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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).¹ 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

¹ 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 searches², 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

² 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.

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 5th 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.³ 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

³ 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.⁴ 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.⁵
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

⁴ The people and centers listed here may be changed with Department approval.

⁵ 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	$\hat{\pi}$	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:

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

4 where $\hat{\pi}$ 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

$$10 \quad \hat{\pi} = \frac{\bar{t} \cdot p}{I} \cdot \left[\frac{\exp\left(\frac{I}{\bar{t}}\right) - 1}{\exp\left(\frac{I}{\bar{t}}\right) - 1 + p} \right]. \quad (4)$$

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 , $\hat{\pi}$ 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 5th
25 and upper 95th percentiles of the 5000 bootstrap estimates are estimates of the lower limit and
26 upper limit of 90% confidence intervals.
27

28 Nocturnal Migrant and Bat Fatalities

29
30 Differences in observed nocturnal avian migrant and bat fatality rates for lit turbines,
31 unlit turbines that are adjacent to lit turbines, and unlit turbines that are not adjacent to lit
32 turbines will be compared graphically and statistically.
33

34 (g) Mitigation

35
36 Mitigation may be appropriate if analysis of the fatality data collected after the first
37 monitoring year shows fatality rates for avian species that exceed a threshold of concern. For the
38 purpose of determining whether a threshold has been exceeded, the certificate holder shall
39 calculate the average annual fatality rates for the species groups after the initial two years of
40

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

Species Group	Threshold of Concern (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.⁶
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

⁶ 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.