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The study area for vegetation includes an area approximately 0.25 mile on either side of each of the proposed segments, for a total of a 0.5-mile-wide strip centered on the proposed segment. Factors that influence the distribution of plant communities include aspect, slope, elevation, moisture source, and duration, and the type of soils, including rock content, and soil depth. The common names of plant species, rather than scientific names, are used in the discussion of vegetation that follows.

Plant communities (also known as plant associations) are assemblages of species that grow together in similar habitats and are found repeated across the landscape.

3.4 Vegetation

The study area lies within the Columbia River Basin province of eastern Washington and Oregon (Franklin and Dyness, 1973). The **plant community** found in most of the study area is referred to as shrub-steppe. The scientific name for each plant species discussed below is listed in a table in Appendix F, *Rare Plant Survey for the Preferred Alternative*. With the exception of several riparian areas, there are few trees in the study area. The dominant woody vegetation on most upland sites consists of shrub species, predominantly sagebrush species. The understory of herbaceous plants in shrub-steppe was dominated by native perennial bunchgrasses prior to European settlement. Within portions of the study area, native bunchgrass-dominated communities are no longer as common due to invasive annual grasses and non-native weedy species which colonize and spread after various types of disturbance (Quigley, 1999). In general, however, the majority of the vegetation communities within the study area are in fair to good condition.

Shrub-steppe vegetation in the study area is characterized as a potential big sagebrush/ bluebunch wheatgrass zone (Daubenmire, 1970). This is the community that is expected to occur without disturbance, alteration of habitat, or invasion by non-native species. Dominant shrubs in upland areas commonly include big sagebrush, threetip sagebrush, stiff sagebrush, bitterbrush, spiny hopsage, gray rabbitbrush, green rabbitbrush, and buckwheat species. In many areas today, non-native species, including cheatgrass, are now co-dominant with the shrubs. Other areas still have a bunchgrass layer of good quality. Common bunchgrass species include bluebunch wheatgrass, Sandberg's bluegrass, Cusick's bluegrass, Indian ricegrass, needle-and-thread grass, and Thurber's needlegrass.

While several riparian areas in the study area have a tree overstory, shrub-lined riparian areas are more common. These riparian areas typically have a narrow margin of upland shrubs, including black hawthorn, red-osier dogwood, mockorange, serviceberry, and big sagebrush. Invasive tree species, such as Russian olive, Siberian elm, and white mulberry grow in some riparian areas and wet areas.

The agricultural lands near the study area are irrigated croplands, vineyards and orchards. There may be small adjacent areas that may have some remnants of native plant communities. These remnants typically have low biodiversity and are very weedy.

Historic and present day causes of disturbances to vegetation in the study area include conversion of land to agricultural uses, grazing, fire, construction, road building, the deliberate and inadvertent introduction of non-native species, and maneuver training exercises

on the YTC. Disturbance reduces native plant species cover and diversity, changes species composition and structure, and increases the likelihood of invasion by non-native species (Rickard, 1988). Native bunchgrasses and native forbs are particularly vulnerable to disturbances and have decreased dramatically in most portions of the shrub-steppe in Washington.

3.4.1 Vegetation Cover Types

Information on vegetation cover types in the study area was obtained from a variety of sources. Federal agencies provided information on plant communities that occur on the lands they manage. The plant communities within the project segments that traverse the Hanford Reach National Monument have been mapped. The botanist from the Wenatchee BLM District provided general information on plant communities that occur along BLM lands. The YTC wildlife biologist supplemented information on plant communities within the YTC Management Plan. Very little information is available on vegetation cover types on state and private lands within the project area.

Studies on regional plant communities within the Columbia Basin provide general descriptions of plant associations, but little site-specific information. Aerial photographs and USGS quadrangle maps covering the project area were also used for information on landforms, water features, and elevation. The field data on sensitive wildlife occurrences mapped on Washington Department of Fish and Wildlife (WDFW) Habitats and Species Maps had some information about plant communities in locations near the project area, although this information was very general in nature.

The USGS produces National Land Cover Data Maps that include some information on vegetation. These maps were used to calculate vegetation cover types along various project segments, presented in Table 3.4-1, *Land Uses and Vegetation Crossed by Each Line Segment*, describes the different land uses and vegetation types crossed by each segment. This data provides a measure of the amount of existing native vegetation along each segment. The two categories, “Shrub-Steppe” and “Forest”, represent areas with plant communities that are likely to have some native species remaining although the condition of these areas could vary from fairly pristine to very degraded. Areas where agricultural activities occur are unlikely to recover and return to natural vegetation, even if abandoned. The small amount of forest cover within the study area indicates the importance of tree-lined riparian habitat.

**Table 3.4-1
Land Uses and Vegetation Crossed by Each Line Segment**

Land Use	Distance and Percentage of Each Segment						
	A	B _{NORTH}	B _{SOUTH}	C	D	E	F
Commercial, Industrial, and Transportation	0.17 mi 0.6%	0.02 mi 0.2%	0.02 mi 0.2%	0.02 mi 0.1%	0.31 mi 1.2%	0.04 mi 0.2%	0.06 mi 0.2%
Residential	0%	0%	0%	0.01 mi 0.1%	0.02 mi 0.1%	0%	0%
Water	0%	0.49 mi 5.4%	0.49 mi 5.2%	0.02 mi 0.1%	0.3 mi 1.1%	0.61 mi 2.4%	0.5 mi 1.5%
Unknown	0.44 mi 1.6%	0.11 mi 1.2%	0.42 mi 4.4%	0.43 mi 1.4%	1.02 mi 3.8%	2.19 mi 8.7%	4.22mi 12.9%
Forest	0.5 mi 1.8%	0%	0%	0.2 mi 0.7%	0.11 mi 0.4%	0.01 mi 0.1%	0.01 mi 0.1%
Shrub-Steppe	25.92 mi 94.1%	8.51 mi 93.2%	8.54 mi 90.2%	29.38 mi 97.7%	16.23 mi 60.7%	17.64 mi 69.8%	27.63 mi 84.3%
Agricultural	0.51 mi 1.9%	0%	0%	0%	8.75 mi 32.7%	4.77 mi 18.9%	0.34 mi 1.0%
Subtotal Vegetation	26.93 mi 97.8%	8.51 mi 93.2%	8.54 mi 90.2%	29.58 mi 98.4%	25.09 mi 93.8%	22.42 mi 88.8%	27.64 mi 85.4%
Total Distance	27.54 mi	9.13 mi	9.47 mi	30.06 mi	26.74 mi	25.26 mi	32.76 mi

New table for the FEIS.

