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## ATTACHMENT A

### GOLDEN HILLS WIND PROJECT WILDLIFE MONITORING AND MITIGATION PLAN

This plan describes wildlife monitoring that the certificate holder shall conduct during operation of the Golden Hills Wind Project (GHWP).<sup>1</sup> The monitoring objectives are to determine whether operation of the facility causes significant fatalities of birds and bats and to determine whether the facility results in a loss of habitat quality. Golden Hills wind power project consists 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 82m (1.65 MW) or 96m (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.

The certificate holder shall use experienced personnel to manage the monitoring required under this plan and properly trained personnel to conduct the monitoring, subject to approval by the Oregon Department of Energy (Department) as to professional qualifications. For all components of this plan except the Raptor Nesting Surveys and the Wildlife Incident Response and Handling System, the certificate holder shall direct a qualified independent third-party biological monitor, as approved by the Department, to perform monitoring tasks.

The Wildlife Monitoring and Mitigation Plan for the GHWP has the following components:

- 1) Fatality Monitoring Program including:
  - a) Removal Trials
  - b) Searcher Efficiency Trials
  - c) Fatality Monitoring Search Protocol
  - d) Statistical Analysis
- 2) Raptor Nesting Surveys
- 3) Avian Use and Behavior Surveys
- 4) Wildlife Incident Response and Handling System

Following is a discussion of the components of the monitoring plan, statistical analysis methods for fatality data, data reporting and potential mitigation.

The selection of the mitigation actions that the certificate holder may be required to implement under this plan should allow for flexibility in creating appropriate responses to monitoring results that cannot be known in advance. If the Department determines that mitigation is needed, the certificate holder shall propose appropriate mitigation actions to the

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<sup>1</sup> This plan is incorporated by reference in the site certificate for the GHWP and must be understood in that context. It is not a “stand-alone” document. This plan does not contain all mitigation required of the certificate holder.

1 Department and shall carry out mitigation actions approved by the Department, subject to review  
2 by the Oregon Energy Facility Council (Council).

3  
4 **1. Fatality Monitoring**

5  
6 (a) Definitions and Methods

7  
8 Seasons

9  
10 This plan uses the following dates for defining seasons:

11

Season	Dates
Spring Migration	March 16 to May 15
Summer/Breeding	May 16 to August 15
Fall Migration	August 16 to October 31
Winter	November 1 to March 15

12  
13 Search Plots

14  
15 The certificate holder shall conduct fatality monitoring within search plots. The  
16 certificate holder, in consultation with the Oregon Department of Fish and Wildlife (ODFW),  
17 will select search plots based on a systematic sampling design that ensures the selected search  
18 plots are representative of the habitat in different parts of the site. Each search plot will contain  
19 one turbine. Search plots will be square or circular. Circular search plots will be centered on the  
20 turbine location and will have a radius equal to the maximum blade tip height of the turbine  
21 contained within the plot. “Maximum blade tip height” is the turbine hub-height plus one-half  
22 the rotor diameter. Square search plots will be of sufficient size to contain a circular search plot  
23 as described above.

24  
25 The certificate holder shall provide maps of the search plots to the Department and  
26 ODFW before beginning fatality monitoring at the facility. The certificate holder will use the  
27 same search plots for each search conducted during each monitoring year. During the second  
28 monitoring year, new search plots will be selected from the turbines not sampled during the first  
29 monitoring year.

30  
31 Sample Size

32  
33 The sample size for fatality monitoring is the number of turbines searched per monitoring  
34 year. The certificate holder shall conduct fatality monitoring during the each monitoring year in  
35 search plots at 1/3 of the turbines. If fewer than 150 turbines are built, GHWF shall monitor a  
36 minimum of 50 turbines.

37  
38 As described in Exhibit B of the ASC, GHWF may choose a combination of smaller  
39 turbines with rotor diameter of 82 meters, or larger turbines with rotor diameter greater than 82  
40 meters. If the final design of GHWP includes both large and small turbines, then GHWF shall,  
41 before beginning fatality monitoring, consult with an independent expert with experience in

1 statistical analysis of avian fatality data to determine whether it would be possible to design a 50-  
2 turbine sample with a sufficient number of turbines in each size class to allow statistical  
3 comparison of fatality rates for all birds as a group. GHWF shall submit the expert's written  
4 analysis to the Department. If the analysis shows that a comparison study is possible and if the  
5 Department approves, GHWF shall sample the appropriate number of turbines in each class and  
6 conduct the comparison study. GHWF may choose to sample more than 50 turbines in a each  
7 monitoring year, if a larger sample size would allow the comparison study to be done.

8  
9 Scheduling and Sampling Frequency

10  
11 Fatality monitoring will begin upon the commencement of commercial operation of the  
12 facility.

13  
14 The first fatality monitoring year will commence on the first day of the month following  
15 the commercial operation date of the facility and will conclude twelve months later (for example,  
16 if commercial operation begins in October of 2008, the monitoring year will commence on  
17 November 1, 2008, and conclude on October 31, 2009). Subsequent monitoring years will follow  
18 the same schedule (for example, the second monitoring year would begin November 1 of the  
19 year in which monitoring is performed, and conclude October 31 of the following year)

20  
21 In each monitoring year, the certificate holder shall conduct fatality-monitoring searches  
22 at the rates of frequency shown below. Over the course of one monitoring year, the certificate  
23 holder would conduct 16 searches<sup>2</sup>, as follows:  
24

Season	Frequency
Spring Migration	2 searches per month (4 searches)
Summer/Breeding	1 search per month (3 searches)
Fall Migration	2 searches per month (5 searches)
Winter	1 search per month (4 searches)

25  
26 Duration of Fatality Monitoring

27  
28 GHWF shall perform one complete monitoring cycle during its first full year of  
29 operation. At the end of the first year of monitoring, GHWF will report the results for joint  
30 evaluation by ODOE, GHWF and ODFW. In the evaluation, results for GHWP will be compared  
31 with the threshold table in section 1(g) of this plan, and with analogous fatality monitoring  
32 results for Klondike III, Biglow Canyon, Combine Hills, Nine Canyon, Hopkins Ridge and, if  
33 available, Leaning Juniper. Fatality monitoring results from other wind power facilities in the  
34 Columbia Basin may also be included, if available. If fatality results for the first year of  
35 monitoring at GHWP do not exceed any of the thresholds of concern and are within the range of  
36 all results from the facilities listed above, then GHWF will perform its second year of monitoring  
37 in year 5 of operations.  
38

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<sup>2</sup> GHWF may omit the searches on some turbines, if searches are not possible due to safety reasons .

1           Otherwise, GHWF shall propose additional mitigation within 6 months, for ODOE and  
2 ODFW review. Alternately, GHWF may opt to perform a second year of fatality monitoring  
3 immediately if it believes that the results of year 1 monitoring were anomalous. If GHWF takes  
4 this option, then it will still perform the monitoring in year 5 of operations described above.

5  
6           *Meteorological Towers*  
7

8           The facility will most likely use non-guyed meteorological towers. Non-guyed towers are  
9 known to cause little if any bird and bat mortality. Therefore, monitoring will not occur at non-  
10 guyed meteorological towers. If the meteorological towers are guyed, the certificate holder shall  
11 search all towers on the same monitoring schedule as fatality monitoring. The certificate holder  
12 will use circular search plots. The radius of the circular search plots will extend a minimum of 5  
13 meters beyond the most distant guy wire anchor point.

