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RESTORATION SERVICES TEAM

Final Revegetation Plan
for the
Marys Peak
BPA Communications Site Project

3/7/2022

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Forest Service Region 6
Restoration Services Team

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Contents

1 Introduction

The Bonneville Power Administration (BPA) needs to maintain and upgrade the existing BPA communications site located at Marys Peak, in Benton County, Oregon. Some communications equipment at the existing site is outdated, unstable and needs to be replaced. The site also needs a more reliable back-up power source due to potential power outages. The Marys Peak BPA Communications Site Project (Project) was developed to address the safety and reliability needs of the site.

Temporary and permanent impacts to vegetation would occur as a result of the Project. The purpose of this Revegetation Plan (Plan) is to present species, metrics, and methods for revegetating areas at the Marys Peak communications site and the West Point Spur (WPS) communications site since they could be disturbed by the implementation of one of the Project action alternatives. Revegetation would be done using seeds and cuttings collected from within the Marys Peak Scenic Botanical Special Interest Area (SBSIA), which are genetically adapted to local conditions, to restore native vegetation.

2 Project Location

Project activities would occur at the existing BPA Marys Peak communications site under all action alternatives. If an action alternative is selected, depending on the action alternative that is selected, activities would also occur at either the existing BPA Albany Substation or the existing BPA Prospect Hill communications site. Under one action alternative, activities would occur at the existing Consumers Power, Inc. (CPI) communications site at WPS.

Marys Peak is located approximately 15 miles southwest of Corvallis, Oregon (Figure 1). The Marys Peak BPA communications site is located within the Marys Peak SBSIA, managed by the United States Forest Service (USFS) Central Coast Ranger District of the Siuslaw National Forest (SNF) under the terms of the SNF Land and Resource Plan as amended by the Northwest Forest Plan (USDA 1990 and USDA USDI 1994). Marys Peak is located on lands managed by the SNF, and its summit is the highest elevation peak in Oregon's Coast Range at 4,097 feet above sea level.

An unpaved access road connects a visitor parking lot to the Marys Peak summit, where the existing USFS and BPA communications sites are located. A portion of the access road crosses lands managed by the Bureau of Land Management (BLM), while most of the road is located on USFS land.

WPS is part of the larger Marys Peak mountain complex and is located about 1 mile west of the Marys Peak summit on City of Corvallis land. About half of the access road leading from Marys Peak Road to the WPS communications site complex is located on USFS land, while the remainder is located on City of Corvallis property.

Revegetation would not be needed at either Prospect Hill communications site (Alternative 4) or the BPA Albany Substation (Alternative 2A and Alternative 3C) because all work would occur within graveled, fenced areas. Therefore, the BPA Albany Substation and the BPA Prospect Hill communications site are not discussed further in this Plan.

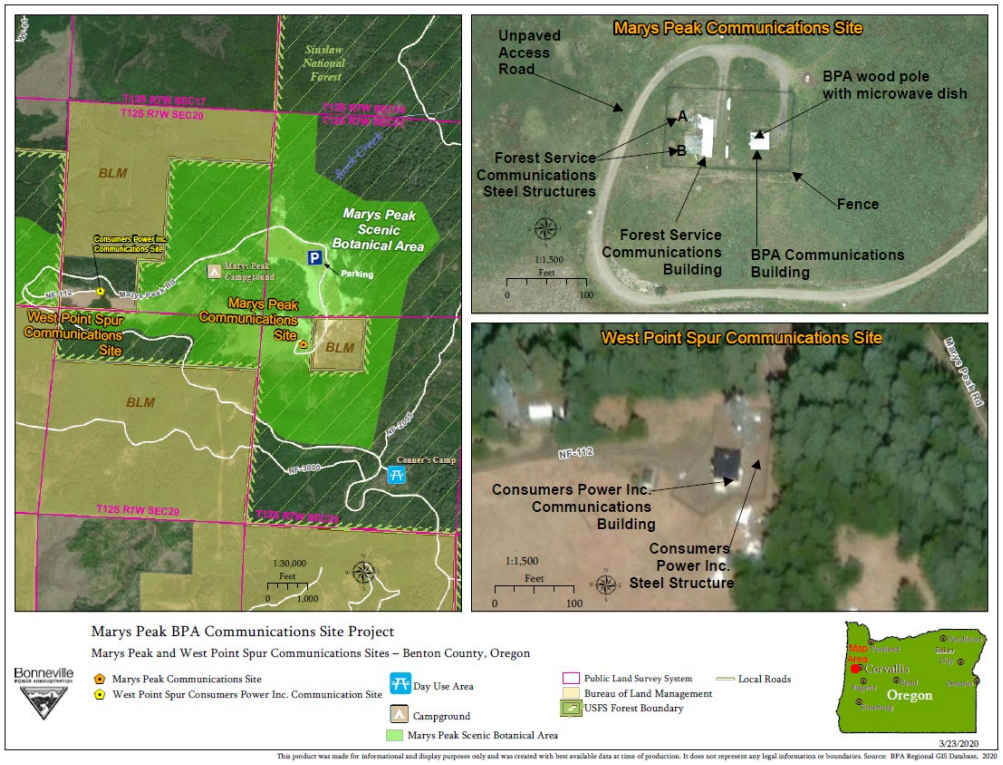

Figure 1. Marys Peak and West Point Spur vicinity map (figure courtesy of BPA).

3 Project Action Alternatives

In 2016, BPA initiated an environmental assessment (EA) process for the Project under the National Environmental Policy Act (NEPA). The EA was released for public review and comment on October 13, 2020. The following three action alternatives are analyzed in detail in the EA:

- Alternative 2A: Marys Peak at Existing BPA Communications Site – BPA Albany Substation
- Alternative 3C: Marys Peak Co-locate with USFS – BPA Albany Substation
- Alternative 4: WPS Co-locate at Existing Consumers Power, Inc. (CPI) Site – BPA Prospect Hill Communications Site

The Project activities that would require revegetation under these action alternatives are described in detail in the construction section of this Plan (Section 9) and summarized in Table 2 in Section 9.1. Although only one action alternative could be selected for implementation, the Plan discusses revegetation at all three action alternatives because they would all involve revegetation and habitat restoration on the Marys Peak summit. Although WPS is about 500 feet lower in elevation than the Marys Peak summit, it is botanically similar to the Marys Peak summit, so methods, species and metrics described in the Plan can be easily applied to accommodate both WPS and the Marys Peak summit with minimal adaptation.

4 Agencies and Partners

Bonneville Power Administration

USDA Forest Service Central Coast Ranger District, Siuslaw National Forest

Bureau of Land Management, Northwest Oregon District

City of Corvallis

Consumers Power, Inc.

5 Soils Present

According to the USDA Natural Resource Conservation Service's Web Soil Survey, the soil directly surrounding BPA's existing communications site at the Marys Peak summit and CPI's communications site at WPS is about 85 percent Mulkey medial loam (NRCS 2019) (Table 1). This soil is well drained and derived from loamy colluvium and residuum derived from basalt and other coarse-grained igneous rock.

Along the 0.6 mile-long access road that connects the summit to the parking lot, the soil type transitions to a 50 percent Sevencedars/20 percent Newanna/20 percent Woodspoint complex. This soil is also well drained and contains up to two inches of decomposed plant matter in undisturbed areas. Other soils along the Marys Peak and WPS access roads include a 65 percent Valsetz/20 percent Yellowstone complex, a 55 percentSevencedars/30 percent Newwana complex, and a 40 percent Chintimini/30 percent Blodgett/20 percent Fiverivers complex. The soil types along these access roads change with slope and elevation. In general, both WPS and Marys Peak summit include soils that are well drained and comprised of variations of mostly gravelly and cobbly medial loam soils.