The Washington Natural Heritage Program (WNHP) tracks occurrences of "**high quality plant communities**" (WNHP Website). Two WNHP high quality shrub-steppe plant communities occur within the study area (Map 5, *Wetlands/Plant Associations*). A Wyoming big sagebrush/bluebunch wheatgrass shrubland community occurs along a small portion of Segment A. Dominant species include big sagebrush, gray rabbitbrush, bluebunch wheatgrass, Sandberg's bluegrass, Cusick's bluegrass, and Lyall's milk-vetch. There is evidence of current cattle grazing in this community. The bitterbrush/Indian ricegrass shrubland community occurs in a broad band north of the Columbia River along segments D, E, and F. It includes the immediate floodplain along the river and has a sandy and cobbly substrate. Dominant species include bitterbrush, Indian ricegrass, stiff sagebrush, snow buckwheat, green rabbitbrush, and needle-and-thread grass. The common forbs are those typical of sandy areas. In one portion of this community, big sagebrush is associated with bitterbrush and Indian ricegrass (USDOE, 2001).

Foot surveys for rare plants and vegetation communities took place along the Preferred Alternative (Segments A, Option B_{SOUTH} and D). Shrub-steppe vegetation communities along these segments were broken into four categories: Washington Natural Heritage Program Areas, Moderate-High Quality Shrub-Steppe, Low Quality Shrub-Steppe and **Lithosol** Areas. Washington Natural Heritage Program Areas refer to the WNHP high quality plant communities described above. Moderate-High Quality Shrub-Steppe describes areas where shrub-steppe is relatively undisturbed and contains high percentages of native species, Low Quality Shrub-Steppe describes areas of shrub-

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Lithosols are rocky soils that usually develop in areas underlain by basalt.

steppe that have been heavily disturbed and/or have a high percentage of non-native species present, and Lithosol Areas describes a shrub-steppe plant community which grows on thin, stony soils known as *lithosols*. Table 3.4-2, *Vegetation Types Crossed by Preferred Alternative*, lists the different types of vegetation crossed.

**Table 3.4-2
Vegetation Types Crossed by Preferred Alternative**

Vegetation Type Crossed by Alignment		A (miles)	B _{SOUTH} (miles)	D (miles)	Total (minus fiber) (miles)	V-C Fiber Optic Line (miles)
Shrub-Steppe	WNHP Program Areas	0.16	0.00	0.76	0.92	-
	Moderate-High Quality Shrub-Steppe	7.94	8.54	8.22	25.85	-
	Low Quality Shrub-Steppe	3.85	0.00	7.25	11.10	-
	Lithosol Areas	13.97	0.00	0.00	11.80	-
	Total Shrub-Steppe	25.92	8.54	16.23	50.69	20.41
Riparian		0.50	0.01	0.30	0.81	0.06
Agricultural		0.51	0.00	8.75	9.26	9.92
Other Unvegetated Areas		0.61	0.93	1.46	3.00	1.12
Total Segment Miles*		27.54	9.48	26.74	63.76	31.51

New table for the FEIS.

3.4.1.1 Segment A

The vegetation of Segment A is mainly shrub-steppe with a few riparian and agricultural lands. The majority of Segment A is composed of lithosol shrub-steppe communities which typically support stiff sagebrush, Sandberg's bluegrass, narrow leaf goldenweed, thyme-leaf buckwheat, Douglas' buckwheat, and Hood's phlox. Other common flowering plant species observed growing in lithosol communities in Segment A include bitterroot, desert-parsley species, and yarrow (St. Hilaire, 2001).

Deep soiled portions of Segment A support a big sagebrush/bluebunch wheatgrass shrub-steppe community that is the dominant potential plant community throughout the study area. Approximately two-thirds of these areas are moderate-high quality shrub-steppe, interspersed with areas of low quality shrub-steppe. Because of past disturbance such as grazing, native grasses have declined in the low quality shrub-steppe areas and the dominant grass species are now cheatgrass and Japanese brome. Diffuse knapweed,

a weedy species, is common along roadsides Segment A, as it is throughout the study area. Parts of the western portion of Segment A are overgrazed.

One area of Segment A covered by the big sagebrush/bluebunch wheatgrass community has been designated a WNHP high quality plant community, as discussed in Section 3.4.1. It occurs along approximately 0.2 miles of Segment A. Other shrub species found in this community include occasional stiff sagebrush, bitterbrush, and gray rabbitbrush.

Approximately 5 miles of Segment A passes through the YTC. Vegetation of the YTC is discussed in Segments B and C below (Sections 3.4.1.2 and 3.4.1.3).

Segment A has several tree-lined riparian areas. Naneum and Wilson Creeks, in the northern portion of Segment A, are lined by scattered black cottonwoods, bittercherry, wavy-leaved alder, and quaking aspen. Common shrub understory species include willow species, Wood's rose, serviceberry, mockorange, common snowberry, and red osier dogwood. To the southeast, Cooke Creek and Coleman Creek have black cottonwood and quaking aspen lined riparian areas with scattered shrubs, including wavy-leaved alder, black hawthorn, willows in wetter areas and oceanspray in dry areas. Many intermittent creeks along Segment A support channel vegetation consisting of upland shrubs, including oceanspray, Wood's rose, mockorange, black hawthorn, serviceberry, and big sagebrush. Understory species include white sagebrush, mountain monardella, cheatgrass, yarrow, chicory and Rocky Mountain iris.

