EAGLE CONSERVATION PLAN AND - BIRD AND BAT CONSERVATION STRATEGIES FOR THE - ECHANIS WIND ENERGY FACILITY AND THE - NORTH TRANSMISSION ROUTE ALTERNATIVE -

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Prepared by

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1.0 INTRODUCTION -

1.1 Background

Echanis, LLC, a Delaware limited liability company ("Echanis"), is developing a 103.5 MW wind energy project on private property in Harney County, Oregon (the "Project"). The Project is located ten miles southeast of Diamond, Oregon on Mann Lake Ranch. As part of the Project, Echanis has applied for a grant of Right of Way ("ROW") for a single pole power line across federal land managed by the BLM and the Malheur National Wildlife Refuge. The environmental impacts associated with the Project are discussed in a Draft Environmental Impact Statement ("DEIS") issued by the Bureau of Land Management ("BLM") in June 2010; a final EIS was issued in October 2011, and a Record of Decision on the ROW application is pending.

Instruction Memorandum 2010-156 was issued by the BLM requiring an Avian and Bat Protection Plan acceptable to the United States Fish and Wildlife Service ("USFWS" or the "Service"), be concluded prior to issuance of the BLM's Record of Decision ("ROD") on the ROW. Accordingly, Echanis engaged the Service in a series of meetings aimed at developing an acceptable ABPP. As those meetings progressed, the Service issued Draft Eagle Conservation Plan Guidance, intended to assist developers and the Service in preparation of a Plans which would also include an Eagle Conservation Plan ("ECP"). Although those guidelines are still in Draft form, Echanis and the Service (with the participation of the Burns BLM staff and Oregon Department of Fish & Wildlife ("ODFW")) undertook a series of "workshops" planned to follow the Draft eagle Guidance, meeting more half a dozen times in 2011 and exchanging information via email and telephone conferences to draft and refine the following Plan, based on the Draft Eagle Conservation Plan Guidance.

In order to prevent and mitigate the impacts to avian species from the Project identified in the DEIS, Echanis has prepared this Eagle Conservation Plan and Bat and Bat Conservation Strategies Plan ("Plan"). This Plan discusses how Echanis plans to eliminate or mitigate avian and bat impacts, including impacts to Golden Eagles, from the Project prior to the construction of the Project, during construction of the Project, and during the operation of the Project.

1.2 Project Description

The Echanis Wind Energy Project was issued a conditional use permit in April 2007 that authorized Echanis to develop a 104 megawatt (MW) wind power project on a 10,500 acre privately owned tract near Princeton, Oregon. This Plan accounts for a project layout that encompasses 45 wind turbine generators (each, a "WTG"), each of which has a nameplate capacity of 2.3 megawatts ("MW"). The layout of the Project used in the site assessment described in Section 3 and the fatality prediction set forth in Section 4 is shown on Figure 1. Echanis has a 20-year power sales agreement with Southern California Edison for energy generated at the wind facility.

