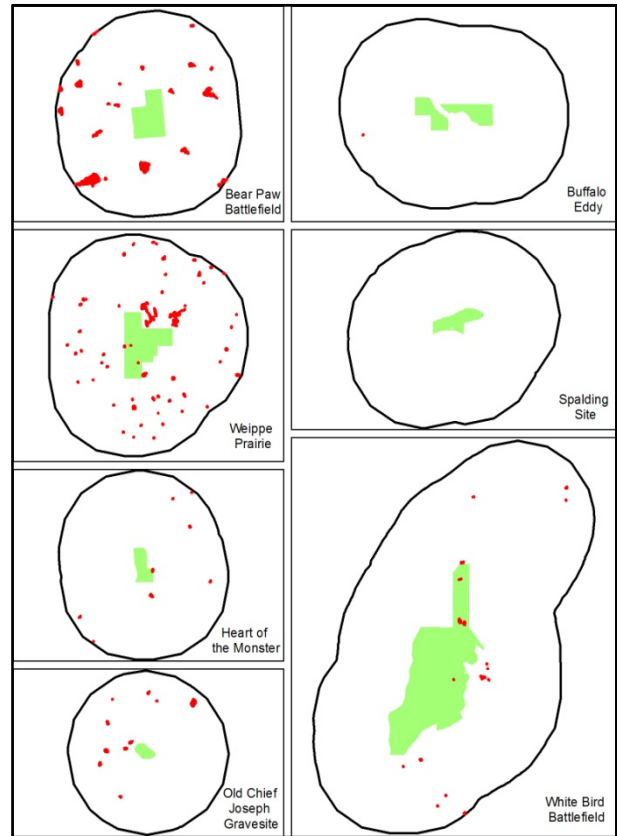
## Heavy Industry



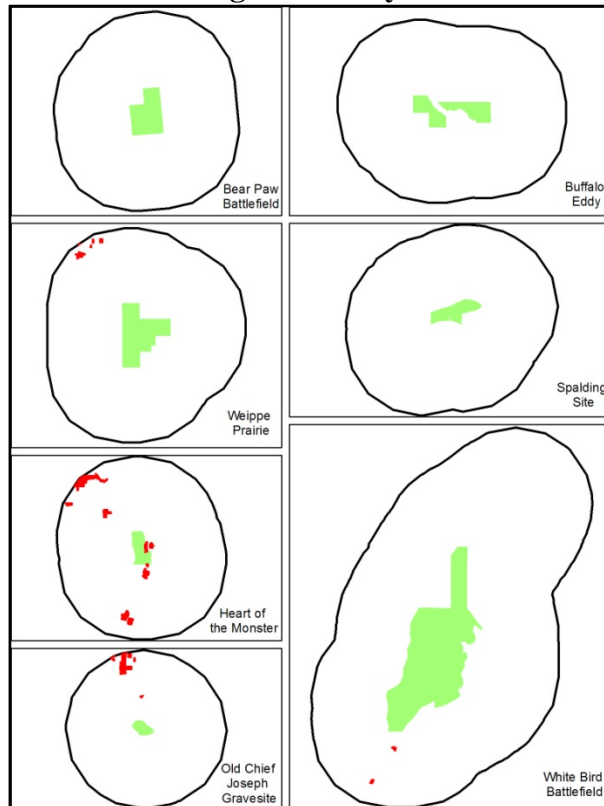
## Lake



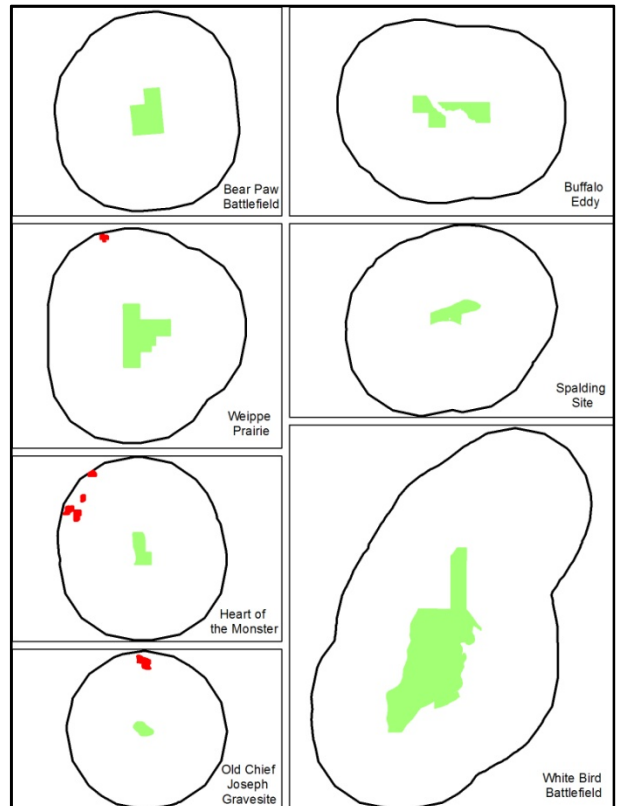
## Pond



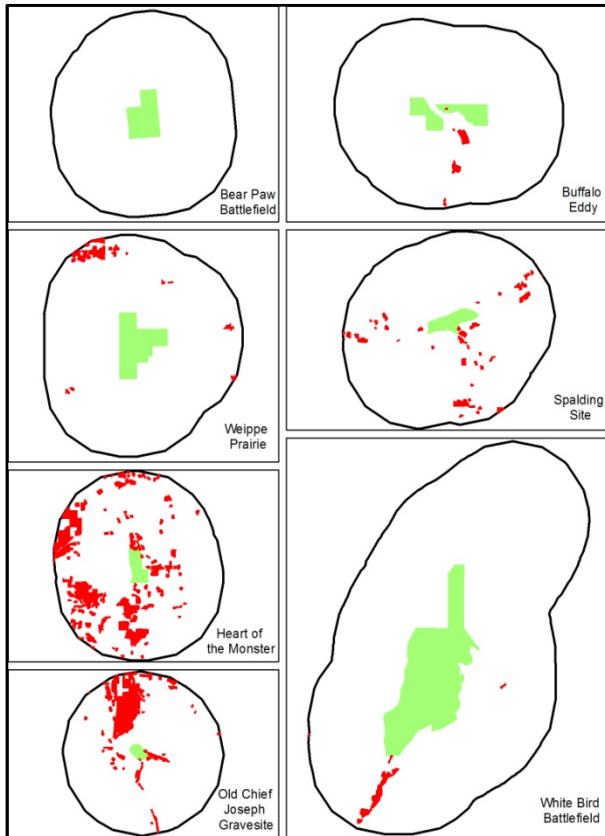