The Sickler-Schultz Reroute crosses a mixture of shrub-steppe and lithosol communities. It also traverses a steep northwest-facing slope with a small patch of open Ponderosa pine forest. Options 1 and 2, associated with the Sickler-Schultz Reroute, would cross different areas of Wilson Creek. Both of the Wilson Creek crossing options and the Naneum Creek crossing have vegetation typical of tree-lined riparian areas.

3.4.1.2 Segment B

The vegetation of Segment B (both Option B_{NORTH} and Option B_{SOUTH}) is almost entirely shrub-steppe with some small riparian areas. The shrub-steppe areas in Options B_{NORTH} and B_{SOUTH} are dominated by big sagebrush and bluebunch wheatgrass. Almost all of Segment B Options B_{NORTH} and B_{SOUTH} are in YTC. YTC categorizes their habitats as upland, riparian, alkali, or rocky habitats (USDOD, 1996). Three potential plant communities occur within the area traversed by Segment B. Although YTC plant communities are not pristine due to

a history of grazing, the plant communities in both Option B_{NORTH} and B_{SOUTH} are generally in good condition. Shrub-steppe vegetation communities surveyed along Option B_{SOUTH} of the Preferred Alternative are composed entirely of moderate-high quality communities.

The three shrub-steppe communities within the YTC portion of Segment B include:

- **Big sagebrush/bluebunch wheatgrass:** This community is estimated to cover half of the uplands at YTC. It is found on ridgetops, hillsides, benches, and alluvial fans on shallow and deep soils. Associated species include gray and green rabbitbrush, desert buckwheat, three-tip sagebrush, and spiny hopsage associated with various grass species. Bitterbrush is co-dominant with big sagebrush in moist sites.
- **Stiff sagebrush/bluegrass:** This low-growing community occurs on hillsides, ridgetops, and benches in shallow soils. The shrub canopy is dominated by stiff sagebrush and eriogonum with traces of Wyoming big sagebrush, slenderbush eriogonum, purple sage, and bitterbrush, with a grass understory.
- **Eriogonum/ bluegrass:** This low-growing community is found on hillsides, ridgetops, and on shallow soils. The shrub canopy is dominated by eriogonum and either stiff sagebrush or three-tip sagebrush with a trace of Wyoming big sagebrush and purple sage. The herbaceous understory is mainly composed of grasses.

The area immediately to the west of the Columbia River is gravelly with very little vegetative cover. A few willows are scattered along the riparian area at the water's edge. The slope from the river leading up to the highway is vegetated with rabbitbrush, occasional sagebrush, and various grass species. Shrub-steppe tops the bare rocky cliff above the highway, extending to the west. On the east side of the Columbia River, a dry, level, sagebrush-dominated area extends along the river. Cheatgrass and knapweed are common in the understory with some native vegetation, including yarrow and buckwheat. Between the Columbia River and the Vantage Substation, the proposed line traverses a dry, hilly expanse of shrub-steppe.

3.4.1.3 Segment C

The vegetation of Segment C is mainly shrub-steppe with some grasslands and no agricultural land. YTC categorizes their habitats as upland, riparian, alkali, or rocky habitats (USDOD, 1996). Five

potential plant communities occur within these habitat types in all of the watersheds traversed by Segment C. Plant communities on YTC are generally not pristine and cheatgrass commonly replaces bluebunch wheatgrass in some areas due to past grazing.

The five plant communities within the YTC portion of Segment C include:

- **Big sagebrush/bluebunch wheatgrass:** This community is estimated to cover half of the uplands at YTC. It is found on ridgetops, hillsides, benches, and alluvial fans on shallow and deep soils. Associated species include gray and green rabbitbrush, desert buckwheat, three-tip sagebrush, and spiny hopsage associated with various grass species. Bitterbrush is co-dominant with big sagebrush in moist sites.
- **Three-tip sagebrush/bluebunch wheatgrass:** This community is typically found on northern exposed hillslopes, canyon walls, and ridgetops, with moderately deep to deep soils. Associated species include big sagebrush, desert buckwheat, with traces of spiny hopsage, purple sage, and various grass species.
- **Stiff sagebrush/bluegrass:** This low-growing community occurs on hillsides, ridgetops, and benches in shallow soils. The shrub canopy is dominated by stiff sagebrush and buckwheat with traces of Wyoming big sagebrush, slenderbush eriogonum, purple sage, and bitterbrush, with a grass understory.
- **Eriogonum/ bluegrass:** This low-growing community is found on hillsides, ridgetops, and on shallow soils. The climax shrub canopy is dominated by buckwheat and either stiff sagebrush or three-tip sagebrush with a trace of Wyoming big sagebrush and purple sage. The herbaceous understory is mainly composed of grasses.
- **Alkali habitat:** This habitat type, found only in the Hanson Creek watershed, is normally found in bottomlands adjacent to intermittent streams and is occasionally associated with riparian communities bordering perennial streams. This community consists of black greasewood with traces of gray rabbitbrush.

Within the YTC, the level and type of disturbance to vegetation varies depending on the location. Most portions of the study area were grazed until 1995. Grazing reduced cover of perennial grasses and native forbs, and increased the cover of sagebrush. Grazing also

damaged the vegetation in riparian areas although YTC has implemented riparian restoration projects along some creeks in the study area. Roads are present within most portions of the watershed, serving to disperse weed species. Training maneuvers occur in portions of the study area, damaging vegetation. Some of the vegetation in the study area is still recovering from several fires in the 1970's and 1980's. Native species were replaced with non-native species, and in some places habitat conditions were altered due to erosion.

