

**HABITAT RESTORATION PLAN
AND
NOXIOUS WEEDS AND INVASIVE SPECIES CONTROL PLAN**

Prepared for the

**Dry Lake Wind Project
Navajo County, Arizona**

1.0 Introduction

PPM Energy, Inc. (PPM) developed this habitat restoration plan to minimize or mitigate negative impacts on vulnerable plants and wildlife while maintaining or enhancing habitat values for other species and to address erosion and stormwater pollution prevention requirements associated with the Dry Lake Wind Project. The sections outlined below identify revegetation, soil stabilization, and erosion reduction measures that will be implemented for the Dry Lake Wind Project to ensure that all temporary use areas are restored and disturbed areas are effectively protected. Restoration will occur as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to preconstruction conditions.

PPM also developed a noxious weed and invasive species control plan to control noxious weeds and invasive species that could occur as a result of new surface disturbance activities in the project area. The sections below describe the plan and how it addresses monitoring, education of personnel on weed identification, and methods for treating infestations.

In addition to the habitat restoration and the noxious weed and invasive species control plans, PPM developed a monitoring plan to ensure that both revegetation and weed control efforts are successful.

2.0 Habitat Restoration Plan

PPM will restore disturbed areas after construction is completed. Temporary use areas, such as access roads used for structure placement, will be restored by recontouring (if necessary) and reseeded. Topsoil from excavations and construction activities will be segregated from sub-soil and reapplied to the surface of the ground during reclamation. In order to reestablish plant communities of most value to wildlife, the appropriate native grass and forb species will be used in all disturbed areas. Additional reclamation measures will be developed to address site-specific conditions as necessary. PPM will also develop and implement a project-specific stormwater pollution prevention plan (SWPPP) in accordance with Arizona Department of Environmental Quality (ADEQ) guidelines to minimize erosion.

2.1 Erosion Reduction Measures

PPM will utilize engineering practices that limit disturbance and related impacts to the surrounding environment and land uses. Erosion control practices will be utilized in areas impacted by proposed construction. All personnel will be trained in mitigation methods suitable for the proposed project.

2.1.1 Soil Stabilization

Erosion control is any action taken or item used as part of a project or as a separate action to minimize the destructive effects of wind and water on surface soil. Accelerated erosion as a result of construction-related activities is a widespread problem affecting the environment. Transported soil has the potential to change the ecosystem, by removing the most fertile part of the soil horizon and depositing it in sensitive resource areas such as streams. National and local programs and polices mandate that erosion be controlled, and sediment contained, on all project sites disturbing more than one acre. Arizona's Pollution Discharge Elimination System (APDES) permit program includes the regulation of waste water and storm water point source discharges and the industrial pretreatment program. Best Management Practices (BMPs) are actions taken to prevent or reduce detrimental impacts to the environment while maintaining the natural characteristics of the environment; BMPs are a useful tool designed to assist in controlling construction and maintenance-related soil erosion. For the Dry Lake Wind Project, PPM will implement the following BMPs:

- Wind turbines, interconnect substations, and Operation and Maintenance facilities as well as all associated work spaces will be set back at least 50 feet from small ephemeral waterbodies, 75 feet from medium ephemeral or intermittent waterbodies (e.g., Washboard Wash), and 100 feet from perennial waterbodies (e.g., Silver Creek).
- When deemed necessary and where there is compact potential (e.g., construction areas around the base of the turbines, temporarily widened access roads), topsoil materials will be stripped and stockpiled. When the site is being restored, topsoil will be replaced on the surface and graded to near natural contour. Topsoil will only be stored temporarily during the construction – no long term topsoil storage will be necessary. If topsoil is stored longer than three months during the construction period, specific steps will be taken to stabilize topsoil piles (e.g., seeding, covering, etc.).