Table 1 Summary of mapped soil types and their components (NRCS 2019)

Location	Soil Name	Soil Map Unit	Soil Components	% of Component
BPA's existing communication site at Marys Peak and CPI's communication	Mulkey medial Loam, 3 to 30 percent slopes	121	Mulkey and similar soils	85
			minor components	15
0.6 mile-long access road between Marys Peak and the parking lot	Seven Cedars-Newanna-Woodpoint complex, 30 to 60 percent slopes	144	Seven Cedars and similar soils	50
			Woodpoint and similar soils	20
			Newanna and similar soils	20
Marys Peak and WPS access roads	Valsetz-Yellowstone complex, 30 to 60 percent slopes	152	Valsetz and similar soils	65
			Yellowstone and similar soils	20
			minor components	15
Marys Peak and WPS access roads	Seven Cedars-Newanna-Woodpoint complex, 60 to 90 percent slopes	142	Seven Cedars and similar soils	55
			Newanna and similar soils	30
			minor components	15
Marys Peak and WPS access roads	Chintimini-Blodgett-Fiverivers complex, 30 to 60 percent slopes	42	Chintimini and similar soils	40
			Blodgett and similar soils	30
			Fiverivers and similar soils	20
			minor components	10

6 Climate

The Marys Peak summit has an elevation of 4,098 feet above sea level. The climate is driven by elevation and proximity to the Pacific Ocean, which is about 26 miles west of the summit. Most precipitation at the Marys Peak summit occurs in the winter months, and sharply declines during the summer months. Between 2011 and 2016, the Marys Peak area averaged 49.03 inches of precipitation in the winter months and 2.98 inches in the summer months, with an annual average of 116.74 inches. The average monthly maximum temperature was 77.85 °F in August, and the average monthly minimum temperature was 31.23 °F in December (Figure 2).

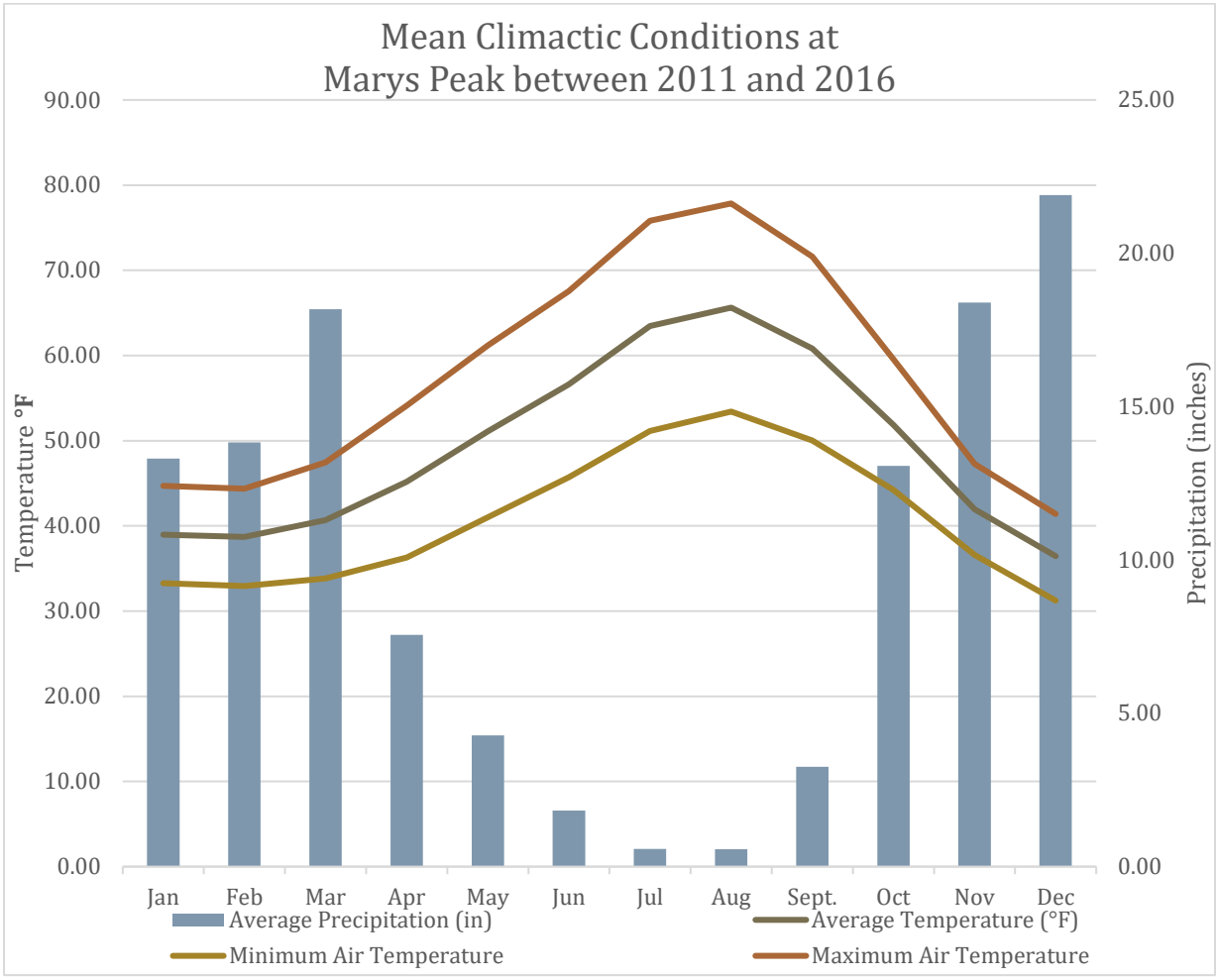

Figure 2. The averaged maximum, minimum, and mean air temperatures, as well as precipitation at the Project site.
Source: Prism Time Series Data for Location: Lat: 44.5043 Long: 123.5512 (800m Resolution).

7 Revegetation Objectives

The objectives of this Plan are as follows:

1) Identify appropriate native plant species for revegetation in areas that could be disturbed by Project activities, based on the type of soils, plant communities in the area disturbed, and adjacent plant communities.
2) Obtain or propagate genetically diverse, locally adapted plant materials from seeds and cuttings to plant in the Project area to which they are adapted, based on functional group and habitat. This would include both containerized plants and seeding.
3) Aid in the natural regeneration of native plant communities and reduce opportunities for noxious weed invasion in areas disturbed by Project activities.
4) Utilize vegetation in areas with exposed soil to mitigate erosion and improve stability in areas disturbed by Project activities.
5) Maintain and enhance aesthetic quality and improve environmental health/functionality by restoring native vegetation in all areas disturbed by Project activities.
6) Describe planting methodology to be utilized.
7) Identify the success criteria that will be used to determine if revegetation is successful or if adaptive management is needed to meet objectives.
8) Create a plan for monitoring to determine if success criteria are being met.

8 Challenges to Plant Establishment

Challenges to plant establishment identified for this Project could include:

1) Rock aprons at the downhill slope of the water bars could be difficult to establish native vegetation establishment and be prone to invasion by weedy non-native species.
2) Compacted soil resulting from construction zones, staging areas, and high traffic areas could limit precipitation penetration into the soil, reduce conditions that allow plants to thrive, and promote compaction-tolerant non-native plants unless soils are decompacted prior to planting.
3) Soil disturbances that reduce or eliminate plant cover and/or topsoil could diminish nutrient availability, increase erosion, and hinder plant establishment and seed germination.
4) Early/late snowfall and freezing air temperatures could kill greenhouse grown seedlings without time to acclimate to outdoor cooler temperatures, lower humidity and increased air movement, even if transferred outdoors at the nursery location for a period of time prior to installation.
5) Disturbed sites are more susceptible to colonization by non-native species which could reduce the survival of newly planted native plants due to competition with non-native plants.

9 Construction

Three action alternatives are currently being considered, in addition to the No Action Alternative. The action alternatives are named Alternative 2A, Alternative 3C, and Alternative 4. Alternative 2A and Alternative 3C include construction of water bars along the access road leading from the parking lot to the Marys Peak summit, and removal of up to 14 noble fir trees from BLM land. A typical water bar design consists of a dip about 4-6 feet wide and 12-18 inches deep crossing diagonally across the width of the road and a 10 foot by 10-foot permanent rock apron on the downhill slope of the access road. Trees that would be cut to accommodate a beam path would be cut with chainsaws as snags, at least 20 feet tall or taller, if possible, and the upper portion of the tree would be limbed and scattered in the forested habitat nearby.

The construction contractor will be responsible for implementing the Project Stormwater Pollution Prevention Plan (SWPPP) and include selection, installation, maintenance, and implementation of Best Management Practices and removal of non-permanent erosion and sediment control devices. The construction contractor will also be responsible for preparing and temporarily stabilizing disturbed soils for later revegetation activities, conducted by RST. Soil preparation could include leveling and contouring disturbed soils, roughening areas disturbed by construction activities, and temporarily stabilizing exposed soils with 100% virgin wood fiber mulch and/or tackifier.

