

Stateline Wind Project: Revegetation Plan

[REVISED MARCH 27, 2009]

1. Introduction

The certificate holders are operating a wind power project in Oregon known as the Stateline Wind Project (SWP). This Revegetation Plan addresses only the parts of the project that are located in Oregon, although there are associated wind energy facilities in Washington that are part of the overall Stateline project.¹ The turbine strings are spread out along several ridgecrests located approximately six miles southwest of the town of Touchet, Washington. In addition to the turbine strings, additional facilities such as access roads, underground and overhead transmission lines and a substation are part of the project.

In the site certificate, the certificate holder agrees to mitigate impacts associated with the loss of grassland and shrub-steppe habitats and Conservation Reserve Program (CRP) lands. The areas of temporary construction disturbance include cultivated or otherwise developed agricultural land (cropland) as well as areas of grassland, and shrub-steppe habitat. This Revegetation Plan addresses both the revegetation of areas temporarily disturbed by SWP construction and mitigation for permanent habitat impacts of the first two phases of the SWP (Stateline 1&2). The goal for temporarily disturbed areas (such as road shoulders, underground electric cable trenches and the temporarily disturbed area around tower sites) is to return the disturbed habitat to pre-construction conditions or better.

In addition to areas temporarily disturbed during construction of the project, certain areas are permanently affected by the placement of project facilities for the life of the project. These permanently disturbed areas include the location of new or widened roads, the turbine pad areas and the substation area. Some of these areas are located in areas cultivated for winter wheat or other grain crops. No mitigation is proposed for the long-term loss of these agricultural areas (although the landowner is compensated through wind lease payments).

The SWP consists of two parts:

- Stateline 1&2: 186 Vestas V47-660-kilowatt (kW) wind turbines, six permanent meteorological towers, access roads and other related or supporting facilities.
- Stateline 3: Up to 67 GE 1.5-MW wind turbines or up to 43 Siemens 2.3-MW wind turbines, two permanent meteorological towers, access roads, a 230-kV transmission line, a substation, an operations and maintenance building and other related or supporting facilities.

For Stateline 1&2, the certificate holders shall mitigate for the permanent impacts on approximately 50 acres of grassland, grassland-steppe and CRP habitat, as shown in the following table:

¹ This plan is incorporated by reference in the site certificate for the Stateline Wind Project and must be understood in that context. It is not a “stand-alone” document. This plan does not contain all mitigation required of the certificate holders.

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Stateline 1		
Category	Vegetation Types	Acres of permanent impact
2	Grassland Steppe	0.5
3	Grassland Steppe; CRP	47.8
	Total Stateline 1	48.3
Stateline 2		
Category	Vegetation Types	Acres of permanent impact
3	Grassland Steppe; CRP	<1
4	Grassland	<1
	Total Stateline 2	>1

For Stateline 3, the certificate holders shall mitigate for the permanent habitat impacts as described in a separate Stateline 3 Habitat Mitigation Plan.

Section 4 below describes habitat improvement procedures for degraded habitat that the certificate holder shall revegetate to mitigate the permanent impacts of Stateline 1&2. Section 3 below describes revegetation procedures for restoring areas of temporary disturbance resulting from construction of all phases of the SWP.

In order to achieve these habitat mitigation objectives, this plan has been prepared to guide the revegetation efforts. Seed mixes, planting methods and weed control techniques have been developed specifically for the project area through consultations with the Oregon Department of Fish and Wildlife (ODFW), reviews of current literature and site visits by revegetation specialists. The plan also specifies monitoring procedures to evaluate the success of the revegetation efforts, including recommended remediative action should initial revegetation efforts prove unsuccessful in certain areas.

2. Project Area

2.1. Project Description

Construction of Stateline 1&2 is complete. There are two project layouts being considered for Stateline 3. One consists of up to 43 Siemens 2.3-93 wind turbines; the other consists of up to 67 GE 1.5 xle or sle wind turbines. The turbines are linked by access roads and underground 34.5-kV transmission lines. In addition, Stateline 3 includes a 230-kV substation and a 16-mile 230-kV transmission line (approximately 12.9 miles of the transmission line are in Oregon and 3.1 miles of transmission line are in Washington). Access roads are needed in several areas to transport equipment and personnel to the facilities. In many cases, existing roads are adequate to provide access, but some new roads and expansion of some existing roads are needed.