Although the proposed Wautoma substation site was once a shrub-steppe community, the site is currently dominated by grass and herbaceous species with only occasional sagebrush and rabbitbrush (St. Hilaire, 2001). This area burned in the recent past, as evidenced by charred shrub stumps and abundant soot in the soil. Three non-native weedy species, tumbled mustard, filaree and cheatgrass, are the dominant species on the site, but other common weeds include diffuse knapweed, spotted knapweed, bulbous bluegrass, and kochia. Native forbs scattered on the site include chaenactis, green-banded star-tulip, hoary aster, Grays' desert parsley, Munro's globemallow, cushion daisy, phlox, and Carey's balsamroot, all relatively common shrub-steppe species. The overall cover of native species in this area is very low.

3.4.1.4 Segment D

The vegetation of Segment D is shrub-steppe and agricultural lands with some riparian areas associated with Lower Crab Creek and the Columbia River. Approximately half of the shrub-steppe communities along Segment D are moderate-high quality shrub-steppe while the other half have been extensively disturbed and are low quality shrub-steppe.

Much of the section between the Vantage Substation and Lower Crab Creek has a very sandy substrate with a bitterbrush/Indian ricegrass shrubland community. A unique assemblage of plants occurs in these sandy habitats, with the dominant species including: bitterbrush, Indian ricegrass, gray rabbitbrush, green rabbitbrush, white buckwheat, spiny hopsage, and needle-and-thread grass. The riparian area along the north shore of Lower Crab Creek is described as willow-dominated wetland (WDFW, April 2, 2001). The emergent wetlands along both shores of Lower Crab Creek are vegetated with rushes, barnyard-grass, purple loosestrife, Canadian thistle, sprangletop, white sweet-clover, and bulrushes. Russian olive, a non-native tree species, occurs in the area. This creek crossing is quite weedy from a prolonged history of grazing.

To the south, the north-facing slope of the Saddle Mountains have a mosaic of shrub-steppe and lithosol in generally good condition. Dominant shrubs include big sagebrush, rigid sagebrush, gray rabbitbrush, slenderbush buckwheat, rock buckwheat, bitterbrush, purple sage, spiny hopsage, and threetip sagebrush. Dominant grass species include bluebunch wheatgrass, Sandberg's bluegrass, Cusick's bluegrass, Indian ricegrass and needle-and-thread grass. The south-facing slope of the Saddle Mountains are comprised of a similar mix of shrub-steppe and lithosol, however, the lower elevation areas are increasingly weedy with cheatgrass, tumble mustard and other non-native species. The Wahluke slope to the south is intensively irrigated and farmed.

The Hanford Site portions of Segment D (owned by Department of Energy) range from north of the Columbia River to the south base of Umtanum Ridge near Cold Creek. North of the Columbia River, a WNHP high quality native plant association occurs along approximately 0.8 mile of Segment D. This community is described in Section 3.4.1, *Vegetation Cover Types*. Wetland plant communities do not appear to occur along the Columbia River north of the Midway Substation, except possibly for a narrow herbaceous shoreline community. A sand dropseed/Sandberg's bluegrass community occupies the sandy and cobbly area immediately along the south side of the Columbia River. This area has become quite weedy due to overgrazing.

The Midway Substation is located at the base of Umtanum Ridge. The area within and immediately adjacent to the substation has been cleared of natural vegetation, with sparse shrub-steppe extending to the base of Umtanum Ridge. The north slopes of Umtanum Ridge support a bluebunch wheatgrass community. While most of the big sagebrush there was killed by an extensive wildfire in 1996, young plants are starting to establish. Rocky areas include the cliffs of Umtanum ridge and a narrow strip of talus at the base of the ridge. Rocky areas support a sparse community of plants that survive in the small pockets of soil that accumulate in cracks. From the crest of Umtanum Ridge to the south, several plant communities have been mapped, including big sagebrush-spiny hopsage/Sandberg's bluegrass-cheatgrass and bunchgrass-cheatgrass communities (USDOE, 2001). In alkaline areas, the shrub winterfat is abundant. Much of the shrub cover on Umtanum Ridge was burned by an extensive wildfire in 1996. There are a number of rare plant species in the Umtanum Ridge area (Section 3.4.3.5, *Known Rare Plant Occurrences by Segment*).

The vegetation along the section between the Hanford Site and the proposed Wautoma substation is comprised of shrub-steppe,

grassland and agricultural land in the Cold Creek Valley. Vegetation on Yakima Ridge is primarily big sagebrush/bluebunch wheatgrass and Sandberg's bluegrass/cheatgrass. Other common species include spiny hopsage, Thurber's needlegrass, Indian ricegrass, and balsamroot. Vegetation communities at higher elevations and on the north slope of Yakima Ridge are typically of higher quality than those at lower elevations and on the south-facing slope. Segment D terminates at the proposed Wautoma substation. The vegetation at the proposed substation site is described in the Segment C discussion (See Section 3.4.1.3, *Segment C*).

3.4.1.5 Segment E

The vegetation of Segment E is mainly shrub-steppe with some grasslands and agricultural lands. The large emergent wetland south of Lower Crab Creek Road is vegetated with cattails and bulrush. To the south, scattered willows line the northern shore of Lower Crab Creek. The south shore of Lower Crab Creek consists of an emergent wetland vegetated with rushes, cattails, grasses, forbs, and scattered Russian olive trees (WDFW, April 2, 2001). To the south, the rocky, steep slopes on the north side of Saddle Mountains are described as having sparse shrub-steppe vegetation in areas with gentler slopes. The agricultural lands in the valley are mainly in cropland with small adjacent areas that may have some remnants of native plant communities.