14  
15       (b) Removal Trials  
16

17           The objective of the removal trials is to estimate the length of time avian and bat  
18 carcasses remain in the search area. Carcass removal studies will be conducted during each  
19 season in the vicinity of the search plots. Estimates of carcass removal rates will be used to  
20 adjust carcass counts for removal bias. “Carcass removal” is the disappearance of a carcass from  
21 the search area due to predation, scavenging or other means such as farming activity. Removal  
22 rates will be estimated by size class, habitat and season.

23  
24           During the first year, the certificate holder shall conduct carcass removal trials within  
25 each of the seasons defined above during the years in which fatality monitoring occurs. During  
26 the first year in which fatality monitoring occurs, trials will occur in at least eight different  
27 calendar weeks in a year, with at least one calendar week between starting dates. Trials will be  
28 spread throughout the year to incorporate the effects of varying weather, farming practices and  
29 scavenger densities. At least two trials will be started in each season. Each trial will use at least 6  
30 carcasses. For each trial, 3 small bird carcasses and 3 large bird carcasses will be distributed in  
31 cultivated agriculture habitat and 3 small bird carcasses and 3 large bird carcasses will be  
32 distributed in non-cultivated habitat (grassland/shrub-steppe and CRP). In a year, approximately  
33 48 carcasses will be placed in cultivated agriculture and 48 carcasses in non-cultivated  
34 grassland/shrub-steppe and CRP for a total of about 96 trial carcasses. The number of removal  
35 trials may be adjusted up or down during the second year of fatality monitoring, subject to  
36 approval by the Department, if the certificate holder can demonstrate that the calculation of  
37 fatality rates will continue to have statistical validity with the new sample size.

38  
39           The “small bird” size class will use carcasses of house sparrows, starlings, commercially  
40 available game bird chicks or legally obtained native birds to simulate passerines. The “large  
41 bird” size class will use carcasses of raptors provided by agencies, commercially available adult  
42 game birds or cryptically colored chickens to simulate raptors, game birds and waterfowl. If  
43 fresh bat carcasses are available, they may also be used.

44  
45           To avoid confusion with turbine-related fatalities, planted carcasses will not be placed in  
46 fatality monitoring search plots. Planted carcasses will be placed in the vicinity of search plots

1 but not so near as to attract scavengers to the search plots. The planted carcasses will be located  
2 randomly within the carcass removal trial plots.  
3

4 Carcasses will be placed in a variety of postures to simulate a range of conditions. For  
5 example, birds will be: 1) placed in an exposed posture (e.g., thrown over the shoulder), 2)  
6 hidden to simulate a crippled bird (e.g., placed beneath a shrub or tuft of grass) and, 3) partially  
7 hidden. Trial carcasses will be marked discreetly for recognition by searchers and other  
8 personnel. Trial carcasses will be left at the location until the end of the carcass removal trial.  
9

10 It is expected that carcasses will be checked as follows, although actual intervals may  
11 vary. Carcasses will be checked for a period of 40 days to determine removal rates. They will be  
12 checked about every day for the first 4 days, and then on day 7, day 10, day 14, day 20, day 30  
13 and day 40. This schedule may vary depending on weather and coordination with the other  
14 survey work. At the end of the 40-day period, the trial carcasses and scattered feathers will be  
15 removed.  
16

#### 17 (c) Searcher Efficiency Trials 18

19 The objective of searcher efficiency trials is to estimate the percentage of bird and bat  
20 fatalities that searchers are able to find. The certificate holder shall conduct searcher efficiency  
21 trials on the fatality-monitoring search plots in both grassland/shrub-steppe and cultivated  
22 agriculture habitat types. Searcher efficiency will be estimated by size class, habitat type, and  
23 season. Estimates of searcher efficiency will be used to adjust carcass counts for detection bias.  
24

25 Searcher efficiency trials will be conducted in each season as defined above, during the  
26 years in which the fatality monitoring occurs. Trials will be spread throughout the year to  
27 incorporate the effects of varying weather, farming practices and scavenger densities. At least  
28 two trials will be conducted in each season. Each trial will use about 12 carcasses, although the  
29 number will be variable so that the searcher will not know the total number of trial carcasses  
30 being used in any trial. For each trial, both small bird and large bird carcasses will be used in  
31 about equal numbers. “Small bird” and “large bird” size classes and carcass selection are as  
32 described above for the removal trials. An equal proportion of the trial carcasses will be  
33 distributed in cultivated agriculture habitat and in non-cultivated habitat (grassland/shrub steppe  
34 and CRP). In a year, about 48 carcasses will be placed in cultivated agriculture and about 48 in  
35 non-cultivated grassland/shrub steppe and CRP for a total of about 96 trial carcasses. The  
36 number of searcher efficiency trials may be reduced to one per season during the second year of  
37 fatality monitoring, subject to approval by the Department, if the certificate holder can  
38 demonstrate that the calculation of fatality rates will continue to have statistical validity with the  
39 reduced sample size.  
40

41 Personnel conducting searches will not know in advance when trials are conducted; nor  
42 will they know the location of the trial carcasses. If suitable trial carcasses are available, trials  
43 during the fall season will include several small brown birds to simulate bat carcasses. Legally  
44 obtained bat carcasses will be used if available.  
45

1 On the day of a standardized fatality monitoring search (described below) but before the  
2 beginning of the search, efficiency trial carcasses will be placed at random locations within areas  
3 to be searched. If scavengers appear attracted by placement of carcasses, the carcasses will be  
4 distributed before dawn.

5  
6 Searcher efficiency trials will be spread over the entire season to incorporate effects of  
7 varying weather and vegetation growth. Carcasses will be placed in a variety of postures to  
8 simulate a range of conditions. For example, birds will be: 1) placed in an exposed posture  
9 (thrown over the shoulder), 2) hidden to simulate a crippled bird and 3) partially hidden.

10  
11 Each non-domestic carcass will be discreetly marked so that it can be identified as an  
12 efficiency trial carcass after it is found. The number and location of the efficiency trial carcasses  
13 found during the carcass search will be recorded. The number of efficiency trial carcasses  
14 available for detection during each trial will be determined immediately after the trial by the  
15 person responsible for distributing the carcasses.

16  
17 If new searchers are brought into the search team, additional detection trials will be  
18 conducted to ensure that detection rates incorporate searcher differences. If GHWF does not  
19 perform a second year of monitoring until the 5<sup>th</sup> year of operation, then searcher efficiency and  
20 removal trials shall be repeated to ensure that the removal and detection rates used to estimate  
21 overall fatalities account for new searchers and changed predation or scavenger behavior  
22 patterns.

#### 23 24 (d) Coordination with the other Wind Projects

25  
26 It is anticipated that other wind projects in Sherman County may be monitored at the  
27 same time that Golden Hills is monitored. If these projects are permitted through EFSEC, they  
28 will require similar wildlife monitoring. Subject to the approval of both certificate holders and  
29 the Department, the number of trials at each site and the number of trial carcasses used at each  
30 site can be reduced by combining the removal data and efficiency data from multiple facilities, if  
31 the certificate holder can demonstrate that the calculation of fatality rates will continue to have  
32 statistical validity for both facilities and that combining the data will not affect any other  
33 requirements of the monitoring plans for either facility.

