

Stateline Wind Project: Revegetation Plan

[REVISED JUNE 6, 2003]

1. Introduction

The certificate holder is operating a wind power project in Oregon known as the “Stateline Wind Project” or “Stateline Energy Center.” 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 project. 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. This Revegetation Plan addresses both the revegetation of areas temporarily disturbed by construction of the project and mitigation for permanent loss of habitat by vegetation improvement within Habitat Enhancement Areas. 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 (or better) conditions.

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 Oregon portion of the project has three parts:

- Stateline 1: no more than 127 wind turbines and related or supporting facilities as described in the Final Order on the Application.
- Stateline 2: no more than 60 wind turbines and related or supporting facilities as described in the Final Order on Amendment #1.
- Stateline 3: no more than 279 wind turbines, 13 met towers, a substation and other related or supporting facilities as described in the Final Order on Amendment #2.

The tables below show the areas of temporary and permanent disturbance and the affected habitat types for each part of the Oregon facility (excluding agricultural areas rated Category 6):

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Stateline 1

Category	Vegetation Types	Acres of temporary disturbance	Acres of permanent impact
2	Grassland Steppe	0.7	0.5
3	Grassland Steppe; CRP	77.3	47.8
	Total Stateline 1	78	48.3

Stateline 2

Category	Vegetation Types	Acres of temporary disturbance	Acres of permanent impact
3	Grassland Steppe; CRP	10	<1
4	Grassland	1	<1
	Total Stateline 2	11	>1

Stateline 3

Category	Vegetation Types	Acres of temporary disturbance	Acres of permanent impact
1	Grassland Steppe	7.7	4.6
2	Grassland Steppe; Riparian	41.5	10.2
3	Grassland Steppe; CRP	57.9	8.5
5	New CRP Seeded Grassland	46.7	5.9
	Total Stateline 3	153.8	29.2

1 Thus, for Stateline 1, 2 and 3, the certificate holder shall mitigate for permanent impact
 2 on a total of approximately 79 acres of grassland steppe and CRP habitats in Oregon. Section 4
 3 describes habitat improvement procedures for degraded habitat that the certificate holder shall
 4 revegetate to mitigate for areas of permanent impact. In addition, the certificate holder shall
 5 restore the areas of temporary disturbance upon completion of construction of each phase of the
 6 project, as shown in the tables. Section 3 below describes revegetation procedures for restoring
 7 areas of temporary disturbance.

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

15 **2. Project Area**

16 **2.1. Project Description**

17 The Stateline wind power project consists of a number of turbine strings, with Vestas 660
 18 kW wind turbine structures. Each structure is approximately 242 feet (ft.) tall (including the
 19 turbine blades), with a rotor diameter of 154 ft. Each turbine is supported on a concrete pad
 20 approximately 40 ft. by 40 ft. The turbines are linked by access roads and underground and

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1 aboveground 34.5 kV transmission lines. In addition, the project includes a substation and an
2 8.5-mile 115-kV or 230-kV transmission line.

3 Access roads are needed in several areas to transport equipment and personnel to the
4 facilities. In many cases, existing roads are adequate to provide access, but some new roads and
5 expansion of some existing roads are needed. Overhead transmission lines are used to conduct
6 electricity from the turbine strings to a substation and from the substation to existing
7 transmission lines in the Washington.

8 If the certificate holder constructs all approved Stateline 1, 2 and 3 facilities, the
9 permanent facilities would occupy approximately 165 acres in Oregon. However, a large portion
10 of this total area (approximately 86 acres) is cultivated land.

11 In addition, areas of temporary disturbance occur during construction of the project.
12 Laydown areas and equipment work areas at the tower sites are needed to construct the turbines.
13 Construction of access roads also requires the temporary disturbance of habitat in addition to
14 permanent disturbance of the roadbed. In addition, construction of powerlines, both above and
15 below ground, temporarily affects habitat. For the underground lines, temporary impacts are
16 similar to pipeline installation, while for the overhead lines, disturbance is primarily limited to
17 the tower bases. Additionally, miscellaneous facilities such as staging areas, parking lots and
18 turnouts are temporarily disturbed during construction. In total, if the certificate holder constructs
19 all approved Stateline 1, 2 and 3 facilities, temporary disturbance would affect approximately
20 565 acres. However, a large portion of the temporarily disturbed area (approximately 322 acres)
21 is on cultivated land.

