

GOLDENDALE ENERGY STORAGE HYDROELECTRIC PROJECT

Federal Energy Regulatory Commission Project No. 14861

Klickitat County, Washington

FINAL LICENSE APPLICATION Appendix E: Vegetation Management and Monitoring Plan

For:

FFP Project 101, LLC



June 2020

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Acronyms and Abbreviations

Applicant	FFP Project 101, LLC
BMP	best management practice
FERC	Federal Energy Regulatory Commission
Project	Goldendale Energy Storage Project No. 14861
VMMP	Vegetation Management and Monitoring Plan
WDFW	Washington Department of Fish and Wildlife

1.0 INTRODUCTION

The Goldendale Energy Storage Project No. 14861 (Project) will be a new power generation and energy storage facility in Klickitat County, Washington as described in the Draft License Application.

The purpose of this Vegetation Management and Monitoring Plan (VMMP) is to establish the programs needed to effectively guide the management of vegetation now and in the future within the Project area. The VMMP is intended to cover all Project-related construction, operation, and management activities. Specific vegetation management and monitoring practices for native vegetation and noxious weeds are presented. The VMMP establishes goals for managing vegetation within the Project Boundary, defines specific activities for processes or measures to meet those goals, and describes how these activities are to be implemented. The VMMP will be further developed as the Project moves through the Federal Energy Regulatory Commission (FERC) licensing process.

1.1 Goals

Goals and objectives were developed to guide vegetation management activities and meet the purpose and intent of the VMMP. Three goals and their respective objectives are listed below.

- **Goal 1:** Promote the establishment and maintenance of native vegetation communities while allowing for continued Project operations in a safe and effective manner.
 - Protect sensitive habitats and plant species within the Project Boundary.
 - Prevent the establishment of woody riparian vegetation at reservoir edges in order to reduce any attraction for riparian-dependent wildlife species to the reservoir and prevent their injury during Project operations and to limit the attraction of predatory golden eagles. (Additional features to reduce reservoir attraction by birds and animals are discussed in the Project Wildlife Management Plan.)
- **Goal 2:** Minimize the establishment and spread of noxious weed species within the Project Boundary.
 - Implement procedures to prevent the establishment of noxious weeds in areas disturbed by Project construction activities.
 - Implement a process and schedule to monitor and prevent the spread of noxious and invasive weeds.
- **Goal 3:** Revegetate areas disturbed during Project construction and operations.
 - Implement a plan for revegetation of areas temporarily disturbed during construction.

- Monitor revegetated areas and develop measures for continued maintenance or replanting if revegetation does not meet performance standards.
- Implement standards and guidelines for plant material selection, site preparation, and planting procedures.
- Provide information for planning revegetation projects to ensure use of certified weed-free seed.

2.0 PROPOSED MEASURES

Impacts to vegetation will generally be minimized by burying several Project features (i.e., access tunnel, headrace tunnel, and tailrace tunnel), selective siting of permanent and temporary disturbance areas, minimization of the surface area of Project features, and other measures developed in consultation with agencies. Permanent impacts to sensitive areas (wetlands and streambeds) will be avoided.

The VMMP includes the following components, which will continue to be developed based on comments received throughout the licensing process:

- Noxious weed management
- Protection of special status species
- Revegetation at temporary disturbance areas

2.1 Noxious Weed Management

FFP Project 101, LLC (the Applicant) will implement the following measures to limit the establishment of noxious weeds within the Project Boundary and control the spread of existing populations.

Prior to Project construction, the Applicant has proposed a formal invasive plant survey to establish baseline environmental conditions, which will be more fully described in this VMMP as it is developed. The survey will develop a list of target invasive species to be surveyed, and identify the location and extent of any target species. This information will be used to aid in the development of a comprehensive plan to control the spread of invasive plants within the Project Boundary and that will maximize the effectiveness of restoration efforts following ground disturbance. After completion of this survey, weed control measures will be developed with the objective of reducing the spread of noxious and invasive weeds within and from outside the Project area.

Revegetation and weed control measures will follow all applicable guidelines and best management practices (BMPs) as recommended by the Washington State Noxious Weed Control Board. Given adequate and appropriate implementation of the protection and mitigation measures outlined in the VMMP, negative effects on local plant communities will be minor and

largely temporary. Net benefits to the area will include reduction of weeds already present and prevention of establishment of new infestations.