During construction, there are areas of temporary disturbance, which the certificate holders must restore in accordance with this plan. Laydown areas and equipment work areas at the tower sites are needed to construct the turbines. Construction of access roads also requires the temporary disturbance of habitat in addition to permanent disturbance of the roadbed. In addition, construction of powerlines, both above and below ground, temporarily affects habitat.

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For the underground lines, temporary impacts are similar to pipeline installation, while for the overhead lines, disturbance is primarily limited to the tower bases. Additionally, miscellaneous areas such as crane paths, staging areas, parking lots and turnouts are temporarily disturbed during construction.

2.2. Physiography, Geology, and Soils

The turbine string sites are located on ridgetops that generally run along northwest-southeast lines. Slopes along the strings themselves are gentle, typically ranging from 0° to 10°. Slopes down from the ridgetops are variable, generally ranging from 5° to 30°.

Elevations of the turbines strings range from 1,100 feet to 2,100 feet. Elevations for the access roads and proposed transmission line range from 850 feet to 1,100 feet.

Soils in the lower elevations of the site range from very deep, well-drained silt loams to shallow, stony silt loams formed in colluvium (rocky accumulations at the base of slopes). The deeper silt loams across the site have been cultivated for small grain production. The shallow, stony soils support grazed native shrub-steppe and grassland.

2.3. Climate

The project area averages 10 to 15 inches of precipitation annually, most of which falls from October through March. The average annual air temperature is 50° to 53° Fahrenheit, and the average frost-free period is 135 to 170 days. Strong winds are often present along the ridgetops.

2.4. General Vegetation

Potential vegetation communities in the project vicinity are primarily bunchgrass and shrub-steppe associations. On the deeper-soiled habitats, *Agropyron spicatum* (bluebunch wheatgrass) and *Festuca idahoensis* (Idaho fescue) are the dominant climax native grasses, and *Artemisia tridentata* (big sagebrush) is the climax shrub associate. Along some of the ridgetops shallow-soiled lithosol communities are present, dominated by *Poa secunda* (Sandberg's bluegrass) and various forb species such as *Eriogonum compositum* (northern buckwheat) and *Phlox hoodii* (Hood's phlox).

Actual vegetation in the general vicinity, however, is heavily disturbed and modified in many places. Much of the area has been cultivated with monoculture crops of wheat and other small grains. Most of the remaining habitat is maintained at an early seral stage due to a number of disturbance factors. Weedy species are prevalent throughout, and extensive habitat modification has taken place. *Bromus tectorum* (cheatgrass) and other annual grasses are the dominant species on many of the deeper-soiled habitats. *Chrysothamnus* spp. (rabbitbrushes) are the dominant shrubs in many of the shrub-steppe habitats. The shallow-soiled communities have also been heavily modified over the years.

2.5. Land Use

The project area is privately owned by several agricultural operators. Much of the area is used for cattle grazing and agricultural activities. The cultivated land is used for production of small grain crops such as wheat or barley. The grazed land is either native shrub-steppe or land

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previously set aside in the federal Conservation Reserve Program. Some of the native habitats on shallow soils receive little or no grazing.

2.6. Environmental Conditions

A variety of environmental conditions within the project area make the establishment of desirable plant species difficult. Low precipitation and sandy soils provide very little available moisture for germinating seeds. In addition, extensive past and present disturbance to the vegetative communities has created many areas dominated by non-native, weedy species. These species could spread to areas disturbed by construction activities and compete with planted species for the limited resources. The noxious weed *Centaurea solstitialis* (star thistle) is particularly abundant in the project area. Finally, high winds in the area further complicate efforts to establish desirable vegetation.

3. Revegetation Procedures (Temporarily Disturbed Areas, Stateline 1&2 and Stateline 3)

The following methods are recommended for all areas of temporary disturbance throughout the project area for Stateline 1&2 and Stateline 3. The certificate holders shall begin restoration of disturbed areas as soon as possible after completion of construction activity in the area to be restored. Seeding or planting should be done at the appropriate time of year to facilitate seed germination and root establishment, based on weather conditions.