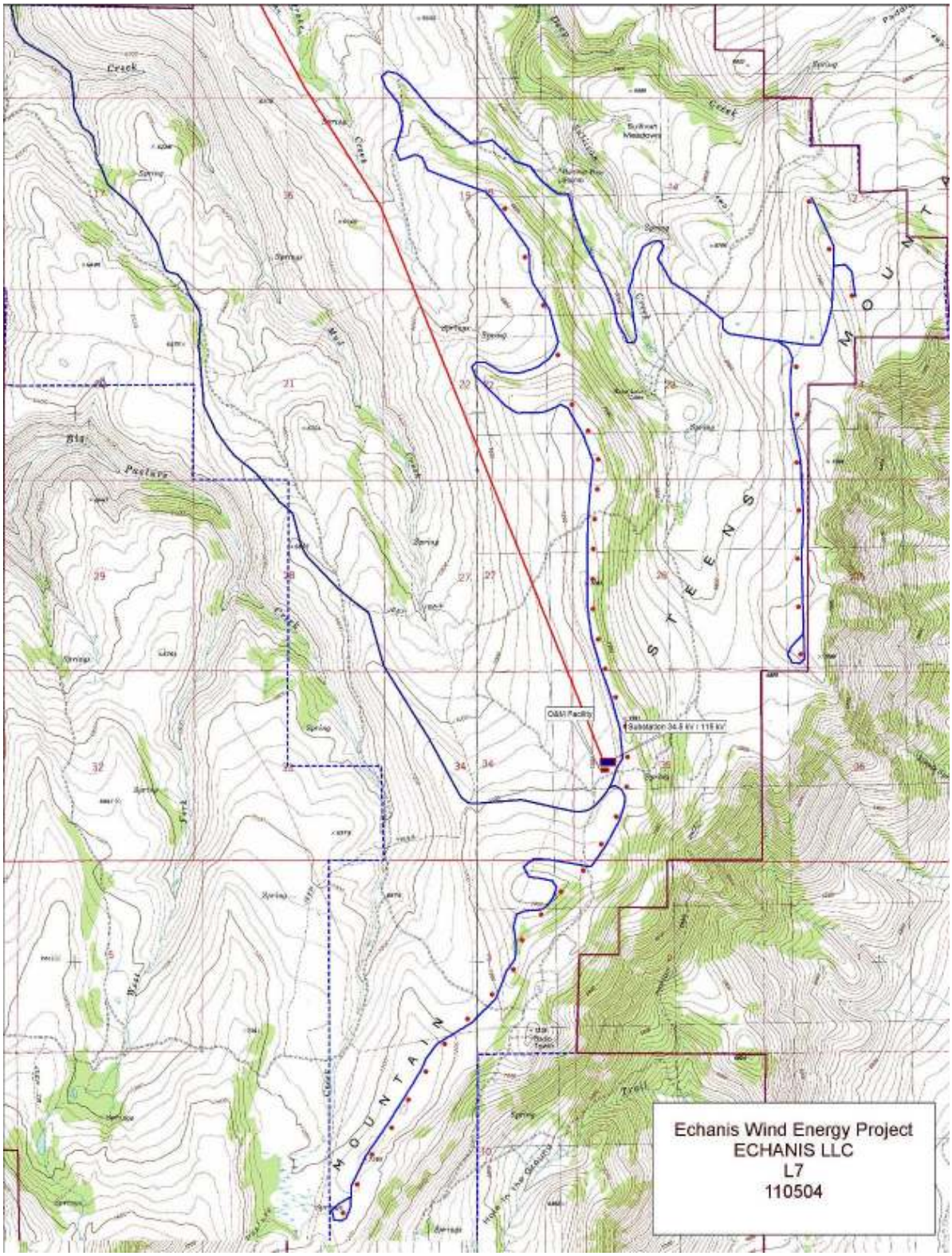

Figure 1: Initial Project Layout

This Plan uses the North Alternative identified in the EIS as the route of the proposed North Steens 230-kV Transmission Line, which would transport electrical power from the Project to an existing 115 kilovolt (kV) transmission line near Crane, Oregon, operated by HEC. The proposed transmission line route would cross approximately 19 miles of private land and 9 miles of land administered by the BLM (Burns District Office). The permanent ROW easement for the new transmission line would be 150 feet (total width). Initially, only one circuit of the double-circuit 230-kV line would be installed. The second circuit would be installed at a later date to transport power from other potential wind energy developments in the project area. The North Transmission Line Route is shown on Figure 2.

Construction of access roads along the transmission line corridor and to the Echanis Wind Energy Project will begin in spring 2012. Construction of the turbines and installation of the transmission line would occur in the spring, summer and fall of 2013. Construction of the Project will last approximately 9-12 months, depending on weather and site conditions.

1.3 Key Avian Laws, Regulations, and Authorizations

The Project is subject to a variety of federal, state, and local statutes, regulations, and plans as described in the EIS.

The Service is the principal Federal agency charged with protecting and enhancing populations and habitats of migratory bird species that spend all or part of their lives in the United States. The Migratory Bird Treaty Act, 16 U.S.C. §§ 703 *et seq*. ("MBTA"), prohibits the taking, killing, possession, transportation and importation of migratory birds, their eggs, parts, and nests, except when authorized by the Department of Interior. Currently, the list of migratory birds includes 1007 species (50 CFR Part 10.13). The MBTA has no provision for allowing unauthorized take of migratory birds that may be killed or injured by otherwise lawful activities. It must be recognized, however, that some birds may be killed at renewable energy developments even if all reasonable measures to avoid it are implemented. Nevertheless, the USFWS encourages companies to work closely with Service biologists to identify available protective measures when developing project plans and/or avian (and bat) protection plans, and to implement those measures during construction and operation of facilities and equipment. This document represents that collaborative effort.

The Bald and Golden Eagle Protection Act, 16 U.S.C. §§ 668-668d ("BGEPA"), further protects eagles from "take", where take is defined as "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, disturb individuals, their nests and eggs. "Disturb" was defined in 2007 (72 FR 31132) as "to agitate or bother a Bald or Golden Eagle to a degree that causes…injury to an eagle, reduced productivity, or nest abandonment…"

In 2009, two new permit rules were created for eagles. Under 50 C.F.R. § 22.26, the Service can issue permits that authorize limited take of Bald and Golden eagles when the take is associated with, but not the purpose of an otherwise lawful activity, and cannot practicably be avoided, and is compatible with the goal of stable or increasing breeding populations of eagles. Further, as explained above, the regulation also authorizes ongoing or programmatic take, but requires that any authorized programmatic take is unavoidable after implementing advanced conservation practices. Under 50 C.F.R. § 22.27, the Service can issue permits that allow the intentional take of eagle nests where necessary to alleviate a safety emergency to people or eagles, to ensure public health and safety, where a nest prevents use of a human-engineered structure, and to protect an interest in a particular locality where the activity or mitigation for the activity will provide a net benefit to eagles. Only inactive nests are allowed to be taken except in cases of safety emergencies.

In addition, in January 2011, the Service issued Draft Eagle Conservation Plan Guidance and Draft Land-Based Wind Energy Guidelines. This Plan seeks to incorporate recommendations from such documents to the greatest extent practicable, with the understanding that such draft guidance documents were issued after the permitting and siting of the Project.

1.4 Policy and Commitment to Environmental Protection

Echanis's parent company, Columbia Energy Partners ("CEP"), is an independent company that develops renewable power projects. Echanis, through CEP, is dedicated to delivering the highest values for their partners and the communities where they work, while exhibiting a strong commitment to promoting environmental stewardship and corporate responsibility. Similarly, the landowners who have leased Echanis/CEP their properties for wind energy development are exemplary stewards of the natural and wildlife resources on their private lands, with long track records of cooperation with resource agencies and research institutions. The CEP team is committed to building environmentally responsible renewable energy projects that also benefit the local and regional communities and economies and continues to work closely with environmental agencies to develop appropriate mitigation measures to reduce impacts to wildlife.