This will be accomplished through BMPs including:

- Training to encourage weed awareness and prevention efforts among Project and contractor staff. This will be included in the Environmental Training seminars, to be further described in the Wildlife Management Plan. Training will include distribution of noxious weed identification materials. The Applicant will develop a manual with photos and identifying characteristics of the priority weed species currently known to occur in the Project Boundary, as well as others that are likely to occur. The manual will also include procedures for reporting and confirming any new noxious weed infestations. It will be designed to be easily carried in a field vest or vehicle. The manual will be given to all staff and contractors who patrol or inspect Project features and/or perform vegetation maintenance in the Project Boundary, as well as personnel involved in any ground-disturbing activity.
- Planning and scheduling of construction and maintenance activities will incorporate treatment of existing infestations before maintenance activities occur.
- Cleaning machinery and other equipment prior to use to remove seeds and prevent new noxious weed introductions. At a minimum, cleaning will occur prior to equipment transfer between the lower and upper sites. Cleaning station locations will be determined based on the noxious weed survey and will be coordinated with construction scheduling.
- Minimizing revegetation and ground disturbance, and avoiding disturbance in riparian, wetland, and other sensitive areas.
- Revegetating with a native plant seed mix after ground disturbing activities. The seed mix will be developed in consultation with the Washington Department of Fish and Wildlife (WDFW) and will follow guidelines described in Benson et al. (2011). A suggested seed mix is provided in Table 2.4-1.
- Use of certified weed-free hay, straw, and topsoil, where available.

2.2 Preconstruction Surveys for Special Status Plants

Prior to Project construction, surveys will be conducted for federally listed special status plant species in all areas that will be disturbed to establish baseline environmental conditions. Surveys will be conducted during anticipated flowering windows of all sensitive species with potential to occur in the area. Updated surveys will be conducted after final design and prior to construction to confirm information collected in previous surveys.

2.3 Employ BMPs to Protect Native Vegetation

Construction activities will be planned and implemented to avoid disturbance to existing native and/or sensitive plant communities and prevent the spread of noxious weeds. These BMPs include those listed under Section 2.1. Further, the Applicant will limit construction related

disturbance of native vegetation as much as possible by flagging or fencing off sensitive areas and designating specific areas for work and equipment movement.

2.4 Revegetation at Temporary Disturbance Areas

Any vegetated area temporarily disturbed during Project construction will be hydroseeded with native upland species following completion of the disturbance. The seed mix will be developed in consultation with WDFW and will follow guidelines described in Benson et al. (2011). A suggested seed mix used by the U.S. Department of Agriculture Forest Service at the Columbia River Gorge National Scenic Area, approximately 9 miles west of the Project, is included below as Table 2.4-1. Additional guidance is provided in Bureau of Land Management Technical Note 443 (Dunwiddie and Camp 2013). These guidelines will be followed where applicable.

Table 2.4-1. Suggested Seed Mix

Grasses	Percent Composition
<i>Pseudoroegneria spicatum</i> (Blue bunch wheat grass)	30%
<i>Festuca idahoensis</i> (Idaho fescue)	25%
<i>Bromus carinatus</i> (Calif. Brome)	15%
<i>Elymus glaucus</i> (blue wild rye)	10%
<i>Stipa comata</i> (Needlegrass)	10%
<i>Sitanion hystrix</i> (Bottlebrush squirreltail)	5-10%
<i>Oryzopsis hymenoides</i> (Indain ricegrass)	5-10%
<i>Poa sandbergii</i> (<i>P. secunda</i>) (Sandberg bluegrass)	5-10%
Forbs	
Lupine (select an appropriate native species for the area)	2 ounces per acre
<i>Achillea millefolium</i> (Yarrow)	1-2 ounces per acre
<i>Balsamorhiza deltoidea</i> (Balsam root)	6 ounces per acre
<i>Eriogonum strictum</i>	1-2 ounces per acre
<i>Lupinus bicolor</i>	1-2 ounces per acre
<i>Eriophyllum lanatum</i> (Oregon sunshine)	1-2 ounces per acre

Revegetation will adhere to particular goals, as practicable based on current and impacted conditions and these areas will be included in subsequent weed survey and treatment efforts. The goal of revegetation will be to create sites with the following characteristics:

- Vegetation contains a characteristic assemblage of the species that occur in the reference ecosystem and that provide appropriate community structure.
- Vegetation consists of indigenous species to the greatest practicable extent.
- Sites include functional groups necessary for continued development and/or stability.
- Sites are capable of self-sustaining, reproducing populations.

- Sites are appropriately integrated into a larger ecological matrix or landscape, in which potential threats (e.g., weed infestations, excessive grazing) have been eliminated or reduced as much as possible.
- Sites are resilient and able to endure normal periodic stress events in the local environment (e.g., fire, drought, etc.).
- If needed, a monitoring program will be established to evaluate the efficacy of revegetation efforts and a filing schedule for periodic monitoring reports. This program also describes procedures to be followed if monitoring indicates that revegetation is not successful.