- Where necessary due to changes in slope, erosion control structures such as water bars, diversion channels, and terraces will be constructed to divert water and reduce soil erosion along the collector line routes and other areas disturbed during construction.
- Where construction areas will be subject to strong erosional forces prior to vegetation reestablishment, special mulching practices or matting will be used to promote physical stabilization.
- In addition to installing erosion-control structures, areas will be reseeded as described in the Stormwater Pollution Prevention Plan (SWPPP), using supplemental fertilizers as necessary.
- Soils will be prepared to provide the best possible conditions for the establishment native vegetation (primarily native bunchgrass species). This may include loosening soils surfaces that are encrusted or compacted and imprinting soil surfaces to catch seeds and water (e.g., through the use of a sheepsfoot roller).
- Rock mulches will be used in steep-sloping rock outcrop areas to reduce erosion and promote vegetation growth.
- Machine cultivation and land preparation (or manual on steeply sloped areas) may be used to trace the contour to minimize erosion.
- Soil areas with rock fragments, such as very coarse gravel, cobble, or stone scattered on the surface will be restored to simulate the original preconstruction surface conditions. The areas will blend to match adjoining areas.
- As needed, erosion control structures and measures will be applied on sloping areas. This reduces accelerated erosion, allows reestablishment of preconstruction surface soil conditions, and augments natural revegetation.
- Where possible, existing woody plants (e.g., oneseed juniper) will be flush cut in areas where site grading is not required, to limit ground disturbance and erosion potential.

2.1.2 Revegetation

PPM will implement revegetation measures to restore disturbed land from construction activities to stable, productive, and aesthetically acceptable conditions, similar to preconstruction conditions. These procedures will apply to all construction phases unless otherwise specified.

This project will require clearing of vegetation to widen existing dirt roads, construct new access roads, provide contractor use areas and install the wind power generating equipment. Clearing will be limited to only the area necessary to construct the project.

As stated above, temporary cover may be needed in erosion-prone areas to stabilize denuded soil. The majority of the soils in the project area are moderately to highly susceptible to erosion. Temporary cover controls runoff and erosion, provides residue for soil protection and seedbed preparation, and reduces problems of mud and dust production from bare soil surfaces during construction. In areas that require temporary cover, a certified weed-free fiber mulch will be applied to limit dust and surface erosion during construction.

Seeding is a means of establishing permanent, perennial vegetative cover on disturbed areas to prevent erosion, remove sediment from runoff, reduce the volume of runoff, and improve water quality. Permanent seeding is well-suited in areas where permanent, long-lived vegetative cover is the most practical or most effective method of stabilizing the soil. Only native seed species will be used, emphasizing native bunchgrass species. The high desert grass seed mix used for restoration of the project will likely include:

- Blue Grama (*Bouteloua gracilis*)
- Galetta (*Hilaria* sp.)
- Three Awn (*Aristida* sp.)
- Needle and Thread (*Stipa comata*)
- Alkali Sacaton (*Sporobolus airoides*)

The rate of seeding will be about 25 pounds of seed per acre of land.

Prior to reseeding, a sample of the seed mix will be tested at a third-party laboratory. No seeds containing noxious weed species will be used during restoration of this project (see definition of noxious weed species in section 3.0). Commercial fertilizer may be applied to soil areas with low inherent fertility to maintain crop yields and establish grass seedings. Application rates will be commensurate with annual precipitation. Generally, the seeding rate is expected to be about 25 pounds per acre.

2.1.2.1 Seedbed Preparation

The area to be seeded will be prepared with a ripper bar, chisel plow, or with other devices, providing cultivation to the appropriate depth for the species being seeded. On slope areas, all tillage will be directional along the contours.

2.1.2.2 Seeding Method

Drill Seeding

Drill seeding with straw mulch will be the preferred method of seeding unless otherwise specified. The drill seeder used should be capable of drilling to the appropriate depth needed for the specific seed mix, and will not damage the prepared seed bed.

Hydroseeding

Hydroseeding will be the alternative method for seeding for slopes in excess of 3:1, and where drill seeding is not practicable or suitable for soil conditions or seed types. The seed will be applied in a slurry containing the appropriate ratio of seed, tacking agent and fiber mulch.

3.0 Noxious Weed and Invasive Species Control Plan

Weed abatement programs have been instituted to prevent the spread of noxious weeds. According to the United States Department of Agriculture, noxious weeds are defined as “species of plants that cause disease or are injurious to crops, livestock, or land, and thus are detrimental to agriculture, commerce or public health.”

3.1 Regulatory Background

The state of Arizona has laws addressing the control and eradication of noxious weeds and identifying specific species that fall under noxious weed definitions (A.A.C. R3-4-244 and -245). Arizona Department of Agriculture is responsible for implementing noxious weed laws. The following table summarizes the prohibited, restricted and regulated plants for the State of Arizona. Additional weed species are regulated by the federal government and may not be transported without a specific permit.