3.1. Seed Mixture (Temporarily Disturbed Areas)

In consultation with ODFW, one seed mixture was developed for use in revegetating all temporarily disturbed upland habitats within the project area (Table 1). Because the project area takes in a variety of different habitats (e.g. deep-soiled habitats, shallow-soiled lithosol communities) it was necessary to use several different species groups, each adapted to a different soil type. The development of a separate species mix for each habitat was considered, but rejected as being impractical in the project area due to the close intermingling of habitat types within the facilities corridors. In order to re-establish plant communities of most value to wildlife, only native species are used. Species were selected based on their tolerance to xeric (low-moisture) conditions, the availability of their seed, and a variety of other factors.

3.2. Seed Planting Methods

The choice of methods should be based on site-specific factors such as slope, erosion potential and the size of the area in need of revegetation. Planting should be done at the appropriate time of year based on weather conditions and timing of the disturbance. Disturbed, unseeded ground may require chemical or mechanical weed control before weeds have a chance to go to seed.

3.2.1 Broadcast Method

1. Obtain the seed from a reputable source to avoid contamination.
2. Broadcast the seed mixture at the given rate.
3. Apply locally obtained, weed free straw at a rate of 2 tons per acre immediately after broadcasting the seed.
4. Crimp straw into the ground using a tractor-mounted straw crimper.

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3.2.2 Hydroseed Method

1. Obtain the seed from a reputable source to avoid contamination.
2. Broadcast the seed mixture at the given rate.
3. Apply wood cellulose fiber mulch (mixed with a tackifier) at a rate of 1 ton per acre immediately after broadcasting the seed.

3.2.3 Drill Method

1. Obtain the seed from a reputable source to avoid contamination.
2. Plant seed mixture at ½ the rate given in Table 1 using a seed drill.
3. Apply locally obtained, weed free straw at a rate of 2 tons per acre immediately after broadcasting the seed.
4. Crimp straw into the ground using a tractor-mounted straw crimper.

4. Habitat Improvement Procedures (Stateline 1&2 Habitat Enhancement Area)

4.1. Introduction

To mitigate for permanent loss of habitat due to placement of Stateline 1&2 facilities (*e.g.* turbines, access roads), the certificate holder shall rehabilitate habitat on a like number of acres located in the vicinity of the project. The total amount of non-agricultural land estimated to be permanently disturbed by the project, and for which mitigation is needed, is approximately 50 acres. For Stateline 1&2, the certificate holder has acquired the legal right to create and maintain an enhancement area of 50 acres for the life of the facility.² The habitat enhancement area was chosen based on a number of factors including:

- the condition of the plant communities (the heavily disturbed habitats are preferred due to the greater potential for improvement);
- accessibility and slope;
- soil type (deeper soils are preferred to aid establishment of desirable grass species);
- distance from the proposed turbine strings (the enhancement areas must be located away from turbine strings to avoid attracting additional avian species to the turbine areas);
- proximity to other functioning wildlife habitat such as the slopes of Vansycle Canyon, native grassland or shrub habitat, CRP grassland; and
- willingness of the landowner to participate in the mitigation activity.

4.2. Habitat Improvement Procedures

The certificate holder shall implement the following measures within the designated Stateline 1&2 enhancement area. The certificate holder has the ultimate responsibility for

² See site certificate conditions (66), (67) and (104).

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implementation and maintenance of these mitigation measures, although other parties may be subcontracted to carry out the procedures.

4.2.1 Fencing

The enhancement area will be fenced prior to treatment to exclude cattle and other domestic ungulates, if the adjacent land use includes grazing. No domestic grazing will take place within the enhancement area for the first five years while native vegetation is being established. Once the inspector certifies that all success criteria have been met and predominantly native vegetation is established (see Section 5.2 below), limited domestic grazing may occur. This grazing will be kept to levels that do not significantly degrade the native habitat. It is expected that regular maintenance will be required to keep the fences functioning. Gates will be installed at regular intervals along the perimeter to allow for the regulation of grazing activities. No livestock supporting facilities (such as watering and mineral sites, corrals, etc.) will be allowed in the enhancement areas.

4.2.2 Preparation of Habitat

The recommended preparation procedure is to chemically treat the enhancement areas in March or April of the first year to suppress or eliminate weedy species as needed prior to seed set. The goal is to remove competing non-native vegetation from the parcel to assist in the later establishment of desirable species. Depending on seedbed conditions, tilling may be necessary in the fall prior to the spring spraying.

