

## **3.5 VEGETATION**

### **3.5.1 INTRODUCTION**

#### **3.5.1.1 Overview**

Naval Weapons Systems Training Facility (NWSTF) Boardman contains unique and remnant vegetation communities important to the region's natural heritage. Proposed activities that could directly affect vegetation are limited to the land area of NWSTF Boardman. Vegetation in areas adjacent to NWSTF Boardman could be indirectly affected by invasive plants and wind-transported soils. Therefore, the study area for vegetation includes NWSTF Boardman and adjacent areas that could be affected indirectly.

The Affected Environment section describes the major vegetation communities or habitat types at NWSTF Boardman. Descriptions of "special status species" are also provided. For the purposes of this Environmental Impact Statement (EIS), special status plant species include:

- Species listed as threatened or endangered under the Endangered Species Act of 1973 (ESA) and species proposed for listing.
- Species considered by the United States (U.S.) Fish and Wildlife Service (USFWS) as a candidate for ESA listing.
- Species of concern identified by USFWS. As an informal category not defined by the ESA, the term commonly refers to species that are declining or appear to be in need of conservation. The USFWS Oregon Ecological Services Field Office maintains a list of species of concern (U.S. Fish and Wildlife Service 2014) for the region.
- Species classified as threatened or endangered by the Oregon Department of Agriculture under the Oregon ESA.
- Species on the Oregon Biodiversity Information Center lists 1, 2, 3, or 4.

Jurisdictional wetlands do not exist at NWSTF Boardman (U.S. Department of the Navy 2012). Accordingly, wetlands and wetlands vegetation are not discussed in further detail.

#### **3.5.1.2 Regulatory Framework**

##### **3.5.1.2.1 Endangered Species Act**

The ESA of 1973 (16 United States Code [U.S.C.] 1531 to 1543) established protection over and conservation of threatened and endangered species and the ecosystems on which they depend. No plant species listed or proposed for listing under ESA occur at NWSTF Boardman. Therefore, ESA is not considered further in this section. A more detailed description of ESA is provided in Section 3.6.1.2 (Regulatory Framework).

##### **3.5.1.2.2 Federal Noxious Weed Act**

The Federal Noxious Weed Act (FNWA) of 1974 was enacted in 1975 with the purpose of managing and controlling the spread of noxious weeds. Pursuant to the Act, the U.S. Secretary of Agriculture was given the authority to declare plants "noxious weeds," and limit the interstate spread of such plants without a permit. The FNWA was amended by the Farm Bill on November 28, 1990. The amendment requires all federal land managing agencies to (1) designate an office or person trained in managing undesirable plant species to develop and coordinate a program to control such plants on the agency's land, (2) ensure that the agency's budget process adequately funds the plant management program, (3) develop and implement cooperative agreements with the States regarding undesirable plants on

agency land, and (4) establish integrated management systems to control or contain undesirable plants targeted under the cooperative agreements.

### **3.5.1.2.3 Executive Order 13112 Invasive Species**

Executive Order (EO) 13112 *Invasive Species* directs federal agencies whose actions may affect the status of invasive species to use relevant programs and authorities to:

- Prevent the introduction of invasive species.
- Detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner.
- Monitor invasive species populations accurately and reliably.

In addition, agencies may not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species unless the agency has determined that the benefits of such actions clearly outweigh the potential harm. All feasible and prudent measures to minimize risk of harm must also be taken in conjunction with the actions.

### **3.5.1.3 Determination of Significance**

The impact analysis for vegetation considered effects of the Proposed Action on plant communities and populations, including whether vegetation would be permanently or temporarily lost, disturbed, or degraded. Potential changes in plant communities arising from invasive species and wildfire were also considered. The significance of impacts on vegetation was considered in the context of local plant communities and populations of special status plant species. Given the quantity and quality of habitat at NWSTF Boardman and on adjacent undeveloped lands to the west, many of the local plant communities are regionally important. Therefore, impacts to local populations could have regional implications. Factors used in determining the significance of impacts on vegetation included the amount of habitat permanently lost, in relationship to the abundance of that habitat type at NWSTF Boardman and adjacent undeveloped lands, and the extent to which proposed activities would contribute to existing invasive plant management issues at NWSTF Boardman and adjacent undeveloped lands.

## **3.5.2 AFFECTED ENVIRONMENT**

### **3.5.2.1 Columbia Plateau Ecoregion**

NWSTF Boardman is situated in the lower Columbia Basin, within the Columbia Plateau Ecoregion. The Columbia Plateau, which occupies about two-thirds of eastern Washington and extends into north central Oregon, is an arid sagebrush steppe (shrub-steppe) and grassland, surrounded on all sides by moister, predominantly forested, mountainous ecological regions (Thorson et al. 2003). "Steppe" is a Russian word that means a vast treeless plain. The region experiences cool winters and hot summers, and the annual average precipitation is about 12 inches (30.5 centimeters). Most of the land in the Oregon portion of this ecoregion is privately owned (85 percent); about 57 percent is range, pasture, or grassland; and almost 37 percent is agricultural cropland (Oregon Department of Fish and Wildlife 2006).

Shrub-steppe habitats are open grass-dominated communities and are usually found on loamy, wind-deposited (loess) soils. In the Columbia Plateau Ecoregion, shrub-steppe communities can be broadly divided into two elevational types. Within 10 miles (16.1 kilometers) of the Columbia River, sandy shrub-steppe communities occur on unstable, well-drained soils. These include grasslands dominated by needle-and-thread grass; shrub-steppe habitats dominated by bitterbrush and needle-and-thread grass or Indian rice grass; and sand dune communities characterized by sagebrush,

bitterbrush, and western juniper. There is usually a component of bare ground or open sand present. Farther from the Columbia River, big sagebrush steppe communities include basin big sagebrush/needle-and-thread grass; basin wildrye and bluebunch wheatgrass steppe; and Wyoming sagebrush/bluebunch wheatgrass, which formerly occupied the low-elevation, loess uplands in the Columbia Plateau (Oregon Department of Fish and Wildlife 2006).

In the Columbia Plateau Ecoregion, grasslands include river terrace grasslands, prairies, canyon slopes and rocky ridges. At low- and mid-elevations, semi-desert grasslands are dominated by drought-resistant perennial bunchgrasses such as needle-and-thread, dropseed, threeawn and muhly, and may have scattered shrubs. Palouse grasslands occur in flat areas with deep soils and are dominated by bluebunch wheatgrass, Idaho fescue, and other grasses and forbs. Canyon and foothill grasslands are found on the steeper, rocky slopes surrounding the major rivers in this region and are dominated by bluebunch wheatgrass, Idaho fescue, Sandberg's bluegrass, balsamroot, and other forbs (Oregon Department of Fish and Wildlife 2006).

*The Oregon Conservation Strategy* identifies grasslands and sagebrush steppe as "strategy habitats" in the Columbia Plateau Ecoregion (Oregon Department of Fish and Wildlife 2006). Strategy habitats have the greatest conservation need based on factors such as historical ecological importance and degree of loss since European settlement. In the lower elevations of the Columbia Plateau, shrub-steppe and grassland communities have been almost entirely replaced by irrigated agriculture. Remnant habitats occur on public lands such as NWSTF Boardman and the Umatilla Chemical Depot, on the private lands such as Boardman Conservation Area and Lindsay Prairie Preserve, and in scattered patches along roadsides and fields. These habitats have also been affected by grazing, alteration of historic fire regimes, and invasive species. Key conservation issues and ecoregional-level limiting factors in the Columbia Plateau Ecoregion include water availability, soil erosion, habitat fragmentation, and invasive species (Oregon Department of Fish and Wildlife 2006).

### **3.5.2.2 Vegetation Communities at NWSTF Boardman**

The vegetation at NWSTF Boardman primarily consists of shrub-steppe and grassland habitats. In contrast to much of the surrounding area, large-scale agriculture has not taken place at NWSTF Boardman. As a result, the installation persists as a large tract of predominately native shrub-steppe and grassland habitats. In fact, the installation and the adjacent Boardman Conservation Area represent one of the largest remaining single blocks of predominantly native shrub-steppe and grassland habitats in Oregon's portion of the Columbia Plateau Ecoregion (approximately 69,000 acres [ac.] [27,923 hectares {ha}]) (National Audubon Society 2011).