9.1 ACTION ALTERNATIVES

Table 2 Summary of Project activities that would require revegetation work by alternative

Alternative	Location	Activities	Roads
2A	Marys Peak Summit	• Staging inside fenced area (6,100 square feet) • Replace wooden pole with 40-foot tall steel-lattice tower	• Install up to 8 new water bars on access road to Marys Peak summit (5 on USFS land, 3 on BLM land)
3C	Marys Peak Summit	• Staging inside fenced area (11,325 square feet) • Co-locate with USFS—construct new building addition immediately adjacent to the east side of and adjoining to the USFS building • Construct 60-foot tall steel-lattice tower, including potential for an adjacent rock retaining wall • Demolish and remove the existing BPA site	• Install up to 8 new water bars on access road to Marys Peak summit (5 on USFS land, 3 on BLM land)
4	Marys Peak summit and CPI communication site at WPS)	• Staging outside of fenced area at CPI site (3,920 square feet) • Demolish and remove existing BPA communications site on Marys Peak summit	• Install up to 5 new water bars on access road to WPS

ALTERNATIVE 2A

Alternative 2A includes updating and installing new equipment inside BPA's existing summit communications building and replacing the wood pole that supports a microwave radio dish with a 40-foot tall steel-lattice box-style communications structure. This would require staging areas of up to 6,100 square feet inside the already-fenced area on the Marys Peak summit, and up to 1,800 square feet of additional staging areas in the existing paved public parking lot for equipment and vehicles. Up to 3,450 feet of the unpaved access road leading to the summit from the parking area would need to be improved, including the installation of up to 3 new water bars, and improvement to 5 existing water bars.

ALTERNATIVE 3C

Alternative 3C includes co-locating with the existing USFS communication site that is located immediately west and downslope of the existing BPA communications site. The USFS communications site is within the established fenced area at the summit. This alternative would include constructing a building addition, approximately 25 feet long by 13 feet wide by 8 feet tall, to the east side of the existing USFS communications building and a new 60-foot tall steel-lattice structure on the southeast corner of the existing USFS building that would support BPA communications equipment. Staging areas and access road improvements for this alternative would be the same as for Alternative 2A

Under this alternative, the existing BPA communication site at the summit would be demolished, removed and revegetated. The chain link fence that surrounds the BPA and USFS communications site could be moved closer to the USFS building and new BPA addition so that it does not enclose the demolished BPA site, reducing the overall size of the remaining communications site footprint.

ALTERNATIVE 4

Alternative 4 includes co-locating with CPI at WPS. BPA communications equipment would be installed inside the existing CPI communications building and BPA communications equipment would be installed on CPI's existing steel-lattice communications structure. A staging area of 3,920 square feet would be needed outside the CPI fence. Approximately 1,990 feet of the existing unpaved access road leading to the CPI site would need to be improved, and up to five water bars would be installed. No access road improvements would be required on the unpaved access road that leads from the paved parking lot to the Marys Peak summit.

Under Alternative 4, the existing BPA communication site at the summit would be demolished, removed and the area revegetated. The chain link fence that surrounds the BPA and USFS communications site could be moved closer to the USFS building and new BPA addition so that it does not enclose the demolished BPA site, reducing the overall size of the remaining communications site footprint.

11 Revegetation Plan

11.1 STRATEGY

Locally sourced, genetically adapted plant materials collected only from within the Marys Peak SBSIA would be utilized for this Project. Species selection is based on the vegetation surveys conducted for both the Marys Peak summit Project area and the WPS Project area, as well as similar natural habitats in the surrounding area.

All areas disturbed by construction within the Project area (meadows, slopes, etc.) would be planted or seeded with native vegetation. The Plan would be implemented as soon as practical during- and post-construction.

The specific actions to prepare the revegetation units for planting would be determined post-construction once the conditions of the revegetation units are known. For example, construction on the summit could compact the soil in the revegetation unit and some patches of dense weeds already present within the fenced area could remain. In this scenario, revegetation units could require a pre-treatment with an approved herbicide on all or part of the area, and the soil could need to be decompacted before planting. If pre-treatment with herbicide(s) was determined necessary prior to revegetation activities, the herbicide treatments would occur as soon as possible following construction.

Revegetation activities such as planting containerized plants or seeding would take place as soon as possible after the herbicide pre-treatment, if used, in fall of the same year as construction, weather permitting. There could be a delay between pre-treatment and revegetation, as many herbicides have a residual period that would inhibit plant growth. Only approved herbicides would be utilized, and of the approved herbicides those with the shortest residual period would be selected for use.

Decompaction activities, if warranted, would be proportional to the site conditions. This could mean hand decompaction using shovels, hoes, hoedads, etc., or mechanized equipment such as a small bobcat or tractor. If the latter, temporary berms would be constructed from native soils to prevent transportation of material through erosion from the site. These berms would need be only approximately 12-18 inches high, would be positioned on the downhill slope and edges immediately adjacent the downhill slop of the work area, and the soil would be repositioned throughout the work area following the decompaction work (thereby removing the berms).

The site preparation strategy is to plan for possible post-construction conditions and use an adaptive approach to take the actions required for successful revegetation. To ensure that no non-native plants, animals, or noxious weeds are introduced to the area from imported materials during site preparation, no compost or topsoil would be imported, except for the sterile potting soil used to grow containerized plants.

Containerized plants could be installed by opening a planting hole with a hand tool such as a hoedad, which typically has a 36 inch handle and 15-17 inch long by four inch wide flat blade that is positioned at a right angle to the handle. If the substrate makes planting with hoedads or other hand tools too difficult, a power auger could be employed. The power auger is a 12 inch long by three inch wide drill bit attached to the

body and engine of a chain saw. The depth and size of planting holes would be tailored to the size of plant being installed, with the largest hole needing to be three inches wide by about eight inches deep.

Seeding would most likely occur by hand, utilizing a belly grinder type of spreader. Belly grinders have an aperture that is adjusted based on the seed size. By utilizing belly grinders, the seed mix can be applied in several passes to ensure the correct proportions of each seed type and size are applied.

The success of the containerized plants and reseeding efforts is highly dependent on weather the first year after installation. Fast draining soils, winds, high air temperatures, early snow, and seasonal weather events can all affect the ability of plants and seeds to thrive. An option item to provide irrigation to the revegetated areas would be included in the revegetation contract. Irrigation could occur by driving a water truck to the area and applying water directly from the onboard nozzles, pulling hoses from the truck to areas, or by walking to an area and applying water from a backpack sprayer. The option item of irrigation could be exercised the same day that application is deemed necessary, making this a very efficient measure to ensure revegetation success.

For Alternative 3C and Alternative 4, where the existing BPA communications site would be removed, the existing fence around the Marys Peak communications site would be left in place during restoration of the site to protect the plantings from trampling and disturbance. The new length of fencing would need to be constructed prior to revegetation so that any disturbance areas created from fence construction could also be revegetated. The plantings would be monitored each year until the defined success criteria are accomplished. If success criteria are not met, adaptive management would be implemented through additional planting, weeding, or other actions to ensure success.

11.2 SPECIES SELECTION PROCESS

The pre-construction habitats in and around the areas defined by the vegetation surveys were used to determine a list of potential species to use for post-construction revegetation. The less disturbed sites surrounding the Project area between the summit and WPS were also evaluated for possible species. These less disturbed sites have plant communities which are in later successional stages, representing a cross section of the major habitats and topological features of the area. The plant communities in these less disturbed sites were considered, along with the species observed during vegetation surveys in the species selection to gain an understanding of species diversity (Armstrong *et al.* 2017).

The sites to be revegetated were broken down into revegetation units based on variations in ecological characteristics. The list was then used to select plants for each of these units. The first criteria in plant selection is the presence of workhorse species. The term workhorse species is used to describe locally adapted native plants with three main characteristics: they occur in many different environments, they are abundant, and easy to propagate, and they survive well when out planted (Armstrong *et al*. 2017).

Because of their characteristics, these plants are usually found in most if not all the revegetation units. Then other species that are specific to the ecology of each revegetation unit are added to the list for that unit. At this point, an additional selection criterion is to include plants that are pollinator species, to support local pollinators.