#### 34 35 (e) Fatality Monitoring Search Protocol

36  
37 The objective of fatality monitoring is to estimate the number of bird and bat fatalities  
38 that are attributable to facility operation and associated variances. The certificate holder shall  
39 conduct fatality monitoring using standardized carcass searches.

40  
41 The certificate holder shall use a worst-case analysis to resolve any uncertainty in the  
42 results and to determine whether the data indicate that additional mitigation should be  
43 considered. The Department may require additional, targeted monitoring if the data indicate the  
44 potential for significant impacts that cannot be addressed by worst-case analysis and appropriate  
45 mitigation.

1 The certificate holder shall estimate the number of avian and bat fatalities attributable to  
2 operation of the facility based on the number of avian and bat fatalities found at the facility site.  
3 All carcasses located within areas surveyed, regardless of species, will be recorded and, if  
4 possible, a cause of death determined based on blind necropsy results. If a different cause of  
5 death is not apparent, the fatality will be attributed to facility operation. The total number of  
6 avian and bat carcasses will be estimated by adjusting for removal and searcher efficiency bias.  
7

8 Personnel trained in proper search techniques (“the searchers”) will conduct the carcass  
9 searches by walking parallel transects within the search plots.<sup>3</sup> Transects will be initially set at 6  
10 meters apart in the area to be searched. A searcher will walk at a rate of about 45 to 60 meters  
11 per minute along each transect searching both sides out to three meters for casualties. Search area  
12 and speed may be adjusted by habitat type after evaluation of the first searcher efficiency trial.  
13 The searchers will record the condition of each carcass found, using the following condition  
14 categories:  
15

- 16 § Intact – a carcass that is completely intact, is not badly decomposed and shows no  
17 sign of being fed upon by a predator or scavenger
- 18 § Scavenged – an entire carcass that shows signs of being fed upon by a predator or  
19 scavenger, or portions of a carcass in one location (e.g., wings, skeletal remains, legs,  
20 pieces of skin, etc.)
- 21 § Feather Spot – 10 or more feathers at one location indicating predation or scavenging  
22 or 2 or more primary feathers  
23

24 All carcasses (avian and bat) found during the standardized carcass searches will be  
25 photographed as found, recorded and labeled with a unique number. Distance from observer to  
26 the carcass will be measured (to the nearest 0.25 meters), as will the perpendicular distance from  
27 the transect line to the carcass. Each carcass will be bagged and frozen for future reference and  
28 possible necropsy. A copy of the data sheet for each carcass will be kept with the carcass at all  
29 times. For each carcass found, searchers will record species, sex and age when possible, date and  
30 time collected, location, condition (e.g., intact, scavenged, feather spot) and any comments that  
31 may indicate cause of death. Searchers will map the find on a detailed map of the search area  
32 showing the location of the wind turbines and associated facilities such as power lines. The  
33 certificate holder shall coordinate collection of state endangered, threatened, sensitive or other  
34 state protected species with ODFW. The certificate holder shall coordinate collection of  
35 federally-listed endangered or threatened species and Migratory Bird Treaty Act protected avian  
36 species with the U.S. Fish and Wildlife Service (USFWS). The certificate holder shall obtain  
37 appropriate collection permits from ODFW and USFWS.  
38

39 The searchers might discover carcasses incidental to formal carcass searches (e.g., while  
40 driving within the project area). For each incidentally discovered carcass, the searcher shall  
41 identify, photograph, record data and collect the carcass as would be done for carcasses within  
42 the formal search sample during scheduled searches  
43

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<sup>3</sup> Where search plots are adjacent, the search area may be rectangular.

1 If the incidentally discovered carcass is found within a formal search plot, the fatality  
2 data will be included in the calculation of fatality rates. If the incidentally discovered carcass is  
3 found outside a formal search plot, the data will be reported separately.  
4

5 The certificate holder shall coordinate collection of incidentally discovered state  
6 endangered, threatened, sensitive or other state protected species with ODFW. The certificate  
7 holder shall coordinate collection of incidentally discovered federally-listed endangered or  
8 threatened species and Migratory Bird Treaty Act protected avian species with the USFWS.  
9

10 The certificate holder shall develop and follow a protocol for handling injured birds. Any  
11 injured native birds found on the facility site will be carefully captured by a trained project  
12 biologist or technician and transported to Jean Cypher (wildlife rehabilitator) in The Dalles, the  
13 Blue Mountain Wildlife Rehabilitation Center in Pendleton or the Audubon Bird Care Center in  
14 Portland in a timely fashion.<sup>4</sup> The certificate holder shall pay costs, if any are charged, for time  
15 and expenses related to care and rehabilitation of injured native birds found on the site, unless  
16 the cause of injury is clearly demonstrated to be unrelated to the facility operations.  
17

#### 18 (f) Statistical Methods for Fatality Estimates

19

20 The estimate of the total number of wind facility-related fatalities is based on:

- 21
- 22 (1) The observed number of carcasses found during standardized searches during the two  
23 monitoring years for which the cause of death is attributed to the facility.<sup>5</sup>  
24
  - 25 (2) Searcher efficiency expressed as the proportion of planted carcasses found by  
26 searchers.  
27
  - 28 (3) Non-removal rates expressed as the estimated average probability a carcass is  
29 expected to remain in the study area and be available for detection by the searchers  
30 during the entire survey period.  
31

#### 32 Definition of Variables

33

34 The following variables are used in the equations below:

- 35  $c_i$  the number of carcasses detected at plot  $i$  for the study period of interest (e.g., one  
36 year) for which the cause of death is either unknown or is attributed to the facility  
37  $n$  the number of search plots  
38  $k$  the number of turbines searched (includes the turbines centered within each  
39 search plot and a proportion of the number of turbines adjacent to search plots to  
40 account for the effect of adjacent turbines on the 90-meter search plot buffer area)  
41  $\bar{c}$  the average number of carcasses observed per turbine per year  
42  $s$  the number of carcasses used in removal trials  
43  $s_c$  the number of carcasses in removal trials that remain in the study area after 40  
44 days

---

<sup>4</sup> The people and centers listed here may be changed with Department approval.

<sup>5</sup> If a different cause of death is not apparent, the fatality will be attributed to facility operation.

1	$se$	standard error (square of the sample variance of the mean)
2	$t_i$	the time (days) a carcass remains in the study area before it is removed
3	$\bar{t}$	the average time (days) a carcass remains in the study area before it is removed
4	$d$	the total number of carcasses placed in searcher efficiency trials
5	$p$	the estimated proportion of detectable carcasses found by searchers
6	$I$	the average interval between searches in days
7	$\hat{\rho}$	the estimated probability that a carcass is both available to be found during a
8		search and is found
9	$m_t$	the estimated annual average number of fatalities per turbine per year, adjusted
10		for removal and observer detection bias
11	$C$	nameplate energy output of turbine in megawatts (MW)

12  
13 Observed Number of Carcasses

14  
15 The estimated average number of carcasses ( $\bar{c}$ ) observed per turbine per year is:

16  
17 
$$\bar{c} = \frac{\sum_{i=1}^n c_i}{k} . \tag{1}$$

18  
19 Estimation of Carcass Removal

20  
21 Estimates of carcass removal are used to adjust carcass counts for removal bias. Mean  
22 carcass removal time ( $\bar{t}$ ) is the average length of time a carcass remains at the site before it is  
23 removed:

24  
25 
$$\bar{t} = \frac{\sum_{i=1}^s t_i}{s - s_c} . \tag{2}$$

26  
27 This estimator is the maximum likelihood estimator assuming the removal times follow an  
28 exponential distribution and there is right-censoring of data. Any trial carcasses still remaining at  
29 40 days are collected, yielding censored observations at 40 days. If all trial carcasses are  
30 removed before the end of the trial, then  $s_c$  is 0, and  $\bar{t}$  is just the arithmetic average of the  
31 removal times. Removal rates will be estimated by carcass size (small and large) and season.