The Saddle Mountain Unit of the Hanford Reach National Monument is characterized as relatively undisturbed or recovering shrub-steppe habitat, with some sand dune areas dominated by grasses, and water influenced areas mapped as riparian areas (USDOE, 2001, Sackschewsky and Downs, 2001). Hanford Site plant community maps depict three communities in the northeastern portion of the Saddle Mountain Unit, including big sagebrush /bunchgrasses-cheatgrass, big sagebrush-spiny hopsage/bunchgrasses-cheatgrass, and a small area of rabbitbrush/bunchgrass. To the south, a large area of bitterbrush/bunchgrass sand dune complex is mapped between two large wetland areas. These communities are considered "Plant Communities of Concern on the Hanford Site" (USDOE, 2001).

The bitterbrush/Indian ricegrass shrubland north of the Columbia River is a WNHP high quality plant community. This community extends along the river for several miles, including about 2.5 miles along Segment E. This sand dune community is described in Section 3.4.1, *Vegetation Cover Types*.

Wetland plant communities, dominated by herbaceous species and scattered shrubs, occur in the Saddle Mountain Wasteway, north of the Columbia River. Wetland plant communities do not occur along

the shoreline of the Columbia River, except possibly for a narrow herbaceous wetland along the shoreline.

3.4.1.6 Segment F

The vegetation of Segment F is mainly shrub-steppe with some grasslands and very little agricultural land. Immediately north of Lower Crab Creek, a dune/willow complex occurs in the area of the proposed line (WDFW, April 2, 2001). This area may be somewhat degraded due to ATV use. The south shore of Lower Crab Creek consists of an emergent wetland vegetated with rushes, cat-tails, grasses, forbs, and scattered Russian olive. To the south, the rocky, steep slopes on the north side of Saddle Mountains are described as having sparse shrub-steppe vegetation in areas with gentler slopes.

Segment F traverses the Saddle Mountains from west to east, mainly along BLM land. BLM has not mapped plant communities in this area (P. Camp, Pers. Comm., 2001). This dry south-facing slope is mainly vegetated with grasses, with very few shrubs due to fires in the past. Scattered shrubs occur, mainly in the drainageways of intermittent creeks.

As described under Segment D, the area to the north of the Columbia River, in the Hanford Reach National Monument, is characterized as relatively undisturbed or recovering shrub-steppe habitat, with some sand dune areas dominated by grasses, and water-influenced areas, mapped as riparian areas (USDOE, 2001).

The bitterbrush/Indian ricegrass shrubland that occurs north of the Columbia River along Segment F is a WNHP high quality native plant community. This community extends along Segment F for approximately 0.3 mile. It is described in Section 3.4.1, *Vegetation Cover Types*.

3.4.1.7 Fiber Optic Line

The 32-mile fiber optic line from Vantage to Columbia traverses a mosaic of agricultural areas, shrub-steppe and wetlands. There are two areas along the line with extensive wetlands; in the vicinity of the Vantage Substation and the WDFW-managed Quincy Lakes Wildlife Area. The wetlands around the Vantage Substation have resulted from irrigation runoff and seepage from nearby agricultural areas. The Quincy Lakes were created by a series of dams and impoundments. In both locations, the wetlands are of low quality and are dominated primarily by weedy species mixed with common native wetland species. Dominant non-native species include: Russian olive, purple loosestrife, cheatgrass, Canadian thistle, reed canarygrass, bulbous bluegrass, white sweetclover, perennial pepperweed, white mulberry, and annual beardgrass. Common native species include: bulrush

species, rush species, sedge species, saltgrass, common spike-rush, basin wildrye, and willow species.

The shrub-steppe communities along the proposed fiber optic line include a combination of big sagebrush /bluebunch wheatgrass shrubland, sandy shrub-steppe and lithosol communities. While there are some areas that are degraded, the shrub-steppe communities along the fiber optic line are generally in good condition. There are big sagebrush/bluebunch wheatgrass shrubland communities on the north slopes of Lynch Coulee and Moses Coulee, in the Frenchman Hills and in Frenchman Coulee. Shrub species include big sagebrush, spiny hopsage, buckwheat species, and purple sage. Common grass species include bluebunch wheatgrass, Sandberg's bluegrass, needle-and-thread grass, and cheatgrass. Forb species include balsamroot, chaenactis, desert-parsley species, and milk-vetch species.

Much of the section between the Vantage Substation and Sand Hollow has a very sandy substrate and a bitterbrush/Indian ricegrass shrubland community. A unique assemblage of plants occurs in these sandy shrub-steppe areas, with the dominant species including: gray rabbitbrush, green rabbitbrush, bitterbrush, Indian ricegrass, white buckwheat, spiny hopsage, and needle-and-thread grass. South of I-90, in between agricultural areas are extensive needle-and-thread grass dominated communities. Cover by native bunchgrasses exceeds 50% in many places. Lithosol communities along the fiber optic line occur on thin, stony soils and support stiff sagebrush, Sandberg's bluegrass, narrow leaf goldenweed, thyme-leaf buckwheat, and Hood's phlox. Common forb species observed growing in lithosol communities include bitterroot, desert-parsley species, daisy species and yarrow. There are limited amounts of black greasewood/saltgrass dominated communities in alkaline areas in the vicinity of the Quincy Lakes.

3.4.2 Weed Species

Some plant species are designated as weeds by federal or state law. Past land uses in the proposed study area, such as grazing, agriculture and road building, have disturbed native plant communities and favored the establishment of some weed species. Present land uses, such as the use of vehicles along dirt roads or off-road, grazing, and the expansion of agriculture, continue to contribute to the spread of weed species. However, some weeds do not require disturbances in order to thrive and are able to invade natural areas.

Weed species have numerous detrimental effects, and their invasion of public and private lands is a matter of great concern. Weed species reduce the quality of shrub-steppe by replacing native species and reducing **biodiversity**. Some form **monocultures**, which

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A **monoculture** is the growth of a single species, tending to exclude other species, resulting in a decrease in biodiversity.

Biodiversity refers to different species of plants and animals in an environment.