Prohibited, Regulated and Restricted Plants in Arizona

Prohibited Plants – prevented from entry into the state

Acrotilon repens (L.) DC. -- Russian knapweed,
Aegilops cylindrica Host. -- Jointed goatgrass,
Alhagi pseudalhagi (Bieb.) Desv. -- Camelthorn,
Alternanthera philoxeroides (Mart.) Griseb. -- Alligator weed,
Cardaria pubescens (C.A. Mey) Jarmolenko -- Hairy whitetop,
Cardaria chalapensis (L.) Hand-Muzz -- Lens podded hoary cress,
Cardaria draba (L.) Desv. -- Globed-podded hoary cress (Whitetop),
Carduus acanthoides L. -- Plumeless thistle,
Cenchrus echinatus L. -- Southern sandbur,
Cenchrus incertus M.A. Curtis -- Field sandbur,
Centaurea calcitrapa L. -- Purple starthistle,
Centaurea iberica Trev. ex Spreng. -- Iberian starthistle,
Centaurea squarrosa Willd. -- Squarrose knapweed,
Centaurea sulphurea L. -- Sicilian starthistle,
Centaurea solstitialis L. -- Yellow starthistle (St. Barnaby's thistle),
Centaurea diffusa L. -- Diffuse knapweed,
Centaurea maculosa L. -- Spotted knapweed,
Chondrilla juncea L. -- Rush skeletonweed,
Cirsium arvense L. Scop. -- Canada thistle,
Convolvulus arvensis L. -- Field bindweed,
Coronopus squamatus (Forsk.) Ascherson -- Creeping wartcress (Coronopus),
Cucumis melo L. var. *Dudaim* Naudin -- Dudaim melon (Queen Anne's melon),
Cuscuta spp. -- Dodder,
Drymaria arenarioides H.B.K. -- Alfombrilla (Lightningweed),
Eichhornia crassipes (Mart.) Solms -- Floating water hyacinth,
Eichhornia azurea (SW) Kunth. -- Anchored water hyacinth,
Elytrigia repens (L.) Nevski -- Quackgrass,
Euphorbia esula L. -- Leafy spurge,
Halogeton glomeratus (M. Bieb.) C.A. Mey -- Halogeton,
Helianthus ciliaris DC. -- Texas blueweed,
Hydrilla verticillata Royale -- Hydrilla (Florida-elodea),
Ipomoea spp. -- Morning glory. All species except *Ipomoea carnea*, Mexican bush morning glory; *Ipomoea triloba*, three-lobed morning glory (which is considered a restricted pest); and *Ipomoea aborescens*, morning glory tree,

Prohibited, Regulated and Restricted Plants in Arizona

Ipomoea triloba L. – Three-lobed morning glory,
Isatis tinctoria L. – Dyers woad,
Linaria genistifolia var. *dalmatica* – Dalmation toadflax,
Lythrum salicaria L. – Purple loosestrife,
Medicago polymorpha L. -- Burclover,
Nassella trichotoma(Nees.) Hack. -- Serrated tussock,
Onopordum acanthium L. -- Scotch thistle,
Orobanche ramosa L. -- Branched broomrape,
Panicum repens L. -- Torpedo grass,
Peganum harmala L. -- African rue (Syrian rue),
Pennisetum ciliare (L.) Link – buffelgrass,
Portulaca oleracea L. -- Common purslane,
Rorippa austriaca (Crantz.) Bess. -- Austrian fieldcress,
Salvinia molesta – Giant salvinia
Senecio jacobaea L. -- Tansy ragwort,
Solanum carolinense L. -- Carolina horsenettle,
Sonchus arvensis L. -- Perennial sowthistle,
Solanum viarum Dunal -- Tropical Soda Apple,
Stipa brachychaeta Godr. -- Puna grass,
Striga spp. -- Witchweed,
Trapa natans L. -- Water-chestnut,
Tribulus terrestris L. -- Puncturevine

Regulated - if found within the state, may be controlled or quarantined to prevent further infestation or contamination

Cenchrus echinatus L. -- Southern sandbur,
Cenchrus incertus M.A. Curtis -- Field sandbur,
Convolvulus arvensis L. -- Field bindweed,
Eichhornia crassipes (Mart.) Solms -- Floating water hyacinth,
Medicago polymorpha L. -- Burclover,
Pennisetum ciliare (L.) Link – buffelgrass,
Portulaca oleracea L. -- Common purslane,
Salvinia molesta– Giant Salvinia
Tribulus terrestris L. -- Puncturevine.

