

Golden Hills Wind Project: Habitat Mitigation & Revegetation Plan

1.0 Introduction

BPAE is proposing to construct a wind power project in Sherman County, Oregon. The potential turbine strings are spread along ridgecrests located approximately 2.5 miles (mi.) northeast of the town of Wasco, Oregon. In addition to the turbine strings, additional facilities such as access roads, underground and overhead transmission lines, and a substation are being constructed to implement the project.

In the Energy Facility Application for a Site Certificate (Application) for the project, BPAE 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 will be 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.

Based on the pre-construction estimates, approximately 0.91 acres of Category 2 habitat, 10.29 acres of Category 3 and 0.97 acres of Category 4 habitat will be permanently disturbed and will require mitigation. Thus, 12.17 acres of Category 2, 3 or 4 habitat will be enhanced or created. In practice this will result in a mitigation ratio slightly greater than 1:1 because expected impacts are less than the maximum possible impacts used in the pre-construction estimates. Approximately 127 acres of cultivated agriculture land may be impacted by permanent facilities. Impacts to the agriculture land will be mitigated by:

- Developing a noxious weed control plan following guidelines based upon consultation with the Sherman County Soil and Water Conservation District and ODFW. The noxious weed control plan will be approved by ODOE and finalized prior to construction.
- The noxious weed control plan will be implemented utilizing Best Management Practices (BMPs) to minimize topsoil loss, and complying with an erosion and sedimentation control plan approved by DEQ as part of the NPDES program in areas adjacent to drainage features.
- Sherman County Soil and Water Conservation District will be consulted for proper procedures for restoring agricultural quality to its original condition.

To achieve these habitat mitigation objectives, this plan has been prepared to guide 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 evaluate the success of revegetation efforts, including recommended remediative action should initial revegetation efforts prove unsuccessful in some areas.

2.0 Project Description

The Project will be located on private land in an unincorporated area of Sherman County. The Project will interconnect with the Bonneville Power Administration's (BPA) transmission system at two locations; one near Klondike Schoolhouse Substation (200 MW) and one at John Day Substation (200 MW). Transmission from the project substations to the interconnection points will involve one 4-mile long overhead transmission line and one 11-mile long overhead transmission line.

Golden Hills wind power project will consist of a number of turbine strings, with up to 267 turbines. Each turbine will likely either be a 1.65 MW or 2.5 MW capacity turbine. Hub height of the turbines will be up to approximately 80 m tall with a rotor diameter of either 82 m (1.65 MW) or 96 m (2.5 MW). Up to six permanent meteorological towers will be built. The turbines will be linked by access roads and a 34.5-kV transmission line. The 62-mile long power collection system will be largely underground, but might be overhead in some locations.

Two project substations may be built. In addition, an operations and maintenance (O&M) facility (including a shop), a control room, a maintenance yard, a kitchen, an office, a washroom, and other provisions typical of this type of facility, will be built.

This project will convert approximately 141 total acres to permanent structures and roads. Other facilities which will permanently disturb habitat include turnaround areas, substation sites, and transmission line pole bases. Less than 10% of the permanent habitat impacts will occur to CRP grassland, and native grassland and shrub-steppe habitats; the remainder of the impact will occur on cultivated land.

It will also be necessary to temporarily disturb additional areas during construction of the project. Laydown areas and equipment work areas at the tower sites will be needed to construct the turbines. Construction of access roads will also require the temporary disturbance of habitat in addition to permanent disturbance of the roadbed. Construction of powerlines, both above and below ground, will also temporarily impact 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 will be constructed on a temporary basis. In total, it is estimated that 1074.5 acres will be temporarily disturbed during construction; 746.2 acres of that area will be on land used for agriculture.