Figure 2: North Transmission Line Route

2.0 EAGLE CONSERVATION PLAN

This section sets forth Echanis's plan to conserve Golden Eagles through the use of avoidance, minimization and mitigation measures per the Draft Eagle Conservation Plan Guidance issued by the Service in January 2011 (the "Guidance"). In summary, this section discusses (a) the five stages of site selection and development undertaken with respect to the Echanis Project; (b) Advanced Conservation Practices ("ACPs") to be employed before, during, and after the construction of the Project (including site design and curtailment measures); and (c) for any remaining, unavoidable take after all practicable avoidance and minimization measures were negotiated, compensatory mitigation for the non-purposeful taking of eagles.

2.1 Stage 1: Site Assessment

Echanis began evaluation of the site in fall 2006 based on review of publicly-available wind resource maps that showed the area had promise as a wind energy resource. (*See* Figure 3: AWS Truewind map of Wind Speed of Oregon at 70 meters.) Echanis signed a lease agreement with Mann Lake Ranch to explore development of the property in 2007. Initial site reconnaissance revealed wind-swept areas well exposed to prevailing west winds and – where present – significant "flagging" of vegetation, indicating a robust westerly wind resource. A meteorological tower erected in spring 2007 began providing information to confirm the preliminary assessment, prompting Echanis to continue preliminary development activities.

Prior to obtaining a Conditional Use Permit from the County in 2007 and subsequent to the receipt of such Permit, Echanis evaluated the broad geographic area surrounding the Project in order to assess the relative importance of various areas on the proposed project site to avian species and other important wildlife. Specifically, Echanis commissioned an initial Wildlife Reconnaissance Report from Northwest Wildlife Consultants, Inc. ("NWC"), a highly-regarded firm with decades of experience in the region that gathered existing information from publicly available databases and other available information. NWC also conducted an initial site survey. Echanis used those data to refine potential project sites, balancing suitability for development with potential risk to special status species. A copy of the Reconnaissance Report is included in Appendix I.

2.2 Stage 2: Site Specific Surveys and Assessments

In the summer of 2007, NWC conducted avian and wildlife surveys on the Project in accordance with NWC's industry practices, designating avian point count locations and survey protocols. These surveys identified the use of the Project site by avian species during the seasons of highest use, as well as the location on the Project site of special status animal and plant species (including Golden Eagles).

With respect to Golden Eagles, NWC determined exposure minutes, that is the period of time during which an eagle was within the 800-meter point-count location between an elevation of the turbine base up to 175 meters. NWC also tracked the flight paths of eagles observed at the site. The results of such surveys are set forth below.