4.2.3 Revegetation

The entire parcel will be seeded using the seed mixture given in Table 2. The recommended procedure is to plant the mixture in October or November at the rate given in Table 2 using a no-till seed drill (five to ten inch row spacing, 1/2 inch planting depth).

4.2.4 Shrub Plantings

The recommended seed mixture contains big sagebrush seeds. However, shrub establishment from seed is often unsuccessful in xeric conditions, such as those found within the project area. Should revegetation monitoring determine that shrub re-establishment within all or part of the habitat improvement parcel has been unsuccessful, shrubs will be planted in those areas.

The certificate holder or designated contractor will obtain containerized (10 cubic inch) big sagebrush from a regional source. The seedlings will be planted within 1 week of delivery, and the unplanted seedlings will be stored in a shaded area and watered as needed. Ten percent of the acres within the parcel will be randomly selected for shrub planting. The seedlings will be planted in clumps of three, with the clumps approximately 20 feet apart (100 clumps per acre). Depending on seasonal moisture during the following spring, irrigation may be necessary to achieve satisfactory establishment. This may be accomplished by watering each clump to saturation once in late May and again in late June.

4.2.5 Maintenance

Because these improvements are mitigation for permanent habitat loss, it is necessary to maintain the fences and seedings over the life of the project (currently anticipated to be 30

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years). This may include such maintenance activities as fence repair, periodic chemical or mechanical weed control, monitoring of improvement success and re-seeding (in areas where native species establishment falls below the percentages specified in the success criteria described below).

5. Monitoring

5.1. Monitoring Procedures (Temporarily Disturbed Areas, Stateline 1&2 and Stateline 3)

In the fall of the year following each seeding and continuing annually for five years, a qualified independent botanist or revegetation specialist will examine all reseeded riparian areas and a representative cross-section of the revegetated upland sites and report to the Oregon Department of Energy (Department). Care will be taken to survey areas in all the major habitat types and throughout the geographic extent of the project area. At least 20% of the revegetated acreage will be examined.

In consultation with the ODFW, the certificate holders shall choose reference sites near the revegetated areas to represent the target conditions for the revegetation effort. For each revegetated area, the certificate holders shall choose a reference site in the immediate vicinity that represents the realistically attainable vegetative conditions for that area. The certificate holders shall choose these reference sites based on factors including land use patterns in the area, soil type, aspect and noxious weed densities. The goal in choosing these reference sites is to identify areas that provide a realistically attainable goal that will determine the success threshold level for a particular revegetated area. It is anticipated that it will be necessary to choose several reference sites to adequately represent all the various habitat conditions within the project area.

The certificate holders shall choose the reference sites during or after field visits by the revegetation monitoring specialist and ODFW personnel. Once the reference sites are chosen, they will be used for comparison during all subsequent monitoring visits, unless some event (such as wildfire) significantly changes habitat conditions so that a particular reference site no longer represents a realistically attainable habitat goal for the associated revegetated area. In that case, the certificate holders shall choose a new reference site.

At each monitoring location, the investigator shall evaluate the following parameters (both within the revegetated area and within the reference site):

- Degree of erosion due to construction activities (high, moderate or low).
- Average stems of desirable vegetation per square foot.

The investigator shall evaluate the revegetated area and the reference site separately to allow for later determination of revegetation success.

5.2. Monitoring Procedures (Stateline 1&2 Habitat Enhancement Area)

In the fall of the year following the seedings, a qualified independent botanist or revegetation specialist will examine a representative cross-section of plots within the revegetated parcel. These visits will occur yearly for the first five years and then take place every five years for the life of the project (although additional monitoring visits may be performed as noted below). Care will be taken to survey areas in all the major habitat types and throughout the geographic extent of the revegetated parcel. At least 10% of the revegetated acreage will be

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examined. After each survey, the qualified independent botanist or revegetation specialist will report to the Department.

At each plot, the investigator shall evaluate the following parameters:

- Percent survival of the shrub plantings (if applicable).
- Average stems of desirable vegetation per square foot.