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State and federal agencies were contacted for information on weed species of concern in the study area. Weed board personnel in Kittitas, Grant, Yakima, and Benton counties provided information on the species of particular concern in the study area.

Class A Weeds are non-native species with a limited distribution in Washington. Preventing new infestations and eradicating existing infestations is the highest priority. Eradication is required by law.

Class B Weeds are noxious weeds that are not native to the state and are of limited distribution or are unrecorded in a region of the state and that pose a serious threat to that region.

Class C Weeds are widely established and have interest to the agricultural industry. Some of these weeds are controlled on a local basis, depending on local threats and the feasibility of control.

completely displace native plant communities. Weeds reduce the quality of wildlife habitat when they replace native food sources and plant cover species. They can also have adverse economic impact on agricultural crops. Some contribute to the rapid spread of fire by providing quick burning fuels. In addition, most weeds are not as efficient as native species at binding soil, which contributes to soil erosion by water and wind.

In Washington, weed species are addressed on a county-by-county basis (Washington State Noxious Weed Control Board Website). Washington State law designates some particularly troublesome weeds as “noxious weed” species. The list of noxious weed species is divided into three classes (A, B, and C) within each county, based on the state of invasion. Table 3.4-3, *Weeds of Concern in Study Area*, lists the **Class A** and **Class B** weeds that are of concern within each project segment.

Class C includes species already widely established in Washington. Where present in the study area, these weeds may be controlled as a local option, depending on the level of threat. Spiny cocklebur, a Class C weed found in Kittitas County, is present in some areas (Segments A, B_{SOUTH}, B_{NORTH}, and C). Bull thistle and Canada thistle are found throughout the entire study area. Other Class C noxious weeds located in moist areas in the study area include: globepodded hoarycress, field bindweed, common St. John’s-wort, and reed canarygrass.

Some weed species are monitored by the state when they are suspected to be a potential threat or if more information is needed on the species. Saltcedar (a Class A Noxious Weed) and common reed are monitored in the state of Washington. They are found in some wetlands on Hanford Site (Segments E and F), where efforts are being made to eliminate known occurrences (D. Gonzales, Pers. Comm., 2001). Many weeds widespread in the study area are not monitored or listed as noxious weeds.

Weed surveys have been completed along the Grant County portion of the Preferred Alternative. No noxious weeds were found. Additional surveys are being conducted for the remaining portions of the Preferred Alternative. These surveys would be completed before construction begins.

**Table 3.4-3
Weeds of Concern in Study Area**

Common Name Scientific Name (Washington State Class*)	Kittitas County	Yakima County	Grant County	Benton County
	Segments A, B, C	Segment C	Segments D, E, F	Segments D, E, F
Dalmatian toadflax <i>Linaria dalmaticasp. dalmatica</i> (Class B)	X	X	+	--
Johnsongrass <i>Sorghum halepense</i> (Class A)	-	X	--	--
Knapweed, diffuse <i>Centaurea diffusa</i> (Class B) except Benton County – no class	X YTC	X YTC	X HAN BLM	X HAN
Knapweed, spotted <i>Centaurea biebersteinii (maculosa)</i> (Class B)	X YTC	X YTC	X BLM	X
Knapweed, Russian <i>Acroptilon (Centaurea) repens</i> (Class B)	YTC	X YTC	X HAN	X HAN
Kochia <i>Kochia scoparia</i> (Class B)	YTC	YTC	+	X
Musk Thistle <i>Carduus nutans</i> (Class B)	X	X	X	--
Pepperweed, perennial <i>Lepidium latifolium</i> (Class B)	YTC	YTC	--	--
Puncturevine <i>Tribulus terrestris</i> (Class B) Grant County <i>Education list</i> Benton County	-	--	HAN	HAN
Purple loosestrife <i>Lythrum salicaria</i> (Class B)	X YTC	X YTC	+	HAN
Rush Skeletonweed <i>Chondrilla juncea</i> (Class B)	--	--	X BLM	X
Scotch thistle <i>Onopordum acanthoides</i> (Class B)	YTC	X YTC	--	--
Sowthistle, perennial <i>Sonchus arvensis</i> (Class B)	YTC	YTC	--	--
Wild carrot <i>Daucus carota</i> (Class B)	+			

X species name provided by County Weed Board staff
 BLM species name provided by BLM personnel
 YTC species name found within the YTC Management Plan
 HAN species name provided by Hanford Reach National Monument personnel
 + field observation

Table has been updated for the FEIS.

3.4.3 Rare Plants

For a complete discussion of the rare plant survey, methodology, and a description of the rare plant species found along the Preferred

Alternative, see Appendix F, Rare Plant Survey for the Preferred Alternative.

The list of potential rare plant species varies depending on land ownership. Table 3.4-4, *Rare Species Addressed in Different Land Ownership Categories*, identifies land ownership categories and the status of species that will be considered within each of these categories.

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The study area for rare plants includes an area 1 mile on either side of each of the segment centerline, for a total of a 2-mile-wide strip. To address known occurrences of rare plant species that may be directly impacted by project activities, occurrences in the “immediate area” of the proposed line are those within 500 feet on either side of the line or within 100 feet of each side of access roads outside the ROW.

Extirpated is a species that is no longer known to occur in a given geographic area.

**Table 3.4-4
Rare Species Addressed in
Different Land Ownership Categories**

Land Ownership/Management Category	Status of Plant Species
BLM	BLM special status species which includes federally listed, proposed, and candidate species and state rare species
All federally managed lands except BLM lands	Federally listed, proposed, and candidate species, federal species of concern, state listed species.
State owned Lands	Federally listed, proposed, candidate species, and species of concern; state endangered, threatened, and sensitive species, and a state category that includes species that are possibly extinct or extirpated in Washington
Private Lands	Federally listed, proposed, and candidate species

Table has been updated for the FEIS.

