

Vegetation

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1 **3.5 VEGETATION**

2 **3.5.1 INTRODUCTION**

3 **3.5.1.1 Overview**

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

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

- 13 • Species listed as threatened or endangered under the Endangered Species Act of 1973 (ESA) and
14 species proposed for listing.
- 15 • Species considered by the United States (U.S.) Fish and Wildlife Service (USFWS) as a candidate
16 for ESA listing.
- 17 • Species of concern identified by USFWS. As an informal category not defined by the ESA, the
18 term commonly refers to species that are declining or appear to be in need of conservation. The
19 USFWS Oregon Ecological Services Field Office maintains a list of species of concern (USFWS
20 2011) for the region.
- 21 • Species classified as threatened or endangered by the Oregon Department of Agriculture under
22 the Oregon ESA.
- 23 • Species on the Oregon Biodiversity Information Center lists 1, 2, 3, or 4.

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

26 **3.5.1.2 Regulatory Framework**

27 **3.5.1.2.1 Endangered Species Act**

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

32 **3.5.1.2.2 Federal Noxious Weed Act**

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

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

3 **3.5.1.2.3 Executive Order 13112 Invasive Species**

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

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

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

14 **3.5.1.3 Determination of Significance**

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

26 **3.5.2 AFFECTED ENVIRONMENT**

27 **3.5.2.1 Columbia Plateau Ecoregion**

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

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

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

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

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

25 **3.5.2.2 Vegetation Communities at NWSTF Boardman**

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

33 The composition of existing vegetation communities at the installation is influenced by numerous
34 factors including climate, soils, military use, wildfire, past grazing, a limited amount of past agricultural
35 use, and introduction of invasive plants (noxious weeds). In particular, two related factors, wildfire and
36 invasive plants, have affected vegetation in recent years. Since 1998, more than 85 percent of NWSTF
37 Boardman has been burned by wildfires, which have caused short- and long-term habitat alterations.
38 Large fires swept portions of the installation in 1998 (17,514 ac. [7,088 ha]), 2007 (11,664 ac. [4,720
39 ha]), and 2008 (30,612 ac. [12,388 ha]), while smaller areas burned in 2002 (1,639 ac. [663 ha]) and 2009
40 (618 ac. [250 ha]) (see Section 3.12 and Figure 3.12-1). With the exception of the 2009 fire, all of these
41 fires were started by lightning strikes. The cause of the 2009 fire is unknown (U.S. Department of the
42 Navy 2012). Training-related wildfires also occur occasionally at NWSTF Boardman. Range safety
43 monitoring by participating military units allows for early detection of training-related fires and rapid

1 response. Therefore, fires that start during training activities are typically contained to relatively small
2 areas compared to lightning-caused fires, which might go undetected for a period of time after ignition.

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

11 Maintaining an up-to-date vegetation inventory and associated mapping for NWSTF Boardman has been
12 a challenge given the recent wildfire history. Habitat types were mapped and described for the entire
13 installation in 1997 by interpreting aerial photographs and conducting ground-truthing studies (U.S.
14 Department of the Navy 2012). In 2007, the U.S. Department of the Navy (Navy) initiated a survey to
15 update vegetation mapping for the entire installation. However, the large 2007 wildfire (11,664 ac.
16 [4,720 ha]) occurred soon after the aerial imagery data were collected. A decision was made not to
17 finalize the vegetation mapping effort because fire-induced vegetation changes rendered the imagery
18 data obsolete. The *NWSTF Boardman Integrated Natural Resources Management Plan (INRMP)* (U.S.
19 Department of the Navy 2012) includes a project recommendation to collect high-resolution aerial
20 photography to map all vegetation and produce geographic-information-system-based vegetation
21 mapping in the near future.

22 The remainder of this section provides descriptions of vegetation communities and habitat types based
23 on information taken from the *NWSTF Boardman INRMP*. As discussed above, the best available
24 vegetation/habitat data are from 1997, prior to a series of wildfires that occurred from 1998 through
25 2009. Vegetation conditions have changed at the installation since 1997 and will continue to change
26 based on future fire regimes and other factors such as invasive species.

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

- 29 • Big sagebrush/bluebunch wheatgrass
- 30 • Bluebunch wheatgrass/sandberg's bluegrass
- 31 • Big sagebrush/western needle-and-thread grass
- 32 • Antelope bitterbrush/needle-and-thread grass
- 33 • Needle-and-thread grass/Sandberg's bluegrass
- 34 • Snowy buckwheat/Sandberg's bluegrass

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

40 Sagebrush/wheatgrass and wheatgrass/bluegrass plant associations dominate the southern half of
41 NWSTF Boardman where soils are deeper and loamier. The presence of sagebrush differentiates these

1 communities. Sagebrush is more prevalent in the draws and lowlands where deep, subsurface water
2 resources are easier obtained. Both of these communities have been severely impacted by grazing (ca.
3 1870s to 1950s) and now are largely dominated by cheatgrass. Healthy stands of wheatgrass are mostly
4 limited to small patches on north-facing slopes, while sagebrush/wheatgrass association stands have
5 been often heavily invaded with cheatgrass.

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

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

27 In their pristine state, apparently none of these plant associations supported a diverse floristic
28 composition, largely because of harsh climatic conditions and the deep soil lichen layers that developed
29 between the grasses. Usually no more than 1 shrub and 1 or 2 species of grass, along with soil lichens
30 and bare ground, accounted for greater than 90 percent of the ground cover. Phlox, lomatium, yarrow,
31 and various members of the pea family were the most conspicuous forbs. However, livestock trampling
32 of the lichen layer and intensive grazing of the palatable forage species has encouraged the invasion of
33 alien weedy annuals such as cheatgrass, Russian thistle, tumbled mustard, and whitlow-grass. It has
34 dramatically increased the number of unpalatable native species, such as hairy golden-aster in the
35 sagebrush/wheatgrass plant associations, and fiddleneck tarweed, lance-leaf scurf-pea, and hairy
36 plantain in the needle-and-thread grass associations.