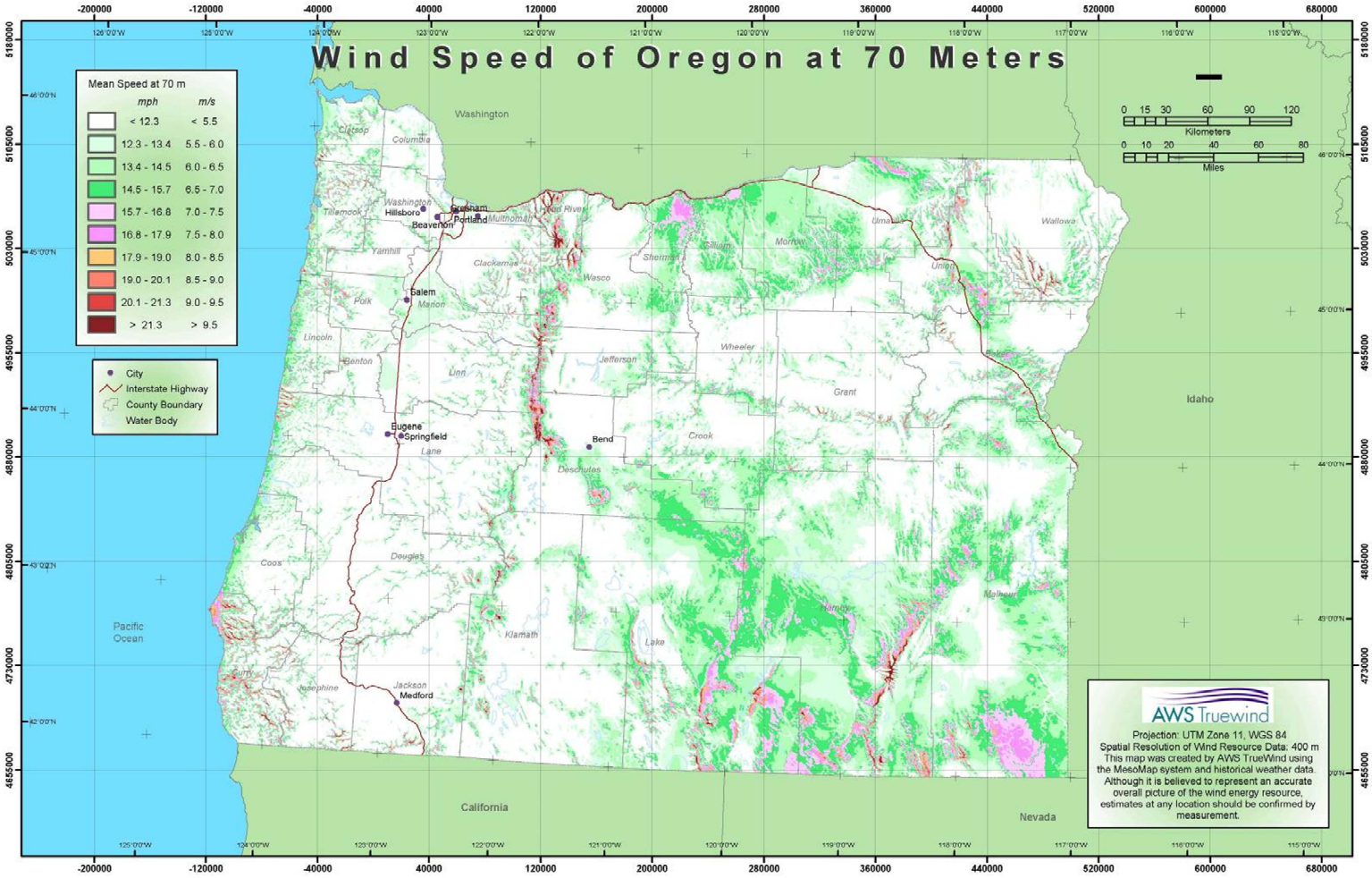

Figure 3: Oregon Wind map

2.2.1 *Surveys Conducted to Date*

Surveys conducted to date at the Project and associated proposed transmission line routes are shown in Table 1:

Table1: *Surveys Conducted at the Project and Transmission Line*

Aerial Raptor Nest Surveys	
Echanis WPP	Conducted June 8, 2007
T-line (West alt.)	Conducted May 27-29, 2009
T-line (North alt.)	Conducted June 8, 2010
Avian Use Surveys	
Echanis WPP	Aug 21-Nov 9, 2008
T-line (West alt.)	Sept 1, 2009-Aug 31, 2010
T-line (North alt.)	Sept 1, 2009-Aug 31, 2010
Special Status Wildlife Species Surveys	
Echanis WPP	Conducted July 25-28, 2008
T-line (West alt.)	Conducted June 5-10, 2009
T-line (North alt.)	Conducted June 8-18, 2010
Special Status Plant Species Surveys	
Echanis WPP	Conducted July 25-28, 2008
T-line (West alt.)	Conducted June 5-15, 2009
T-line (North alt.)	Conducted June 16-18, 2010
Small-Plot Avian Surveys	
T-line (West alt.)	May 14, May 25, June 10, 2010
Habitat Mapping	
Echanis WPP	Completed July 2008
T-line (West alt.)	Completed June 2009

A map showing the areas covered by these surveys is shown in Figure 4. All of these surveys are included in Appendix I.

These studies demonstrated that Golden Eagles use the east rim of the Project Area as a navigational guide when migrating, and the migration corridor is east of the Project Area (*see* Echanis Avian Use Study at 3). This conclusion is supported by the eagle flight paths recorded on the site (discussed in Section 2.2.3, *infra*), which show that migrating eagles fly below and to the east of the east rim, due to the presence of winds that assist in migration.

The data collected during the Avian Use Surveys at Echanis were used in a USFWS-developed model that estimates risk of eagle mortality at the site (Section 2.3).