## Commercial / Light Industry



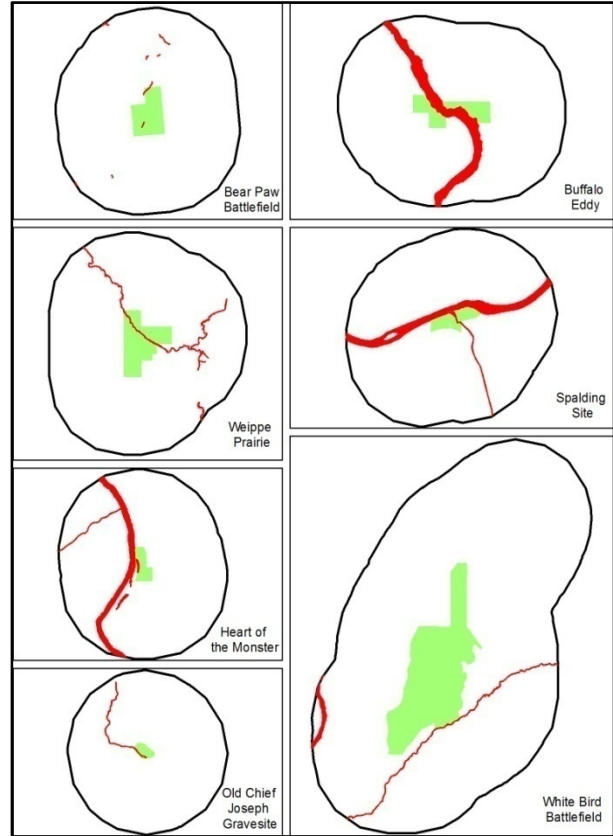
## Entertainment / Recreation



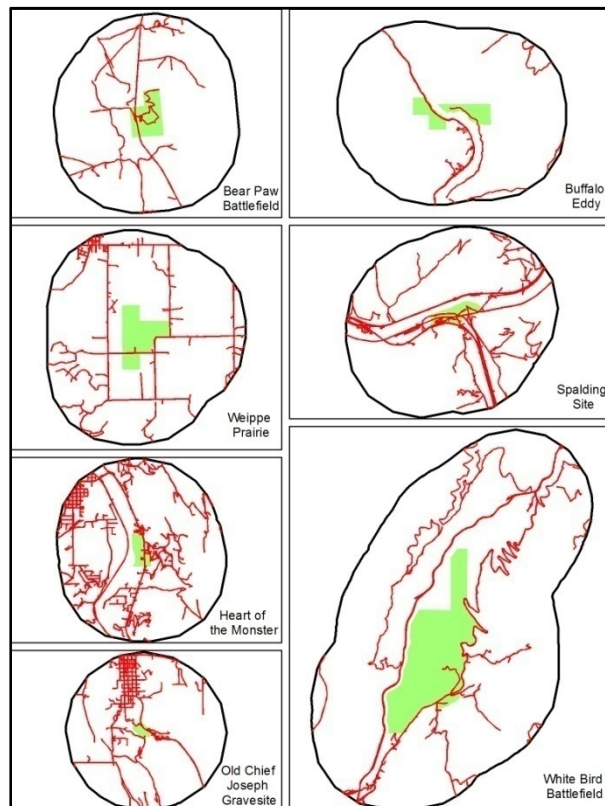
## Residential



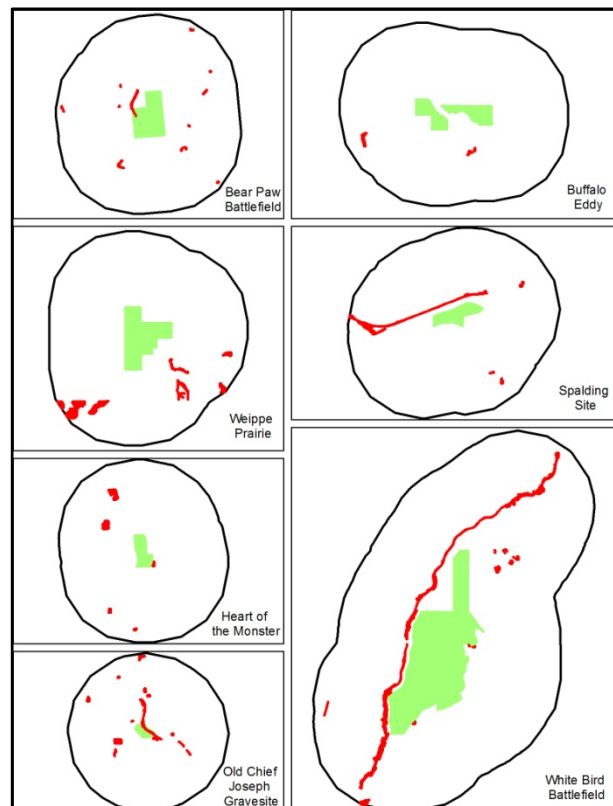