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

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

Habitat Type	Size (Acres) ¹	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 six 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 plaitain. 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.

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

Habitat Type	Size (Acres) ¹	Description	Wildlife Uses
Juniper	Not applicable ²	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.

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

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

Source: U.S. Department of the Navy 2012

2 **3.5.2.3 Invasive Plants and Weeds**

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

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

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

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

Common Name	Scientific Name	Classification ¹	Introduction Pathway and Spread at NWSTF Boardman ²
Cheatgrass	<i>Bromus tectorum</i>	-	Upwind seed source and disturbed soil, vehicle spread, fires.
Diffuse knapweed	<i>Centaurea diffusa</i>	B	Upwind seed source and disturbed soil, vehicle spread, fires.
Yellow starthistle	<i>Centaurea solstitialis</i>	B, T	Primarily associated with roads and fence lines. Upwind seed source and disturbed soil, vehicle spread.
Spikeweed	<i>Hemizonia pungens</i>	B	Associated with alkaline soils of Juniper Canyon and Well Spring, disturbed soil colonizer.
Rush skeletonweed	<i>Chondrilla juncea</i>	B, T	Not known.
Cereal rye	<i>Secale cereale</i>	B (Morrow County)	Agricultural remnant.
Medusahead rye	<i>Taeniatherum caput-medusae</i>	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	Primarily associated with roads and fence lines. Upwind seed source and disturbed soil, vehicle spread.
Perennial pepperweed	<i>Lepidium latifolium</i>	B, T	Associated with mesic soils of Juniper Canyon, disturbed soil colonizer.

¹Source is 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.

²Source: The Nature Conservancy 1997

Note: NWSTF = Naval Weapons Systems Training Facility

6 Weeds in Oregon are categorized under the Oregon State Noxious Weed Classification System
 7 depending on economic importance and feasibility of control. Major invasive species and weeds are
 8 listed in Table 3.5-2 along with their classification under the *Noxious Weed Classification System* and the
 9 potential pathway of introduction to NWSTF Boardman.

10 Landscape factors other than fire can alter natural vegetation succession, such as grazing, agricultural
 11 practices, and ground disturbance (e.g., off-road vehicle traffic) (Young et al. 2001). Grazing leases (for
 12 cattle and sheep) were cancelled at NWSTF Boardman in 2002. Termination of agricultural outleases in
 13 2002 ended alfalfa production on 240 ac. (97 ha) (U.S. Department of the Navy 2012).

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

6 **3.5.2.4 Special Status Plant Species**

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

12 **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.

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

18 Laurence’s milk-vetch (*Astragalus collinus var. laurentii*), an Oregon threatened species and USFWS
 19 species of concern, occurs in the Columbia Basin portion of Morrow County. However, this species is not
 20 on Quade’s (1994) extensive list of vascular plants occurring on the facility. The surveys conducted in
 21 2003 and 2004 targeted this species, but none were found (U.S. Department of the Navy 2004).
 22 Therefore, Laurence’s milk-vetch is not expected to occur at NWSTF Boardman and is not addressed in
 23 further detail in this EIS.

24 **3.5.2.5 Biological Soil Crust**

25 Biological soil crusts are an intimate association between soil particles and cyanobacteria, algae,
 26 microfungi, lichens, and bryophytes (in different proportions) that live within or on top of the

1 uppermost millimeters of soil. These communities have been known by a variety of names, including
2 cryptobiotic, cryptogamic, and microbiotic soil crusts. They are found in all dryland regions of the world,
3 including the polar regions, and in all vegetation types within these lands. In these landscapes, biological
4 soil crusts often cover all soil spaces not occupied by trees, grasses, or shrubs and can comprise over 70
5 percent of the living ground cover. Biological soil crusts at NWSTF Boardman are primarily comprised of
6 cyanobacterias and mosses with some lichens.

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

14 **3.5.2.6 Research Natural Areas**

15 Three RNAs (A, B, and C) were established on NWSTF Boardman in 1978 and are co-managed by The
16 Nature Conservancy under a Memorandum of Understanding with the Navy (Figure 1-5). The RNAs are
17 part of a federal government system established for research and educational purposes. Natural
18 features are preserved for scientific purposes and natural processes are allowed to dominate. The RNA
19 program was created to (1) preserve examples of all significant natural ecosystems for comparison with
20 those influenced by man, (2) provide educational and research areas for ecological and environmental
21 studies, and (3) preserve gene pools of threatened and endangered plants and animals. The RNAs on
22 NWSTF Boardman were the first established on Department of Defense lands. The Nature Conservancy
23 activities in the RNAs include research and monitoring of the native habitat types and wildlife species, as
24 well as control of noxious weeds. The RNAs are fenced and, with the exception of RNA-A, access is
25 normally limited to research and management activities such as weed control. RNA-A is located within
26 the Main Target Area, portions of which are subjected to disturbance from training and maintenance
27 activities. As discussed in Section 3.5.3.4.3, the Navy is proposing to relocate RNA-A.

28 **3.5.2.7 Current Requirements and Management Practices**

29 Following is a summary of current requirements and practices applicable to vegetation at NWSTF
30 Boardman.

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

36 **3.5.3 ENVIRONMENTAL CONSEQUENCES**

37 **3.5.3.1 No Action Alternative**

38 **3.5.3.1.1 Ground Disturbing Activities and Alteration/Loss of Vegetation Communities**

39 Under the No Action Alternative, the primary causes of ground disturbances would be target
40 maintenance and non-explosive practice munitions impacting the ground surface within the Main Target
41 Area and fire break maintenance. Ground vehicle traffic would be very limited and would occur on the

1 existing road network. Direct effects of vehicle traffic on vegetation would be negligible, but vehicles
2 would act as a dispersal pathway for invasive plants (see discussion below in Section 3.5.3.1.2).