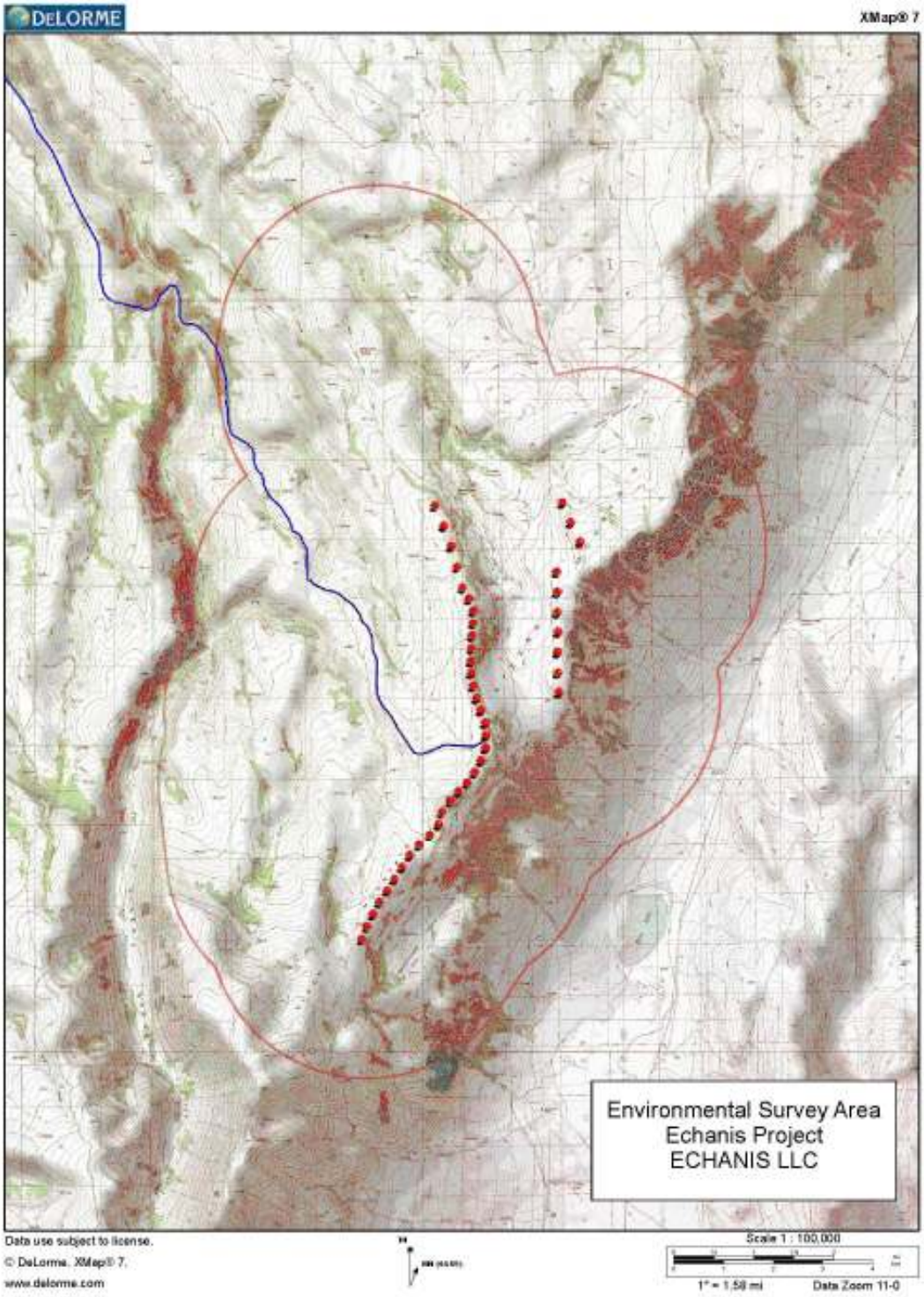

Figure 4: Environmental Study Areas

2.2.2 *Golden Eagle Flight Paths*

NWC tracked the flight paths for eagles observed over the site. Figure 5 shows all eagle flight paths observed on the Echanis site during 16 eagle exposure minutes out of 1,120 minutes (18.6 hours) of observations during the seasons of highest eagle use (summer and fall). These data confirm that the east rim is used by migrating Golden Eagles as a navigational feature.

2.2.3 *Eagle Use of the Project Site*

According to Rick Gerhardt of NWC, the avian use survey data discussed above and the eagle nest data (as set forth in Figure 8) indicate that Golden Eagles do not use the Project Area as a source of prey. Rather, the eagles that nest on the east rim feed on prey located on the spacious valley found east of the Project Area.

2.2.4 *Use of Site Assessment Data in Project Design*

Mirroring the process later set out in the Guidance, Echanis consulted with NWC on an iterative basis over the course of several years as information became available from both avian and wildlife studies and as Echanis developed a better understanding of the site's wind resource, topographical features and overall potential.

Beginning in 2007, when presented with the initial Wildlife Reconnaissance survey, Echanis determined there was a reasonably low probability of encountering threatened and endangered wildlife species on the site. In 2008, when Echanis shared very preliminary project designs with NWC, NWC urged Echanis to move turbines further to the west, away from the East Rim where NWC had observed raptors in migration (flying south, over the valley to the east of the Project site). Later guidance from the Service's Draft Eagle Conservation Plan Guidance suggests turbines be 50 meters or more from the edge of a major ridgeline: in fact, in accordance with NWC's recommendations, Echanis turbines are located more than 100 meters from the East Rim.

Also in 2007, NWC conducted a helicopter raptor nest survey, searching for active and inactive raptor nests within a (then widely accepted) two mile radius of the Project. No active raptor nests were found within that survey at the time, so Echanis continued with its development activities.

Since that time, a wide range of survey information from a number of sources has been accumulated and analyzed in conjunction with the Service, BLM and ODFW (*see, e.g.*, Figure 8: Golden Eagle Nesting Sites). This expanded survey and data base has yielded a more complete impression of Golden Eagle usage of the broader area, which shows no additional Golden Eagle nests in the two-mile radius around the project boundary, even from historical surveys conducted by a variety of agencies or groups over many years.

Echanis has sought to optimize production of the site, while at the same time, reducing the Project's footprint and potential impacts by increasing the efficiency of the turbines selected for

the Project. Original plans called for as many as 69 1.5 MW turbines. Current plans call for 45 turbines with a nameplate capacity of 2.3 MW each. While the 2.3 turbines are larger and have larger rotor diameters, they will require a smaller footprint and less infrastructure.

2.3 Stage 3: Predicting Eagle Fatalities

Pursuant to the Draft Guidance issued in January 2011, Echanis worked with the Service to model eagle risk at the site and conduct an initial fatality prediction for the Project. This risk assessment took into account the Draft Eagle Conservation Plan Guidance, the Service's models for assessing risk, an analysis of the risk factors set forth in the Draft Eagle Conservation Plan Guidance, as well as other concerns raised by the Service during meetings with Echanis. After a thorough discussion, it was determined that the Project is a low-risk site with respect to all avian and bat species, including eagles.