It is important to recognize that this Revegetation Plan is a living document and would most likely be refined as the Project plans develop. For example, native annual forbs have not been included in the suite of revegetation species at this point. This is not to imply that native annual forbs would not be included. Rather, it is the case that their inclusion is dependent upon which Action Alternative is selected, which species are available for collection, and which species respond well to nursery cultivation and have high success rates once planted onsite. Every effort will be made to collect and deploy additional species such as bluehead gilia (*Gilia capitata* ssp. *capitata*), spreading dogbane (*Apocynum androsaemifolium*), sicklekeel lupine (*Lupinus albicaulis*), and others that are present in the Project area.

Some groups of plants could be excluded from a revegetation unit. For instance, in the revegetation unit for water bars, plants such as trees and shrubs would not be included as they could grow into the road, and/or they can interfere with line of sight along the road, making travel on narrow roads more hazardous.

Some plant species are included because they are of special interest to the area. These can include plants that are difficult to collect and/or propagate, such as the two violas included in this revegetation plan: *Viola glabella* and *Viola adunca*. These two species disperse their seed ballistically, which means, when the seed is ripe, the pods pop open and the seed is shot away from the parent plant. This makes collecting seed difficult in that seed needs to be ripe to collect it. In order to successfully collect seeds from these two Viola species, they were collected by placing net bags over the seed pods, so that when the pods open the seed was contained within the bag and then hand collected.

11.3 REVEGETATION UNITS

There are up to three revegetation units for this Project: water bar locations, the Marys Peak summit, and the WPS staging area. However, the action alternative that could be selected would determine if all three revegetation units are applicable (Alternative 4), or if only two revegetation units are necessary (Alternative 2A and 3C). See Table 3 for square footage related to each revegetation unit and action alternative (square feet estimates obtained from the Marys Peak BPA Communications Project EA, Chapter 2).

Table 3 Approximate square footage for each of the three revegetation units by action alternative.

Action Alternative	Water Bars (sq. ft.)	Summit (sq. ft.)	WPS Staging Area (sq. ft.)	Total Revegetation Area (sq. ft.)
2A	4,800	6,100	N/A	10,900
3C	4,800	11,325	N/A	16,125
4	3,000	7,700	3,920	14,620

Water Bars

The water bars would create approximately 4,800 square feet (0.11 acres) of disturbance under Alternative 2A or Alternative 3C, and 3,000 square feet (0.07 acres) of disturbance under Alternative 4. Construction of each water bar would create approximately 100 square feet of permanent disturbance from the rock apron,

and 500 square feet of temporary disturbance from grading and soil compaction at the sides of the rock apron. In some instances, the rock apron area could be smaller once the design is refined based on site conditions; in some cases the rock aprons could be reduced in size if there is an established pathway for water to flow off the road. Under Alternative 2A or Alternative 3C, three new water bars would be installed, and improvements would be made to five existing water bars on the road leading to Marys Peak summit (Figure 3B). Because improvements to an existing water bar would include applying additional rock and further soil compaction, they are considered to create the same disturbance as installing a new water bar. Under Alternative 4, five new water bars would be added along the WPS road and no improvements or additional water bars would be installed on the road to the summit (Figure 3A).

The BPA and USFS access road engineers would attempt to place water bars to avoid high quality vegetation. The locations of water bars would be marked with flags in the field prior to conducting access road work. A botanist would inspect the area to determine if there are any native plants that could be salvaged and then replanted in the fall.

Rock aprons are of special concern for native vegetation establishment and weed management as they create novel habitat. To help reduce erosion, a rolled erosion control product, such as coir or similar, would be impregnated with native seed collected from Marys Peak and then installed at the base of the rock apron of each water bar. The blanket would be held in place by metal, wood, or cornstarch stakes every six inches that were pushed through the fabric and into the ground at least three inches deep, or by digging a trench with hand tools and burying the edges of the fabric under soil. This process would allow the rolled erosion control blanket to receive the same suite of species, at the same application rate, as the surrounding reseeding efforts, which would provide visual and species continuity. The seed germinates readily through the rolled erosion control blanket, and the blanket helps preclude competition from non-native species. Once installed, containerized plants would also be installed in the area of the rolled erosion control blanket. A small 'x' would be cut into the blanket, allowing one containerized plant to be installed per 'x'. Containerized plants installed would include forbs and graminoids (Table 4).

Native plant species for the water bar rock aprons were chosen based on the current species present at the Project area that are tolerant to rocky substrate and able to compete with weeds. See Table 4 for the plant species that could be used for revegetation of water bars.

Following construction, areas at the sides of the rock aprons that are disturbed by water bar installation and improvement would be planted with containerized plants. The sides of the rock aprons would be seeded by hand to stabilize the bank and help prevent invasion by noxious weed. Signs alerting the public to restoration efforts and advisement to avoid the areas of the rock aprons and rolled erosion control blankets would be erected. If it appears the public is ignoring this request and the plants are experiencing trampling, temporary fencing could be erected to exclude the public from these specific areas until the vegetation develops sufficiently.

Figure 3. Location of proposed water bars (W) A: on WPS road under Alternative 4 and B: on the road leading to Marys Peak summit under Alternative 2A or Alternative 3C.

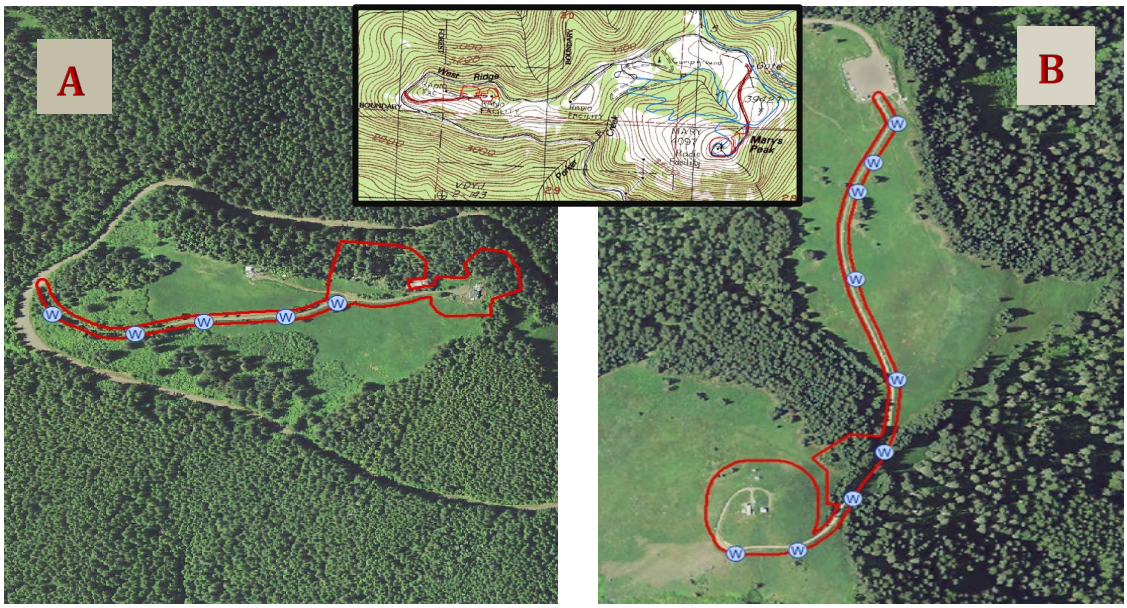

Table 4 Seed mix and containerized plants to potentially be used in revegetation efforts for water bar locations. Stock type definitions as follows: D27' 27 cubic inch container volume, D16' 16 cubic inches. Spacing on center will be determined by baseline data and included in the final Plan.

Common Name	Botanical Name	Stock Type or Seed mix	Spacing (on center)
riverbank lupine	*Lupinus rivularis*	Seedling/D16	TBD
Cascade barberry	*Mahonia nervosa*	Seedling/D27	TBD
California sedge	*Carex californica*	Seedling/RL7	TBD
Cardwell's beardtounge	*Penstemon cardwellii*	Seedling/D16	TBD
cascade desertparsley	*Lomatium martindalei*	Seedling/D16	TBD
sanddune wallflower	*Erysimum capitatum*	Seedling/D16	TBD
common yarrow	*Achillea millefolium*	Seed mix	N/A
western pearly everlasting	*Anaphalis margaritacea*	Seed mix	N/A
blue wildrye	*Elymus glaucus*	Seed mix	N/A
Alaska brome	*Bromus sitchensis*	Seed mix	N/A

Marys Peak Summit (Alternative 2A, Alternative 3C, or Alternative 4)

Approximately 6,100 square feet (0.14 acres) of disturbance would be created on the summit of Marys Peak under Alternative 2A, 11,325 square feet (0.26 acres) of disturbance would be created under Alternative 3C, and 7,700 square feet (0.18 acres) under Alternative 4. These disturbances would be caused by use as staging areas and construction excavation and fill areas within the fenced area on the summit. Additional revegetation would be needed under Alternative 3C and Alternative 4 because the old BPA communications building would be demolished and the area where it was located would be revegetated.