The composition of existing vegetation communities at the installation is influenced by numerous factors including climate, soils, military use, wildfire, past grazing, a limited amount of past agricultural use, and introduction of invasive plants (noxious weeds). In particular, two related factors, wildfire and invasive plants, have affected vegetation in recent years. Since 1998, more than 85 percent of NWSTF Boardman has been burned by wildfires, which have caused short- and long-term habitat alterations. Large fires swept portions of the installation in 1998 (17,514 ac. [7,088 ha]), 2007 (11,664 ac. [4,720 ha]), 2008 (30,612 ac. [12,388 ha]), and 2015 (approximately 16,000 ac. [6,475 ha]), while smaller areas burned in 2002 (1,639 ac. [663 ha]), 2009 (618 ac. [250 ha]), 2011 (acreage not mapped), and 2013 (1,480 ac [599 ha]) (see Section 3.13, Wildfire, and Figure 3.13-1). The 1998, 2002, 2007, and 2008 fires were started by lightning strikes (U.S. Department of the Navy 2012), the 2011 fire was training-related, and the causes of the 2009 and 2013 fires were not confirmed. The 2015 fire was started by spontaneous combustion of a hay stack west of and outside NWSTF Boardman, which spread onto the

range. Training-related wildfires occur occasionally at NWSTF Boardman. Range safety monitoring by participating military units allows for early detection of training-related fires and rapid response. Therefore, fires that start during training activities are typically contained to relatively small areas compared to lightning-caused fires, which might go undetected for a period of time after ignition.

Historically, the area was comprised of fire-adapted vegetation communities with fire return intervals that likely ranged from about 20 to 70 years based on information for similar habitats (Leenhouts 1998, Paysen et al. 2000). With the widespread introduction of invasive, non-native annual grasses such as cheatgrass, the amount of fuel for wildfires has increased. Wildfires now tend to be more frequent and more severe (burn hotter), and can be long-term or permanent habitat altering events. Frequent and hot burning fires like those that have occurred at NWSTF Boardman favor a shift from shrublands to grasslands. Humple and Holmes (2001) documented decreases in sagebrush cover and increases in cover of grass, primarily cheatgrass, in study plots following the 1998 fire at NWSTF Boardman.

Maintaining an up-to-date vegetation inventory and associated mapping for NWSTF Boardman has been a challenge given the recent wildfire history. Habitat types were mapped and described for the entire installation in 1997 by interpreting aerial photographs and conducting ground-truthing studies (U.S. Department of the Navy 2012). In 2007, the U.S. Department of the Navy (Navy) initiated a survey to update vegetation mapping for the entire installation. However, the large 2007 wildfire (11,664 ac. [4,720 ha]) occurred soon after the aerial imagery data were collected. A decision was made not to finalize the vegetation mapping effort because fire-induced vegetation changes rendered the imagery data obsolete. The *NWSTF Boardman Integrated Natural Resources Management Plan (INRMP)* (U.S. Department of the Navy 2012) includes a project recommendation to collect high-resolution aerial photography to map all vegetation and produce geographic-information-system-based vegetation mapping in the near future.

The remainder of this section provides descriptions of vegetation communities and habitat types based on information taken from the *NWSTF Boardman INRMP*. As discussed above, the best available vegetation/habitat data are from 1997, prior to a series of wildfires that occurred from 1998 through 2009. Vegetation conditions have changed at the installation since 1997 and will continue to change based on future fire regimes and other factors such as invasive species.

A list of plant species known to occur on NWSTF Boardman is provided in Appendix F (Additional Biological Information). The following six major plant associations occur on NWSTF Boardman (U.S. Department of the Navy 2012).

- Big sagebrush/bluebunch wheatgrass
- Bluebunch wheatgrass/Sandberg's bluegrass
- Big sagebrush/western needle-and-thread grass
- Antelope bitterbrush/needle-and-thread grass
- Needle-and-thread grass/Sandberg's bluegrass
- Snowy buckwheat/Sandberg's bluegrass

Lesser represented communities include the matchweed (an introduced species) variant of the big sagebrush/bluebunch wheatgrass association, and relict stands of western juniper/big sagebrush/bluebunch wheatgrass association. It should also be noted that large portions of nearly all of these associations are currently invaded by cheatgrass. Finally, there are some largely unvegetated sand dune and "alkali" areas.

Sagebrush/wheatgrass and wheatgrass/bluegrass plant associations dominate the southern half of NWSTF Boardman where soils are deeper and loamier. The presence of sagebrush differentiates these communities. Sagebrush is more prevalent in the draws and lowlands where deep, subsurface water resources are easier obtained. Both of these communities have been severely impacted by grazing (ca. 1870s to 1950s) and now are largely dominated by cheatgrass. Healthy stands of wheatgrass are mostly limited to small patches on north-facing slopes, while sagebrush/wheatgrass association stands have been often heavily invaded with cheatgrass.

Moving south to north on the facility, the soils become sandier resulting in a replacement of the sagebrush/wheatgrass and wheatgrass/bluegrass plant associations with the sagebrush/needle-and-thread grass and needle-and-thread grass/bluegrass associations. Prior to the invasion of alien weedy annuals around the early 1900s, much of the land now supporting these associations was characterized as isolated patches of western needle-and-thread surrounded by blowing sand. Outlines of the extensive dune systems that dominated this portion of the range are still evident in aerial photographs. While much of the original needle-and-thread stands have been replaced by dense stands of cheatgrass, needle-and-thread appears to also be establishing in areas of former dunes now stabilized by weedy annuals, including cheatgrass. Quality stands of needle-and-thread can still be found on the center portion of the range, especially where historically protected from grazing in the Research Natural Areas (RNAs). The resilience of needle-and-thread, compared to bluebunch wheatgrass, to withstand grazing probably resides in its lesser palatability to livestock. However, gray and green rabbitbrush now dominate large portions of these communities because of disturbance from fire and historic grazing.

On the farthest northern edge of NWSTF Boardman is found the sandiest soils supporting the bitterbrush/needle-and-thread association and, where parent soils are slightly rocky, small patches of buckwheat/bluegrass plant associations. Very little needle-and-thread is found in these communities because it has either been replaced by cheatgrass, Russian thistle, and other alien weedy annuals, or has not yet colonized these areas since dune stabilization. Finally, due east of Research Natural Area (RNA)-C (Figure 1-5) is a small community of matchweed, a small, non-native shrub that apparently established in the John Day River drainage in the late 1940s and has been moving eastward since. This plant is an indicator of previous severe grazing.

In their pristine state, apparently none of these plant associations supported a diverse floristic composition, largely because of harsh climatic conditions and the deep soil lichen layers that developed between the grasses. Usually no more than one shrub and one or two species of grass, along with soil lichens and bare ground, accounted for greater than 90 percent of the ground cover. Phlox, lomatium, yarrow, and various members of the pea family were the most conspicuous forbs. However, livestock trampling of the lichen layer and intensive grazing of the palatable forage species has encouraged the invasion of alien weedy annuals such as cheatgrass, Russian thistle, tumbled mustard, and whitlow-grass. It has dramatically increased the number of unpalatable native species, such as hairy golden-aster in the sagebrush/wheatgrass plant associations, and fiddleneck tarweed, lance-leaf scurf-pea, and hairy plantain in the needle-and-thread grass associations.

Table 3.5-1 provides a summary of major habitat types that were identified during the mapping effort completed in 1997 (U.S. Department of the Navy 2012). Habitat types are units that can be mapped with discrete characteristics that separate them from other habitat types, and provide a specific set of components important as life requisites for specific wildlife species. Most habitat types are based loosely on the plant communities described earlier using vegetative structure and floristic composition as classification parameters.