2.3.1 *Eagle Risk Modeling*

In its Guidance, the USFWS suggested use of an exposure-based model that uses site-specific estimates of eagle use of the project footprint for such assessments. The USFWS exposure-based model has not been tested, thus there is considerable uncertainty regarding its performance. The model relies on a logical assumption that there is a positive relationship between the number of minutes eagles are present in the air in a project footprint, the number of turbines present and the associated "dangerous" airspace, and the number of fatalities that will occur. This assumption, and others inherent in the model, will be tested using post-construction fatality data collected at the Echanis site and other permitted wind facilities. In the meantime, the USFWS is placing heavy emphasis on the measures of uncertainty in the fatality predictions in programmatic take permit decisions.

The following is a fatality prediction for Echanis using eagle use data generated by the bird surveys at the site.

2.3.1.1 *Methods*

The data generated by the avian surveys differed in several respects from that suggested in the Guidance, but the basic information (eagle detections per minute of observation) are compatible with the USFWS's fatality prediction model. The most notable departure from the suggested approach in the Guidance was that data at Echanis were collected between Aug 21 and Nov 9, 2008, leaving uncertain how much annual variation in eagle use might occur in the project footprint by season and across years. The other departure from the recommended protocol in the Guidance was that some point counts continued for 60 minutes rather than the standard 20 minutes. These 60 minute periods were counted as 3 separate point counts run together.

The model used to derive the fatality prediction was created by the Eagle Technical Assessment Team in July 2011. The ETAT continues to refine this model and subsequent versions might result in slightly different predictions of risk. Part of the analysis involves a characterization of the variance around the point mortality estimate, and involves a bootstrap resampling to obtain

variance estimates for key model parameters in R (R Development Core Team 2010). The USFWS model includes a term for estimating project-specific risk to eagles based on the presence of added risk factors around certain turbines. However, this aspect of the model has not been sufficiently developed. (Despite this, the site-specific factors that likely reduce risk at Echanis are detailed in Section 2.3.2, *Analysis of Site Characteristics at Echanis that Influence Eagle Risk*.) Thus in this model we assumed a constant 1% collision rate for Golden Eagles that fly within the potential strike area (a 100 meter radius) around each turbine. This assumes that 99% of the time, eagles flying within the "strike zone" of a turbine will not be struck (Whitfield 2009).

2.3.1.2 *Results*

The avian-use data for Echanis consisted of 1760 minutes of observations, during which Golden Eagles were within the 800-m point count circle for a total of 16 minutes (Table 2). We estimated the mean from the count data (mean = 0.0091 eagles per min.). The count data do not differ significantly from the Poisson distribution, where the mean equals the variance. Thus the eagle exposure minutes variance = 0.0091 eagles per minute.

Table 2. Sample minutes by season and number of Golden Eagle detections on 800-m avian use surveys August-October 2008 (Data are from Gerhardt et al. (2011)).

Point	# 20-min surveys	# Hour-long counts	Total min	GOEA exposure min
A	7	4.67	420	0
B	7	5	440	3
C	10	1	260	0
D	5	4	340	1
E	6	3	300	12
Total			1760	16

We carried these mean and variance estimates forward in the model, using the 0.01 risk factor adjustment, to obtain a point estimates of the mean and standard deviation of the annual fatality estimate of 3.43 and 0.86, respectively (Table 3).

2.3.1.3 *Conclusion*

The fatality prediction for the Echanis Project using the USFWS exposure-based model is 3.4 eagles per year with a 95% upper confidence limit of 5.1 eagles per year (Table 3).

This prediction assumes that operational measures discussed in this ABPP/ECP will be ineffective at reducing eagle mortality. CEP finds this unlikely. The model also scales risk

relative to monitoring effort - the amount of overall minutes spent conducting point counts at Echanis - all of which fell within a single late summer and fall season. This is likely the season of greatest use by eagles at Echanis; this high elevation site is snow-covered for five or more months out of the year, and incidental observations suggest little to no use by eagles during this time (Rich Gerhardt, personal communication). Thus, using these data, the model will derive a very conservative estimate of annual risk. Regardless, post-construction monitoring will yield data that will be essential in evaluating the predicted mortality risk to eagles, as well as the tool that will inform on- and off-site minimization measures and mitigations.

Table 3. Inputs and calculated values used to obtain the point estimate of the eagle fatality prediction at Echanis using the exposure-based model in the Guidance. Shaded boxes are project-specific inputs (see Table 2), blue text are formulas, and the orange-shaded cells include the point estimates of annual fatalities and the 95% confidence interval.

ETAT Collision model	**Point estimate**	**Upper CI**	**Comments**
Number of turbines	46	46	
Project area (km^2)	12	12	
Number of points	5	5	Pre-construction count data
Number of counts/point	17.6	17.6	Pre-construction count data
Minutes/count	20	20	
Number of counts	88	88	(Number of points)*(number of counts/pt)
Number of eagle minutes	16.00000	24.00000	Point estimate from count data; upper CI = mean+2SD
Project in danger zone	0.12043	0.12043	(Number of turbines*0.1^2*PI)/(project area)
Point count area (km^2)	2.01062	2.01062	Fixed-radius around each point (radius = 800 m)
Exposure minutes for project area	0.01085	0.01628	(Project Area/Sample Area)*(Eagle min. as a proportion of observation time)
Exposure minutes/year for project area	2851.76721	4277.65081	(Exposure min. for project area)*(total daylight min.)
Baseline collision risk	0.01000	0.01000	Assumes avoidance rate = 0.99
Predicted collisions/yr	**3.43432**	**5.15148**	(Project in danger zone)*(collision risk)*(Expos. min./yr)
Count data	**Point estimate**	**Upper CI**	
Total	16.00000	24.00000	Upper CI Total = (mean)*(no. of counts)*(min./count) + 2SD
Mean	0.00909		Eagle min/no. of counts/min. per count
Variance	0.00909	16.00000	Assume Poisson distrib where var=mean
SD	0.09535	4.00000	SD=(VAR)^0.5
2*SD	0.19069	8.00000	Assuming normality, approx 95% are within 2 SD.