32  
33 Estimation of Observer Detection Rates

34  
35 Observer detection rates (i.e., searcher efficiency rates) are expressed as  $p$ , the proportion  
36 of trial carcasses that are detected by searchers. Observer detection rates will be estimated by  
37 carcass size and season.

38  
39 Estimation of Facility-Related Fatality Rates

1 The estimated per turbine annual fatality rate ( $m_t$ ) is calculated by:

$$2 \quad m_t = \frac{\bar{c}}{\hat{\rho}}, \quad (3)$$

4 where  $\hat{\rho}$  includes adjustments for both carcass removal (from scavenging and other means) and  
5 observer detection bias assuming that the carcass removal times  $t_i$  follow an exponential  
6 distribution unless a different assumption about carcass removal is made with the approval of the  
7 Department. Under these assumptions, this detection probability is estimated by:  
8  
9

$$10 \quad \hat{\rho} = \frac{\bar{t} \times p}{I} \times \frac{\exp\left(\frac{I}{\bar{t}}\right) - 1}{\exp\left(\frac{I}{\bar{t}}\right) - 1 + p}. \quad (4)$$

11 The estimated per MW annual fatality rate ( $m$ ) is calculated by:

$$12 \quad m = \frac{m_t}{C}. \quad (5)$$

13  
14  
15 The certificate holder shall calculate fatality estimates for: (1) all birds, (2) small birds,  
16 (3) large birds, (4) raptors, (5) target grassland birds, (6) nocturnal avian migrants, 7) avian State  
17 Sensitive Species listed under OAR 635-100-0040, and 8) bats. The final reported estimates of  
18  $m$ , associated standard errors and 90% confidence intervals will be calculated using  
19 bootstrapping (Manly 1997). Bootstrapping is a computer simulation technique that is useful for  
20 calculating point estimates, variances and confidence intervals for complicated test statistics. For  
21 each iteration of the bootstrap, the plots will be sampled with replacement, trial carcasses will be  
22 sampled with replacement and  $\bar{c}$ ,  $\bar{t}$ ,  $p$ ,  $\hat{\rho}$  and  $m$  will be calculated. A total of 5,000 bootstrap  
23 iterations will be used. The reported estimates will be the means of the 5,000 bootstrap estimates.  
24 The standard deviation of the bootstrap estimates is the estimated standard error. The lower 5<sup>th</sup>  
25 and upper 95<sup>th</sup> percentiles of the 5000 bootstrap estimates are estimates of the lower limit and  
26 upper limit of 90% confidence intervals.  
27  
28

### 29 Nocturnal Migrant and Bat Fatalities

30  
31 Differences in observed nocturnal avian migrant and bat fatality rates for lit turbines,  
32 unlit turbines that are adjacent to lit turbines, and unlit turbines that are not adjacent to lit  
33 turbines will be compared graphically and statistically.  
34

#### 35 (g) Mitigation

36  
37 Mitigation may be appropriate if analysis of the fatality data collected after the first  
38 monitoring year shows fatality rates for avian species that exceed a threshold of concern. For the  
39 purpose of determining whether a threshold has been exceeded, the certificate holder shall  
40 calculate the average annual fatality rates for the species groups after the initial two years of

1 monitoring. Based on current knowledge of the species that are likely to use the habitat in the  
 2 area of the facility, the following thresholds apply to the GHWP:  
 3

<b>Species Group</b>	<b>Threshold of Concern</b> (fatalities per MW)
Raptors (All eagles, hawks, falcons and owls, including burrowing owls.)	0.09
Raptor species of special concern (Swainson’s hawk, ferruginous hawk, peregrine falcon, golden eagle, bald eagle, burrowing owl and any federal threatened or endangered raptor species.)	0.06
Target grassland birds (All native bird species that rely on grassland habitat and are either resident species, occurring year round, or species that nest in the area, excluding horned lark, burrowing owl and northern harrier.)	0.59
State sensitive avian species listed under OAR 635-100-0040 (Excluding raptors listed above.)	0.20
Bat species as a group	2.50
Guyed Meteorological Tower Mortality	
Raptor T&E species and raptor species of special concern, as a group (Swainson’s hawk, ferruginous hawk, golden eagle and burrowing owl; bald eagle, peregrine falcon, and any other federal threatened or endangered raptor species)	0.20/ guyed tower
Avian State Sensitive Species listed under OAR 635-100-0040 (Excluding raptors)	0.20/ guyed tower

4  
 5 Before the end of the first monitoring year, GHWF shall form a technical advisory  
 6 committee (TAC) that will include at least GHWF, ODOE and ODFW. Other stakeholders, such  
 7 as USFWS, may also serve on the TAC. The TAC shall consider the fatality monitoring results  
 8 from Klondike III, Biglow Canyon, Nine Canyon, Leaning Juniper, Hopkins Ridge, Combine  
 9 Hills, and other wind projects in Sherman County if available, and determine if the thresholds  
 10 should be adjusted.

11  
 12 In addition, mitigation may be appropriate if fatality rates for individual species  
 13 (especially State Sensitive Species) are higher than expected and at a level of biological concern.  
 14 If the data show that a threshold of concern for a species group has been exceeded or that the  
 15 fatality rate for any individual species is at a level of biological concern, mitigation shall be  
 16 required if the Department determines that mitigation is appropriate based on analysis of the data  
 17 and any other significant information available at the time. If mitigation is appropriate, the  
 18 certificate holder, in consultation with ODFW, shall propose mitigation measures designed to  
 19 benefit the affected species. This may take into consideration whether mitigation required or  
 20 provided for other impacts, such as raptor nesting or grassland bird displacement, would also  
 21 benefit the affected species.

22  
 23 The certificate holder shall implement mitigation as approved by the Council. The  
 24 Department may recommend additional, targeted data collection if the need for mitigation is  
 25 unclear based on the information available at the time. The certificate holder shall implement  
 26 such data collection as approved by the Council.

1  
2 Mitigation shall be designed to benefit the affected species group. Mitigation may  
3 include, but is not limited to, protection of nesting habitat for the affected group of native species  
4 through a conservation easement or similar agreement. Tracts of land that are intact and  
5 functional for wildlife are preferable to degraded habitat areas. Preference should be given to  
6 protection of land that would otherwise be subject to development or use that would diminish the  
7 wildlife value of the land. In addition, mitigation measures might include: enhancement of the  
8 protected tract by weed removal and control; increasing the diversity of native grasses and forbs;  
9 planting sagebrush or other shrubs; constructing and maintaining artificial nest structures for  
10 raptors; reducing cattle grazing; improving wildfire response; and local research that would aid  
11 in understanding more about the species and conservation needs.

12  
13 If the threshold for bats species as a group is exceeded, the certificate holder shall  
14 contribute to Bat Conservation International or to a Pacific Northwest bat conservation group  
15 (\$10,000 per year for three years) to fund new or ongoing research in the Pacific Northwest to  
16 better understand impacts to the bat species impacted by the facility and to develop possible  
17 ways to reduce impacts to the affected species.