**Table 3.5-1: Summary of Habitat Types and Acreage at NWSTF Boardman**

Habitat Type	Size (Acres) <sup>1</sup>	Description	Wildlife Uses
Sagebrush	7,415	Sagebrush stands can be found throughout much of the facility, but are most prevalent in and near Juniper Canyon. Sagebrush can be structurally separated into a lowland type of larger plants with an understory of cheatgrass or sandy bare ground, and a structurally shorter upland type with lichen typically covering the understory.	Birds such as the black-billed magpie, Brewer's blackbird, lark sparrow, and loggerhead shrike appear to prefer the larger lowland sagebrush, while the sage sparrow and Brewer's sparrow may prefer the upland sage.
Bitterbrush	2,555	Antelope bitterbrush dominates large portions of the sandy-soiled region in the northern edge of the facility. Structurally it can become very tall (greater than 6 feet) and is sometimes co-dominated with gray rabbitbrush.	Larger bitterbrush plants provide nesting habitat for black-billed magpies, black-throated sparrows, and loggerhead shrikes, and perching habitat for burrowing owls. It also provides important cover for black-tailed jackrabbits and northern sagebrush lizards.
Bunchgrass	12,100	Bunchgrass habitat types include areas on the central and northern portion of the facility dominated by western needle-and-thread grass, and on the southern end by bluebunch wheatgrass. Portions of these habitats have been purposely historically protected from grazing.	Wildlife species typically found here include the grasshopper sparrow and Washington ground squirrel.
Open Low Shrub	9,150	The low shrub habitat type includes areas throughout the facility dominated by gray rabbitbrush, although green rabbitbrush and matchweed may comprise a significant portion of the shrub component. The presence of rabbitbrush on the facility, extensive in some areas, is largely a result of past fires as both rabbitbrush species are fire-tolerant, especially compared to other dominant shrubs.	The black-tailed jackrabbit, northern pocket gopher, gray partridge, and western meadowlark are among the dominant wildlife species found here.
Annual Grass/Forb	15,840	Annual grass/forb habitats are the areas on the facility dominated by cheatgrass, or co-dominated with the perennial Sandberg's bluegrass, usually associated with weedy forbs such as lance-leaf scurf-pea, fiddleneck tarweed, Jim Hill mustard, whitlow-grass, and hairy plantain. These habitats typify areas that were once heavily disturbed by grazing or crop production, or have invaded sandy areas that they have subsequently stabilized.	This habitat type provides nesting habitat for long-billed curlews, burrowing owls, horned larks, and western meadowlarks, and Great Basin pocket mice are very common here.

**Table 3.5-1: Summary of Habitat Types and Acreage at NWSTF Boardman (continued)**

Habitat Type	Size (Acres) <sup>1</sup>	Description	Wildlife Uses
Juniper	Not applicable <sup>2</sup>	The juniper habitat type includes both the small juniper "forest" found in the Juniper Canyon, and the scattered juniper trees found on the periphery of Juniper Canyon and the western edge of the facility. In 1999 there were 188 mature juniper trees found on the facility. Some of these trees have since died and a number of young junipers have been found.	Junipers provide nesting habitat for Swainson's hawks, ferruginous hawks, ravens, long-eared owls, western kingbirds, and black-billed magpies. They also provide shade for mule deer and cover for porcupines.
Human Structures/Disturbed	145	This habitat type includes buildings associated with the existing headquarters area, previous locations of buildings that have been demolished, and disturbed areas such as the old moving target indicator track, the main bulls-eye, the old cattle corrals, and used weapons accumulation areas.	Buildings may provide habitat for a variety of non-native pests such as starlings, house sparrows, and house mice. The observation tower in the southeastern corner of the target area has been used for several years by nesting ravens.
Dune	210	Dune habitats are found mostly on the north central end of the facility and within central Juniper Canyon.	Sagebrush lizards are commonly found along the dune edges.
Alkali	45	Alkali habitats occur in southern Juniper Canyon and at Well Springs. These habitats are devoid of vegetation.	The short-horned lizard is one of the few wildlife species found here.

<sup>1</sup> Acreages are based on data collected in 1997, prior to a series of lightning-caused wildfires.

<sup>2</sup> Acreage was not calculated because most junipers are scattered and largely fall within another habitat type.

Source: U.S. Department of the Navy 2012

### 3.5.2.3 Invasive Plants and Weeds

The term "invasive species" is defined by Presidential EO 13112 to mean "an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health." The EO goes on to define an alien species as any species not native to a particular ecosystem, including the seeds, eggs, spores, or other biological material capable of propagating that species. Exotic invasive plants and animals have the potential to cause vast ecological and economical damage, and sometimes pose human health impacts in areas they infest. Economic costs of invasive plants and weeds for Oregon are estimated at \$120 million a year for 21 species of noxious weeds, resulting in agricultural production losses, fire damage, habitat loss and transition, and control costs (Cusack et al. 2009).

Invasive plants and weeds, which are often referred to as "noxious weeds," can degrade wildlife habitat quality and unnaturally increase fuel loading and wildfire risk in heavily infested areas. For instance, the exotic annual cheatgrass (*Bromus tectorum*) is fast replacing sagebrush communities throughout the Columbia Basin and nearby regions in the western United States, impacting native plant communities and altering fire regimes, which contributes to the long-term persistence of this weedy species. Conversion of shrub-steppe vegetation to annual grasslands is occurring on NWSTF Boardman, as evidenced by the increased fire frequency and intensity (U.S. Department of the Navy 2012). Other weed species identified at NWSTF Boardman include spikeweed (*Hemizonia pungens*), yellow starthistle

(*Centaurea solstitialis*), diffuse knapweed (*Centaurea diffusa*), rush skeletonweed (*Chondrilla juncea*), scotch thistle (*Onopordum acanthium*), cereal rye (*Secale cereale*), perennial pepperweed (*Lepidium latifolium*), and medusahead rye (*Taeniatherum caput-medusae*) (The Nature Conservancy 1997, U.S. Department of the Navy 2012) (Table 3.5-2).

**Table 3.5-2: Major Invasive Plants and Noxious Weeds at NWSTF Boardman**

Common Name	Scientific Name	Oregon Classification <sup>1</sup>	Morrow County Classification <sup>2</sup>	Introduction Pathway and Spread at NWSTF Boardman <sup>3</sup>
Cheatgrass	<i>Bromus tectorum</i>	-	-	Upwind seed source and disturbed soil, vehicle spread, fires.
Diffuse knapweed	<i>Centaurea diffusa</i>	B	B	Upwind seed source and disturbed soil, vehicle spread, fires.
Yellow starthistle	<i>Centaurea solstitialis</i>	B, T	A	Primarily associated with roads and fence lines. Upwind seed source and disturbed soil, vehicle spread.
Spikeweed	<i>Hemizonia pungens</i>	B	A	Associated with alkaline soils of Juniper Canyon and Well Spring, disturbed soil colonizer.
Rush skeletonweed	<i>Chondrilla juncea</i>	B, T	A	Not known.
Cereal rye	<i>Secale cereale</i>	-	B	Agricultural remnant.
Medusahead rye	<i>Taeniatherum caput-medusae</i>	B	B	Annual grass species with potential to out-compete cheatgrass. Wind dispersal from upland seed source, disturbed soil, vehicle spread, and fires.
Scotch thistle	<i>Onopordum acanthium</i>	B	B	Primarily associated with roads and fence lines. Upwind seed source and disturbed soil, vehicle spread.
Perennial pepperweed	<i>Lepidium latifolium</i>	B, T	B	Associated with mesic soils of Juniper Canyon, disturbed soil colonizer.

<sup>1</sup> Source: Oregon Department of Agriculture 2011. B = a weed of economic importance which is regionally abundant, but which may have limited distribution in some counties. T = priority noxious weeds designated by the State Weed Board as target weed species and warrant implement statewide management plans.

<sup>2</sup> Source: Morrow County Weed Classification. A = Weeds of known economic importance occurring in the county in small enough infestations to make eradication practicable. B = Weeds of economic importance and of limited distribution in the county; is subject to control or eradication where feasible.

<sup>3</sup> Source: The Nature Conservancy 1997

Note: NWSTF = Naval Weapons Systems Training Facility

Weeds in Oregon are categorized under the Oregon State Noxious Weed Classification System depending on economic importance and feasibility of control. Morrow County also maintains a weed classification list, which is more specific to local concerns and is relied on to determine specific areas of concern at NWSTF Boardman. Major invasive species and weeds documented at NWSTF Boardman are listed in Table 3.5-2 along with their classification and potential pathways of introduction to NWSTF Boardman.

Landscape factors other than fire can alter natural vegetation succession, such as grazing, agricultural practices, and ground disturbance (e.g., off-road vehicle traffic) (Young et al. 2001). Grazing leases (for cattle and sheep) were cancelled at NWSTF Boardman in 2002. Termination of agricultural outleases in 2002 ended alfalfa production on 240 ac. (97 ha) (U.S. Department of the Navy 2012).

Plants invade natural habitats, such as shrub-steppes of the Columbia Basin, through specific pathways. Cheatgrass, thought to originate in southwest Asia, may have been introduced through the importation of contaminated grain (Pellant 1996). Other non-intentional pathways may include contaminated feed containing invasive plant seeds, shipments of cargo, contaminated vehicles, and contaminated fill material used in construction.