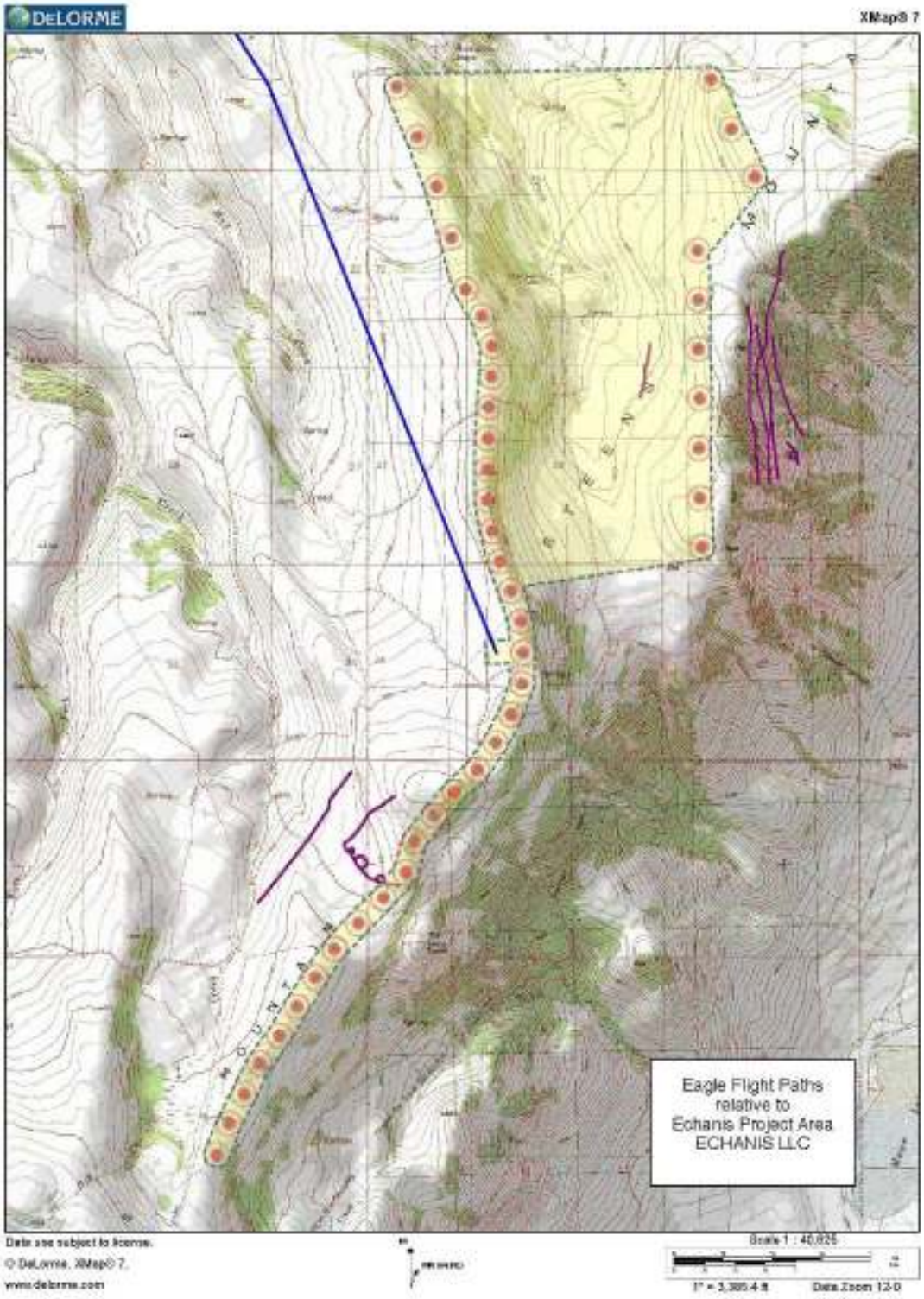

Figure 5: Eagle Flight Paths

2.3.2 *Analysis of Site Characteristics at Echanis that Influence Eagle Risk*

As part of the overall risk modeling effort, NWC's Rick Gerhardt also applied his knowledge of the site and survey results to assess "Danger Zone Factors," per Draft Eagle Conservation Guidance. He summarized the conclusions of the of the USFWS, ODFW, BLM and Echanis working group's preliminary analysis of "Danger Zone Factors" using the format found in the Guidance (shown in **bold typeface**).