3 Habitat types that occur in the Main Target Area include annual grass/forb, bunchgrass, open-low shrub,
4 and disturbed, based on 1997 data. Lightning-caused wildfires burned portions of this area in 1998 and
5 all of the area in 2008. Numerous occurrences of the special status plants stalked-pod milk-vetch and
6 Columbia milk-vetch were recorded in the Main Target Area during the 2003 to 2004 plant surveys (U.S.
7 Department of the Navy 2004). Approximately 14 survey locations in the Main Target Area were
8 classified as high or medium-high quality habitat during these surveys, while most survey locations were
9 medium or medium-low quality habitat. A low density of diffuse knapweed was recorded throughout
10 most of the Main Target Area during the 1997 noxious weed inventory (The Nature Conservancy 1997).

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

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

28 **3.5.3.1.2 Invasive Plants and Weeds**

29 Vegetation communities at NWSTF Boardman would continue to be affected by invasive plants under
30 the No Action Alternative. Ground disturbing activities described above would continue to indirectly
31 affect native plant communities by creating favorable conditions for establishment of invasive plants
32 and providing pathways for seed dispersal. Areas disturbed mechanically for target maintenance would
33 be susceptible to invasion and frequent treatments would be necessary to prevent establishment. If
34 invasive plants become established in an area that requires maintenance, then the subsequent
35 mechanical treatment would likely aid in wind dispersal of seeds and exacerbate the spread of invasive
36 plants. Seeds could also be transported to other areas by the equipment. Routine vehicle movements on
37 the road network would also contribute to seed dispersal.

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

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

8 **3.5.3.1.3 Wildfire**

9 Section 3.12, Wildfire, describes the fire risk potential of activities under the No Action Alternative and
10 current fire protection measures. The No Action Alternative would not alter current fire cycles (intensity
11 and frequency) and would not introduce new ignition sources. Since 1998, more than 85 percent of
12 NWSTF Boardman has been burned by wildfires. With the exception of the 2009 fire and one 2011 fire,
13 all of these fires were started by lightning strikes. The cause of the 2009 fire is unknown (U.S.
14 Department of the Navy 2012).

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

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

25 **3.5.3.2 Alternative 1**

26 **3.5.3.2.1 Ground Disturbing Activities and Alteration/Loss of Vegetation Communities**

27 **Construction Activities**

28 Site excavation, grading, and equipment operations during construction of the proposed range
29 enhancements for Alternative 1 would result in temporary disturbances to the ground surface. The area
30 of disturbance for individual construction projects would range from less than 1 to 40 ac. (0.4 to 16 ha).
31 The total area of disturbance would be 92 ac. (37 ha), 13 ac. (5.3 ha) of which are previously disturbed
32 (Table 2-5). Approximately 79 ac. (32 ha) of previously undisturbed area would be affected, about 50 ac.
33 (20 ha) would be permanently converted to development, and about 30 ac. (12 ha) would be
34 temporarily disturbed and revegetated in accordance with the post-construction restoration plan
35 (Appendix F). Construction activities for the range enhancements would be spaced over a period of
36 several years as funding becomes available (Table 2-6). Therefore, the total area of disturbance at any
37 given time during construction would be much less than 92 ac. (37 ha).

38 Annual grass/forb, bunchgrass, and open-low shrub communities would be affected based on 1997
39 mapping data. Biological soil crust would also be affected. Surveys would be conducted during the
40 project design phase to identify existing vegetation communities and evaluate habitat quality. This
41 information would be used during project design to support micro-siting decisions. Micro-siting would
42 involve looking at proposed construction sites at a "micro" level to identify sensitive features that

1 should be avoided to the extent practicable. Areas of higher quality habitat (e.g., undisturbed areas with
2 a relatively high percentage of native plant cover) would be avoided in favor of areas of lower quality
3 habitat (e.g., disturbed areas with a relatively high percentage of non-native plant cover), to the extent
4 practicable. The survey data would also be used to support post-construction restoration efforts
5 (Appendix F).

6 As noted above, approximately 50 ac. (20 ha) would be permanently converted to development.
7 Vegetation in these areas would be permanently lost. The area of permanently lost vegetation would be
8 small relative to the total land area at NWSTF Boardman (about 0.1 percent). Approximately 30 ac. (12.1
9 ha) temporarily disturbed during construction would be revegetated in accordance with the proposed
10 post-construction restoration plan, which includes provisions for biological soil crust inoculation
11 (Appendix F).

12 Two special status plant species, stalked-pod milk vetch and Columbia milk vetch (Table 3.5-3), are
13 expected to occur within portions of the area of disturbance and some plants would be lost as a result of
14 construction. These species were common and widespread across NWSTF Boardman in the 2003 to
15 2004 plant surveys. For each of these species, the surveyors consider their occurrence at NWSTF
16 Boardman as one population as opposed to several separate populations (U.S. Department of the Navy
17 2004). While the numbers of individual plants that would be lost cannot be estimated based on available
18 data, the total area of disturbance for construction represents very small part of the habitat occupied by
19 these species. Construction activities would not affect the viability of special status plant populations at
20 NWSTF Boardman.

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

28 Construction activities would result in permanent localized effects to vegetation in the form of lost
29 vegetation communities, lost biological soil crust, and lost individual special status plants under
30 Alternative 1. The intensity of the permanent effects would be considered moderate because special
31 status plant species and uncommon plant communities would be affected. The effects would be
32 localized because the area affected would be small relative to the total land area at NWSTF Boardman
33 (about 0.1 percent).

34 The overall viability of special status plant populations would not be affected. Construction activities
35 would also result in short-term localized effects to vegetation in areas that would be temporarily
36 disturbed and restored. The intensity of the short-term effects are considered minor because the area
37 affected would be small relative to the total land area at NWSTF Boardman (less than 0.06 percent) and
38 a post-construction restoration plan (Appendix F) would be implemented. Construction activities would
39 have no significant impacts on vegetation under Alternative 1.