### 3.5.2.4 Special Status Plant Species

In 2003 and 2004, field surveys of NWSTF Boardman were conducted to update information on all special status plant species (U.S. Department of the Navy 2004). There are no Federal threatened or endangered species of vascular plants, lichen, or fungi occurring on NWSTF Boardman (U.S. Department of the Navy 2012). As summarized in Table 3.5-3, two plant species that are considered rare in Oregon have been documented at NWSTF Boardman (Quade 1994, U.S. Department of the Navy 2004).

**Table 3.5-3: Special Status Plant Species Known to Occur at NWSTF Boardman**

Common Name	Scientific Name	Federal Status	State Status	OBIC Rank	Description
Stalked-pod milk-vetch	<i>Astragalus sclerocarpus</i>	None	None	List 3	Associated with sagebrush-steppe from Washington to northeast Oregon along both sides of the Columbia River. Specific habitats include sandy barrens, dunes, xeric (dry) sites in sagebrush-steppe and lower elevation zones characterized by ponderosa pine. This milk-vetch blooms in April through June, with seeds setting in late June through July. This species was common and widespread across NWSTF Boardman in the 2003–2004 surveys.
Columbia milk-vetch	<i>Astragalus succumbens</i>	None	None	List 4	Associated with sagebrush desert to lower foothills characterized by xeric (dry) dunes and/or sandy soils. This milk-vetch blooms in April through May, and sets seed in late May and June. This species was common and widespread across NWSTF Boardman in the 2003–2004 surveys.

Notes: OBIC = Oregon Biodiversity Information Center, NWSTF = Naval Weapons Systems Training Facility  
Sources: Quade 1994; U.S. Department of the Navy 2004, 2012.

Two other notable occurrences from the 2003 to 2004 surveys included Columbia cut-leaf (*Hymenopappus filifolius*), which was reclassified as common during the 2001 Oregon rare plant review and now has no special plant status, and buckwheat milk-vetch (*Astragalus carcinus*). Although buckwheat milk-vetch is not a rare plant, it is a notable collection because it was previously not known from the Oregon side of the Columbia River (U.S. Department of the Navy 2012).

Laurence's milk-vetch (*Astragalus collinus* var. *laurentii*), an Oregon threatened species and USFWS species of concern, occurs in the Columbia Basin portion of Morrow County. However, this species is not on Quade's (1994) extensive list of vascular plants occurring on the facility. The surveys conducted in 2003 and 2004 targeted this species, but none were found (U.S. Department of the Navy 2004).

Therefore, Laurence's milk-vetch is not expected to occur at NWSTF Boardman and is not addressed in further detail in this EIS.

### 3.5.2.5 Biological Soil Crust

Biological soil crusts are an intimate association between soil particles and cyanobacteria, algae, microfungi, lichens, and bryophytes (in different proportions) that live within or on top of the uppermost millimeters of soil. These communities have been known by a variety of names, including cryptobiotic, cryptogamic, and microbiotic soil crusts. They are found in all dryland regions of the world, including the polar regions, and in all vegetation types within these lands. In these landscapes, biological soil crusts often cover all soil spaces not occupied by trees, grasses, or shrubs and can comprise over 70 percent of the living ground cover. Biological soil crusts at NWSTF Boardman are primarily comprised of cyanobacterias and mosses with some lichens.

The presence of these organisms on the soil surface increases soil stability. Well-developed crusts (with lichens and mosses) on both silt and sandy soils have 2 to 130 times greater resistance to soil erosion than less well-developed crusts or bare soil (Belnap and Gillette 1997). Because biological soil crusts are photosynthetic they also contribute carbon to the underlying soils. Free-living and lichenized cyanobacteria can also convert atmospheric nitrogen into bio-available nitrogen, and thus are an important source of this often limiting nutrient. All these organisms also secrete compounds that increase the bio-availability of phosphorus.

### 3.5.2.6 Research Natural Areas

Three RNAs (A, B, and C) were established on NWSTF Boardman in 1978 and are co-managed by The Nature Conservancy under a Memorandum of Understanding with the Navy (Figure 1-5). The RNAs are part of a federal government system established for research and educational purposes. Natural features are preserved for scientific purposes and natural processes are allowed to dominate. The RNA program was created to (1) preserve examples of all significant natural ecosystems for comparison with those influenced by man, (2) provide educational and research areas for ecological and environmental studies, and (3) preserve gene pools of threatened and endangered plants and animals. The RNAs on NWSTF Boardman were the first established on Department of Defense lands. The Nature Conservancy activities in the RNAs include research and monitoring of the native habitat types and wildlife species, as well as control of noxious weeds. The RNAs are fenced and, with the exception of RNA-A, access is normally limited to research and management activities such as weed control. RNA-A is located within the Main Target Area, portions of which are subjected to disturbance from training and maintenance activities. As discussed in Section 3.5.3.4.1 (Proposed Management Practices), the Navy is proposing to relocate RNA-A.

### 3.5.2.7 Current Requirements and Management Practices

The following is a summary of current requirements and practices applicable to vegetation at NWSTF Boardman.

- Vegetation is managed under the *NWSTF Boardman INRMP*. Actions focus on minimizing disturbance, controlling invasive plants and weeds, and restoring of native habitats.
- All training and facility operation actions at NWSTF Boardman are reviewed by the Naval Air Station Whidbey Island/NWSTF Boardman Natural Resources Manager for potential invasive plant and noxious weed issues.

### **3.5.3 ENVIRONMENTAL CONSEQUENCES**

#### **3.5.3.1 No Action Alternative**

##### **3.5.3.1.1 Ground Disturbing Activities and Alteration/Loss of Vegetation Communities**

###### **Training and Maintenance Activities**

Under the No Action Alternative, the primary causes of ground disturbances would be target maintenance and non-explosive practice munitions impacting the ground surface within the Main Target Area and fire break maintenance. Ground vehicle traffic would be very limited and would occur on the existing road network. Direct effects of vehicle traffic on vegetation would be negligible, but vehicles would act as a dispersal pathway for invasive plants (discussion below in Invasive Plants and Weeds).

Habitat types that occur in the Main Target Area include annual grass/forb, bunchgrass, open-low shrub, and disturbed, based on 1997 data. Lightning-caused wildfires burned portions of this area in 1998 and all of the area in 2008. Numerous occurrences of the special status plants stalked-pod milk-vetch and Columbia milk-vetch were recorded in the Main Target Area during the 2003–2004 plant surveys (U.S. Department of the Navy 2004). Most of the Main Target Area was classified as medium or medium-low habitat quality during the 2003–2004 plant surveys. A low density of diffuse knapweed was recorded throughout most of the Main Target Area during the 1997 noxious weed inventory (The Nature Conservancy 1997).

The Main Target Area includes the main bull's eye, the strafing pit, the laser-guided training range bull's eye, and several single targets or grouped target sets (e.g., old vehicles, tanks, etc.). The vegetation in and around each of these targets must be maintained or removed for fire safety and to provide a viable visual cue to pilots. This is accomplished by mechanical disturbance (i.e., plowing or disking) with a tractor one time per year. Approximately 23 ac. (9.3 ha) in the Main Target Area would be subjected to this maintenance under the No Action Alternative. Most non-explosive practice munitions would impact the ground in maintained areas that lack vegetation and would have little additional effect on vegetation. In addition, fire breaks throughout NWSTF Boardman are maintained annually by mechanical disturbance (e.g., plowing or disking) with a tractor. Approximately 462 ac. (187 ha) of fire breaks are maintained. A total area (target areas and fire breaks) of approximately 485 ac. (196 ha) would continue to be maintained by mechanical disturbance under the No Action Alternative.

The Main Target Area and fire breaks have been subjected to similar maintenance and disturbance regimes for years. Therefore, ground disturbing activities under the No Action Alternative would not result in additional loss of vegetation communities or additional direct alteration of habitat. Ground disturbing activities under the No Action Alternative would result in direct, long-term minor effects on vegetation. The effects would be localized, and therefore would have no significant impacts on vegetation.