Plant species for revegetation were chosen based on the grassland/meadow species found near the summit, as described in the Marys Peak Vegetation Survey Report. See Table 5 for the plant species that could be used for this revegetation unit.

The current planned timeline of the construction activities would facilitate revegetation the fall of the same year as construction. Revegetation, whether installation of started plants or reseeding, could not occur if the ground is frozen or snow covered, however. Weather permitting, areas disturbed by construction would be planted with containerized plants and specifically adapted graminoid/forb seeds the fall of the same year as construction.

Genetically appropriate, locally sourced seed would be made available to the BPA construction contractor for erosion control needs immediately following construction (Appendix A). The construction contractor would have temporarily stabilized disturbed areas with the native seed mix provided to them (Appendix A), or with 100% virgin wood fiber and tackifier as described in the Construction section above (Section 9). The seed mix includes two native forbs (common yarrow and pearly everlasting) and three native grass species (Alaska brome, blue wildrye, and Roemer's fescue). If weather prevents revegetation once construction activities cease, revegetation with containerized plants and native seed applications would occur either the following early spring or fall, depending on weather.

Table 5 Seed mix and containerized plants for revegetation efforts in areas disturbed by construction on the summit. Stock type definitions as follows: 'D27' = 27 cubic inch container volume, 'D16' = 16 cubic inches. Spacing on center will be determined by baseline data and included in the final Plan.

Common Name	Botanical Name	Stock Type or Seed mix	Spacing (on center)
harsh Indian paintbrush	*Castilleja hispida*	Seedling/D16	TBD
Cardwell's beardtongue	*Penstemon cardwellii*	Seedling/D16	TBD
Columbia lily	*Lilium columbianum*	Seedling/D16	TBD
common woolly sunflower	*Eriophyllum lanatum*	Seedling/D16	TBD
pioneer violet	*Viola glabella*	Seedling/D16	TBD
hookedspur violet	*Viola adunca*	Seedling/D16	TBD
arrowleaf ragwort	*Senecio triangularis*	Seedling/D16	TBD
riverbank lupine	*Lupinus rivularis*	Seedling/D16	TBD
spreading phlox	*Phlox diffusa*	Seedling/D16	TBD
Olympic onion	*Allium crenulatum*	Seedling/D16	TBD
cascade desert parsley	*Lomatium martindalei*	Seedling/D16	TBD
Douglas's catchfly	*Silene douglasii*	Seedling/D16	TBD
giant white fawnlily	*Erythronium oregonum*	Seedling/D16	TBD
mahogany fawnlily	*Erythronium revolutum*	Seedling/D16	TBD
common yarrow	*Achillea millefolium*	Seed mix	N/A
western pearly everlasting	*Anaphalis margaritacea*	Seed mix	N/A
blue wildrye	*Elymus glaucus*	Seed mix	N/A
Alaska brome	*Bromus sitchensis*	Seed mix	N/A
Roemer's fescue	*Festuca idahoensis spp. roemeri*	Seed mix	N/A

WPS Staging Area (Alternative 4)

Approximately 3,920 square feet (0.09 acres) of disturbance could be caused by a staging area at the WPS site outside the fenced CPI communications site. The species selected for this area were observed during the WPS vegetation survey. See Table 6 for the plants that would be used for this area.

The current planned timeline of the construction activities would facilitate revegetation the fall of the same year as construction. Revegetation, whether installation of started plants or reseeding, could not occur if the ground is frozen or snow covered, however. Weather permitting, areas disturbed would be planted with containerized plants and specifically adapted graminoid/forb seeds the fall following construction. If the construction timeline shifts, or if weather prevents revegetation once construction activities cease, the areas would be stabilized utilizing common BMPs such as applying hydromulch or straw for erosion control and then revegetation would occur either the following early spring or fall, depending on weather. Genetically appropriate, locally sourced seed would be made available to the BPA construction contractor for erosion control needs (Appendix A).

Table 6 Seed mix and containerized plants to potentially be used in revegetation efforts for WPS staging areas. Stock type definitions as follows: D27' 27 cubic inch container volume, D16' 16 cubic inches. Spacing on center will be determined by baseline data and included in the final Plan.

Common Name	Botanical\ Name	Stock Type or Seed Mix	Spacing (on center)
riverbank lupine	*Lupinus rivularis*	Seedling/D16	TBD
toughleaf iris	*Iris tenax*	Seedling/D16	TBD
California sedge	*Carex californica*	Seedling/RL7	TBD
starry false lily of the valley	*Maianthemum stellatum*	Seedling/D16	TBD
Cascade barberry	*Mahonia nervosa*	Seedling/D27	TBD
giant white fawnlily	*Erythronium oregonum*	Seedling/D16	TBD
mahogany fawnlily	*Erythronium revolutum*	Seedling/D16	TBD
common yarrow	*Achillea millefolium*	Seed mix	N/A
western pearly everlasting	*Anaphalis margaritacea*	Seed mix	N/A
blue wildrye	*Elymus glaucus*	Seed mix	N/A
Alaska brome	*Bromus sitchensis*	Seed mix	N/A
Roemer's fescue	*Festuca idahoensis spp. roemeri*	Seed mix	N/A

11.4 NATIVE SEED AND PLANTS

Seeds

Native grass and forb seed are being collected, grown out, and increased for this Project using genetically appropriate, locally adapted species and sources (either from WPS or Marys Peak in the Project vicinity). Most materials are being collected and produced by the DGRC. If more plant propagules are needed, collection contract(s) would be administered by the Forest Service and awarded to members of a pre-vetted contracting pool. Grass and forb seed were chosen for each specific habitat based on either what is currently present, or what grows in similar habitats near the Project area and are good selections for quickly recolonizing disturbed sites as well as providing erosion control. Native grass and forb seed would be produced for all revegetation units using locally collected species and/or purchased from local producers that can assure the original collections were made within the Marys Peak SBSIA. Seed would be made available to the construction contractor for reseeding for permanent erosion control. Seedling growout and seed procurement would be coordinated by the Forest Service. erosion control seed mix would be provided to the BPA construction contractor. If an action alternative is selected, three seed mixes would be used:

- **Meadow Mix for Marys Peak Summit and WPS staging area Revegetation** (see Appendix A for species, mixing ratios, pounds per revegetation unit and amounts for BPA construction contractor and Restoration Services Team (RST) contractor use)
- **Erosion Control Mix for Marys Peak Summit and WPS staging area Revegetation** (See Appendix A for species, mixing rations, pounds per revegetation unit, and amount provided to the BPA construction contractor).

- **Water Bar Revegetation** (see Appendix A for species, mixing ratios, pounds per revegetation unit and amounts for BPA construction contractor and RST contractor use).

Containerized Plants

Containerized plants would be utilized in addition to seeding because in some instances installation of containerized plants is beneficial. Not all plant species grow well from seed applied to the ground and are more easily established when they are started in containers at a nursery. Additionally, larger containerized plants often reduce weed establishment by facilitating resource competition through larger canopies and root systems. Containerized plants of graminoid, forb, and shrub seedlings for the Project from genetically appropriate, locally collected native species would be grown out at DGRC.

Species were chosen for each specific habitat based on either what is currently present, or what grows in similar habitats near the Project area and are good selections for the specific purpose of each unit as well as providing erosion control. Most materials would be collected and produced by the USFS DGRC in Cottage Grove, Oregon. Collection contract(s) will be administered by the Forest Service and awarded to members of a pre-vetted contracting pool. Seed and vegetation collection are required for any future nursery production. Seedling growout and seed procurement will be coordinated between the Forest Service and DGRC.

An extra ten percent of the total quantity of containerized plants needed is built into the plant schedule. These additional plants will be grown to allow for replacement due to mortality during the lifetime of the Project agreement. Appendix B (Table 17) includes the list of the containerized plant palette with species list and total number of plants needed for each revegetation unit.