2.5 Vegetation Management During Project Operations

Noxious weeds will be managed as discussed above during construction and operations (Section 2.1). After Project construction and revegetation is complete, revegetated areas will be monitored as discussed below in Section 3.0. During operations, new disturbance to vegetation will be avoided. If the vegetation is not meeting performance standards, additional revegetation amendments may be applied, as discussed in Section 3.3.

2.6 Grazing Control for New Plantings

If planting of individual trees and shrubs are required, protective enclosures will be used to protect the young plants from consumption by wildlife such as deer, antelope, or elk. These enclosures may consist of wire cages or rigid protection tubes.

3.0 MONITORING PLAN

Restored areas will be monitored annually for compliance with performance standards listed below for a minimum of 5 years or until those performance standards are met. Subsequent monitoring and maintenance will vary annually depending on the success of previous activities and the need for continued maintenance. If performance standards are not achieved within 5 years, monitoring and maintenance activities will continue until standards are met. The revegetation program and maintenance activities will continually be evaluated in consultation with affected landowners and agency stakeholders (i.e., the Bureau of Land Management, WDFW, and the U.S. Fish and Wildlife Service).

Once vegetation cover and composition are in compliance with revegetation goals, the area will be inventoried less frequently and managed based on the results of that inventory. Management summaries will be prepared at 5-year intervals.

3.1 Objectives and Performance Standards

Objectives and performance standards are presented in Table 3.1-1, specific to vegetation cover, species composition, and invasive species. The performance standards present the measurable criteria to determine whether each objective has been met. Objectives related to erosion control

will be covered under a Soil Erosion Control Plan, to be developed by the Applicant for construction.

Table 3.1-1. Objectives and Performance Standards

	Objective	Performance Standard
Vegetation cover	Vegetate disturbed sites with appropriate cover of desired species	By year 5, total percent cover of desired species (collectively) on disturbed areas will be >70% of percent cover of desired species in reference areas. (For cut/fill areas, total cover of desired species will be >70%; no use of reference areas.)
Species composition	Establish a species composition on disturbed sites that is similar to reference sites	By year 5, at least 70% of total plant species must be either from the seed mix or plantings or from the plant species present in the reference areas or on the location prior to disturbance.
Invasive plants	Minimize the introduction or spread of invasive species	Percent cover of non-designated invasive weeds will not exceed the percent cover of weeds in the reference areas; monitoring to occur through year 5.

3.2 Monitoring Methods

Monitoring methods are intended to be relatively simple and repeatable over time, with methods and performance standards distinct for the three disturbance types: damaged vegetation areas, graded areas, and cut/fill areas. Monitoring will be conducted by a qualified vegetation specialist familiar with the species and vegetation types found within the Project Boundary.

For the damaged vegetation and grading areas, revegetation success (establishment and planting survivorship) will be assessed by comparing the revegetated condition to the reference areas condition over time. Areas of cut/fill will be monitored by qualitatively assessing the general condition and any erosion that may be occurring, and documenting percent cover and species composition within a survey plot (size and dimension to be determined based on the cut/fill area).

3.2.1 Reference Area Conditions

Reference plots adjacent to disturbed areas of the Project will be established to compare and evaluate revegetation success. The Project area's vegetation types are outlined in the FLA Exhibit E Section 3.3.1.2, Vegetation Types. The vegetation types include:

- Columbia Plateau Steppe and Grassland
- Inter-Mountain Basins Cliff and Canyon
- Inter-Mountain Basins Big Sagebrush Steppe
- Columbia Plateau Scabland Shrubland
- Columbia Plateau Western Juniper Woodland and Savanna

- Introduced Upland Vegetation—Annual Grassland
- Introduced/Invasive Wooded
- Introduced Upland Vegetation—Annual Grassland with Rock Outcroppings

At least two permanent reference plots will be established within each vegetation type disturbed by the Project. Coverages in these reference plots will be averaged by vegetation type for the basis of the performance standards above in Table 3.1-1.

Reference plots will be selected randomly but will be representative of the area's conditions. To document reference plot conditions, the data should include the following metrics: total percent cover, species composition, percent bare ground, woody species number, and density. Photos should also be of sufficient quantity and quality to illustrate the general vegetation conditions present across a site.

Plot size will vary with strata. For example, herbaceous plants and shrubs may be surveyed within 1 and 10 meter square nested plots, respectively. One or more smaller herbaceous plots could also be surveyed within the shrub plot.