18  
19 In addition, mitigation may be appropriate if fatality rates for a State Sensitive bat species  
20 listed under OAR 635-100-0040 are higher than expected and at a level of concern. If the data  
21 show that a threshold of concern for a species group has been exceeded or that the fatality rate  
22 for any individual species is at a level of concern, mitigation shall be required if the Department  
23 determines that mitigation is appropriate based on analysis of the data and any other significant  
24 information available at the time. If mitigation is appropriate, the certificate holder, in  
25 consultation with ODFW, shall propose mitigation measures designed to benefit the affected  
26 species. The certificate holder shall implement mitigation as approved by the Council.

## 27 28 **2. Raptor Nest Surveys**

29  
30 The objectives of raptor nest surveys are to estimate the size of the local breeding  
31 populations of tree or other above-ground-nesting raptor species in the vicinity of the facility and  
32 to determine whether operation of the facility results in a reduction of nesting activity or nesting  
33 success in the local populations of the following raptor species: Swainson's hawk, ferruginous  
34 hawk and golden eagle. The certificate holder shall direct a qualified biologist, approved by the  
35 Department, to conduct the raptor nest surveys. The certificate holder may select other qualified  
36 biologists to conduct the raptor nest surveys, subject to Department approval.

### 37 38 (a) Survey Protocol

39  
40 For the species listed above, aerial and ground surveys will be used to gather nest success  
41 data on active nests, nests with young and young fledged. The certificate holder will share the  
42 data with state and federal biologists. The certificate holder shall conduct two years of post-  
43 construction raptor nest surveys for the completed facility during the sensitive nesting and  
44 breeding season. One year of post-construction surveys will be done in the first nesting season  
45 after construction is completed. The second year of post-construction surveys will be done at a  
46 time recommended by the certificate holder and approved by the Department. The certificate

1 holder may collaborate with other certificate holders in the vicinity of the facility in the  
2 development of useful information about future impacts on raptor nesting activity and nesting  
3 success.

4  
5 Prior to the raptor nesting surveys, the certificate holder shall review the locations of  
6 known raptor nests based on the GHWP, the Biglow Canyon Wind Farm and Klondike Wind  
7 Project pre-construction surveys as well as any nest survey data collected after construction. All  
8 known nest sites and any new nests observed within the GCWF site and within two miles of the  
9 GHWP site will be given identification numbers. Nest locations will be recorded on U.S.  
10 Geological Survey 7.5-minute quadrangle maps. Global positioning system coordinates will be  
11 recorded for each nest and integrated with the baseline database. Locations of inactive nests will  
12 also be recorded as they may become occupied during future years.

13  
14 During each raptor nesting monitoring year, the certificate holder shall conduct a  
15 minimum of one helicopter survey in late May or early June within the GHWP site and a 2-mile  
16 zone around the turbines to determine nest occupancy. Determining nest occupancy will likely  
17 require two visits to each nest: The second visit may be done by air or by ground as appropriate.  
18 For occupied nests of the species identified above, the certificate holder shall determine nesting  
19 success by a minimum of one ground visit to determine species, number of young and nesting  
20 success. "Nesting success" means that the young have successfully fledged (the young are  
21 independent of the core nest site). Nests that cannot be monitored due to the landowner denying  
22 access will be checked from a distance where feasible.

23  
24 (b) Mitigation

25  
26 The certificate holder shall analyze the raptor nesting data collected after two monitoring  
27 years to determine whether a reduction in either nesting success or nest use has occurred in the  
28 vicinity of the GHWP. If the analysis indicates a reduction in nesting success by Swainson's  
29 hawk, ferruginous hawk or golden eagle within two miles of the facility (including the area  
30 within the GHWP site), then the certificate holder shall propose appropriate mitigation and shall  
31 implement mitigation as approved by the Council. At a minimum, if the analysis shows that any  
32 of these species has abandoned a nest territory within the facility site or within ½ mile of the  
33 facility site, or has not fledged any young over the two survey years within the facility site or  
34 within ½ mile of the facility site, the certificate holder shall assume the abandonment or  
35 unsuccessful fledging is the result of the facility unless another cause can be demonstrated  
36 convincingly. If the GHWP facility and the Klondike III facility are both required to provide  
37 mitigation for the same nest, the two certificate holders shall coordinate the required mitigation  
38 with the approval of the Department.

39  
40 Given the very low buteo nesting densities in the area, statistical power to detect a  
41 relationship between distance from a wind turbine and nesting parameters (*e.g.*, number of  
42 fledglings per reproductive pair) will be very low. Therefore, impacts may have to be judged  
43 based on trends in the data, results from other wind energy facility monitoring studies and  
44 literature on what is known regarding the populations in the region.

1 If the analysis shows that mitigation is appropriate, the certificate holder shall propose  
2 mitigation for the affected species in consultation with the Department and ODFW, and shall  
3 implement mitigation as approved by the Council. Mitigation should be designed to benefit the  
4 affected species or contribute to overall scientific knowledge and understanding of what causes  
5 nest abandonment or nest failure. Mitigation may be designed to proceed in phases over several  
6 years. It may include, but is not limited to, additional raptor nest monitoring, protection of  
7 natural nest sites from human disturbance or cattle activity (preferably within the general area of  
8 the facility), or participation in research projects designed to improve scientific understanding of  
9 the needs of the affected species. Mitigation may take into consideration whether mitigation  
10 required or provided for other impacts, such as fatality impacts or grassland bird displacement,  
11 would also benefit the raptor species whose nesting success was adversely affected.

### 12 13 (c) Long-term Raptor Nest Monitoring and Mitigation 14

15 In addition to the two years of post-construction raptor nest surveys described in  
16 subsection (a), GHWF shall conduct long-term raptor nest surveys at five year intervals for the  
17 life of the facility. GHWF shall conduct the first long-term raptor nest survey in the ninth year  
18 after construction is completed. In conducting long-term surveys, GHWF shall follow the same  
19 survey protocols as described above in subsection (a) unless GHWF proposes an alternative  
20 protocol that is approved by the Department. In developing an alternative protocol, GHWF shall  
21 consult with ODFW.  
22

23 GHWF shall analyze the raptor nesting data collected after each year of long-term raptor  
24 nest surveys to determine whether a reduction in either nesting success or nest use has occurred  
25 in the vicinity of the GHWP. If the analysis indicates a reduction in nesting success or nest use  
26 by Swainson's hawks, golden eagles, or ferruginous hawks within the facility site or within 2  
27 miles of the site, then GHWF shall propose appropriate mitigation for the affected species as  
28 described in subsection (b) and shall implement mitigation as approved by the Council. At a  
29 minimum, if the analysis shows that any raptors of these species have abandoned a nest territory  
30 within the facility site or within ½ mile of the facility site or has not fledged any young within  
31 that same area, GHWF shall assume the abandonment or unsuccessful fledging is due to  
32 operation of the facility unless another cause can be demonstrated convincingly.  
33

34 Any reduction in nesting success or nest use could be due to operation of the GHWP  
35 facility, operation of another wind facility in the vicinity or some other cause. GHWF shall  
36 attribute the reduction to operation of GHWP if the wind turbine closest to the affected nest site  
37 is a GHWP turbine unless GHWF demonstrates, and the Department agrees, that the reduction  
38 was due to a different cause.  
39