Seed Collection

Seed collection for containerized plants and seed mixes has already taken place and is ongoing. Tables 7 and 8 list the seed collection and planning actions that have already been completed as of September 23, 2020, to prepare for revegetation for any of the proposed alternatives. These seeds will either be grown as containerized plants at DGRC, or they will be stored and used for the seed mixes.

Table 7 Seed collection and planning trips from 2019 – present.

Date	Activity
8/28/2019	Initial seed collection trip for workhorse species.
6/01/2020 – 6/03/2020	Scouting trip to identify populations of target species. Locations of target species were mapped for future collection trips.
6/24/2020	Scouting trip to track target species phenology. Secured mesh bags around *Viola adunca* and *Viola glabella* plants to reliably collect their ballistic seed.
7/01/2020	Located more violet plants and added additional mesh bags. Tracked target species phenology.
7/08/2020	Added additional violet bags and tracked target species phenology.
7/30/2020	Removed most of the violet bags and collected their seed. Collected target species seed.
8/13/2020	The remainder of the violet bags were removed. Target species seed collected.
8/24/2020 – 8/26/2020	Large seed collection trip. Many graminoid workhorse species and some forb species were collected.

Table 8 List of species from which seed has been collected for containerized plants and/or seed mixes by date, to prepare for any selected action alternative.

Date Collected	Common Name	Botanical Name
8/28/2019	common yarrow	*Achillea millefolium*
8/28/2019	California sedge	*Carex californica*
8/28/2019	fireweed	*Chamerion angustifolium*
8/28/2019	blue wildrye	*Elymus glaucus*
8/28/2019	Columbia lily	*Lilium columbianum*
8/28/2019	Cardwell's beardtongue	*Penstemon cardwellii*
7/30/2020	Olympic onion	*Allium crenatum*
7/30/2020	giant white fawnlily	*Erythonium oregonum*
7/30/2020	mahogany fawnlily	*Erythonium revolutum*
7/30/2020	cascade desert parsley	*Lomatium martindalei*
7/30/2020	spreading phlox	*Phlox diffusa*
7/30/2020	hookedspur violet	*Viola adunca*
7/30/2020	pioneer violet	*Viola glabella*
8/13/2020	Alaska brome	*Bromus sitchensis*
8/13/2020	California sedge	*Carex californica*
8/13/2020	blue wildrye	*Elymus glaucus*
8/13/2020	riverbank lupine	*Lupinus rivularis*
8/13/2020	western swordfern	*Polystichum munitum*
8/13/2020	arrowleaf ragwort	*Senecio triangularis*
8/13/2020	hookedspur violet	*Viola adunca*
8/13/2020	pioneer violet	*Viola glabella*
8/24/2020 – 8/26/2020	common yarrow	*Achillea millefolium*
8/24/2020 – 8/26/2020	Alaska brome	*Bromus sitchensis*
8/24/2020 – 8/26/2020	California sedge	*Carex californica*
8/24/2020 – 8/26/2020	fireweed	*Chamerion angustifolium*
8/24/2020 – 8/26/2020	blue wildrye	*Elymus glaucus*
8/24/2020 – 8/26/2020	common woolly sunflower	*Eriophyllum lanatum*
8/24/2020 – 8/26/2020	giant white fawnlily	*Erythronium oregonum*
8/24/2020 – 8/26/2020	mahogany fawnlily	*Erythronium revolutum*
8/24/2020 – 8/26/2020	Roemer's fescue	*Festuca idahoensis ssp. roemeri*
8/24/2020 – 8/26/2020	toughleaf iris	*Iris tenax*
8/24/2020 – 8/26/2020	riverbank lupine	*Lupinus rivularis*
8/24/2020 – 8/26/2020	Cardwell's beardtongue	*Penstemon cardwellii*
8/24/2020 – 8/26/2020	arrowleaf ragwort	*Senecio triangularis*

12 Noxious and Non-native Plant Control

12.1 CURRENT CONDITIONS

Tansy ragwort (*Senecio jacobaea*) and common St. Johnswort (*Hypericum perforatum*) are currently found in the Marys Peak summit and WPS Project areas. Both are listed as category "B" noxious weeds and are designated for management by the USFS and the Oregon Department of Agriculture (ODA). Other state listed weeds could be present, but none were observed during the vegetation survey for either site.

12.2 NON-NATIVE PLANT CONTROL

All areas that would be disturbed during Project activities would be monitored for state listed "A" and "B" noxious weeds and treated by RST after construction. In addition to those species that appear on Oregon's "A" and "B" lists, oxeye daisy (*Leucanthemum vulgare*), hairy cat's ear (*Hypochaeris radicata*), and creeping velvet grass (*Holcus mollis*) would also be monitored for and treated if observed within the areas disturbed during Project activities. These three additional species do not appear on the state noxious weed list but are included in response to concerns about their spread, as expressed by the SNF.

Although little to no disturbance is expected to occur along the sides of the access road to Marys Peak summit, a 15-foot buffer on either side from the paved parking lot to the summit will be included in monitoring and treatment as described above. Construction BMPs, such as the cleaning of machinery prior to entrance to the Project area, would mitigate most vectors for novel non-native plant introduction. BPA is very sensitive to eliminating any that may occur, however, and immediate treatment would be conducted on any newly introduced noxious weed.

Following construction, monitoring and noxious weed control at the summit, water bar locations, and at the WPS staging area (if Alternative 4 is selected) would occur at least once per year for 5 consecutive years. . The number of treatments would vary, depending on need in order to meet the success criteria described below. The best management practices (BMP's) outlined in the Project Final EA would be implemented to minimize potential noxious weed introduction and dispersal.

The populations of common St. Johnswort on the summit of Marys Peak and of tansy ragwort near the CPI communications building are currently small enough to be hand pulled. During any site visits, whether for planning, plant propagule collection, revegetation efforts, etc., flower and seed heads of non-desirable plant species will be hand pulled, bagged, and removed from the area (disposed of appropriately) to pre-emptively reduce population increase. This applies to all state listed noxious weeds and oxeye daisy, hairy cat's ear, and creeping velvet grass.

If noxious weeds and the three non-native species specified above could not be adequately controlled by hand pulling, herbicide applications would be applied on foot with a backpack sprayer. Spot treatments would be timed with the correct phenology depending on the specific treatment mechanism and scheduled when weather conditions are ideal to minimize drift and runoff.

As discussed in the survey report for West Spur Point, "there are …challenges associated with chemical control of common St. Johnswort. It would be difficult to locate all individuals and could require many applications over several years because un-germinated seed could germinate in subsequent years, and any individuals not killed would add to the seed bank. Additionally, a chemical application would likely have a negative effect on native plants because common St. Johnswort is integrated into dense native plant populations. Specific herbicide treatments would follow herbicide use guidelines described in the Siuslaw National Forest Land and Resource Plan (USFS 1990). This plan allows the use of herbicides only when other methods are ineffective or increase Project costs unreasonably. Emphasis is given to prevention and early treatment.

13 Monitoring Plan

13.1 MONITORING PLAN

The purpose of vegetation monitoring is to evaluate the success of revegetation and identify any need for additional revegetation or weed management. Vegetation monitoring for Marys Peak will assess the percent cover of native, noxious weeds, select non-native species, and bare ground using line-point intercept transects, fixed area plots, and established photo plots.

13.2 MONITORING TIMELINE

Baseline assessments and yearly monitoring assessments would be conducted by RST in spring/early-mid summer when vegetation is most amenable to identification. Up to three monitoring trips per year are often required, timed by the phenology of the plants and trips would be subject to change based on weather conditions and seasonal averages. The timing of monitoring trips would be adjusted accordingly for early/late bloom years.

Prior to construction, a baseline monitoring assessment would be performed to establish monitoring plots at the summit or at the CPI staging area and to determine the current vegetation conditions for future monitoring assessments. The water bar revegetation units will not be included in the baseline assessment because construction of the water bars will completely alter the previous conditions and create novel structures. The summit revegetation unit and water bar locations along the Marys Peak access road (if Alternative 2A or Alternative 3C are selected), the WPS water bar locations (along NF-112), and the WPS staging area (if Alternative 4 is selected) would be monitored once a year for five years (Figure 4).