###### **Invasive Plants and Weeds**

Vegetation communities at NWSTF Boardman would continue to be affected by invasive plants under the No Action Alternative. Ground disturbing activities described above would continue to indirectly affect native plant communities by creating favorable conditions for establishment of invasive plants and providing pathways for seed dispersal. Areas disturbed mechanically for target maintenance would be susceptible to invasion and frequent treatments would be necessary to prevent establishment. If invasive plants become established in an area that requires maintenance, then the subsequent mechanical treatment would likely aid in wind dispersal of seeds and exacerbate the spread of invasive

plants. Seeds could also be transported to other areas by the equipment. Routine vehicle movements on the road network would also contribute to seed dispersal.

The Navy implements invasive plant and weed controls annually at NWSTF Boardman based on available funding and identified priorities. The Nature Conservancy has undertaken weed control on the RNAs (Figure 1-5) on an annual basis for the last 18 years and, to a lesser extent, outside the RNAs. Continuation of these management actions would provide long-term benefits to native plant communities, but the benefits would be localized.

While training activities under the No Action Alternative would contribute to the invasive plant problems at NWSTF Boardman, their overall contribution is minor when considered in the context of landscape-scale disturbances such as wildfire. Overall, invasive plants would continue to have long-term impacts on vegetation under the No Action Alternative. These overall effects would be widespread. Although the indirect effects specifically associated with training activities would be long term, these impacts would be minor. Invasive plant issues specifically associated with training activities would have no significant impact on vegetation under the No Action Alternative.

### **Training-Related Wildfire**

Section 3.13 (Wildfire) describes the fire risk potential of activities under the No Action Alternative and current fire protection measures. The No Action Alternative would not alter current fire cycles (intensity and frequency) and would not introduce new ignition sources. Since 1998, more than 85 percent of NWSTF Boardman has been burned by wildfires. The 1998, 2002, 2007, and 2008 fires were started by lightning strikes (U.S. Department of the Navy 2012), the 2011 fire was training-related, and the causes of the 2009 and 2013 fires were not confirmed.

While the effects of large, lightning-caused wildfires on vegetation at NWSTF Boardman are not fully known at this time, the general pattern observed is a decrease in native sagebrush and other shrub cover accompanied by an increase in non-native cheatgrass cover (Humble and Holmes 2001). In turn, increased cheatgrass cover can increase fire frequency and intensity (Marr 2001, U.S. Department of the Navy 2012).

Occasional training-related fires would be expected to occur under the No Action Alternative, but the area affected would be small based on implementation of current fire protection measures. Short- and long-term impacts to vegetation would occur, but the area affected would be small relative to NWSTF Boardman as a whole. Wildfires caused by training activities under the No Action Alternative would have no significant impacts on vegetation.

### **3.5.3.2 Alternative 1**

#### **3.5.3.2.1 Ground Disturbing Activities and Alteration/Loss of Vegetation Communities**

##### **Construction Activities**

Site excavation, grading, and equipment operations during construction of the proposed range enhancements for Alternative 1 would result in temporary disturbances to the ground surface. The area of disturbance for individual construction projects would range from less than 1 to 40 ac. (0.4 to 16 ha). The total area of disturbance would be 92 ac. (37 ha) (0.2 percent of NWSTF Boardman), 13 ac. (5.3 ha) of which are previously disturbed (Table 2-5). Approximately 79 ac. (32 ha) of previously undisturbed area would be affected; about 49 ac. (20 ha) would be permanently converted to development, and about 30 ac. (12 ha) would be temporarily disturbed and revegetated in accordance with the post-construction restoration plan (Appendix F, Additional Biological Information). Construction activities for

the range enhancements would be spaced over a period of several years as funding becomes available (Table 2-6). Therefore, the total area of disturbance at any given time during construction would be much less than 92 ac. (37 ha).

Annual grass/forb, bunchgrass, and open-low shrub communities would be affected based on 1997 mapping data. Biological soil crust would also be affected. Surveys would be conducted during the project design phase to identify existing vegetation communities and evaluate habitat quality. This information would be used during project design to support micro-siting decisions. Micro-siting would involve looking at proposed construction sites at a “micro” level to identify sensitive features that should be avoided to the extent practicable. Areas of higher quality habitat (e.g., undisturbed areas with a relatively high percentage of native plant cover) would be avoided in favor of areas of lower quality habitat (e.g., disturbed areas with a relatively high percentage of non-native plant cover), to the extent practicable. The survey data would also be used to support post-construction restoration efforts (Appendix F, Additional Biological Information).

As noted above, approximately 49 ac. (20 ha) would be permanently converted to development. Vegetation in these areas would be permanently lost. The area of permanently lost vegetation would be small relative to the total land area at NWSTF Boardman (about 0.1 percent). Approximately 30 ac. (12 ha) temporarily disturbed during construction would be revegetated in accordance with the proposed post-construction restoration plan, which includes provisions for biological soil crust inoculation (Appendix F, Additional Biological Information).

Two special status plant species, stalked-pod milk vetch and Columbia milk vetch (Table 3.5-3), are expected to occur within portions of the area of disturbance and some plants would be lost as a result of construction. These species were common and widespread across NWSTF Boardman in the 2003 to 2004 plant surveys. For each of these species, the surveyors consider their occurrence at NWSTF Boardman as one population as opposed to several separate populations (U.S. Department of the Navy 2004). While the numbers of individual plants that would be lost cannot be estimated based on available data, the total area of disturbance for construction represents very small part of the habitat occupied by these species. Construction activities would not affect the viability of special status plant populations at NWSTF Boardman.

Restoration of disturbed areas in arid or semi-arid environments can be challenging, particularly in locations with established invasive plant populations. Accordingly, the post-construction restoration plan (Appendix F, Additional Biological Information) has been developed in coordination with USFWS, Oregon Department of Fish and Wildlife, and other subject matter experts. The restoration plan and impact avoidance measures would be incorporated into project design and specification documents, which would become an enforceable part of the construction contracts. Qualified Navy or Oregon National Guard (ORNG) personnel would conduct construction monitoring and would oversee restoration and long-term monitoring activities.

Construction activities would result in permanent localized effects on vegetation in the form of lost vegetation communities, lost biological soil crust, and lost individual special status plants under Alternative 1. The intensity of the permanent effects would be considered moderate because special status plant species and uncommon plant communities would be affected. The effects would be localized because the area of permanently lost vegetation would be small relative to the total land area at NWSTF Boardman (about 0.1 percent). The overall viability of special status plant populations would not be affected.

Construction activities would also result in short-term localized effects on vegetation in areas that would be temporarily disturbed and restored. The intensity of the short-term effects are considered minor because the area temporarily disturbed would be small relative to the total land area at NWSTF Boardman (less than 0.06 percent) and a post-construction restoration plan (Appendix F, Additional Biological Information) would be implemented. Construction activities would have no significant impacts on vegetation under Alternative 1.

### **Training Activities**

Disturbance regimes associated with training-related activities conducted in the Main Target Area under Alternative 1 would be the same as the No Action Alternative. However, training activities on the proposed new ranges would result in increased ground disturbance. Soils and vegetation around targets on the new ranges would be disturbed by non-explosive practice munitions striking the ground and during target maintenance. Some of the areas affected would coincide with areas temporarily disturbed during construction, thus hampering restoration efforts. Large-caliber weapons firing at the proposed Digital Multipurpose Training Range (DMPTR) would result in ground disturbance and destruction of vegetation, most or all of which would have also been disturbed during construction. Similar disturbances would occur around target emplacements on the Multipurpose Machine Gun Range (MPMGR) and eastern Convoy Live Fire Range (CLFR).

Areas disturbed by projectile impacts would likely be colonized by invasive plants. These areas, as well as the other proposed action areas, would be monitored annually pursuant to the *NWSTF Boardman INRMP* to determine the effects of range activities on vegetative structure and composition. Surveys would be performed by qualified personnel. Control of invasive plants would be prioritized within the footprints of the proposed training ranges and along all roads expected to be used during training. Vegetation around highly disturbed target emplacements could be permanently lost, either as a result of persistent disturbance from projectile impacts or required vegetation maintenance around the targets.

Vehicle and equipment use would increase substantially under Alternative 1 during ground-based training events. However, vehicles, including tracked vehicles, would continue to use existing roads or new gravel roads constructed under Alternative 1. No off-road maneuver training is proposed.

Training activities under Alternative 1 would result in permanent localized effects on vegetation in the form of lost vegetation communities and lost individual special status plants. The intensity of the permanent effects are considered minor because the area affected would be small relative to the total land area at NWSTF Boardman, the viability of special status plant populations would not be affected, and management practices (MPs) (invasive plant monitoring and control) would be implemented. Training activities would have no significant impacts on vegetation under Alternative 1.