40 Given the low raptor nesting densities in the area, statistical power to detect a relationship  
41 between distance from a wind turbine and nesting parameters (e.g. number of fledglings per  
42 reproductive pair) will be very low. Therefore, impacts may have to be judged based on trends in  
43 the data, results from other wind energy facility monitoring studies and literature on what is  
44 known regarding the population in the region.  
45

### 46 **3. Avian Use and Behavior Surveys**

1  
2         Searchers will also record bird species observed and their behavior relative to turbine  
3 locations before or after each standardized carcass search (as described in Section 1(e) above).  
4 Observations will be recorded during 5-minute surveys at each turbine sampled during the  
5 fatality-monitoring program, using standard variable circular plot point count survey methods.  
6 Collection and recording of these additional observations of live birds will be carried out in a  
7 manner that does not distract searchers from carrying out the standardized carcass searches.  
8

9         All of these avian use and behavior data, as well as raptor and waterfowl mortality  
10 observed at the turbines near these stations, will be used to understand direct and indirect impacts  
11 of the GHWP facility on raptors, waterfowl and other avian species. The certificate holder shall  
12 include an analysis of this data in the reports described in Section 5.  
13

#### 14 **4. GHWP Wildlife Incident Response and Handling System**

15  
16         The Wildlife Incident Response and Handling System is a monitoring program set up for  
17 responding to and handling avian and bat casualties found by construction and maintenance  
18 personnel during construction and operation of the facility. This monitoring program includes the  
19 initial response, the handling and the reporting of bird and bat carcasses discovered incidental to  
20 construction and maintenance operations (“incidental finds”). Construction and maintenance  
21 personnel will be trained in the methods needed to carry out this program.  
22

23         All carcasses discovered by construction or maintenance personnel will be photographed,  
24 recorded and collected.  
25

26         If construction or maintenance personnel find carcasses within the plots for protocol  
27 searches, they will notify a qualified biologist, as approved by the Department, who will collect  
28 the carcasses. The fatality data will be included in the calculation of fatality rates.  
29

30         If construction or maintenance personnel discover incidental finds that are not within  
31 plots for fatality monitoring protocol searches, they will notify a qualified biologist, as approved  
32 by the Department, and the carcass will be collected by a carcass-handling permittee (a person  
33 who is listed on state and federal scientific or salvage collection permits). Data for these  
34 incidental finds will be reported separately from standardized fatality monitoring data.  
35

36         The certificate holder shall coordinate collection of state endangered, threatened,  
37 sensitive or other state protected species with ODFW. The certificate holder shall coordinate  
38 collection of federally-listed endangered or threatened species and Migratory Bird Treaty Act  
39 protected avian species with the USFWS.  
40

#### 41 **5. Data Reporting**

42  
43         The certificate holder will report the monitoring data and analysis to the Department.  
44 Monitoring data include fatality monitoring program data, raptor nest survey data, avian use and  
45 behavior survey data and data on incidental finds by fatality searchers and GHWF personnel.  
46 The report may be included in the annual report required under OAR 345-026-0080 or may be

1 submitted as a separate document at the same time the annual report is submitted. In addition, the  
2 certificate holder shall provide to the Department any data or record generated in carrying out  
3 this monitoring plan upon request by the Department.  
4

5 The certificate holder shall immediately notify USFWS and ODFW, respectively, in the  
6 event that any federal or state endangered or threatened species are killed or injured on the  
7 facility site.  
8

9 The public will have an opportunity to receive information about monitoring results and  
10 to offer comment. Within 30 days after receiving the annual report of monitoring results, the  
11 Department will make the report available to the public on its website and will specify a time in  
12 which the public may submit comments to the Department.<sup>6</sup>  
13

## 14 **6. Amendment of the Plan**

15

16 This Wildlife Monitoring and Mitigation Plan may be amended from time to time by  
17 agreement of the certificate holder and the Council. Such amendments may be made without  
18 amendment of the site certificate. The Council authorizes the Department to agree to  
19 amendments to this plan and to mitigation actions that may be required under this plan. The  
20 Department shall notify the Council of all amendments and mitigation actions, and the Council  
21 retains the authority to approve, reject or modify any amendment of this plan or mitigation action  
22 agreed to by the Department.  
23  
24

---

<sup>6</sup> The certificate holder may establish a Technical Advisor Committee (TAC) but is not required to do so. If the certificate holder establishes a TAC, the TAC may offer comments to the Council about the results of the monitoring required under this plan.

## ATTACHMENT B

### **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 Appendix 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.**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Pounds (PLS)/ Acre</b>
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

**APPENDIX A**

**HABITAT MITIGATION PROJECT**

# **GOLDEN HILLS HABITAT MITIGATION PROJECT**

## **OFF-SITE UPLAND GRASSLAND SHRUB-STEPPE ENHANCEMENT JOHN DAY RIVER BASIN**

### **SITE DESCRIPTION AND PROPOSED MITIGATION MANAGEMENT**

#### **John Day River Rim – Upland Grassland Shrub-steppe Enhancement**

##### ***Current Condition***

The mitigation area is located “off-site” approximately 5 miles southeast of the Golden Hills Wind Farm layout (Figure 1). The enhancement area is within approximately 330 acres of fenced rangeland, with large tracts of CRP located immediately to the north and south, and BLM land to the east. The entire property has been extensively grazed historically and recently by livestock, yet harbors mature big sagebrush on the hillside slopes and interior drainage. The site is at the uppermost region of the Willow Springs Canyon tributary of the John Day River, approximately two miles up-drainage of the river (Figure 1). The area selected for enhancement is approximately 21.9 acres within a 40 acre deep-soil parcel (Figure 2). The 21.9 acre enhancement area may be reduced or increased based upon finalized calculations for habitat impacts from the Golden Hills Wind Facility layout. This mitigation parcel includes an upland 1 to 7 degree slope deep-soil area classified by USDA NRCS as 1B Anderly silt loam (1-30 inch typical depth profile; Figure 3). This soil type is considered prime farmland if irrigated. The area has historically been cultivated and seeded to provide better forage for cattle, although currently non-native undesirable cheatgrass dominates the area (see Appendix A photos). Horizontal and vertical vegetative structure, especially of native grasses and forbs, is largely depleted due to livestock grazing impacts (Appendix A). The enhancement area is adjacent to CRP to the west/southwest and BLM to the north, east, and southeast. Areas on all sides of the previously cultivated area have stands of blue bunch wheatgrass, with a variety of forbs including balsamroot, big sagebrush, rigid sagebrush, phlox species, pussy toes, lupine, daisy fleabane, yarrow, and green rabbitbrush (Appendix A).

##### ***Potential for Wildlife Habitat Enhancement***

This site has the potential to provide more diverse grassland in greater quantity with greater horizontal and vertical structure. If enhanced, the parcel would provide better nesting habitat for grassland bird species, including loggerhead shrikes, and also provide higher quality forage and cover for big game. Limited big game forage such as sandberg bluegrass, bluebunch wheatgrass, and various forbs, would be enhanced with livestock exclusion providing better fall, winter, and early spring rangeland for big game. Summer habitat for ground-nesting birds would also be

enhanced. Enhancement would also likely provide better hunting grounds for raptors as well. Due to the elevational gradient and mixed soil depths, the site has the potential to provide several different quality ecotones.