3.0 Site Setting

3.1 Physiography, Geology, and Soils

The turbine string sites are located on ridgetops that run along northeast-southwest lines, as well as on flat terrain. Topography in the facility area is characterized by gently rolling hills with slopes from 0° to 70°. Steeper topography is associated with the Grass Valley Canyon and associated side drainages. Elevations of the turbines strings ranges from 1,066 ft. to 2,201 ft (325 m to 671 m) above mean sea level. Soils within the project area are primarily deep, well-drained loams, and are used to cultivate small grains and hay or for livestock grazing (Macdonald et al. 1999).

3.2 Climate

Sherman County averages 11.11 inches (in.) of precipitation annually, most of which falls from October through March. Average winter snowfall is 18.9 in. The average air temperature in winter is 32.9° F and the average summer temperature is 65.4° F (Macdonald et al. 1999).

3.3 Landcover/General Vegetation

Land coverages in the project area consist primarily of cultivated agriculture (dryland wheat; 83%), followed by shrub-steppe/grassland (10%) and Conservation Reserve Program (CRP) grassland (4%), with less than 2% each of developed, riparian tree, riparian-intermittent stream (IS), upland tree, and Conservation Reserve Enhancement Program (CREP) habitats.

Vegetation communities in the project vicinity are primarily bunchgrass and shrub-steppe associations including some historic climax communities. Grasses include: bluebunch wheatgrass (*Pseudoroegneria spicata* ssp. *spicata*), Idaho fescue (*Festuca idahoensis*), and Sandberg bluegrass (*Poa secunda*). Forbs representative of these communities include arrowleaf balsamroot (*Balsamorhiza sagittata*), milkvetch (*Astragalus* sp.), lomatium (*Lomatium dissectum*), common yarrow (*Achillea millefolium*), lupine (*Lupinus* sp.), phlox (*Phlox* sp.), and pussytoes (*Antennaria* sp.). Shrub species include gray rabbitbrush (*Ericameria nauseosa*), Greene's rabbitbrush (*Ericameria greenei*), and basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*). In heavily disturbed areas, the following weedy and noxious species occur: cereal rye (*Secale cereale*), cheat grass (*Bromus tectorum*), Russian thistle (*Salsola kali*), tumblemustard (*Thelypodopsis* sp.), China lettuce (*Lactuca serriola*), prostrate knotweed (*Polygonum aviculare*), and knapweed (*Centaurea* sp.) Much of the area has been cultivated with monoculture crops of wheat and other small grains.

3.4 Land Use

The project area is located on privately-owned land. As mentioned above, much of the area is used for agricultural activities and cattle grazing. The cultivated land is used for production of small grain crops, primarily dry land wheat and barley. The grazed land is either native shrub-steppe or land previously set aside in the federal Conservation Reserve Program.

3.5 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. Finally, high winds in the area further complicate efforts to establish desirable vegetation.

3.6 Pre Construction Inventory

The site certificate authorizes construction on corridors rather than specific turbine locations. The precise impact of construction, therefore, depends on the final project design. Therefore, prior to disturbing any area, GHWF will conduct an impact inventory, to be conducted by a qualified biologist. The pre-construction inventory will include:

- The ODFW habitat category for the area disturbed,
- The number of acres impacted,
- Photos representing the habitat,
- An assessment of dominant plant species, and
- The percentage of vegetative ground cover

4.0 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.

4.1 Seed Mixture (Temporarily Disturbed Non-Agricultural Upland Areas)

As noted in section 2.0 above, the project is expected to result in temporary disturbance to approximately 279 acres of non-agricultural land, subject to verification as part of the preconstruction inventory. GHWF will reseed this area after construction. One seed mixture was developed for use in revegetating all temporarily disturbed upland habitats within the project area (Table 1). This seed mixture will be used, unless an alternative mixture is requested by a landowner, or agency biologist. The ODFW will need to approve the alternative mixture. To re-establish plant communities of most value to

wildlife, native species are included in the seed mixture, as well as certain non-native species that ODFW has determined to be beneficial to wildlife. Species were selected based on a variety of factors including tolerance to xeric conditions and seed availability.