40 **Training Activities**

41 Disturbance regimes associated with training-related activities conducted in the Main Target Area under
42 Alternative 1 would be the same as the No Action Alternative. However, training activities on the

1 proposed new ranges would result in increased ground disturbance. Soils and vegetation around targets
2 on the new ranges would be disturbed by non-explosive practice munitions striking the ground and
3 during target maintenance. Some of the areas affected would coincide with areas temporarily disturbed
4 during construction, thus hampering restoration efforts. Large-caliber weapons firing at the proposed
5 Digital Multi-Purpose Training Range (DMPTR) would result in ground disturbance and destruction of
6 vegetation, most or all of which would have also been disturbed during construction. Similar
7 disturbances would occur around target emplacements on the Multi-Purpose Machine Gun Range
8 (MPMGR) and east Convoy Live Fire Range (CLFR).

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

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

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

25 **Maintenance Activities**

26 Maintenance activities around targets in the Main Target Area under Alternative 1 would be the same as
27 those described for the No Action Alternative. Approximately 23 ac. (9.3 ha) would continue to be
28 maintained by mechanical disturbance. However, as discussed in Section 3.12, Wildfire, the Draft
29 Integrated Wildland Fire Management Plan (Appendix H) includes proposed modifications to the existing
30 system of fire breaks. The width of some fire breaks would be reduced to the width of the adjacent
31 road, some fire breaks that do not follow roads would be eliminated, and some new fire breaks would
32 be created (Figure 3.12-2). The total area of fire breaks that would be maintained annually by
33 mechanical disturbance (plowing or disking with a tractor) would decrease from 462 ac. (187 ha) to 243
34 ac. (98 ha). A long-term re-vegetation plan (Appendix F) would be implemented to restore the areas
35 removed from mechanical maintenance. These areas would be re-vegetated with native bunchgrasses,
36 primarily Sandberg's bluegrass with some needle and thread or bluebunch wheatgrass, to provide a low-
37 structure and low-fuel load area next to the road/fire break, and also provide some wildlife habitat
38 value. Grass revegetation would be considered successful if seeding results in a stand of grass providing
39 a uniform coverage of at least 80% density of a representative bunchgrass stand area within two to
40 three years of seeding. Selective herbicide treatments or other appropriate management actions would
41 be used to control invasive plants until these areas are completely restored. The proposed modifications
42 to the fire break system would result in long-term benefits to vegetation communities at NWSFT
43 Boardman by restoring approximately 219 ac (89 ha) of mechanically disturbed land to native plant

1 communities, which would also reduce the potential for soil erosion and reduce the likelihood of
2 invasive plant infestations.

3 In summary, an overall reduction in impacts to vegetation from ground disturbing activities would be
4 observed under Alternative 1 compared to the No Action Alternative when the combined effects of
5 construction, training, and maintenance activities are considered. The total area of disturbance from
6 construction activities would be 92 ac (37 ha), but proposed modifications to the fire break system
7 would result in restoration of about 219 ac (89 ha) of disturbed land.

8 **3.5.3.2.2 Invasive Plants and Weeds**

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

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

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

39 Construction and training activities under Alternative 1 would result in indirect long-term effects to
40 vegetation from invasive plants. The effects would be considered long-term and minor with
41 implementation of proposed mitigation measures (Section 3.5.3.4). Invasive plant issues specifically
42 associated with training activities would have no significant impacts on vegetation under Alternative 1.

1 **3.5.3.2.3 Wildfire**

2 As discussed in Section 3.12, Wildfire, the proposed increases in training under Alternative 1 at NWSTF
3 Boardman could increase the risk of wildfire. Vegetation communities and special status plants may be
4 impacted through direct mortality (i.e., burning), and subsequent indirect effects such as soil erosion
5 and conversion of native vegetation communities to non-native annual grasslands.

6 To address these issues the Navy and ORNG prepared a Draft Integrated Wildland Fire Management
7 Plan which contains a Fire Danger Rating and Wildland Fire Risk Management Matrix, both of which are
8 contained in Appendix H. The Plan would be finalized prior to implementing the Proposed Action and
9 the Navy, ORNG, and other range users would implement the Plan. Specifics regarding implementation
10 of the Plan are provided in Section 3.12 and Appendix H.

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

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

32 **3.5.3.3 Alternative 2**

33 **3.5.3.3.1 Ground Disturbing Activities and Alteration/Loss of Vegetation Communities**

34 **Construction Activities**

35 As shown in Table 2-5, Figure 2-4 and Figure 2-9, the total area of disturbance associated with proposed
36 range enhancements would increase by 12.5 ac. (5.5 ha) under Alternative 2 compared to Alternative 1.
37 However, most of this increase (12 ac. [4.9 ha]) would be attributable to the western CLFR, which would
38 involve placing additional gravel on an existing gravel road. Therefore, no vegetation would be lost in
39 construction of the western CLFR. The area of vegetation permanently lost to development under
40 Alternative 2 would increase by 0.5 ac. (0.2 ha) compared to Alternative 1. Based on the slight increase
41 in the area of permanently lost vegetation, the effects of Alternative 2 would be the same as those
42 described for Alternative 1. The mitigation measures for Alternatives 1 and 2 would also be the same.
43 Therefore, the analysis presented above for Alternative 1 is also applicable to Alternative 2.

1 Construction activities would result in permanent localized effects to vegetation in the form of lost
2 vegetation communities and lost individual special status plants under Alternative 2. Biological soil crust
3 would also be lost. The intensity of the permanent effects would be considered moderate because some
4 of the plant species and plant communities affected are uncommon. The effects would be localized
5 because the area affected would be small relative to the total land area at NWSTF Boardman (about 0.1
6 percent).

7 The overall viability of special status plant populations would not be affected. Construction activities
8 would also result in short-term localized effects to vegetation in areas that would be temporarily
9 disturbed and restored. The intensity of the short-term effects are considered minor because the area
10 affected would be small relative to the total land area at NWSTF Boardman (less than 0.06 percent) and
11 a post-construction restoration plan, which includes provisions for biological soil crust inoculation
12 (Appendix F) would be implemented. Construction activities would have no significant impacts on
13 vegetation under Alternative 2.