### **Maintenance Activities**

Maintenance activities around targets in the Main Target Area under Alternative 1 would be the same as those described for the No Action Alternative. Approximately 23 ac. (9.3 ha) would continue to be maintained by mechanical disturbance. However, as discussed in Section 3.13 (Wildfire), the *Draft Integrated Wildland Fire Management Plan* (Appendix H) includes proposed modifications to the existing system of fire breaks. The width of some fire breaks would be reduced to the width of the adjacent road, some fire breaks that do not follow roads would be eliminated, and some new fire breaks would be created (Figure 3.13-3). The total area of fire breaks that would be maintained annually by mechanical disturbance (plowing or disking with a tractor) would decrease from 462 ac. (187 ha) to 243 ac. (98 ha). Areas removed from mechanical maintenance would be planted with native

bunchgrasses, primarily Sandberg's bluegrass with some needle and thread or bluebunch wheatgrass, to provide a low-structure and low-fuel load area next to the road/fire break. Initial fire break restoration efforts would be limited to relatively small areas to determine if restoration on a larger scale is feasible.

In summary, an overall increase in impacts to vegetation from ground disturbing activities would be observed under Alternative 1 compared to the No Action Alternative when the combined effects of construction, training, and maintenance activities are considered. The total area of disturbance from construction activities would be 92 ac. (37 ha).

### **Invasive Plants and Weeds**

Vegetation communities at NWSTF Boardman would continue to be affected by invasive plants under Alternative 1. Ground disturbing activities described above would continue to indirectly affect native plant communities by creating favorable conditions for establishment of invasive plants and providing pathways for seed dispersal. Disturbance regimes and associated invasive plant impacts in the Main Target Area under Alternative 1 would be similar to the No Action Alternative. Construction and operation of the proposed new ranges would exacerbate existing invasive plant problems. Construction and military vehicles and equipment coming from offsite would provide a new pathway for introduction of invasive plants and would be a dispersal mechanism for seeds at NWSTF Boardman. As discussed in Section 3.5.3.4 (Proposed Management Practices, Monitoring, and Mitigation Measures), several MPs would be implemented to avoid invasive plant infestations, monitor invasive plants, and adaptively manage invasive plants during construction and over the life of the proposed training ranges. In addition to project specific MPs, NWSTF Boardman-wide invasive plant and noxious weed management actions would be implemented as part of the *NWSTF Boardman INRMP*. The invasive plant and noxious weed management actions, developed in cooperation with USFWS and Oregon Department of Fish and Wildlife, would be reviewed annually and updated as necessary. Key elements of the plan include the following:

- Standard operating procedures for preventing and minimizing the introduction and spread of invasive plants
- Updates of the invasive plant inventory and mapping prior to implementing the Proposed Action
- Responsibilities and procedures for integrating efforts of the Navy, ORNG, and The Nature Conservancy
- Criteria for prioritizing management actions
- Short- and long-term monitoring programs
- Annual work plans, including funding requirements and funding sources

In addition to the potential adverse effects on vegetation, the proposed increase in use of NWSTF Boardman is expected to result in indirect beneficial effects. As use increases, NWSTF Boardman's value as a training asset would increase. Range sustainability would become a higher priority as training value rises. As is the case with all government agencies, the Navy and National Guard Bureau make resource allocations and funding decisions based on mission priorities. Therefore, funding for investments in sustainability and conservation would be expected to increase under Alternative 1, resulting in long-term benefits to vegetation through more effective invasive plant management.

Construction and training activities under Alternative 1 would result in indirect long-term effects on vegetation from invasive plants. The effects would be considered long-term and minor with implementation of proposed MPs (Section 3.5.3.4, Proposed Management Practices, Monitoring, and

Mitigation Measures). Invasive plant issues specifically associated with training activities would have no significant impacts on vegetation under Alternative 1.

### **Training-Related Wildfire**

As discussed in Section 3.13 (Wildfire), the proposed increases in training under Alternative 1 at NWSTF Boardman could increase the risk of wildfire. Vegetation communities and special status plants may be impacted through direct mortality (i.e., burning), and subsequent indirect effects such as soil erosion and conversion of native vegetation communities to non-native annual grasslands.

To address these issues, the Navy and ORNG prepared a *Draft Integrated Wildland Fire Management Plan*, which contains a Fire Danger Rating and Wildland Fire Risk Management Matrix, both of which are contained in Appendix H. The Plan would be finalized prior to implementing the Proposed Action and the Navy, ORNG, and other range users would implement the Plan. Specifics regarding implementation of the Plan are provided in Section 3.13 (Wildfire) and Appendix H.

Fires resulting from training activities would be expected to occur on the DMPTR, MPMGR, and eastern CLFR under Alternative 1, particularly during dry periods. However, the area burned is expected to be relatively small based on finalization and implementation of the *Draft Integrated Wildland Fire Management Plan* and the increase in fire suppression assets that would be associated with ORNG training activities. Wildfires would result in short- and long-term effects on vegetation under Alternative 1. The effects would be localized based on finalization and implementation of the *Draft Integrated Wildland Fire Management Plan*. Wildfires caused by training activities under Alternative 1 would have no significant impacts on vegetation.

In summary, NWSTF Boardman is unique because it represents one of the largest remaining single blocks of predominantly native shrub-steppe and grassland habitats in Oregon's portion of the Columbia Plateau Ecoregion. Accordingly, the potential impacts on vegetation from ground disturbing activities, invasive plants, and wildfire would be mitigated, monitored, and adaptively managed during construction and over the life of the proposed training ranges. An overall increase in impacts to vegetation from ground disturbing activities would be observed under Alternative 1 compared to the No Action Alternative when the combined effects of construction, training, and maintenance activities are considered. The total area of disturbance from construction activities would be 92 ac. (37 ha). However, proposed modifications to the fire break system could result in restoration of about 219 ac. (89 ha) of disturbed land. The total area of disturbance from construction activities represents a relatively small portion of NWSTF Boardman (0.2 percent). Invasive plants and increased wildfire risk represent potentially significant impacts to native vegetation, but proposed MPs would avoid and minimize impacts. The overall viability of plant populations or plant communities would not be affected. Alternative 1 would have no significant impacts on vegetation.

### **3.5.3.3 Alternative 2**

#### **3.5.3.3.1 Ground Disturbing Activities and Alteration/Loss of Vegetation Communities**

##### **Construction Activities**

Site excavation, grading, and equipment operations during construction of the proposed range enhancements for Alternative 2 would result in temporary disturbances to the ground surface (Table 2-5 and Figure 2-9). The area of disturbance for individual construction projects would range from less than 1 to 30 ac. (less than 0.4 to 12 ha). The total area of disturbance would be about 65 ac. (26 ha) (0.1 percent of NWSTF Boardman), 25 ac. (10 ha) of which have been previously disturbed (mostly consisting of existing gravel or dirt roads) (Table 2-5). Approximately 40 ac. (16 ha) of previously

undisturbed areas would be affected, about 25 ac. (10 ha) would be permanently converted to development, and about 15 ac. (6 ha) would be temporarily disturbed and revegetated. Construction activities for the range enhancements would be spaced over a period of several years as funding becomes available. Therefore, the total area of disturbance at any given time during construction would be much less than 65 ac. (26 ha).

Under Alternative 2, a second CLFR (western CLFR) would be constructed and the Joint-Use Range Operations Support Center would be constructed as a standalone building. However, the DMPTR would not be constructed under Alternative 2. Therefore, the total area of disturbance for Alternative 2 would decrease 27 ac. (11 ha) compared to Alternative 1 (from 92 ac. [37 ha] to 65 ac. [26 ha]). The area permanently converted to development under Alternative 2 would decrease 25 ac. (10 ha) compared to Alternative 1 (from 50 ac. (20 ha) to 25 ac. [10 ha]). Construction of the western CLFR would include placement of additional gravel on about 12 ac. (4.9 ha) of existing gravel road, but previously undisturbed areas would not be affected. The MPs for Alternative 2 would be the same as those described for Alternative 1.

Construction activities would result in permanent localized effects on vegetation in the form of lost vegetation communities and lost individual special status plants under Alternative 2. Biological soil crust would also be lost. The intensity of the permanent effects would be considered moderate because some of the plant species and plant communities affected are uncommon. The effects would be localized because the area of permanently lost vegetation would be small relative to the total land area at NWSTF Boardman (about 0.05 percent). The overall viability of special status plant populations would not be affected.