Restricted - if found within the state, will be quarantined to prevent further infestation or contamination

Acroptilon repens (L.) DC. -- Russian knapweed,
Aegilops cylindrica Host. -- Jointed goatgrass,
Alhagi pseudalhagi (Bieb.) Desv. -- Camelthorn,
Cardaria draba (L.) Desv. -- Globed-podded hoary cress (Whitetop),
Centaurea diffusa L. -- Diffuse knapweed,
Centaurea maculosa L. -- Spotted knapweed,
Centaurea solstitialis L. -- Yellow starthistle (St. Barnaby's thistle),
Cuscuta spp. -- Dodder,
Eichhornia crassipes (Mart.) Solms – Floating water hyacinth
Elytrigia repens (L.) Nevski -- Quackgrass,
Euryops sunbcarnosus subsp. *vulgaris* – Sweet resinbush,
Halogeton glomeratus (M. Bieb.) C.A. Mey -- Halogeton,
Helianthus ciliaris DC. -- Texas blueweed,
Ipomoea triloba L. -- Three-lobed morning glory,
Linaria genistifolia var. *dalmatica* -- Dalmation toadflax,
Onopordum acanthium L. -- Scotch thistle

Source: Arizona Administrative Code R3-4-244 and 245, amended 1999.

According to AAC R3-4-244, the following commodities are hosts or carriers of the prohibited, regulated or restricted plants:

- all plants other than those categorized as a regulated or restricted pest;
- forage, straw and feed grains;
- live and dead flower arrangements;
- ornamental displays; and
- any appliance, construction or dredging equipment, boat, boat trailer or related equipment, or any other vehicle with soil attached or carrying plant debris.

3.2 Weed Management Components

PPM will require that all construction contractors guarantee that all vehicles and equipment arriving in the project area (any vehicle leaving State Highway 377 into the project area) will be clean. No vehicles or equipment will have soil attached or be carrying plant debris.

As noted above, seed mixes used during restoration will be tested to ensure they are free of noxious weeds. Additionally, the use of certified weed-free mulching will be required.

All construction contractors will be responsible for training its personal on noxious weed and invasive species control. Education will include the manner in which weeds spread, prevention methods (vehicle inspection and washing, etc.) and treatment methods.

No known areas of infestation occur within the project site; therefore, it is not anticipated that transport of noxious species by vehicles exiting the project will be a concern.

4.0 Monitoring Plan

PPM will conduct follow-up inspections of all disturbed areas after the first, second, and third growing seasons to determine the success of restoration. Restoration will be considered successful if the surface condition of the disturbed areas are similar to undisturbed lands, construction debris is removed, proper drainage has been restored, and revegetation is successful. Revegetation will be considered successful if upon visual survey the cover of herbaceous and/or wood species is at least 60 percent of the type, density, and distribution of the vegetation in adjacent areas that were not disturbed by construction. If revegetation is not successful at the end of three years, PPM will consult with range restoration/conservation specialists with the Bureau of Land Management (BLM) and the Natural Resource Conservation Service to determine the need to develop and implement a remedial revegetation plan.

Presence of noxious weeds or invasive species will be monitored and managed at the project facilities throughout the life of the project. For example, vegetation of any type is unacceptable within the project substation (left unchecked weeds create a safety hazard for workmen). Typically, the types of vegetation that try to re-establish in substation are grasses, tumble weed and desert scrub. When necessary and practical, hand removal and mechanical methods (e.g. weed eaters, mowing etc.) and herbicide applications are combined to achieve the maximum level of control in an integrated vegetation management (weed control) program. Any herbicides used as part of the weed control program will be mixed, handled and applied in accordance with manufacturer's label instructions by a state certified licensed Contractor. No herbicide applications will be performed during unfavorable wind and weather conditions. Herbicide containers will be returned to the Contractors' facilities- for disposal in accordance with applicable state, federal and local codes and regulations. Prior to using any herbicide on lands administered by the BLM, PPM would obtain a Pesticide Use Permit (PUP) from the BLM. No impacts to non-target vegetation are anticipated.

5.0 References

Arizona Department of Agriculture. *Prohibited, Regulated and Restricted Noxious Weeds*. 2005. <http://www.azda.gov/PSD/quarantine5.htm>. Retrieved June 11, 2007.

Arizona Department of Transportation. *Seeding Guidelines Manual: 805SEED*. http://www.azdot.gov/highways/cns/CNS_Stored_specs.asp. Retrieved June 18, 2007.

Howery, Larry D. and Ruyle George B. *Noxious Weeds: A Disaster Looking for a Place to Happen in Arizona!!* 2002. <http://ag.arizona.edu/agnic/az/weeds/noxiousweeds1.html>. Retrieved June 11, 2007.