## Stream / River



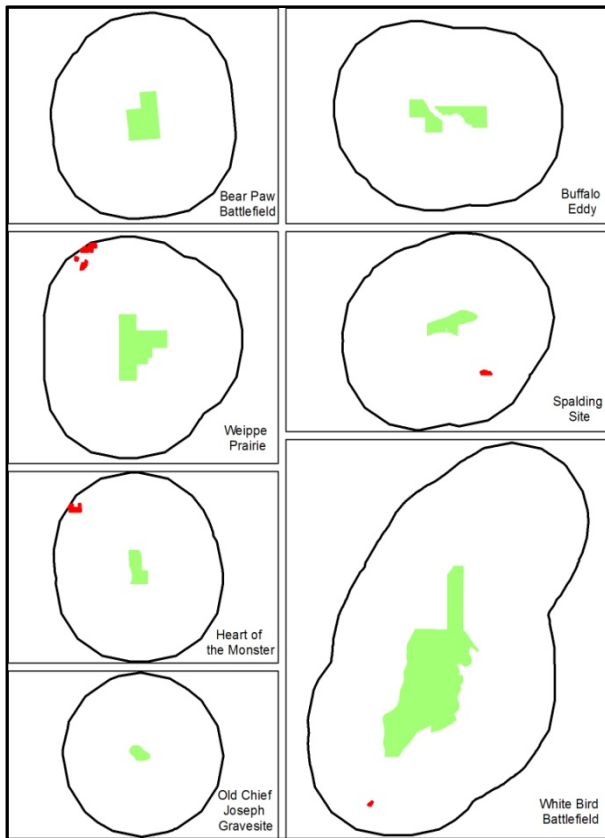
## Transportation



## Transitional

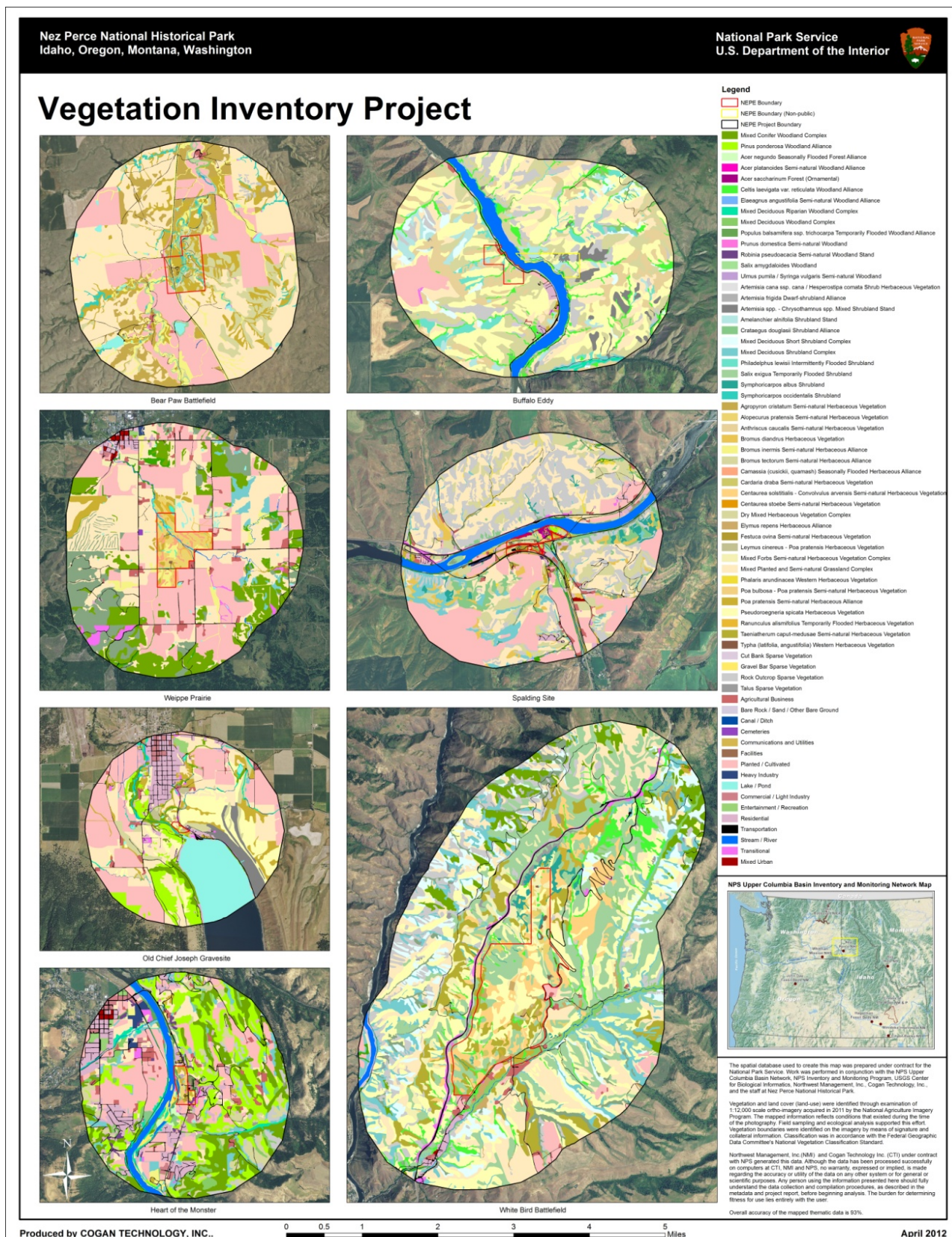


## Mixed Urban





# Appendix G - Final NEPE Vegetation Map







The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

NPS 429/114689, June 2012

**National Park Service**  
**U.S. Department of the Interior**



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