14 **Training Activities**

15 As shown in Tables 2-1, 2-2, and 2-3, the training activities conducted under Alternative 2 would be the
16 same as Alternative 1 with two exceptions. Non-explosive practice mortar rounds would be fired into
17 the Main Target Area and half of the CLFR training events would shift from the eastern CLFR to the
18 western CLFR. These activities would result in slight increases in the area of disturbance associated with
19 training activities compared to Alternative 1. Ground disturbance from use of the mortar firing points
20 would be negligible. Additional vegetation disturbance would occur under Alternative 2 around the
21 target emplacements along the western CLFR. Based on the slight increase in the area of disturbance,
22 the effects of Alternative 2 would be the same as those described for Alternative 1. The mitigation
23 measures for Alternatives 1 and 2 would also be the same. Therefore, the analysis presented above for
24 Alternative 1 is also applicable to Alternative 2.

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

31 **Maintenance Activities**

32 Maintenance activities around targets in the Main Target Area under Alternative 2 would be the same as
33 those described for the No Action Alternative and Alternative 1. Approximately 23 ac. (9.3 ha) would
34 continue to be maintained by mechanical disturbance. However, as discussed in Section 3.12, Wildfire,
35 the Draft Integrated Wildland Fire Management Plan (Appendix H) includes proposed modifications to
36 the existing system of fire breaks (Figure 3.12-2). As discussed for Alternative 1, the total area of fire
37 breaks that would be maintained annually by mechanical disturbance (plowing or disking with a tractor)
38 would also decrease from 462 ac. (187 ha) to 243 ac. (98 ha) under Alternative 2. A long-term re-
39 vegetation plan (Appendix F) would be implemented to restore the areas removed from mechanical
40 maintenance. These areas would be re-vegetated with native bunchgrasses, primarily Sandberg's
41 bluegrass with some needle and thread or bluebunch wheatgrass, to provide a low-structure and low-
42 fuel load area next to the road/fire break, and also provide some wildlife habitat value. Grass
43 revegetation would be considered successful if seeding results in a stand of grass providing a uniform
44 coverage of at least 80% density of a representative bunchgrass stand area within two to three years of

1 seeding. Selective herbicide treatments or other appropriate management actions would be used to
2 control invasive plants until these areas are completely restored. The proposed modifications to the fire
3 break system would result in long-term benefits to vegetation communities at NWSFT Boardman by
4 restoring approximately 219 ac (89 ha) of mechanically disturbed land to native plant communities,
5 which would also reduce the potential for soil erosion and reduce the likelihood of invasive plant
6 infestations.

7 In summary, an overall reduction in impacts to vegetation from ground disturbing activities would be
8 observed under Alternative 2 compared to the No Action Alternative when the combined effects of
9 construction, training, and maintenance activities are considered. The total area of disturbance from
10 construction activities would be 105 ac (42 ha), but proposed modifications to the fire break system
11 would result in restoration of about 219 ac (89 ha) of disturbed land.

12 **3.5.3.3.2 Invasive Plants and Weeds**

13 As discussed above, ground disturbances associated with construction and training activities under
14 Alternative 2 would increase slightly compared to Alternative 1. The corresponding indirect effects from
15 invasive plants would also increase slightly. A more important factor for Alternative 2 is that the overall
16 activity footprint would increase relative to Alternative 1 and the No Action Alternative. For example,
17 mortar firing points and the western CLFR would be in use. This increased activity footprint would
18 provide additional pathways for invasive plant seed dispersal at NWSTF Boardman, thus increasing the
19 potential for infestations. As discussed in Section 3.5.3.4, several mitigation measures would be
20 implemented to avoid invasive plant infestations, monitor invasive plants, and adaptively manage
21 invasive plants. While the same invasive plant management approach would be used under Alternatives
22 1 and 2, the level of effort required for invasive plant control would be greater if infestations become
23 more widespread under Alternative 2.

24 Training activities on the MPMGR and the DMPTR would not change under Alternative 2. Therefore,
25 potential invasive plant issues in these areas would be the same as Alternative 1.

26 Construction and training activities under Alternative 2 would result in indirect long-term effects to
27 vegetation from invasive plants. The effects would be considered long-term, minor, and localized with
28 implementation of proposed mitigation measures (Section 3.5.3.4.3). Invasive plant issues specifically
29 associated with training activities would have no significant impacts on vegetation under Alternative 2.

30 **3.5.3.3.3 Wildfire**

31 As discussed in Section 3.12, Wildfire, the proposed increases in training under Alternative 2 at NWSTF
32 Boardman could increase the risk of wildfire, but the risk would not change appreciably compared to
33 Alternative 1. The effects of wildfire on vegetation would be the same for Alternatives 1 and 2.
34 Therefore, the analysis above for Alternative 1 is also applicable to Alternative 2.

35 Fires resulting from training activities would be expected to occur on the DMPTR, MPMGR, and the
36 eastern and western CLFRs under Alternative 2, particularly during dry periods. However, the area
37 burned is expected to be relatively small based on implementation of the *Integrated Wildland Fire
38 Management Plan* (Appendix H). Wildfires would result in short- and long-term effects to vegetation
39 under Alternative 2. The effects would be localized based on implementation of the *Integrated Wildland
40 Fire Management Plan*. Wildfires caused by training activities under Alternative 2 would have no
41 significant impacts on vegetation.