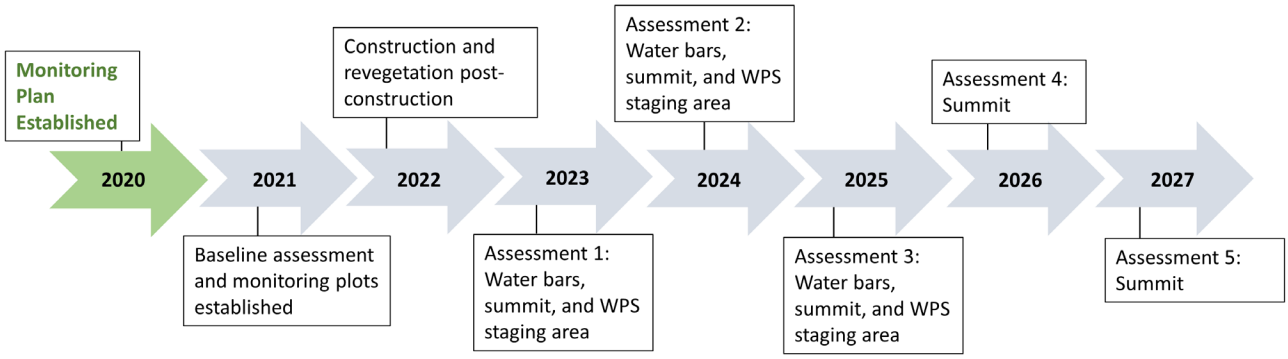

Figure 4. Timeline for vegetation monitoring.

13.3 SUCCESS CRITERIA

Success criteria are a set of defined metrics that are used to quantitatively determine revegetation success. Success criteria are differentiated by revegetation unit to account for the differences in level of disturbance expected in the unit.

Success criteria for the presence of native species includes all acceptable plants, whether they were naturally recruited or actively installed by planting.

For any area disturbed by Project construction (all alternatives):

- Presence of new weed species introduced as a result of Project activities must be 0% by year 5

For the Marys Peak summit revegetation unit (all action alternatives) or the WPS staging area revegetation unit (Alternative 4), the following success criteria apply:

- Cover by native species must be equal to or greater than the baseline native species cover by year 5
- Cover by state listed "A and "B" noxious weeds, oxeye daisy, creeping velvet grass, and hairy cat's ear must be equal to or less than the baseline cover by year 5

For the 15-foot buffer on either side of the access road leading from the paved parking lot to Marys Peak summit (Alternative 2A or Alternative 3C) and to West Point Spur (Alternative 4) from Marys Peak Road, including the water bar locations, the following success criteria apply:

- Cover by state listed "A and "B" noxious weeds, oxeye daisy, creeping velvet grass, and hairy cat's ear must be equal to or less than the baseline cover by year 5

Success is achieved when all criteria are met and continue to be met by the end of year 5. An example of reporting on the status of success criteria in annual monitoring reports is in Table 9.

Table 9. Example of annual success criteria summary, which would be included in annual monitoring report

Success Criteria	2023 Results	2024 Results	2025 Results	2026 Results	2027 Results
Presence of new weed species introduced as a result of Project activities must be 0%					
Location:	Criteria Met/Criteria not Met: Names of new weed species observed				
Location:	Criteria Met/Criteria not Met: Names of new weed species observed				
Location:	Criteria Met/Criteria not Met: Names of new weed species observed				
Marys Peak summit: Native species cover must be at least equal to or greater than baseline native species cover.					
Location: Marys Peak Summit	Criteria Met/Criteria not Met: Summit native species cover at XX% compared to the baseline native cover of XX%				
Cover by state listed "A and "B" noxious weeds, oxeye daisy, creeping velvet grass, and hairy cat's ear must be equal to or less than the baseline cover by year 5					
Location:	Criteria Met/Criteria not Met: Names of weed species observed and the cover at XX% compared to the baseline cover of XX%				
Location:	Criteria Met/Criteria not Met: Names of weed species observed and the cover at XX% compared to the baseline cover of XX%				

13.4 METHODS

A baseline assessment would establish the monitoring locations for point-intercept transects, photopoints and fixed area plots that will be used for all 5 years for the WPS staging area Marys Peak summit, and water bar vegetation monitoring. Monitoring of water bars is discussed below. Although the transects, photo points and fixed area plots would not be permanently monumented, their locations would be recorded with a high accuracy GPS device and photographs that include permanent features such as large boulders, geographic features on the horizon, etc. to aid in their relocation each year. The protocols that would be used for point intercept, photo and fixed plot data collection are found in 2 sources, the Monitoring Manual for Grassland, Shrubland and Savanna Ecosystems (Herrick et al. 2009) and NFS Field Sampled Vegetation ("Field Sampled Vegetation (FSVeg)" 2015).

The point-intercept method uses a transect of fixed length and a set of sample points at fixed distances along it to tally surface or vegetation presence at each point. Percent cover is then calculated by dividing the number of points in each surface cover class or species or lifeform by the total number of points collected on the transect. This method should be used whenever accurate surface vegetation cover estimates are needed and as such is suitable for monitoring changes over time. Along the transects, all species would be identified, and the percent cover calculated. The transects would also be used to determine percent cover of noxious weeds and selected non-native species. It is recommended that more than one transect be established at a site to distribute observation across the site, capture within plot variability, and reduce sensitivity to directional patterns. Many monitoring programs use three transects at each site (Herrick et al. 2009). See Figure 5 for data sample of point intercept data collection form.

Photo points are used to qualitatively monitor how vegetation changes over time. Repeat photographs of a landscape are useful in measuring changes in vegetation structure over time and are vital for relocating a plot or transect in subsequent visits. Two photos would be taken at each transect. One, a photo of the ground cover at the beginning of the transect, then a second looking down the transect from the beginning point (Herrick et al. 2009). Photo points will also be established for the fixed area plots from plot center in each of the cardinal directions: north, east, south and west. See Figure 6 for an example of photo point documentation form.

A fixed-area plot would also be established at each site. Fixed area plots are used to collect ocular estimates of coverages desired such as noxious weed cover as well as percent cover by lifeform and or species. A size of 1/100 acre is commonly used for regeneration areas ("Field Sampled Vegetation (FSVeg)" 2015). See Figure 7 for an example of a fixed-area plot data collection form.

Both the summit and the WPS sites would receive all three methods: Three transects of point-intercept, one fixed-area plot, and two photo points associated with both.

Because of the small area of impact of the water bars, only a fixed area plot with photo points would be established for each water bar and only percent cover of noxious weed and select non-native species assessed. See Table 3 for acreage associated with each site under each alternative.

Figure 5. Example of Line Intercept Data Sheet

Line-point Intercept Data Form

Page of Shaded cells for calculations

Plot: Line #: Observer: Recorder: Direction: Date: Intercept (Point) Spacing Interval = 24 (in)

Pt.	Top layer	Lower layers			SS	W	Pt.	Top layer	Lower layers			SS	W
		Code 1	Code 2	Code 3					Code 1	Code 2	Code 3		
1							26						
2							27						
3							28						
4							29						
5							30						
6							31						
7							32						
8							33						
9							34						
10							35						
11							36						
12							37						
13							38						
14							39						
15							40						
16							41						
17							42						
18							43						
19							44						
20							45						
21							46						
22							47						
23							48						
24							49						
25							50						

% foliar cover = top layer pts (1st col) x 2 = %
% bare ground* = pts (w/NONE over SS) x 2 = %
% basal cover = plant base pts (SS) x 2 =
% weed cover =Weeds (W) X2=

Top layer codes: Species code, common name, or NONE (no cover).