Construction activities would also result in short-term localized effects on vegetation in areas that would be temporarily disturbed and restored. The intensity of the short-term effects are considered minor because the area temporarily disturbed would be small relative to the total land area at NWSTF Boardman (about 0.03 percent) and a post-construction restoration plan, which includes provisions for biological soil crust inoculation (Appendix F, Additional Biological Information) would be implemented. Construction activities would have no significant impacts on vegetation under Alternative 2.

### **Training Activities**

As shown in Tables 2-1, 2-2, and 2-3, the training activities conducted under Alternative 2 would be the same as Alternative 1 with three exceptions: (1) the DMPTR would not be constructed, (2) non-explosive practice mortar rounds would be fired into the Main Target Area, and (3) half of the CLFR training events would shift from the eastern CLFR to the western CLFR. These activities would result in a decrease in the area of disturbance associated with training activities compared to Alternative 1. Ground disturbance from use of the mortar firing points would be negligible. Additional vegetation disturbance would occur under Alternative 2 around the target emplacements along the western CLFR, but there would be no disturbance associated with the DMPTR. The MPs for Alternatives 1 and 2 would be the same.

Training activities under Alternative 2 would result in permanent localized effects on vegetation in the form of lost vegetation communities and lost individual special status plants. The intensity of the permanent effects are considered minor because the area affected would be small relative to the total land area at NWSTF Boardman, the viability of special status plant populations would not be affected, and MPs would be implemented. Training activities would have no significant impacts on vegetation under Alternative 2.

### **Maintenance Activities**

Maintenance activities around targets in the Main Target Area under Alternative 2 would be the same as those described for the No Action Alternative and Alternative 1. Approximately 23 ac. (9.3 ha) would continue to be maintained by mechanical disturbance. However, as discussed in Section 3.13 (Wildfire), the *Draft Integrated Wildland Fire Management Plan* (Appendix H) includes proposed modifications to the existing system of fire breaks (Figure 3.13-3). As discussed for Alternative 1, the total area of fire breaks that would be maintained annually by mechanical disturbance (plowing or disking with a tractor) would also decrease from 462 ac. (187 ha) to 243 ac. (98 ha) under Alternative 2. Areas removed from mechanical maintenance would be planted with native bunchgrasses, primarily Sandberg's bluegrass with some needle and thread or bluebunch wheatgrass, to provide a low-structure and low-fuel load area next to the road/fire break. Initial fire break restoration efforts would be limited to relatively small areas to determine if restoration on a larger scale is feasible.

In summary, an overall increase in impacts to vegetation from ground disturbing activities would be observed under Alternative 2 compared to the No Action Alternative when the combined effects of construction, training, and maintenance activities are considered. The total area of disturbance from construction activities would be 65 ac. (26 ha).

### **Invasive Plants and Weeds**

As discussed above, ground disturbance associated with construction and training activities under Alternative 2 would decrease compared to Alternative 1 because the DMPTR would not be constructed and operated. The corresponding indirect effects from invasive plants would also decrease. Mortar firing points and the western CLFR would be in use under Alternative 2, but the overall activity footprint would be smaller than Alternative 1. Nonetheless, the activity footprint would be larger than the No Action Alternative and this would provide additional pathways for invasive plant seed dispersal at NWSTF Boardman, thus increasing the potential for infestations. As discussed in Section 3.5.3.4 (Proposed Management Practices, Monitoring, and Mitigation Measures), several MPs would be implemented to avoid invasive plant infestations, monitor invasive plants, and adaptively manage invasive plants. The same invasive plant management approach would be used under Alternatives 1 and 2.

Construction and training activities under Alternative 2 would result in indirect long-term effects on vegetation from invasive plants. The effects would be considered long-term, minor, and localized with implementation of proposed MPs discussed in Section 3.5.3.4 (Proposed Management Practices, Monitoring, and Mitigation Measures). Invasive plant issues specifically associated with training activities would have no significant impacts on vegetation under Alternative 2.

### **Training-Related Wildfire**

As discussed in Section 3.13 (Wildfire), the proposed increases in training under Alternative 2 at NWSTF Boardman could increase the risk of wildfire, but the risk would be lower than Alternative 1 because the DMPTR would not be constructed and operated.

Fires resulting from training activities would be expected to occur on the MPMGR, and the eastern and western CLFRs under Alternative 2, particularly during dry periods. However, the area burned is expected to be relatively small based on implementation of the *Draft Integrated Wildland Fire Management Plan* (Appendix H). Wildfires would result in short- and long-term effects on vegetation under Alternative 2. The effects would be localized based on implementation of the *Draft Integrated*

*Wildland Fire Management Plan.* Wildfires caused by training activities under Alternative 2 would have no significant impacts on vegetation.

In summary, NWSTF Boardman is unique because it represents one of the largest remaining single blocks of predominantly native shrub-steppe and grassland habitats in Oregon's portion of the Columbia Plateau Ecoregion. Accordingly, the potential impacts on vegetation from ground disturbing activities, invasive plants, and wildfire would be mitigated, monitored, and adaptively managed during construction and over the life of the proposed training ranges. An overall increase in impacts to vegetation from ground disturbing activities would be observed under Alternative 2 compared to the No Action Alternative when the combined effects of construction, training, and maintenance activities are considered. The total area of disturbance from construction activities would be 65 ac. (26 ha). However, proposed modifications to the fire break system could result in restoration of about 219 ac. (89 ha) of disturbed land. The total area of disturbance from construction activities represents a relatively small portion of NWSTF Boardman (about 0.1 percent). Invasive plants and increased wildfire risk represent potentially significant impacts to native vegetation, but proposed MPs would avoid and minimize impacts. The viability of plant populations or plant communities would not be affected. Alternative 2 would have no significant impacts on vegetation.

### **3.5.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures**

#### **3.5.3.4.1 Proposed Management Practices**

The current MPs listed in Section 3.5.2.7 (Current Requirements and Management Practices) would continue to be implemented under Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions. The following MPs would be implemented to avoid and minimize potential impacts to vegetation under Alternatives 1 and 2:

- Surveys would be conducted during the project design phase to identify existing vegetation communities and evaluate habitat quality. This information would be used during project design to support micrositeing decisions. Areas of higher quality habitat (e.g., undisturbed areas with a relatively high percentage of native plant cover) would be avoided in favor of areas of lower quality habitat (e.g., disturbed areas with a relatively high percentage of non-native plant cover), to the extent practicable. Micrositeing efforts would be limited to buildings and structures, as opposed to targetry or other range components, because even minor changes to the range design could affect the associated surface danger zone or impact range safety in other ways. The survey data would also be used to support post-construction restoration efforts.
- Vegetation temporarily disturbed during construction would be restored in accordance with the proposed post-construction restoration plan (Appendix F, Additional Biological Information). The restoration plan would be implemented by the ORNG in accordance with the Host-Tenant Agreement and Inter-Service Support Agreement that would be updated prior to implementing the selected alternative.
- Invasive plants would continue to be managed and controlled under the *NWSTF Boardman INRMP*. The Plan would be updated in cooperation with ORNG, USFWS, and Oregon Department of Fish and Wildlife during routine annual reviews to reflect the evolving invasive plant management situation associated with construction and operation of the new ranges. Updates to the Plan would include provisions for short- and long-term monitoring of invasive plants (see Section 3.5.3.4.2, Proposed Monitoring, below); responsibilities and procedures for integrating efforts of the Navy, ORNG, and The Nature Conservancy; criteria for prioritizing management

actions and adaptive management strategies to control invasive plants; and annual work plans, including funding requirements and funding sources.