Information on known occurrences, habitat preferences, and potential habitats of federal listed and federal candidate plant species are discussed below. Information was also assembled for federal species of concern, BLM special status species, and state listed rare plant species. This includes known occurrences of these species within the study area. Information sources included: USFWS, WNHP sources, and regional floras.

3.4.3.1 Federal Listed Plants

The USFWS identified two federally listed species and three federal candidate species with the potential to occur within the study area (USFWS, 2001). Table 3.4-5, *Federal Status Plant Species with the Potential to Occur in the Study Area*, lists the habitat and known occurrences of federal status species within the vicinity of the study area. These plants are also listed by the State of Washington (WNHP, 1997) (See Table 3.4-8, *Known Occurrences of Rare Plant Species*). A detailed description of these species is in Appendix F, Rare Plant Survey for the Preferred Alternative.

**Table 3.4-5
Federal Status Plant Species with the Potential to
Occur in the Study Area**

Common Name <i>Scientific Name</i>	Federal Status	Habitat Preference and Plant Associations	Known Occurrence(s) in the Vicinity of the Study area
Wenatchee Mountains checker-mallow <i>Sidalcea oregana</i> var. <i>calva</i>	Endangered	Grows in meadows that are moist into the summer – associated with quaking aspen, black hawthorn, snowberry, and serviceberry.	Approximately 25 miles north of the north end of Segment A.
Ute ladies'-tresses <i>Spiranthes diluvialis</i>	Threatened	Low elevation wetlands in valleys - associated with spikerush, sedges, grasses, and rushes	None
Northern wormwood <i>Artemisia campestris</i> var. <i>wormskioldii</i>	Candidate	Grows only within the floodplain of the Columbia River in relatively level, arid, shrub-steppe, on basalt, compacted cobble, and sand - associated with sagebrush and grasses	None within 1 mile of line segments. One occurrence within the floodplain of the Columbia River, several miles south of the Segment B river crossing.
Basalt daisy <i>Erigeron basalticus</i>	Candidate	Grows in crevices in basalt cliffs on canyon walls facing north, east, or west, from 1,250 to 1,500 feet in elevation - associated with a few grass and forb species	None within 1 mile of line segments. Occurs within Kittitas and Yakima counties along the Yakima River and Selah Creek; within the YTC, approximately 10 miles west of Segment C.
Umtanum desert buckwheat <i>Eriogonum codium</i>	Candidate	Found on the exposed tops of a ridgeline that is composed of basalt, from 1,100 to 1,320 feet in elevation - associated with cheatgrass and a variety of forbs.	One known population, on part of Umtanum Ridge, in Benton County.

Table has been updated for the FEIS.

Potential habitat for federally listed and candidate species occurs within the study area. Potential habitat includes any areas that meet the known habitat requirements for that species. Table 3.4-6, Potential Habitat for Federal Listed and Candidate Plant Species, lists the project segments that may contain potential habitat for federally listed and candidate species and state listed species.

Rare plant field surveys were conducted in 2001 and 2002 along the Preferred Alternative (Segments A, B_{SOUTH}, and D) to locate federally listed and candidate species. No federally listed or candidate species were identified within the Preferred Alternative ROW, however a population of Umtanum desert buckwheat was identified along Segment D, next to an access road outside the ROW.

**Table 3.4-6
Potential Habitat for Federal Listed and Candidate Plant Species**

Common Name <i>Scientific Name</i>	Segments With Potential Habitat for Federal Listed and Candidate Rare Plant Species						
	A	B	C	D	E	F	Fiber Optic Line
Wenatchee Mountains checker- mallow <i>Sidalcea oregana</i> var. <i>calva</i>	■						
Ute ladies'-tresses <i>Spiranthes diluvialis</i>	■			■	■	■	■
Northern wormwood <i>Artemisia campestris</i> var. <i>wormskioldii</i>		■		■	■	■	
Basalt daisy <i>Erigeron basalticus</i>			■	■			
Umtanum desert buckwheat <i>Eriogonum codium</i>				■			

Table has been updated for the FEIS.

3.4.3.2 Federal Species of Concern

Seven federal species of concern were identified by the USFWS as having potential to occur within the study area (See Table 3.4-7, *Known Occurrences of Rare Plant Species*). A federal species of concern is one whose conservation standing is of concern to the USFWS, but for which status information is still needed (WNHP, 1997). These species are also listed by the State of Washington. Rare plant field surveys were conducted in 2001 and 2002 along the Preferred Alternative (Segments A, B_{SOUTH}, and D) to locate federal species of concern. No federal species of concern were located along Segments A and B_{SOUTH}. Populations of Hoover's desert-parsley, gray cryptantha, and Columbia milk-vetch were located along Segment D.

**Table 3.4-7
Known Occurrences of Rare Plant Species**

Common Name <i>Scientific Name</i>	Federal Status	State Status	Known Occurrences of Rare Plant Species Along Segments							
			A	B _{NORTH}	B _{SOUTH}	C	D	E	F	Fiber Optic Line
Umtanum desert buckwheat <i>Eriogonum codium</i>	Candidate	Endangered					■ *			
Columbia milk-vetch <i>Astragalus columbianus</i>	Species of Concern	Threatened		■*	■	■*	X			
Gray cryptantha <i>Cryptantha leucophaea</i>	Species of Concern	Sensitive		■	■*		X	■*		X
Hoover's desert-parsley <i>Lomatium tuberosum</i>	Species of Concern	Threatened					X	■*	■*	
Wanapum crazyweed <i>Oxytropis campestris</i> var. <i>Wanapum</i>	Species of Concern	Threatened							■	
Persistentsepal yellowcress <i>Rorippa columbiae</i>	Species of Concern	Threatened					■ *			
Hoover's tauschia <i>Tauschia hooveri</i>	Species of Concern	Threatened	■*							