3.2.2 Revegetation Monitoring

Revegetated areas will be monitored for germination success (initially) and establishment success thereafter to determine whether the revegetation objectives are being met, based on the performance standards presented in Table 3.1-1. The amount of erosion (e.g., rilling or gullyng) present in steeper areas will also be documented during the annual revegetation monitoring.

Germination success will be assessed qualitatively for all seeded areas at the start of the first growing season after seeding (e.g., late April-early May) to determine whether seeds are germinating and whether additional seeding or other corrective actions should be implemented. Grasses and forbs would be expected to begin germinating during the first growing season after seeding, while shrubs can take longer to germinate (e.g., up to 3 years). Therefore grass and forb germination will be assessed in the first year after seeding, and shrub germination will continue to be assessed in subsequent years.

To measure establishment success, permanent plots will be established in areas of homogenous vegetation cover and landscape features. Monitoring plots will be selected randomly but will be representative of the area's conditions. The following metrics will be collected at each permanent monitoring plot: total percent cover, species composition, percent bare ground, woody species number, density, and survivorship of planted individuals. Photo points will also be installed at each plot to provide visual representation of change over time. Within each revegetation area, results will be averaged across vegetation types (e.g., within each big sagebrush steppe or juniper woodland plot type). Plot size will vary with strata. For example, herbaceous plants and shrubs

may be surveyed within 1 and 10 meter square nested plots, respectively. One or more smaller herbaceous plots could also be surveyed within the shrub plot.

While invasive species will be documented as part of the annual plot monitoring (e.g., species composition and percent cover metrics), weeds will further be monitored across all revegetated areas. Weed monitoring will involve walking revegetated areas to document the presence and percent cover (within a patch) of target weed species. Target weed species include all noxious weeds listed on the 2017 State of Washington and Klickitat County Noxious Weeds Lists (Klickitat County 2017). Locations of weed patches will be mapped using a handheld GPS unit with sub-meter accuracy.

3.2.3 Monitoring Schedule

- Reference areas: Plots will be monitored annually starting in the first growing season after seeding or planting the revegetation areas, and each year thereafter, for a total of 5 years or until performance standards are met (Section 3.1).
- Germination success: Grass and forb germination monitored at the start of the first growing season after seeding (e.g., late April-early May); shrub germination (if included in seed mix) monitored for a total of three growing seasons after seeding.
- Establishment success and erosion: Plots will be monitored annually starting in the first growing season after seeding or planting, and each year thereafter, for a total of 5 years or until performance standards are met (Section 3.1).
- Weeds: Monitored annually starting in the first growing season after seeding or planting, and each year thereafter for a total of 5 years or until performance standards are met.

3.3 Additional Revegetation Amendments

Additional revegetation amendments will be determined on an as needed basis. For example, additional planting, hydroseeding, fertilizer application, and irrigation may be considered if the site is not meeting performance standards.

4.0 REFERENCES

- Benson, J. E., R.T. Tveten, M. G. Asher, and P.W. Dunwiddie. 2011. *Shrub-Steppe and Grassland Restoration Manual for the Columbia River Basin*.
- Dunwiddie, P., and P. Camp. 2013. *Enhancement of Degraded Shrub-Steppe Habitat with an Emphasis on Potential Applicability in Eastern Washington*. Teach Note 443. Bureau of Land Management, Spokane District, Spokane, WA.
- Klickitat County. 2017. *Klickitat County Noxious Weed List, Washington State Noxious Weed Control Board*. Accessed January 2019. <https://www.klickitatcounty.org/575/Klickitat-County-Weed-List-PDF>.

ATTACHMENT 1:

LEVEL A—FIELD DATA FORM

ATTACHMENT 1: LEVEL A—FIELD DATA FORM

Site Name	
Wildlife area unit	
Date:	
Recorded by	
Survey Distance or Area	
Time since planted	

Abundance rating
1=Rare
2=Occasional
3=Frequent
4=Common
5=Abundant

Table 1: Project Objectives Being Evaluated/Monitoring Conclusions

Insert list of objectives. Add rows as necessary Draw conclusions as to whether or not objectives were met.

Objective	Met?	Notes
<i>Example #1: Within 3 years, establish two or more native bunchgrasses at abundance level 5</i>	<i>Yes</i>	<i>Dominants match reference dominants</i>

Table 2: Vegetation Observations. *Add/remove rows or columns as necessary*

Species	Observed Abundance	Objectives and associated success criteria.				
		1	2	3	4	5
Seeded grasses						
Seeded forbs						
Shrubs						
Non-seeded native species						
Exotic species						

Observations: Erosion, use by wildlife, patterns of vegetation establishment, success or failure of plantings and weed control, etc.