22 2.2. Physiography, Geology, and Soils

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

26 Elevations of the turbines strings range from 1,760 ft. above mean sea level to 1,100 ft.
27 Elevations for the access roads and proposed transmission line near Ninemile Canyon range from
28 1,100 ft. down to 385 ft.

29 Soils within the project area are primarily basalt-derived loams (NRCS 1994, NRCS
30 1988). The ridgetops, where the turbines will be located, are typically shallow lithosols. Other
31 areas have deeper soils, which have often been cultivated for small grain production or seeded as
32 grazing lands.

33 2.3. Climate

34 The project area averages 10 to 15 inches of precipitation annually, most of which falls
35 from October through March. The average annual air temperature is 50° to 53° Fahrenheit, and
36 the average frost-free period is 135 to 170 days (NRCS 1988). Strong winds are often present
37 along the ridgetops.

38 2.4. General Vegetation

39 Potential vegetation communities in the project vicinity are primarily bunchgrass and
40 shrub-steppe associations. On the deeper-soiled habitats, *Agropyron spicatum* (bluebunch

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1 wheatgrass) and *Festuca idahoensis* (Idaho fescue) are the dominant climax native grasses, and
2 *Artemisia tridentata* (big sagebrush) is the climax shrub associate. Along some of the ridgetops
3 shallow-soiled lithosol communities are present, dominated by *Poa secunda* (Sandberg's
4 bluegrass) and various forb species such as *Eriogonum compositum* (northern buckwheat) and
5 *Phlox hoodii* (Hood's phlox).

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

14 **2.5. Land Use**

15 The project area is privately owned by several agricultural operators. As mentioned
16 above, much of the area is used for cattle grazing and agricultural activities. The cultivated land
17 is used for production of small grain crops such as wheat or barley. The grazed land is either
18 native shrub-steppe or land previously set aside in the federal Conservation Reserve Program.
19 Some of the native habitats on shallow soils receive little or no grazing.

20 **2.6. Environmental Conditions**

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

29 **3. Revegetation Procedures (Temporarily Disturbed Areas)**

30 The following methods are recommended for all areas of temporary disturbance in the
31 upland habitats throughout the project area. Section 3.3 addresses restoration of temporarily
32 disturbed riparian habitat.

33 **3.1. Seed Mixture (Temporarily Disturbed Areas)**

34 One seed mixture was developed for use in revegetating all temporarily disturbed upland
35 habitats within the project area (Table 1). Because the project area takes in a variety of different
36 habitats (e.g. deep-soiled habitats, shallow-soiled lithosol communities) it was necessary to use
37 several different species groups, each adapted to a different soil type. The development of a
38 separate species mix for each habitat was considered, but rejected as being impractical in the
39 project area due to the close intermingling of habitat types within the facilities corridors. In order
40 to re-establish plant communities of most value to wildlife, only native species are used. Species

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1 were selected based on their tolerance to xeric (low-moisture) conditions, the availability of their
2 seed, and a variety of other factors.

3 **3.2. Seed Planting Methods**

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

9 **3.2.1 Broadcast Method**

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

15 **3.2.2 Hydroseed Method**

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

20 **3.2.3 Drill Method**

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

26 **3.3. Restoration of Riparian Areas**

27 The certificate holder shall seed all temporarily disturbed riparian areas (stream bed
28 alterations associated with road crossings) with grass species using seed mixtures and seeding
29 methods appropriate for the site. In addition, at the road crossing located immediately west of the
30 Stateline 3 substation, the certificate holder shall plant bare root willow shrub stock. The
31 certificate holder shall plant twenty shrubs along the disturbed stream bank to provide shrub
32 cover for wildlife and for moderating stream temperatures.