Common Name <i>Scientific Name</i>	Federal Status	State Status	Known Occurrences of Rare Plant Species Along Segments							
			A	B _{NORTH}	B _{SOUTH}	C	D	E	F	Fiber Optic Line
<i>Texosporium sancti-jacobi</i>	Species of Concern								■	
Dwarf evening-primrose <i>Camissonia pygmaea</i>	--	Threatened		■	■			■		■*
White eatonella <i>Eatonella nivea</i>	--	Threatened		■	■			■		
Geyer's milk-vetch <i>Astragalus geyeri</i>	--	Sensitive								X
Pauper milk-vetch <i>Astragalus misellus</i> var. <i>pauper</i>	--	Sensitive	■							
Naked-stemmed evening-primrose <i>Camissonia scapoidea</i>	--	Sensitive		■	■					
Bristle-flowered collomia <i>Collomia macrocalyx</i>	--	Sensitive		■	■					
Beaked cryptantha <i>Cryptantha rostellata</i>	--	Sensitive	■	■	■					
Desert cryptantha+ <i>Cryptantha scoparia</i>	--	Sensitive			X					
Snake River cryptantha <i>Cryptantha spiculifera</i>	--	Sensitive					■			
Shining flatsedge <i>Cyperus bipartitus</i>	--	Sensitive					■			
Beaked spikerush <i>Eleocharis rostellata</i>	--	Sensitive								X
Piper's daisy <i>Erigeron piperianus</i>	--	Sensitive					X		■	
Longsepal globemallow <i>Iliamna longisepala</i>	--	Sensitive	■*							
Suksdorf's monkey-flower <i>Mimulus suksdorfii</i>	--	Sensitive	■*	■	■				■*	
Nuttall's sandwort <i>Minuartia nutallii</i> var. <i>fragilis</i>	--	Sensitive					■*			
Tufted evening-primrose <i>Oenothera cespitosa</i> ssp. <i>cespitosa</i>	--	Sensitive		■*	X	■	■*			

■ Occurrence within the general area of the segment.

■* Occurrence in the immediate vicinity (within approximately 500 feet) of segment.

X Rare plant documented within the ROW or access road – only segments A, B_{SOUTH} and D were surveyed for rare plants.

+ Species to be added when the WNHP next revises its list.

Table has been updated for the FEIS.

3.4.3.3 BLM Special Status Species

The Wenatchee Resource Area of the Spokane BLM District provided a special status species list for BLM lands within each of the four counties within the study area (See Appendix F, *Rare Plant Survey for the Preferred Alternative*). Rare plant surveys for species listed by the BLM were conducted on all BLM lands along the Preferred Alternative (Segments A, B_{SOUTH}, and D) in 2001 and 2002. Small populations of the BLM special status species Hoover's desert-parsley and gray cryptantha were located on BLM lands in the Saddle Mountains along Segment D.

The list of BLM special status species with the potential to occur along Segment F is included in Table 3.4-8, *BLM Special Status Plant Species*. The other line segments cross only a few land sections or smaller portions of sections of BLM land than Segment F. A specific list of special status species that might occur along line segments other than Segment F is not available from the BLM (Camp, Pers. Comm., 2001).

**Table 3.4-8
BLM Special Status Plant Species**

Species Common Name Scientific Name	Habitat Requirements
Geyer's milk-vetch <i>Astragalus geyeri</i>	Occurs in depressions in mobile or stabilized dunes, sandy flats, and valley floors within gray rabbitbrush/Indian ricegrass communities.
Bristle-flowered collomia <i>Collomia macrocalyx</i>	Dry, open habitats, on talus, rock outcrops, and lithosols, in sparsely vegetated areas with a low species diversity; within sagebrush dominated communities.
Gray cryptantha <i>Cryptantha leucophaea</i>	Occurs in sandy areas, on slopes associated with big sagebrush, and grasses, including Indian ricegrass, needle-and-thread grass, Sandberg's bluegrass, cheatgrass, and various forb species.
Common blue-cup <i>Githopsis specularioides</i>	Open places at lower elevation, on thin soils over bedrock outcrops, talus slopes and gravelly areas.
Hoover's desert-parsley <i>Lomatium tuberosum</i>	Occurs in loose talus, typically on east and north-facing slopes, within big sagebrush/bluebunch wheatgrass communities; also found in talus in drainage channels on south-facing slopes.
Nuttall's sandwort <i>Minuartia nuttallii</i> var. <i>fragilis</i>	Sagebrush dominated hills to high elevation slopes, found mainly on gravelly benches or talus slopes.
Cespitose evening-primrose <i>Oenothera cespitosa</i> ssp. <i>cespitosa</i>	Occurs in open sites on talus or on rocky slopes and may colonize road cuts; associated with big sagebrush, occurs in sagebrush dominated communities associated with gray rabbitbrush, Sandberg's bluegrass, needle and thread grass, Indian ricegrass, Junegrass, and forbs.
Wanapum crazyweed <i>Oxytropis campestris</i> var. <i>wanapum</i>	Occurs on the summit of the Saddle Mountains, descending down the north slope; in deep sand in the big sagebrush/blue bunch wheatgrass community.
<i>Texosporum santi-jacobi</i>	A pin-head lichen that occurs on soils as part of biological crust.

Table has been updated for the FEIS.

3.4.3.4 Washington State Rare Plant Species

All state lands along the Preferred Alternative were surveyed for state listed rare plant species, including Endangered, Threatened and Sensitive (WNHP, 1997). WNHP-maintained lists of rare plant species for each of the four counties along the Preferred Alternative were used as potential species lists (WNHP website, 2001) (see also Appendix F, *Rare Plant Survey for the Preferred Alternative*). A portion of a population of Columbia milk-vetch was located on DNR lands along Segment D. State listed rare plant species were also surveyed on federal lands. Populations of desert cryptantha, Piper's daisy, and tufted evening-primrose were located on federal lands along Segments B_{SOUTH} and D.