1 In summary, NWSTF Boardman is unique because it represents one of the largest remaining single
2 blocks of predominantly native shrub-steppe and grassland habitats in Oregon's portion of the Columbia
3 Plateau Ecoregion. Accordingly, the potential impacts on vegetation from ground disturbing activities,
4 invasive plants, and wildfire would be mitigated, monitored, and adaptively managed during
5 construction and over the life of the proposed training ranges. An overall reduction in impacts to
6 vegetation from ground disturbing activities would be observed under Alternative 2 compared to the No
7 Action Alternative when the combined effects of construction, training, and maintenance activities are
8 considered. The total area of disturbance from construction activities would be 105 ac (42 ha), but
9 proposed modifications to the fire break system would result in restoration of about 219 ac (89 ha) of
10 disturbed land. The area of permanently lost vegetation and disturbed vegetation from construction
11 activities represents a relatively small portion of NWSTF Boardman. Invasive plants and increased
12 wildfire risk represent potentially significant impacts to native vegetation, but proposed management
13 practices would avoid and minimize impacts. The viability of plant populations or plant communities
14 would not be affected. Alternative 2 would have no significant impacts on vegetation.

15 **3.5.3.4 Proposed Management Practices, Monitoring, and Mitigation Measures**

16 **3.5.3.4.1 Proposed Best Management Practices**

17 The current management practices listed in Section 3.5.2.7 would continue to be implemented under
18 Alternatives 1 and 2, and existing programs and plans would be updated to reflect new conditions. The
19 following Best Management Practices (BMPs) would be implemented to avoid and minimize potential
20 impacts to vegetation under Alternatives 1 and 2:

- 21 • Surveys would be conducted during the project design phase to identify existing vegetation
22 communities and evaluate habitat quality. This information would be used during project design
23 to support micro-siting decisions. Areas of higher quality habitat (e.g., undisturbed areas with a
24 relatively high percentage of native plant cover) would be avoided in favor of areas of lower
25 quality habitat (e.g., disturbed areas with a relatively high percentage of non-native plant cover),
26 to the extent practicable. Micro-siting efforts would be limited to buildings and structures, as
27 opposed to targetry or other range components, because even minor changes to the range
28 design could affect the associated surface danger zone or impact range safety in other ways. The
29 survey data would also be used to support post-construction restoration efforts.
- 30 • Vegetation temporarily disturbed during construction would be restored in accordance with the
31 proposed post-construction restoration plan (Appendix F). The restoration plan would be
32 implemented by the ORNG in accordance with the Host-Tenant Agreement that would be
33 updated prior to implementing the selected alternative.
- 34 • Invasive plants would continue to be managed and controlled under the *NWSTF Boardman*
35 *INRMP*. The Plan would be updated in cooperation with ORNG, USFWS, Oregon Department of
36 Fish and Wildlife, and The Nature Conservancy during routine annual reviews to reflect the
37 evolving invasive plant management situation associated with construction and operation of the
38 new ranges. Updates to the Plan would include provisions for short- and long-term monitoring
39 of invasive plants (see Section 3.5.3.4.2 below); responsibilities and procedures for integrating
40 efforts of the Navy, ORNG, and The Nature Conservancy; criteria for prioritizing management
41 actions and adaptive management strategies to control invasive plants; and annual work plans,
42 including funding requirements and funding sources.
- 43 • The NWSTF Boardman Draft Integrated Wildland Fire Management Plan (Appendix H) would be
44 finalized and implemented. In addition to other fire protection measures, the Plan includes
45 proposed modifications to the existing system of fire breaks. The width of some fire breaks

1 would be reduced to the width of the adjacent road, some fire breaks that do not follow roads
2 would be eliminated, and some new fire breaks would be created (Figure 3.12-2). The total area
3 of fire breaks that would be maintained annually by mechanical disturbance (plowing or disking
4 with a tractor) would decrease from 462 ac. (187 ha) to 243 ac. (98 ha). A long-term re-
5 vegetation plan (Appendix F) would be implemented to restore the areas removed from
6 mechanical maintenance. These areas would be re-vegetated with native bunchgrasses,
7 primarily Sandberg's bluegrass with some needle and thread or bluebunch wheatgrass, to
8 provide a low-structure and low-fuel load area next to the road/fire break, and also provide
9 some wildlife habitat value. Grass revegetation would be considered successful if seeding results
10 in a stand of grass providing a uniform coverage of at least 80% density of a representative
11 bunchgrass stand area within two to three years of seeding. Selective herbicide treatments or
12 other appropriate management actions would be used to control invasive plants until these
13 areas are completely restored.

- 14 • As part of the *NWSTF Boardman INRMP*, the Navy, in cooperation with The Nature Conservancy,
15 is proposing to relocate RNA-A to a more suitable location. As discussed in Section 3.5.2.6, three
16 RNAs (A, B, and C, Figure 1-5) were established on NWSTF Boardman in 1978 and are co-
17 managed by The Nature Conservancy under a Memorandum of Understanding with the Navy.
18 The RNA program was created to (1) preserve examples of all significant natural ecosystems for
19 comparison with those influenced by man, (2) provide educational and research areas for
20 ecological and environmental studies, and (3) preserve gene pools of threatened and
21 endangered plants and animals. RNA-A encompasses the Main Target Area at NWSTF
22 Boardman, which must be used and maintained to meet mission requirements. Portions of the
23 Main Target Area are highly disturbed by military use. While the rationale for originally
24 establishing RNA-A within the Main Target Area is uncertain, it has become clear that this area is
25 not functioning as an RNA and is not providing the intended scientific and educational benefits
26 of an RNA. Therefore, the Navy, in coordination with The Nature Conservancy, is proposing to
27 relocate RNA-A to one or more suitable locations on NWSTF Boardman. The new RNA would be
28 sited to avoid possible conflicts with military activities and the new location would be more
29 representative of the unique habitat types RNAs are designed to protect. Similar to existing
30 RNA-B and RNA-C, access to the relocated RNA would normally be limited to research activities,
31 invasive plant control, and emergency response. Vegetation communities would benefit from
32 the increased protection and management provided by relocating RNA-A to a more suitable
33 location.