1 **4. Habitat Improvement Procedures (Habitat Enhancement Areas)**

2 **4.1. Introduction**

3 To mitigate for permanent loss of habitat due to placement of facilities (*e.g.* turbines,
4 access roads), the certificate holder shall rehabilitate habitat on a like number of acres located in
5 the vicinity of the project. The total amount of non-agricultural land estimated to be permanently
6 disturbed by the project, and for which mitigation is needed, is approximately 79 acres. For
7 Stateline 1 and 2, the certificate holder has acquired the legal right to create and maintain an
8 enhancement area of 50 acres for the life of the facility.¹ For Stateline 3, the certificate holder
9 shall acquire the legal right to create and maintain the enhancement area of 35 acres for the life
10 of the facility.² The habitat enhancement areas are chosen based on a number of factors
11 including:

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

22 **4.2. Habitat Improvement Procedures**

23 The certificate holder shall implement the following measures within the designated
24 enhancement areas. The certificate holder has the ultimate responsibility for implementation and
25 maintenance of these mitigation measures, although other parties may be subcontracted to carry
26 out the procedures.

27 **4.2.1 Fencing**

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

¹ See site certificate conditions (66), (67) and (104).

² See site certificate condition (112).

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1 **4.2.2 Preparation of Habitat**

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

7 **4.2.3 Revegetation**

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

11 **4.2.4 Shrub Plantings**

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

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

25 **4.2.5 Maintenance**

26 Because these improvements are mitigation for permanent habitat loss, it is necessary
27 maintain the fences and seedings over the life of the project (currently anticipated to be 30
28 years). This may include such maintenance activities as fence repair, periodic chemical or
29 mechanical weed control, monitoring of improvement success and re-seeding (in areas where
30 native species establishment falls below the percentages specified in the success criteria
31 described below).

32 **5. Monitoring**

33 **5.1. Monitoring Procedures (Temporarily Disturbed Areas)**

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

39 In consultation with the ODFW, the certificate holder shall choose reference sites near
40 the revegetated areas to represent the target conditions for the revegetation effort. For each

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1 revegetated area, the certificate holder shall choose a reference site in the immediate vicinity that
2 represents the realistically attainable vegetative conditions for that area. The certificate holder
3 shall choose these reference sites based on factors including land use patterns in the area, soil
4 type, aspect and noxious weed densities. The goal in choosing these reference sites is to identify
5 areas that provide a realistically attainable goal that will determine the success threshold level for
6 a particular revegetated area. It is anticipated that it will be necessary to choose several reference
7 sites to adequately represent all the various habitat conditions within the project area.

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

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

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

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

20 **5.2. Monitoring Procedures (Habitat Enhancement Areas)**

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

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

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

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

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5.3. Success Criteria (Temporarily Disturbed Areas)

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.

For riparian areas, the success criterion for willow shrub establishment is survival of 10 of the 20 planted willow shrubs. Revegetation success for seeded grass species is based on a comparison with a nearby riparian reference area (selected by the certificate holder and approved by ODFW). A reseeded riparian area is successfully revegetated when the stem density of desirable species (stems per square foot) in the reseeded area is equal to or greater than the density observed in the reference area.

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 (Habitat Enhancement Areas)

The habitat enhancement areas are 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 Office of Energy to agree to amendments to this plan. The Office of Energy 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 Office.

References

- Natural Resources Conservation Service (NRCS). 1994. Umatilla County area, Oregon: hydric soils list (Draft copy). USDA Natural Resources Conservation Service, Pendleton, Oregon. 22 pp.
- Natural Resources Conservation Service (NRCS). 1988. Soil survey of Umatilla County area, Oregon. USDA Natural Resources Conservation Service, Pendleton, Oregon. 388 pp.

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Table 1: Revegetation Seed Mixture (Temporarily Disturbed Areas)

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 project area.)

Table 2: Revegetation Seed Mixture (Habitat Enhancement Areas)

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 areas set aside as mitigation for permanent project ground disturbance. This mix should not be used to revegetate areas temporarily disturbed by project construction.)