In addition to the regular monitoring schedule (every year for the first five years, and then once every five years after that), a qualified investigator shall conduct additional monitoring visits in the habitat enhancement areas if grazing levels are changed significantly. In particular, if domestic grazing is introduced in the parcel or if the grazing regime is changed significantly, the investigator shall monitor the parcel every fall for two years following the grazing change. This is intended to make sure that domestic grazing activities do not significantly degrade habitat quality such that the parcel fails to meet the success criteria defined below.

5.3. Success Criteria (Temporarily Disturbed Areas, Stateline 1&2 and Stateline 3)

A temporarily disturbed area is successfully revegetated when the average desirable vegetation stem density within the revegetated area is greater than, or equal to, that observed in the comparable reference site.

If success criteria are not met for a site at the time of a monitoring inspection, the investigator may recommend reseeding. In small areas (less than 0.2 acres) where weed encroachment may make native seed establishment impossible, additional reseedings may be optional if erosion from construction activities is moderate or low and total vegetative cover (of native and non-native species together) exceeds 30%.

5.4. Success Criteria (Stateline 1&2 Habitat Enhancement Area)

The Stateline 1&2 habitat enhancement area will be considered successfully revegetated when the average stem densities of desirable species are greater than 0.5 stems per square foot. Shrub plantings will be considered successful when at least 25% of the sagebrush seedlings have survived. If success criteria are not met for a site at the time of a monitoring inspection, the investigator may recommend reseeding or replanting.

After predominantly native vegetation has been established in a habitat enhancement area, the investigator will verify, during subsequent visits, that the plant communities within the parcel continue to meet the success criteria described above. In particular, if domestic grazing is allowed within the enhancement area, the investigator shall determine whether stocking levels or length of the grazing season are significantly degrading the native habitat. If all or part of the habitat within the parcel has fallen below the success levels described above, the investigator shall recommend remediative measures, which may include replanting selected areas, lowering stocking levels or restricting grazing in the enhancement area.

6. Amendment of the Plan

This Revegetation Plan may be amended from time to time by agreement of the certificate holder and the Council. Such amendments may be made without amendment of the site certificate. The Council authorizes the Department to agree to amendments to this plan. The

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Department shall notify the Council of all amendments, and the Council retains the authority to approve, reject or modify any amendment of this plan agreed to by the Department.

Table 1: Revegetation Seed Mixture (Temporarily Disturbed Areas, Stateline 1&2 and Stateline 3)

Common Name	Scientific Name	lbs/acre PLS*
Secar Bluebunch Wheatgrass	<i>Pseudoroegneria spicata</i> ssp. <i>Spicata</i>	12
Sherman Big Bluegrass	<i>Poa ampla</i> (<i>secunda</i>)	6
Critana Thickspike Wheatgrass	<i>Elymus lanceolatus</i>	6
Sandberg's Bluegrass	<i>Poa sandbergii</i> (<i>secunda</i>)	0.4
Basin Big Sagebrush	<i>Artemisia tridentata</i>	0.4
Total		24.8

Notes: *PLS (Pure Live Seed)

(The above seed mixture is for use in revegetating all upland areas of temporary ground disturbance within the SWP site boundary.)

Table 2: Revegetation Seed Mixture (Stateline 1 &2 Habitat Enhancement Area)

Common Name	Scientific Name	lbs/acre PLS*
Secar Bluebunch Wheatgrass	<i>Pseudoroegneria spicata</i> ssp. <i>Spicata</i>	3
Sherman Big Bluegrass	<i>Poa ampla</i> (<i>secunda</i>)	3
Critana Thickspike Wheatgrass	<i>Elymus lanceolatus</i>	3
Whitmar Beardless Wheatgrass	<i>Pseudoroegneria spicata</i> ssp. <i>Inermis</i>	3
Appar Lewis Blue Flax**	<i>Linum perrene</i>	0.5
Basin Big Sagebrush	<i>Artemisia tridentata</i>	0.5
Total		13

Notes: *PLS (Pure Live Seed) **Optional in areas where ongoing or expected application of broad-leafed herbicides to control weedy species would limit the establishment of blue flax

(The above mixture is for use in seeding habitat within the specific habitat enhancement area set aside as mitigation for permanent Stateline 1&2 ground disturbance. This mix should not be used to revegetate areas temporarily disturbed by project construction.)