- Transport of invasive plant seeds by ORNG vehicles and equipment would be minimized by washing vehicles and equipment before and after training events. Washing would normally occur at the unit's home station.
- The *NWSTF Boardman Draft Integrated Wildland Fire Management Plan* (Appendix H) would be finalized and implemented. In addition to other fire protection measures, the Plan includes proposed modifications to the existing system of fire breaks. The width of some fire breaks would be reduced to the width of the adjacent road, some fire breaks that do not follow roads would be eliminated, and some new fire breaks would be created (Figure 3.13-3). The total area of fire breaks that would be maintained annually by mechanical disturbance (plowing or disking with a tractor) would decrease from 462 ac. (187 ha) to 243 ac. (98 ha). Areas removed from mechanical maintenance would be planted with native bunchgrasses, primarily Sandberg's bluegrass with some needle and thread or bluebunch wheatgrass, to provide a low-structure and low-fuel load area next to the road/fire break. Initial fire break restoration efforts would be limited to relatively small areas to determine if restoration on a larger scale is feasible.
- As part of the *NWSTF Boardman INRMP*, the Navy, in cooperation with The Nature Conservancy, is proposing to relocate RNA-A to a more suitable location. As discussed in Section 3.5.2.6 (Research Natural Areas), three RNAs (A, B, and C, Figure 1-5) were established on NWSTF Boardman in 1978 and are co-managed by The Nature Conservancy under a Memorandum of Understanding with the Navy. The RNA program was created to (1) preserve examples of all significant natural ecosystems for comparison with those influenced by man, (2) provide educational and research areas for ecological and environmental studies, and (3) preserve gene pools of threatened and endangered plants and animals. RNA-A encompasses the Main Target Area at NWSTF Boardman, which must be used and maintained to meet mission requirements. Portions of the Main Target Area are highly disturbed by military use. While the rationale for originally establishing RNA-A within the Main Target Area is uncertain, it has become clear that this area is not functioning as an RNA and is not providing the intended scientific and educational benefits of an RNA. Therefore, the Navy, in coordination with The Nature Conservancy, is proposing to relocate RNA-A to one or more suitable locations on NWSTF Boardman. The new RNA would be sited to avoid possible conflicts with military activities and the new location would be more representative of the unique habitat types RNAs are designed to protect. Similar to existing RNA-B and RNA-C, access to the relocated RNA would normally be limited to research activities, invasive plant control, and emergency response. Vegetation communities would benefit from the increased protection and management provided by relocating RNA-A to a more suitable location.

#### **3.5.3.4.2 Proposed Monitoring**

Environmental monitoring involves systematic sampling of physical and biological resources to derive knowledge of the environment, its resources, and processes or activities that affect them. Monitoring can be conducted for a number of purposes, including establishing environmental baselines and trends; informing decision-making for management actions; assessing the effects of natural and human influences; and ensuring compliance with environmental regulations. Accordingly, monitoring is an important component of the Navy's natural resources management strategy implemented under the *NWSTF Boardman INRMP*. The current Plan includes vegetation monitoring project recommendations, which will be implemented subject to the availability of funds properly authorized and appropriated under Federal law.

To the extent possible, vegetation monitoring conducted under the current *NWSTF Boardman INRMP* will be designed to support the Proposed Action, as well as existing management needs. In addition, the Plan would continue to be the primary means of designing and implementing vegetation monitoring to address the evolving management situation associated with construction and operation of the new ranges. Necessary updates to the Plan and associated monitoring would be accomplished during routine annual reviews conducted in cooperation with ORNG, USFWS, and Oregon Department of Fish and Wildlife. This process will help to ensure that a comprehensive and consistent approach to vegetation management and monitoring is accomplished for the entire NWSTF Boardman property.

#### **3.5.3.4.3 Proposed Mitigation Measures**

Based on the analysis presented in Section 3.5.3 (Environmental Consequences) and implementation of proposed MPs and monitoring efforts for vegetation, additional mitigation measures are not required to further reduce adverse impacts on vegetation. However, mitigation measures proposed to reduce adverse impacts on the Washington ground squirrel (Section 3.6.3.4, Proposed Management Practices, Monitoring, and Mitigation Measures) would also result in benefits to vegetation communities at NWSTF Boardman. These proposed mitigation measures include restoration of native shrub steppe and grassland habitats at NWSTF Boardman and are described in detail in the USFWS Conference Opinion (Appendix B, Regulatory Correspondence).

#### **3.5.3.5 Summary of Effects and Conclusions**

Table 3.5-4 lists each stressor analyzed for potential impacts on vegetation at NWSTF Boardman. The No Action Alternative would not result in significant impacts on vegetation. The analysis indicates that ground disturbance, invasive plants, and wildfires under Alternative 1 and Alternative 2 would not significantly impact vegetation based on implementation of MPs to reduce impacts associated with construction, wildfire, and invasive plants.

**Table 3.5-4: Summary of Impacts on Vegetation**

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
<b>No Action Alternative</b>	
<b>Ground Disturbing Activities and Alteration of Habitat</b>	
Construction Activities	Not applicable. No construction would occur.
Military Training Activities	No additional loss of vegetation communities or additional direct alteration of habitat. Long-term, minor, and localized effects on vegetation.
Maintenance Activities	No additional loss of vegetation communities or additional direct alteration of habitat. Long-term, minor, and localized effects on vegetation.
Training-related Wildfire	Short- and long-term localized effects on vegetation from fires related to training activities.
<b>Impact Conclusion</b>	The No Action Alternative would not result in significant impacts on vegetation.
<b>Alternative 1</b>	
<b>Ground Disturbing Activities and Alteration of Habitat</b>	
Construction Activities	Permanent localized effects on vegetation in the form of lost vegetation communities and lost individual special status plants in developed areas. Short-term localized effects on vegetation in areas that would be temporarily disturbed and restored. The effects would be localized because the total area of disturbance would be small relative to the total land area at NWSTF Boardman (0.2 percent). The viability of special status plant populations and native plant communities would not be affected. A post-construction restoration plan (Appendix F, Additional Biological Information) would be implemented.
Military Training Activities	Permanent localized effects on vegetation in the form of lost vegetation communities and lost individual special status plants. The intensity of the permanent effects are considered minor because the area affected would be small relative to the total land area at NWSTF Boardman, the viability of special status plant populations would not be affected, and MPs would be implemented.
Maintenance Activities	Proposed modifications to the fire break system could result in long-term benefits to vegetation communities at NWSTF Boardman by restoring approximately 219 ac. (89 ha) of mechanically disturbed land to native plant communities, which would also reduce the potential for soil erosion and reduce the likelihood of invasive plant infestations.
Invasive Plants	Indirect, long-term, minor, and localized effects with implementation of proposed MPs.
Training-related Wildfire	Short- and long-term effects on vegetation. The effects would be localized based on implementation of the <i>Draft Integrated Wildland Fire Management Plan</i> .
<b>Impact Conclusion</b>	Alternative 1 would not result in significant impacts on vegetation based on implementation of MPs to reduce impacts associated with construction, wildfire, and invasive plants.

**Table 3.5-4: Summary of Impacts on Vegetation (continued)**

Stressor	Summary of Effects and National Environmental Policy Act Impact Determination
<b>Alternative 2</b>	
<b>Ground Disturbing Activities and Alteration of Habitat</b>	
Construction Activities	Permanent localized effects on vegetation in the form of lost vegetation communities and lost individual special status plants in developed areas. Short-term localized effects on vegetation in areas that would be temporarily disturbed and restored. The effects would be localized because the total area of disturbance would be small relative to the total land area at NWSTF Boardman (0.1 percent). The viability of special status plant populations and native plant communities would not be affected. A post-construction restoration plan (Appendix F, Additional Biological Information) would be implemented. The affected area would be smaller than Alternative 1.
Military Training Activities	Permanent localized effects on vegetation in the form of lost vegetation communities and lost individual special status plants. The intensity of the permanent effects are considered minor because the area affected would be small relative to the total land area at NWSTF Boardman, the viability of special status plant populations would not be affected, and MPs would be implemented. The affected area would be smaller than Alternative 1.
Maintenance Activities	Proposed modifications to the fire break system could result in long-term benefits to vegetation communities at NWSTF Boardman by restoring approximately 219 ac. (89 ha) of mechanically disturbed land to native plant communities, which would also reduce the potential for soil erosion and reduce the likelihood of invasive plant infestations.
Invasive Plants	Indirect, long-term, minor, and localized effects with implementation of proposed MPs. The affected area would be smaller than Alternative 1.
Training-related Wildfire	Short- and long-term effects on vegetation. The effects would be localized based on implementation of the <i>Draft Integrated Wildland Fire Management Plan</i> . The affected area would be smaller than Alternative 1.
<b>Impact Conclusion</b>	Alternative 2 would not result in significant impacts on vegetation based on implementation of MPs to reduce impacts associated with construction, wildfire, and invasive plants.

Notes: ac. = acres, ha = hectares, MP = management practice, NWSTF = Naval Weapons Systems Training Facility

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