### ***Proposed Management for Enhancement***

Eradication or control of non-desirable invasive/noxious species would be conducted by either using small controlled prescribed burns or spot spraying with herbicide. The area would be reclaimed for desirable grassland/shrub-steppe wildlife habitat using the revegetation methods described in section 4.0 of the Golden Hills Wind Farm revegetation plan for temporarily disturbed upland non-agriculture lands. The entire mitigation parcel would be fenced off and not grazed by domestic livestock. Given the selected mitigation parcel is currently heavily grazed and predominantly cheatgrass, there exists a high potential for successful reclamation of high quality wildlife habitat. In addition, a water catchment (“guzzler”) would be installed providing a water source for wildlife. Prior to any land management change, the ecological condition of the site should be assessed using Oregon protocols for rangeland inventory and evaluation (USDA 2004). This assessment would include photo documentation of the site with additional notes regarding wildlife habitat condition. Post-management site assessment, for example every 5 years, should also be agreed upon by ODFW allowing adaptive management needs.

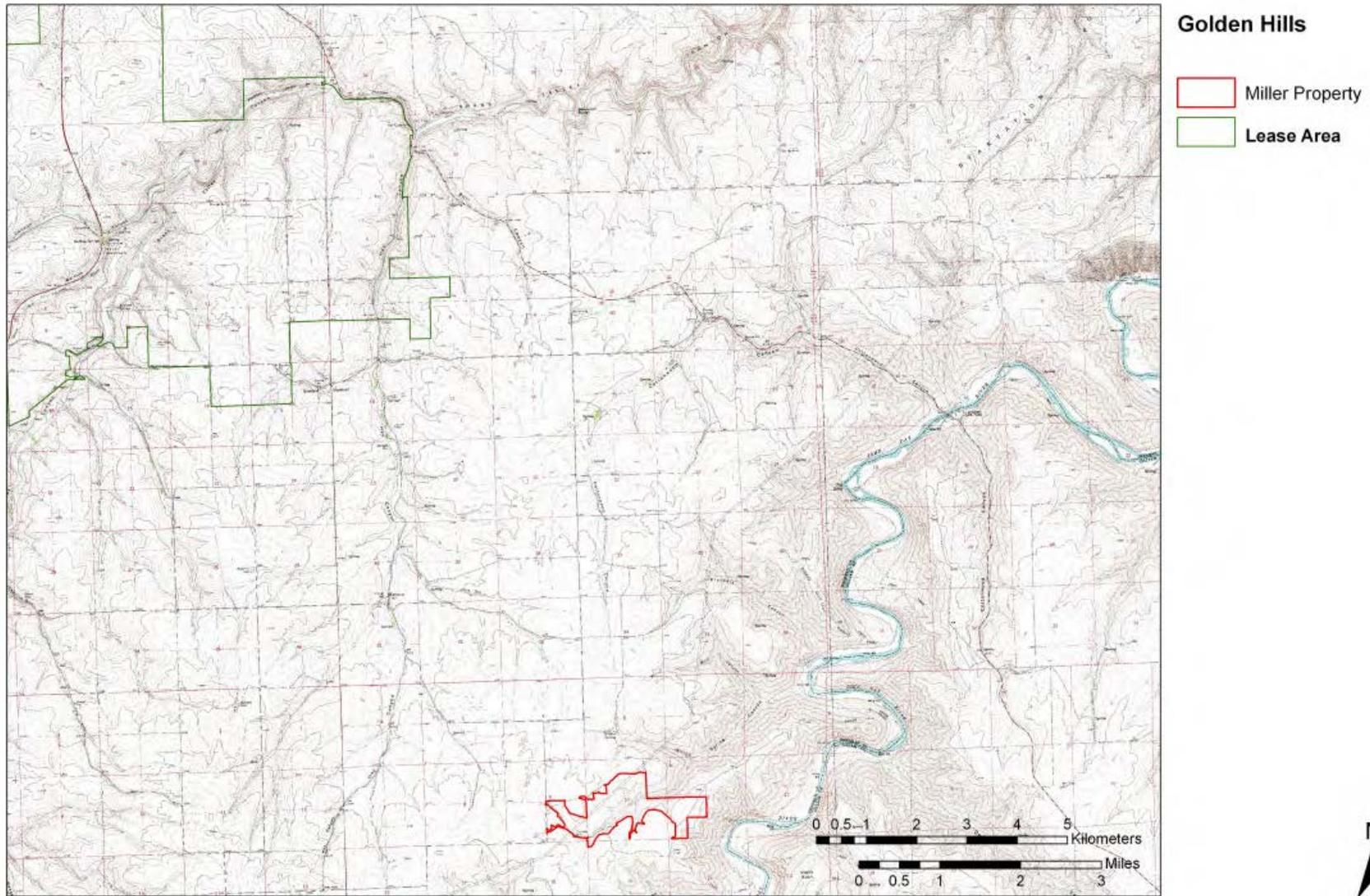
### ***Advantages***

This site lacks public road access and is remote and infrequently disturbed by humans, used largely for hunting by landowner only. The site is approximately 5 miles from the proposed Golden Hills Wind Farm (Figure 1). The landowner has expressed willingness to enter into at least a 25 year conservation easement agreement for the site. The enhancement parcel has suitable soils for successful seeding and is surrounded by existing stands of grassland/shrub-steppe. The area is adjacent to a watershed with riparian habitat to the north, and cliff and riparian corridor habitat of the John Day River to the east; enhancing landscape-level wildlife forage, thermal and security cover, and water. This location presents the opportunity to enhance grassland/shrub-steppe quality and quantity that is limited in availability for wildlife. Successful enhancement would provide greater connectivity between adjacent large tracts of CRP and BLM lands, creating a larger overall mosaic of quality wildlife habitat.

