

Stateline Wind Project: Revegetation Plan

[REVISED MAY 17, 2002]

1. Introduction

FPL Energy Vansycle, LLC is operating a wind power project in Oregon and Washington known as the “Stateline Wind Project” or “Stateline Energy Center.” The turbine strings are spread out along several ridgecrests located approximately six miles (mi.) 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 SEPA Environmental Impact Statement (EIS) on the Washington portion of the project (October 2000) and in the Energy Facility Application for a Site Certificate (September 2001) for the Oregon portion of the project, FPL Energy agreed to mitigate impacts associated with the loss of native shrub-steppe habitats and Conservation Reserve Program (CRP) lands. 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 area under tower bases, 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).

For the Washington portion of the project, the SEPA EIS (Section 2.6.3.9, Mitigation) specifies that approximately 50 acres (ac.) of grassland steppe and low shrub/scrub steppe habitats require mitigation. The Oregon portion of the project has two parts:

- Stateline 1: including 127 wind turbines and related or supporting facilities as described in the Final Order on the site certificate application (September 14, 2001).
- Stateline 2: including 60 wind turbines and related or supporting facilities as described in the Final Order on Amendment #1.

For Stateline 1, about 49 ac., combined, of Category 2, 3 and 4 habitat has been permanently disturbed and requires mitigation. For Stateline 2, slightly more than 1 ac., combined, of Category 3 and 4 habitat would be permanently disturbed. Thus, a total of approximately 100 ac. of permanent impact to grassland steppe and low shrub/scrub steppe habitats in both states require mitigation.

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 affected agencies, reviews of current literature, and site visits by revegetation specialists. The plan also specifies monitoring procedures to

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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

The Stateline wind power project consists of a number of turbine strings, with Vestas 660 kW wind turbine structures. Each structure is approximately 242 feet (ft.) tall (including the turbine blades), with a rotor diameter of 154 ft. Each turbine is supported on a concrete pad approximately 40 ft. by 40 ft. The turbines are linked by access roads and a 34.5 kV underground transmission line.

In addition to the turbine strings, 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 in some locations new roads are being constructed, or existing roads are being upgraded. Overhead transmission lines are used to conduct electricity from the project substation to existing transmission lines in the area.

Permanent structures occupy approximately 186 total ac. (99 ac. in Washington and, in Oregon, 58 ac. for Stateline 1 and 29 ac. for Stateline 2). Other facilities that permanently disturb habitat include turnaround areas, substation sites, and transmission line pole bases. Only a portion of this total area affects shrub-steppe habitats; the remainder of the area is cultivated land.

In addition, areas of temporary disturbance occur during construction of the project. 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. 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 facilities such as staging areas, parking lots, and turnouts are temporarily disturbed during construction. In total, temporary disturbance affects 121 ac. in Washington, in Oregon, 117 ac. for Stateline 1 and 103 ac. for Stateline 2. A portion of the temporarily disturbed area is on land cultivated in wheat or other grains.

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°. The proposed transmission line in Washington running from the project site north through Ninemile Canyon also traverses relatively gently-sloping ground, although the sides of Ninemile Canyon are steep in places.

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

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

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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 (NRCS 1988). 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. 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 shrub 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. As mentioned above, 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 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)

The following methods are to be used for all areas of temporary ground and/or vegetation disturbance in the upland habitats throughout the project area. Because no disturbance to wetland habitats is expected, no wetland revegetation methods have been specified.

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3.1. Seed Mixture (Temporarily Disturbed Areas)

One seed mixture was developed for use in revegetating all temporarily disturbed upland habitats within the project area (Table 1 on page B-8). 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 conditions, the availability of their seed, and a variety of other factors.

3.2. Seed Planting Methods

The following planting methods should be used within the project area. 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 in March-April (for disturbance that occurs during the winter and spring), and/or in October-November (for disturbance that occurs in the summer and fall). Disturbed, unseeded ground may require chemical or mechanical weed control in May or June, 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.

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 $\frac{1}{4}$ 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.