4.2 Seed Planting Methods

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.

In general, a weed-free seedbed should be prepared using conventional tillage equipment. Herbicide should be sprayed to control weedy and/or noxious species, following Oregon's buffer requirements for pesticide use (e.g., 300 feet from water sources). Summer fallowing may be required.

Areas to be seeded should be disked twice in early spring and spot-sprayed on the ground with an herbicide. This area should then be harrowed prior to seeding, ideally by the beginning of April. A conventional seed drill shall be used, except in areas where a rangeland drill is deemed more applicable, with a spacing less than 12 inches and at a depth of 1/8-1/4 inch. The prescribed seed mixture (Table 1) should be drilled at a rate of 12 pounds of pure live seed (PLS) per acre. If fallowing the area is to be used to increase soil moisture content, then the same procedure should be followed, but without seeding. If bare, disturbed soil is not seeded immediately, it will be protected from erosion. Seeding would then occur the following spring.

4.3 Restoration of Cropland

GHWF shall seed disturbed cropland areas with wheat or other cropseed. GHWF shall consult with the landowner and farm operator to determine species composition, seed and fertilizer application rates and application methods.

Cropland areas are successfully revegetated when the replanted areas achieve crop production comparable to adjacent non-disturbed cultivated areas. GHWF shall consult with the landowner or farmer to determine whether these areas have been successfully revegetated and shall report to the Department on the success of revegetation in these areas.

4.4 Revegetation Records

GHWF shall maintain a record of revegetation work for both cropland and wildlife habitat areas. In the record, GHWF shall include the date that construction activity was completed in the area to be restored, a description of the affected area (location, acres affected and pre-disturbances condition) the date that revegetation work began and a description of the work done within the affected area. GHWF shall update the revegetation records from

time to time as revegetation work occurs. GHWF shall provide copies of these records to the Department at the time it submits the annual report required under the site certificate.

4.5 Monitoring Procedures (Temporarily Disturbed Habitats)

The pre-construction inventory (section 3.6) will be repeated post-construction in the areas temporarily disturbed by construction activity to determine the success of the restoration. A qualified independent botanist or revegetation specialist hired by the certificate holder will examine a representative cross-section of plots within the revegetated areas. Following seeding, these visits will occur after the first growing season (year 1), then at year 3 and year 5. After year 5, an annual noxious weed assessment will be conducted on the site. The assessment will be made in May or June, when the largest number of weeds would be evident. If weeds are found, GHWF will make reasonable efforts to eradicate them. Care will be taken to survey areas in all the major habitat types and throughout the geographic extent of the revegetated areas. Each inventory will include:

- the ODFW habitat category for the area disturbed;
- the number of acres impacted;
- photos representing the habitat;
- an assessment of noxious weeds;
- an assessment of dominant plant species; and
- the percentage of vegetative ground cover

4.6 Success Criteria

In each monitoring report to the Department, the certificate holder shall provide an assessment of revegetation success for all previously-disturbed areas. A wildlife habitat area is successfully revegetated when its habitat quality is equal to, or better than, the habitat quality of the pre-construction ODFW habitat category of the disturbed area.

When the Department finds that the condition of a wildlife habitat area satisfies the criteria for revegetation success, the Department shall conclude that the certificate holder has met the restoration obligations for that area. If the Department finds that the landowner has converted a temporarily disturbed area to a use that is inconsistent with these success criteria, the Department shall conclude that the certificate holder has no further obligation to restore the area for wildlife habitat uses.

5.0 Habitat Improvement Procedures (Mitigation Area)

5.1 Introduction

To mitigate for permanent loss of habitat due to placement of facilities (e.g., turbines, access roads), BPAE has agreed to rehabilitate habitat on a like number of acres, of equivalent habitat quality, located in the vicinity of the project. The total amount of grassland and shrub-steppe land (including CRP) estimated to be permanently disturbed by the project, and for which mitigation is proposed for permanent impacts is 12.17 acres.