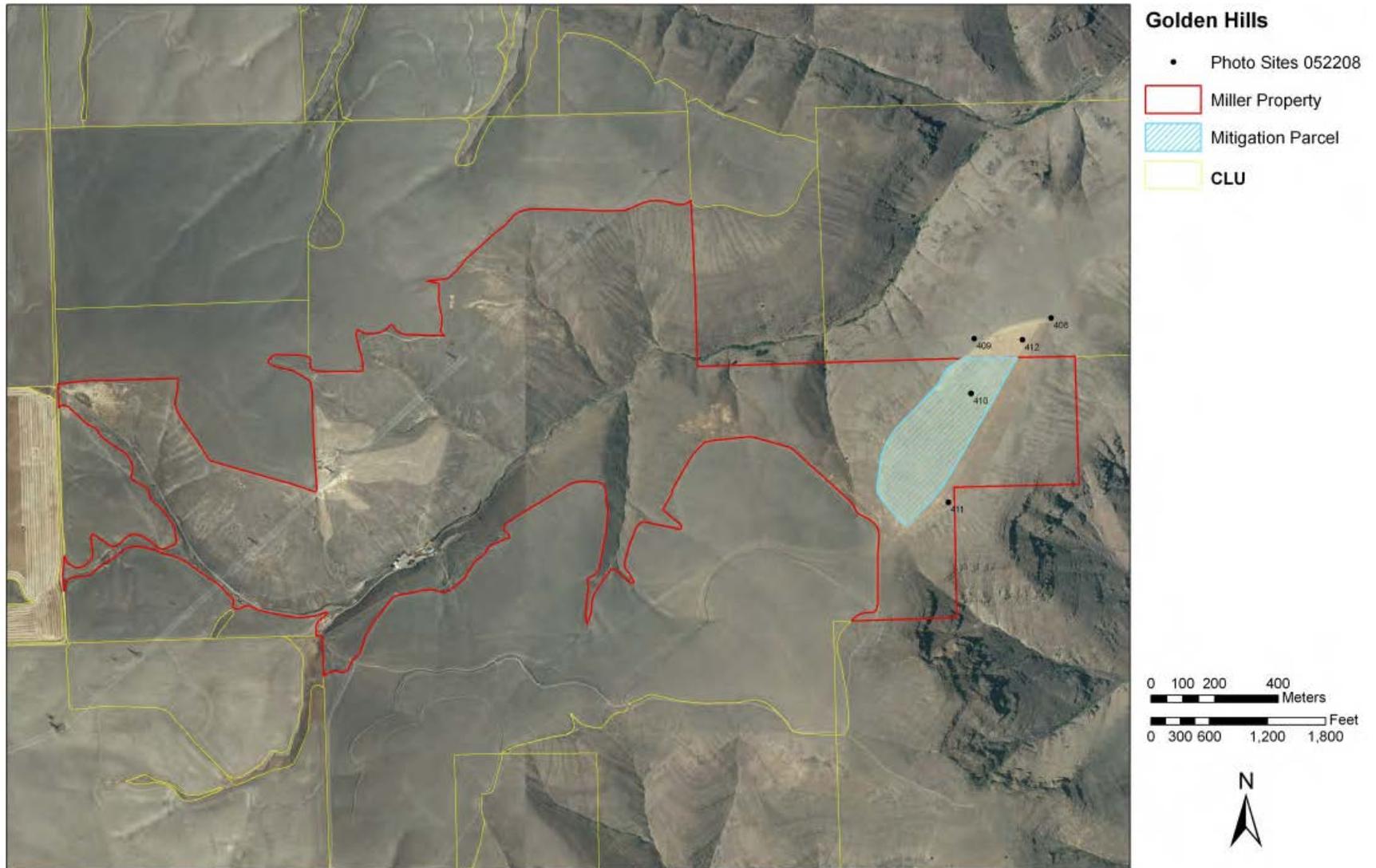
### ***Reference***

USDA. 2004. National Range and Pasture Handbook: Amendment 2 600.0401a; Oregon Protocols for Rangeland and Pature / Hayland Inventory and Evaluation. United States Department of Agriculture, Natural Resources Conservation Service, Grazing Lands Technology Institute.

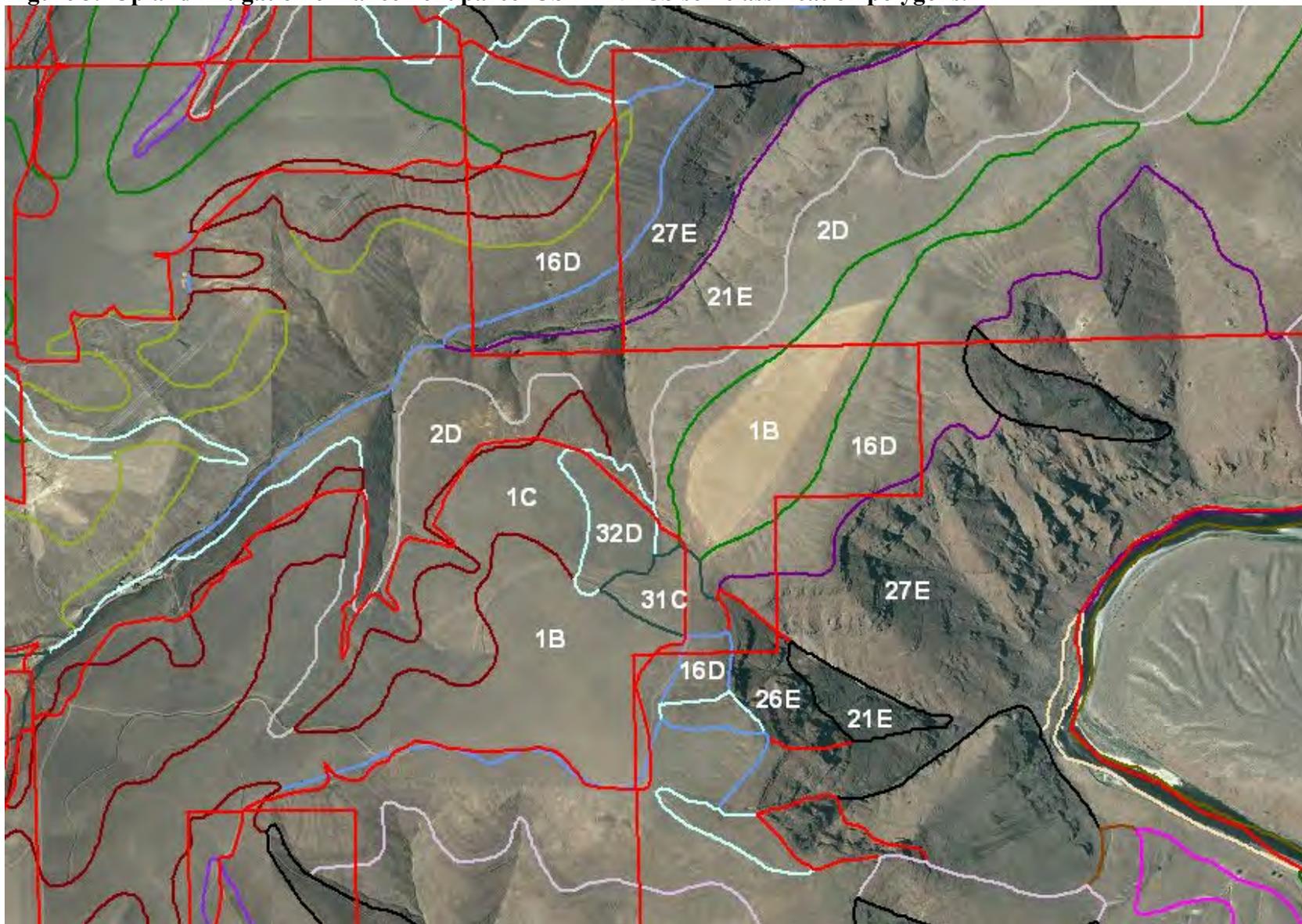
**Figure 1. Miller property with mitigation area in relation to the Golden Hills Wind Farm location.**



**Figure 2. Upland mitigation enhancement parcel within the Miller property rangeland area.**



**Figure 3. Upland mitigation enhancement parcel USDA NRCS soil classification polygons.**



**Appendix A (Photo Sites 408-412). Mitigation Enhancement Parcel pictures of vegetation and grazing impacts.  
PHOTO SITE 408 – ENHANCEMENT PARCEL WITH ADJACENT BUNCHGRASS**



**PHOTO SITE 409 – ENHANCEMENT PARCEL WITH ADJACENT BUNCHGRASS (FOREGROUND)**



**PHOTO SITE 410 – ENHANCEMENT PARCEL**



PHOTO SITE 411 – ENHANCEMENT PARCEL WITH ADJACENT BUNCHGRASS



**PHOTO SITE 412 – ENHANCEMENT PARCEL**



**PHOTO – ENHANCEMENT PARCEL WITH CATTLE GRAZING MAY 22, 2008**



**PHOTO – ENHANCEMENT PARCEL WITH ADJACENT SAGEBRUSH/BUNCHGRASS (FOREGROUND) AND DRILL MAY 22, 2008**