34 **3.5.3.4.2 Proposed Monitoring**

35 Environmental monitoring involves systematic sampling of physical and biological resources to derive
36 knowledge of the environment, its resources, and processes or activities that affect them. Monitoring
37 can be conducted for a number of purposes, including establishing environmental baselines and trends;
38 informing decision-making for management actions; assessing the effects of natural and human
39 influences; and ensuring compliance with environmental regulations. Accordingly, monitoring is an
40 important component of the Navy's natural resources management strategy implemented under the
41 *NWSTF Boardman INRMP*. The current Plan includes several vegetation monitoring project
42 recommendations for fiscal years 2012 through 2016, which will be implemented subject to the
43 availability of funds properly authorized and appropriated under Federal law.

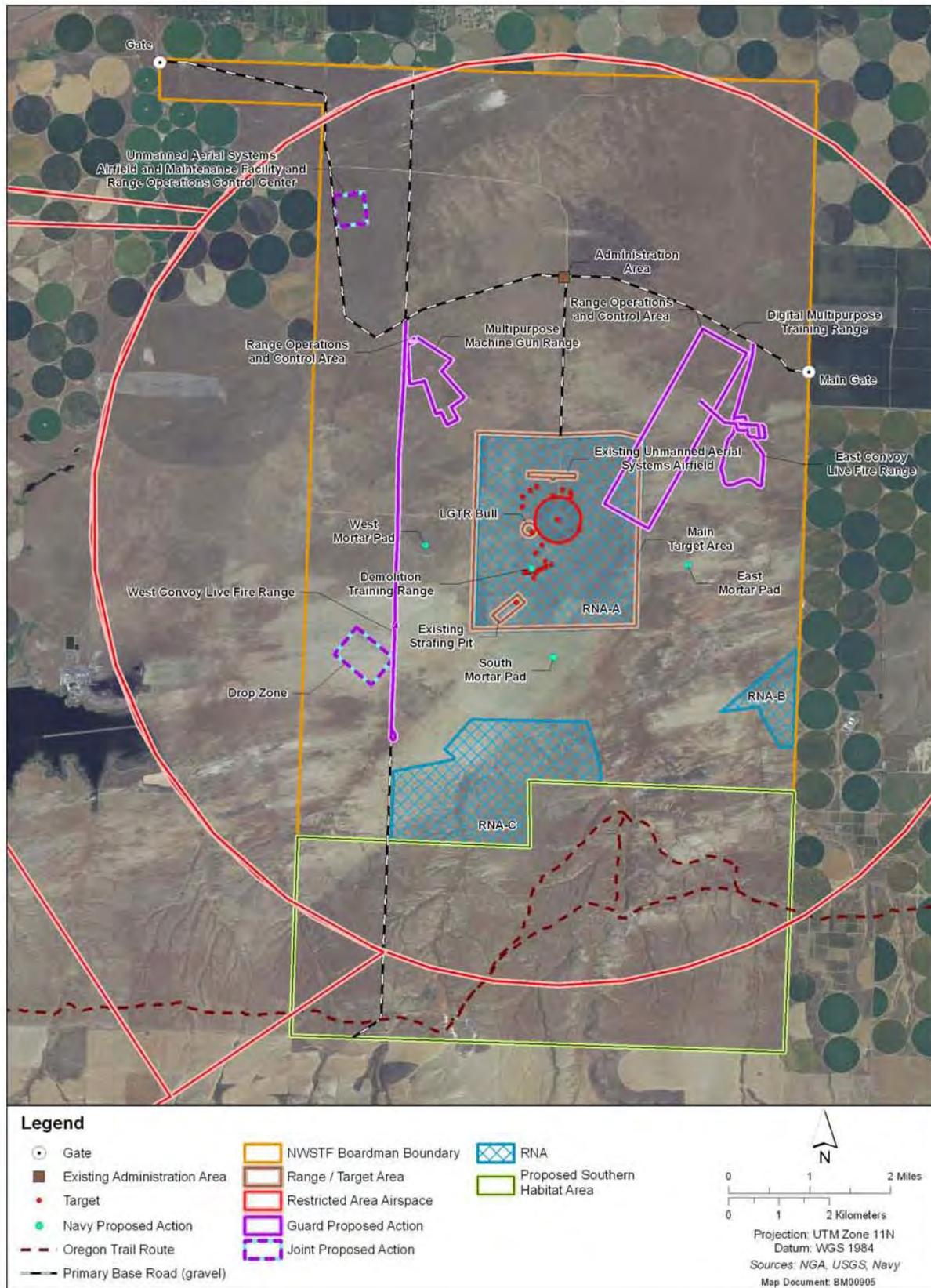
44 To the extent possible, vegetation monitoring conducted under the current *NWSTF Boardman INRMP*
45 will be designed to support the Proposed Action, as well as existing management needs. In addition, the
46 Plan would continue to be the primary means of designing and implementing vegetation monitoring to

1 address the evolving management situation associated with construction and operation of the new
2 ranges. Necessary updates to the Plan and associated monitoring would be accomplished during routine
3 annual reviews conducted in cooperation with ORNG, USFWS, and Oregon Department of Fish and
4 Wildlife. This process will help to ensure that a comprehensive and consistent approach to vegetation
5 management and monitoring is accomplished for the entire NWSTF Boardman property. Vegetation
6 monitoring project recommendations contained in the current *NWSTF Boardman INRMP* and their
7 relevance and relationship to the Proposed Action are summarized below:

- 8 • **V-1: Monitor and control noxious weeds and invasive, non-native plants.** The annual
9 monitoring component of this project is used to identify priority areas for invasive plant control
10 actions. Similar annual monitoring would continue following implementation of the Proposed
11 Action, with appropriate modifications to address conditions resulting from construction and
12 operation of the new ranges.
- 13 • **V-2: Count, measure, re-tag, and map all junipers.** All juniper trees are located well outside the
14 area of disturbance for the Proposed Action.
- 15 • **V-3: Use high-resolution aerial photography to map all vegetation; produce Geographic
16 Information System (GIS)-based vegetation map.** This project is currently programmed for fiscal
17 year 2014 to update vegetation mapping that is more than 10 years old and to document
18 changes in vegetation communities resulting from wildfires and changes that have occurred
19 since grazing leases were terminated. This project will also provide new baseline data prior to
20 implementing the Proposed Action and information to support micro-siting decisions.
- 21 • **V-4: Recover monumented vegetation plots and resurvey vegetation using established
22 protocol; produce GIS data layers.** This project will resurvey plots established in the 1980s to
23 provide ground truthing for the V-3 project above, trend analysis for vegetation change, and
24 permanent locations to measure future vegetation change or stability. Plots located within the
25 area of disturbance for the Proposed Action will provide new baseline data.
- 26 • **V-5: Monitor previously burned areas for vegetation recovery.** Pedestrian surveys conducted
27 under this project will assist in evaluating natural recovery to pre-fire habitat types and identify
28 priority areas for potential post-fire restoration measures. Information obtained during this
29 project will also be used to identify potential restoration sites in the southern portion of NWSTF
30 Boardman to mitigate impacts of the Proposed Action (see Section 3.5.3.4.3 below). Similar
31 monitoring would be conducted in the area of disturbance for the Proposed Action to evaluate
32 success of post-construction restoration efforts (see Section 3.5.3.4.1 and Appendix F).
- 33 • **V-8: Map noxious weeds and invasive, non-native plants.** This project is currently programmed
34 for fiscal year 2014 to update the NWSTF Boardman-wide invasive plant survey conducted in
35 1997 and to help prioritize control. This project will also provide new baseline data prior to
36 implementing the Proposed Action, information to support micro-siting decisions, and help
37 identify potential restoration sites in the southern portion of NWSTF Boardman to mitigate
38 impacts of the Proposed Action (see Section 3.5.3.4.3 below).

39 **3.5.3.4.3 Proposed Mitigation Measures**

40 Based on the analysis presented in Section 3.5.3 and implementation of proposed BMPs for vegetation,
41 additional mitigation measures are not required to further reduce adverse impacts on vegetation.
42 However, mitigation measures proposed to reduce adverse impacts on the Washington ground squirrel
43 (Section 3.6.3.4) would also result in benefits to vegetation communities at NWSTF Boardman. These
44 proposed mitigation measures include restoration of native shrub steppe and grassland habitats in the
45 southern portion of NWSTF Boardman (Figure 3.5-1).



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Figure 3.5-1: Proposed Southern Habitat Area at NWSTF Boardman

1 The Navy and ORNG are proposing to implement a long-term habitat restoration program for selected
 2 locations on the southern portion of NWSTF Boardman to improve native plant communities that have
 3 been degraded by invasive plants and to enhance habitat for Washington ground squirrels, long-bill
 4 curlews, grasshopper sparrows, western burrowing owls, and other species. The southern portion of
 5 NWSTF Boardman consists of approximately 13,000 ac. (5,261ha) that are located away from most of
 6 the ongoing and proposed training activities. The restoration program would be incorporated into and
 7 implemented under the purview of the *NWSTF Boardman INRMP*. The restoration program would be
 8 implemented under the direction of the Naval Air Station Whidbey Island/NWSTF Boardman Natural
 9 Resources Program Manager, with support from Commander Pacific Fleet, Navy Region Northwest,
 10 National Guard Bureau, and ORNG in accordance with the Host-Tenant Agreement that would be
 11 updated prior implementing the selected alternative.

12 **3.5.3.5 Summary of Effects and Conclusions**

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

18 **Table 3.5-4: Summary of Impacts for Vegetation**

STRESSORS		Summary of Effects and National Environmental Policy Act Impact Determination
Major Stressor Category	Stressor Type	
No Action Alternative		
Ground Disturbing Activities– Training		No additional loss of vegetation communities or additional direct alteration of habitat. Long-term, minor, and localized effects to vegetation.
Invasive Plants		The indirect effects specifically associated with training activities would be long-term, minor, and localized.
Wildfire		Short- and long-term localized effects to vegetation from fires related to training activities.
Impact Conclusion		The No Action Alternative would not result in significant impacts on vegetation.

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

STRESSORS		Summary of Effects and National Environmental Policy Act Impact Determination
Major Stressor Category	Stressor Type	
Alternative 1		
Ground Disturbing Activities	Construction	Permanent localized effects to vegetation in the form of lost vegetation communities and lost individual special status plants in developed areas. Short-term localized effects to vegetation in areas that would be temporarily disturbed and restored. The effects would be localized because the area affected would be small relative to the total land area at NWSTF Boardman (less than 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) would be implemented.
	Training	Permanent localized effects to 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 best management practices would be implemented.
	Maintenance	Proposed modifications to the fire break system would result in long-term benefits to vegetation communities at NWSFT 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 best management practices.
Wildfire		Short- and long-term effects to vegetation. The effects would be localized based on implementation of the Integrated Wildland Fire Management Plan.
Impact Conclusion		Alternative 1 would not result in significant impacts on vegetation based on implementation of best management practices to reduce impacts associated with construction, wildfire, and invasive plants.
Alternative 2		
Ground Disturbing Activities	Construction	Permanent localized effects to vegetation in the form of lost vegetation communities and lost individual special status plants in developed areas. Short-term localized effects to vegetation in areas that would be temporarily disturbed and restored. The effects would be localized because the area affected would be small relative to the total land area at NWSTF Boardman (less than 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) would be implemented.
	Training	Permanent localized effects to 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 best management practices would be implemented.
	Maintenance	Proposed modifications to the fire break system would result in long-term benefits to vegetation communities at NWSFT 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.

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

STRESSORS		Summary of Effects and National Environmental Policy Act Impact Determination
Major Stressor Category	Stressor Type	
Alternative 2 (continued)		
Invasive Plants		Indirect, long-term, minor, and localized effects with implementation of proposed best management practices.
Wildfire		Short- and long-term effects to vegetation. The effects would be localized based on implementation of the Integrated Wildland Fire Management Plan.
Impact Conclusion		Alternative 2 would not result in significant impacts on vegetation based on implementation of best management practices to reduce impacts associated with construction, wildfire, and invasive plants.

Note: NWSTF = Naval Weapons Training Facility

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