However, final impact areas will be calculated based on the pre-construction inventory described in Section 3.6. In addition, BPAE has also agreed to mitigate for indirect loss of habitat of an additional 10.45 acres of grassland/shrub-steppe habitat due to potential indirect impacts to grassland birds caused by operation of the wind project. Indirect impacts were calculated based on ODOE ratios used in previous site certificates (see attached spreadsheet). See Attachment A for a description of the habitat mitigation area. One parcel of land of similar size (approximately 22 acres) will be selected from the mitigation area for habitat enhancement based on a number of factors including:

- cost-effectiveness for quality implementation, management, and monitoring
- likelihood of successful enhancement benefiting wildlife
- willingness of landowner to participate in mitigation approach/activities

5.2 Pre-Management Inventory

- Prior to any management implementation (e.g., removal of grazing), GHWF will conduct a habitat inventory of the mitigation parcel, to be conducted by a qualified botanist or revegetation specialist. This person will examine a representative cross-section of plots within the mitigation 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. Ten plots will be established within the mitigation site. At each plot or for the entire site, the investigator shall evaluate the following parameters:

- The ODFW habitat categories for the entire site,
- Photos representing the habitat at each plot,
- As assessment of dominant plant species at each plot (Year 1, Year 5)
- The percentage of vegetative ground cover at each plot (Year 1, Year 5)
- Record any wildfires within the mitigation area and remedial action taken on the entire site,
- An assessment of the presence of invasive weeds on the entire site
- Conduct avian surveys within mitigation area with one station set up at each plot, and
- Record observations of special status plants and animals within the mitigation area

5.3 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 BPAE, although other parties may be subcontracted to carry out the procedures.

5.3.1 Fencing and Grazing

The parcel will be fenced prior to treatment to exclude cattle and other domestic ungulates. It is expected that regular maintenance will be required to keep the fences functioning. Gates will be installed at regular intervals along the perimeter.

GHWF shall prohibit grazing within the habitat mitigation area. Eliminating livestock grazing within the mitigation area will facilitate recovery of native bunchgrass and sagebrush in areas where past grazing has occurred, potentially resulting in better vegetative structure and complexity for a variety of wildlife.

5.3.2 Site Preparation and Planting Methods

Methods and seed mixtures used for revegetation of mitigation areas will follow those described above for temporarily disturbed areas. The mitigation site has been planted in grasses, therefore the site shall be planted and seeded using the same planting and seeding methods described for disturbed sites at sections 4.1 and 4.2 above. Ground cover canopy and height will be enhanced by the grazing exclusion.

In addition to the plantings described above, the certificate holder shall install a guzzler per ODFW specifications.

5.3.3 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 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).

5.3.4 Fire Control

GHWF shall implement a fire control plan for wildfire suppression within the mitigation area. GHWF shall provide a copy of the fire control plan to the Department before starting habitat enhancement actions. GHWF shall include in the plan appropriate fire prevention measures, methods to detect fires that occur and a protocol for fire response and suppression. GHWF shall maintain fire control for the life of the facility.

5.4. Post-Management Monitoring Procedures

- A qualified botanist or revegetation specialist will re-examine the mitigation parcel and compare the conditions of the site relative to the pre-management period (see section 5.2). A visit to the site will occur yearly to assess the presence of noxious weeds, and

record any wildfires within the mitigation area. If noxious weeds are found, GHWF will make reasonable efforts to eradicate them. In addition, focused monitoring will be conducted on a periodic basis to determine the success of the management measures to improve habitat. The investigator shall evaluate the following parameters:

- The ODFW habitat categories mapped and area calculated for the entire mitigation site (Year 1, 5, and every five years for life of project),
- Photos representing the habitat at each selected plot (Year 1, 5, and every five years for life of project),
- An assessment of dominant plant species at each plot (Year 1, 5, and every five years for life of project)
- The percentage of vegetative ground cover at each plot (Year 1, 5, and every five years for life of project)
- Record any wildfires within the mitigation area and remedial action taken (Annual for life of project),
- An assessment of the presence of invasive weeds on the site (Annual for life of project)
- Assess success of weed control program and recommend remedial actions if needed (Annual for life of project),
- Conduct avian surveys within mitigation area in spring (Year 5, 10, 15, 20), and
- Record observations of special status plants and animals within the mitigation area when on site

GHWF shall submit the monitoring reports with the annual report required by the site certificate.

5.5. Success Criteria

Mitigation of the permanent and temporal habitat impacts of the facility may be considered successful if the certificate holder protects and enhances sufficient habitat within the mitigation area to meet the ODFW goals of no net loss of habitat in Categories 2, 3 and 4 and a net benefit in habitat quantity or quality for impacts to habitat in Categories 2 and 5. The certificate holder must protect the quantity and quality of habitat within the mitigation area for the life of the facility.

The certificate holder shall determine the actual mitigation area requirements, subject to Department approval, before beginning construction of the GHWF. If the land selected for the mitigation area does not already contain sufficient habitat in each category to meet these requirements, then the certificate holder must demonstrate improvement of habitat quality sufficient to change lower-value habitat to a higher value (for example, to convert Category 3 habitat to Category 2). The certificate holder may demonstrate improvement of habitat quality based on evidence of indicators such as increased avian use by a diversity of species, more abundant seed production of desirable native bunchgrass, natural recruitment of sagebrush and successful weed control. If the certificate holder cannot demonstrate that the habitat mitigation area is trending toward the habitat quality

goals described above within three years, the certificate holder shall investigate the cause of the failure and report the results of the investigation to ODOE within six months after the end of the third year of operation. If the investigation shows that the site is unlikely to reach the required habitat quality, then the certificate holder shall propose an alternate site for Department approval in time for the next planting season. If the investigation shows that the cause of the failure was inadequate implementation of the habitat improvement procedures, then the certificate shall repeat those procedures and begin post implementation monitoring as before.

After the certificate holder has demonstrated that the habitat quantity goals have been achieved, the investigator shall verify, during subsequent monitoring visits, that the mitigation area continues to meet the ODFW “no net loss” and “net benefit” goals described above. The investigator shall recommend remedial action if the habitat quality within the mitigation area falls below the habitat quantity goals listed above. The Department may require other corrective measures and additional monitoring as necessary to ensure that the habitat quantity goals are achieved and maintained.

6.0 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.

7.0 References

Macdonald, Gerald D., James M. Lamkin, and Roger H. Borine. 1999. Soil Survey of Sherman County, Oregon. Natural Resources Conservation Service, U.S. Department of Agriculture.

Table 1. Seed mixture and rate (Pure Live Seed, PLS, lbs/acre) to be used for revegetation of temporarily disturbed areas.

Common Name	Scientific Name	Pounds (PLS)/ Acre
Luna pubescent wheatgrass *	<i>Thinopyrum intermedium</i>	1
Sherman big bluegrass	<i>Poa ampla</i>	1
Magnar basin wildrye	<i>Leymus cinereus</i>	1
Whitmar beardless wheatgrass	<i>Pseudoroegneria spicata</i> ssp. <i>inermis</i>	2
Small burnett *	<i>Sanguisorba minor</i>	0.5
Alfalfa*	<i>Medicago sativa</i>	1.5
Sandberg bluegrass	<i>Poa secunda</i>	2
Idaho fescue	<i>Festuca idahoensis</i>	2
Basin big sagebrush	<i>Artemisia tridentata</i> ssp. <i>Tridentate</i>	1
TOTAL		12

* non-native species determined by ODFW to be beneficial to wildlife