Lower layers codes: Species code, common name, L

Unknown Species Codes: AF# = annual forb
PF# = perennial forb AG# = annual graminoid PG# = perennial graminoid SH# = shrub

Soil Surface (do not use litter):
Species Code (for basal intercept)
R = rock fragment (>5 mm (~1/4 in) diameter)
BR = bedrock, M = moss
LC = visible biotic crust on soil S = soil without any other soil surface code
EL = embedded litter (see page 10) (herbaceous litter), WL (woody litter, >5 mm (~1/4 in) diameter).
TR# = tree D = duff
**Bare ground occurs ONLY when Top layer = NONE, Lower layers are empty (no L), and Soil surface = S.*

Figure 6. Example of photo point documentation form

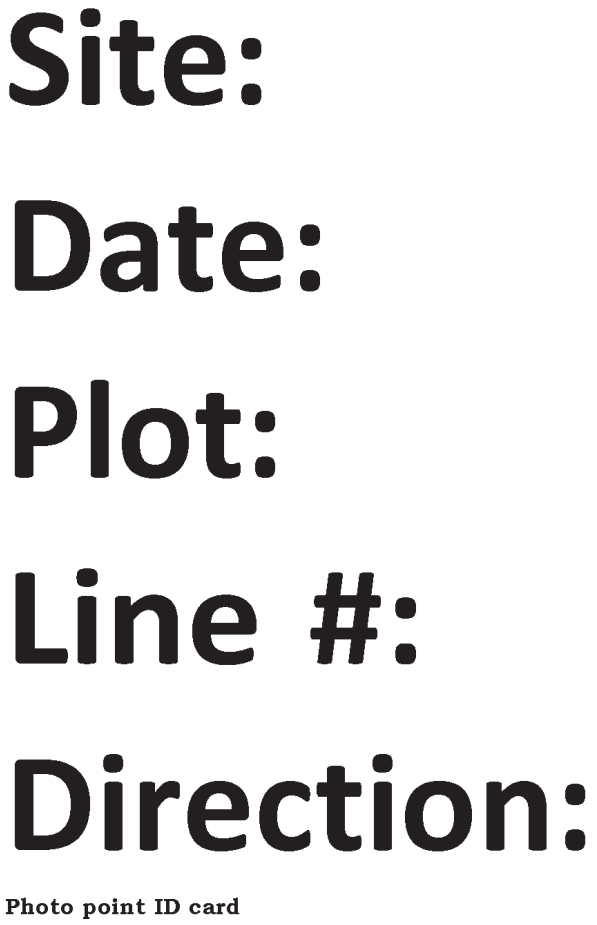

Figure 7. Example of fixed plot data collection form

Fixed Area Plot Data Collection Form

Date: _____

Plot ID: _____

Name(s) _____

Species	% Cover	Cover by Lifeform	% Cover
		Biotic crust	
		Lichens	
		Non-vascular plants	
		Forbs	
		Graminoids	
		Noxious Weeds/Select Non-natives	
		Shrubs	
		Trees	
Ground Cover			
Bare Soil			
Bare Rock			
Grass litter			
Leaf litter			
Woody Debris			
Unvegetated			

14 References

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15 APPENDIX A SEED MIXES

15.1 MEADOW SEED MIX – PERMANENT EROSION CONTROL BY CONSTRUCTION CONTRACTOR

Table 11. Species to be used in the meadow seed mix by action alternative. Includes total pounds needed of each species and pounds needed for each species per bag of seed mix.

	Pounds/Bag			Total Pounds Needed		
Species	**2A**	**3C**	**4**	**2A**	**3C**	**4**
Achillea millefolium (common yarrow)	0.13	0.13	0.13	0.05	0.10	0.1
Anaphalis margaritacea (western pearly everlasting)	0.06	0.06	0.06	0.02	0.04	0.05
Elymus glaucus (blue wildrye)	4.57	4.57	4.57	1.92	3.56	3.70
Bromus sitchensis (Alaska brome)	7.04	7.04	7.05	2.96	5.49	5.70
Festuca idahoensis spp. roemeri (Roemer's fescue)	1.65	1.65	1.65	0.69	1.29	1.34
			Totals:	5.65	10.49	10.89

Table 12. Pounds of meadow mix needed for each revegetation unit by alternative.

	Alternative 2A		Alternative 3C		Alternative 4	
Revegetation Unit:	**Summit**	**WPS**	**Summit**	**WPS**	**Summit**	**WPS**
Acres	0.14	N/A	0.26	N/A	0.18	0.09
Lbs. Seed Mix	5.65	N/A	10.49	N/A	7.26	3.63

Table 13. Seed, target seeding rates, bags of seed per acre, sowing rates, and number of bags needed for the meadow mix under each alternative.

Alternative	**2A**	**3C**	**4**
Acres to seed:	0.14	0.26	0.27
Target Seedlings/ft^2	20	20	20
Seed Bags per Acre:	3	3	3
Total Pounds/Bag:	13.45	13.45	13.45
Pounds Per Acre:	40.34	40.34	40.34
Total No. of Bags	**0.42**	**0.78**	**0.81**

15.2 WATER BAR MANAGEMENT SEED MIX– PERMANENT EROSION CONTROL BY CONSTRUCTION CONTRACTOR

Table 14. Species to be used in the water bar management seed mix for action alternatives. Includes total pounds needed of each species and pounds needed for each species per bag of seed mix.

	Pounds/Bag			Total Pounds Needed		
Species	**2A**	**3C**	**4**	**2A**	**3C**	**4**
Achillea millefolium (common yarrow)	0.21	0.21	0.21	0.07	0.07	0.04
Anaphalis margaritacea (western pearly everlasting)	0.08	0.08	0.08	0.03	0.03	0.02
Elymus glaucus (blue wildrye)	4.57	4.57	4.57	1.51	1.51	0.96
Bromus sitchensis (Alaska brome)	7.04	7.04	7.04	2.32	2.32	1.48
			Totals:	3.94	3.94	2.50

Table 15. Pounds of water bar management mix needed for each revegetation unit for each alternative.

	Alternative 2A	Alternative 3C	Alternative 4
Revegetation Unit:	**Water Bars**	**Water Bars**	**Water Bars**
Acres	.11	.11	.07
Lbs. Seed Mix	3.94	3.94	2.50

Table 16. Seed, target seeding rates, bags of seed per acre, sowing rates, and number of bags needed for the water bar management mix under each Alternative.

Alternative	**2A**	**3C**	**4**
Acres to seed:	0.11	0.11	.07
Target Seedlings/ft^2	20	20	20
Seed Bags per Acre:	3	3	3
Total Pounds/Bag:	11.93	11.93	11.93
Pounds Per Acre:	35.79	35.79	35.79
Total No. of Bags	**0.33**	**0.33**	**0.21**

16 APPENDIX B PLANT PALLETTE

Table 17. Planned containerized plant species, quantity, and stock type per revegetation unit.

Note: To be installed by RST-not the construction contractor.

		Marys Peak Summit - Forbs	Waterbars	Waterbars - Graminoids	WPS Staging Area - Forbs	WPS Staging Area - Graminoids	Total	
	Acreage	0.260	0.110	0.110	0.090	0.090	0.550	
	Spacing (ft)	5	5	3	8	8		
	% Survival	85	75	75	85	85		
	Plants needed	**533**	**256**	**710**	**72**	**72**	1643	
	10% contingency (total needed)	**586**	**281**	**781**	**79**	**79**	1807	
	Total planned	**585**	**280**	**781**	**70**	**80**	**1796**	Stocktype
Olympic onion	*Allium crenulatum*	50					50	Seedling/D16
California sedge	*Carex californica*	35		781		80	896	Seedling/RL7
harsh Indian paintbrush	*Castilleja hispida*	30					30	Seedling/D16
blue eyed Mary	*Collinsia parviflora*	15					15	Seedling/D16
common woolly sunflower	*Eriophyllum lanatum*	30	25				55	Seedling/D16
sanddune wallflower	*Erysimum capitatum*		60				60	Seedling/D16
giant white fawnlily	*Erythronium oregonum*	30					30	Seedling/D16
mahogany fawnlily	*Erythronium revolutum*	30					30	Seedling/D16
toughleaf iris	*Iris tenax*	20			15		35	Seedling/D16
Columbia lily	*Lilium columbianum*	25					25	Seedling/D16
Cascade desert parsley	*Lomatium martindalei*	40	25				65	Seedling/D16
riverbank lupine	*Lupinus rivularis*	40	40		20		100	Seedling/D16
Cascade barberry	*Mahonia nervosa*		40		15		55	Seedling/D27
starry false lily of the valley	*Maianthemum stellatum*				10		10	Seedling/D16
Cardwell's beardtongue	*Penstemon cardwellii*	100	60				160	Seedling/D16
spreading phlox	*Phlox diffusa*	50					50	Seedling/D16
western swordfern	*Polystichum munitum*				10		10	Seedling/D27
arrowleaf ragwort	*Senecio triangularis*		30				30	Seedling/D16
Douglas's catchfly	*Silene douglasii*	10					10	Seedling/D16
hookedspur violet	*Viola adunca*	40					40	Seedling/D16
pioneer violet	*Viola glabella*	40					40	Seedling/D16