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4. Habitat Improvement Procedures (Habitat Enhancement Areas)

4.1. Introduction

In order to mitigate for permanent loss of habitat due to placement of facilities (*e.g.* turbines, access roads), FPL Energy has agreed to 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 proposed, is 100 ac. One parcel of land of similar size will be selected for habitat improvement (alternately, one parcel in Oregon and one in Washington may be chosen). The habitat improvement parcel(s) will be 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 parcel[s] must be located away from turbine strings to avoid attracting additional avian species to the turbine areas); and
- willingness of the landowner to participate in the mitigation activity.

4.2. Habitat Improvement Procedures

Once the habitat improvement parcel has been designated, the following measures will be implemented within its boundary. Ultimate responsibility for implementation and maintenance of these mitigation measures will be the responsibility of FPL Energy, although other parties may be subcontracted to carry out the procedures.

4.2.1 Fencing

The parcel will be fenced prior to treatment to exclude cattle and other domestic ungulates. No domestic grazing will take place within the parcel for the first five years while native vegetation is being established. Once the inspector certifies that all success criteria have been met for the parcel, 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.

4.2.2 Preparation of Habitat

The parcel will be chemically treated in March or April of the first year to suppress or eliminate weedy species prior to seed set. The goal will be to remove competing non-native vegetation from the parcel to assist in the later establishment of desirable species.

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4.2.3 Revegetation

The entire parcel will be seeded using the seed mixture given in Table 2 on page B-8. The mixture will be planted 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.

FPL Energy, or designated contractor, will obtain containerized (10 cubic inch) big sagebrush and antelope bitterbrush from a regional source. Seventy-five percent of the seedlings will be sagebrush and twenty-five percent will be bitterbrush. 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 maintain the fences and seedings over the life of the project (currently anticipated to be 30 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)

In August or September of the year following each seeding, and continuing for five years, a qualified independent botanist or revegetation specialist will examine a representative cross-section of the revegetated sites and report to the Oregon Office of Energy. 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.

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

- Percent cover for the following four classes: native forbs and grasses; non-native forbs and grasses; shrubs; bare ground and rock.
- Degree of erosion due to construction activities (high, moderate, or low).

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5.2. Monitoring Procedures (Habitat Enhancement Areas)

In August or September 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. 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 examined. After each survey, the qualified independent botanist or revegetation specialist will report to the Oregon Office of Energy.

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

- Percent cover for the following four classes: native forbs and grasses; non-native forbs and grasses; shrubs; bare ground and rock.
- Percent survival of the shrub plantings (if applicable).

5.3. Success Criteria

All areas, both the temporarily disturbed areas and the habitat enhancement areas, (except the lithosol plant communities) will be deemed successfully revegetated when total cover of all vegetation exceeds 30%, and at least 25% of the ground surface is covered by native species. For the lithosol communities, where total vegetative cover under natural conditions is typically less than 30%, an area will be deemed successfully revegetated when at least 25% of the total vegetative cover is composed of native species. Shrub plantings will be considered successful when at least 25% of the sagebrush or bitterbrush seedlings have survived.

In the event that success criteria are not met for a site, the investigator may recommend reseeding or replanting of those areas. In certain instances, the revegetation area may be small enough that weed encroachment may make native seed establishment impossible. In these areas, additional reseedings will not be recommended if erosion from construction activities is moderate or low, and vegetative cover of non-native species exceeds 30%. The exemption described in this paragraph does not apply to the habitat improvement parcel, where native species establishment is the primary goal.

After predominantly native vegetation has been established in the habitat improvement parcel, 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 parcel, the investigator will verify that stocking levels are not high enough to significantly degrade the native habitat. Should the investigator discover that all or part of the habitat within the parcel has fallen below the success levels described above, remediative measures may be recommended. These may include replanting of selected areas, or lowering of stocking levels within the parcel.

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

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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.

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>	6
Sherman Big Bluegrass	<i>Poa ampla</i> (<i>secunda</i>)	6
Critana Thickspike Wheatgrass	<i>Elymus lanceolatus</i>	6
Whitmar Beardless Wheatgrass	<i>Pseudoroegneria spicata</i> ssp. <i>Inermis</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-leaved 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 improvement parcel[s] set aside as mitigation for permanent project ground disturbance. This mix should not be used to revegetate areas temporarily disturbed by project construction.)