1. Topographic features conducive to slope soaring
   - **a. On or bordering the top of a slope oriented perpendicular to the prevailing wind direction**. The entire land mass upon which the Echanis Project (like the East and West Ridge Projects) is proposed is a gently-sloped fault block that rises from northwest to southeast. Though turbine orientation will be perpendicular to the prevailing wind direction (which is westerly), the slopes to the west of all turbines are gradual, and do not create consistent updrafts that would attract or concentrate eagles.
   - **b. Near (within 50 meters) of a ridge-crest or cliff edge.** Though some turbines were originally sited near the eastern rim, all were moved back from that cliff edge due to wildlife concerns.
2. Topographic features that create potential flight corridors
   - **a. In a saddle or low point on a ridge line** Two saddles exist within the Echanis Project, but no turbines are sited in proximity to these.
   - **b. Near a riparian corridor, at a forest or wetland edge, or near shorelines of large water bodies that eagles are reluctant to traverse.** This feature does not apply to the Project area.
3. Proximate to potential foraging sites
   - **a. - Near perennial or ephemeral water sources that support a robust fishery or harbor concentrations of waterfowl.** These features are not found on the Project area.
   - **b. - Near a prairie dog (*Cynomys* spp.) colony or area of high ground squirrel density.** Colonies of Belding's ground-squirrel (*Urocitellus beldingi*) exist at lower elevations to the west of Echanis. Echanis is apparently at too great an elevation for any concentrations of this, the only colonial rodent species in the region.
   - **c. - Near cover likely to support rabbits or hares.** Jackrabbits are abundant in the lower elevations to the east and north of the Echanis Project, and likely represent the dominant prey of Golden Eagles in the area. The Project area itself, however, does not provide cover for rabbits or hares.
   - **d. - Near concentrations of livestock where carcasses and neonatal stock occur.** Cattle are not moved to the Project area until summer, well after calving is complete.
   - **e. - Near sources of carrion.** No.
   - **f. - Near game dumps or landfills.** No.

4. - **Near likely perch structures or roost sites.** Naturally-occurring perches are not found in proximity to proposed turbines.

5. - **In an area where eagles may frequently engage in territorial interactions**
a. At about one-half of the mean project-area inter-nest distance (based on Stage 2 surveys) from an eagle nest site. Golden eagle territories, far from saturating the Project area, are few and far between. The only meaningful inter-nest distance would be derived from the two nearest nests, and one-half that distance would be approximately two miles. Although a few turbines are sited within two miles of the nearest nest, they are in a different direction than the next-nearest nest and thus away from the areas where territorial interactions are expected to occur.

6. **Other risk factors not identified above.** No additional factors were identified.

Those factors that contribute to increased risk of mortality largely seem not to apply at Echanis. It is likely that most eagles seen from the point count stations were not using the site in a way that would lead to increased risk of collision. In particular, interactions between nearby nesting pairs are unlikely at this site, and the low prey densities are unlikely to attract eagles.

2.3.3 *Discussion of additional concerns raised in Workshops with USFWS*

In the course of Workshop meetings with the Service, ODFW and BLM, several concerns were raised and discussed in detail. Echanis provided substantial information to the Workshop group as the conversations progressed. Several of those topics are addressed below:

The Service expressed concerns about ability of birds to pass through a 'picket fence' of turbines, arrayed perpendicular to the prevailing west winds. Echanis provided the Service with detailed calculations and illustrations demonstrating anticipated "rotor swept area" calculations and the resultant conditions across the site. (*See* Figure 6.) The conclusion from the Workshop was that the current Project design provides significant open space for eagle navigation during those occasional events when an eagle is moving through the Project.

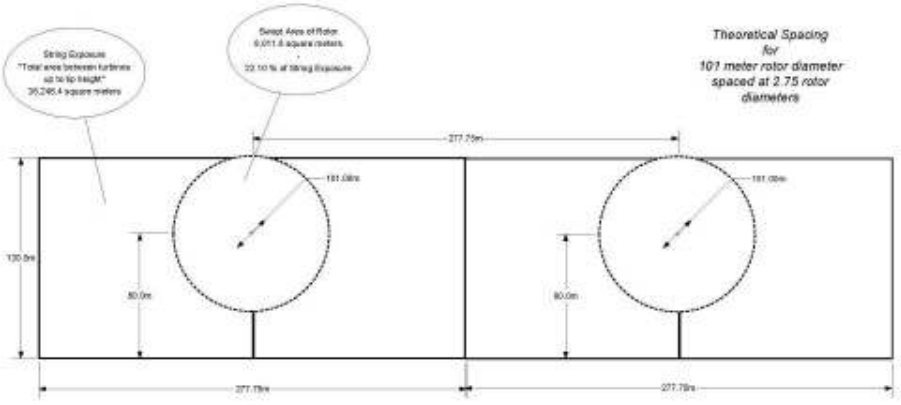

Figure 6: Calculation of Rotor Swept Area

- The Service also expressed concerns about proximity to treed areas, in particular, groves of aspen in lower elevation areas near the site. Echanis provided maps delineating buffer areas of 100 meters or more on nearly every turbine location (see Figure 7.) Based on these workshop discussions and other review of eagle prey resources, there was general consensus that the forested habitats added little to no additional significant eagle risk factors to the project siting.

- Finally, the Service expressed concerns about seasonal (fall) east winds that might create soaring or 'kiting' conditions over the project area, prompting migrating raptors to possibly collide with turbines. Echanis provided the Service with three years of data from on site meteorological measuring equipment that measures vertical wind patterns (see Figure 8.) Those data indicate the types of conditions that might prompt such behavior occurs infrequently. Further discussion of the phenomenon led to the view that even in circumstances of east winds in fall and early winter months, during raptor migrations, there was nothing about the terrain where turbines will be located to suggest that eagles would be more likely to fly over the Project than over the valley to the east.

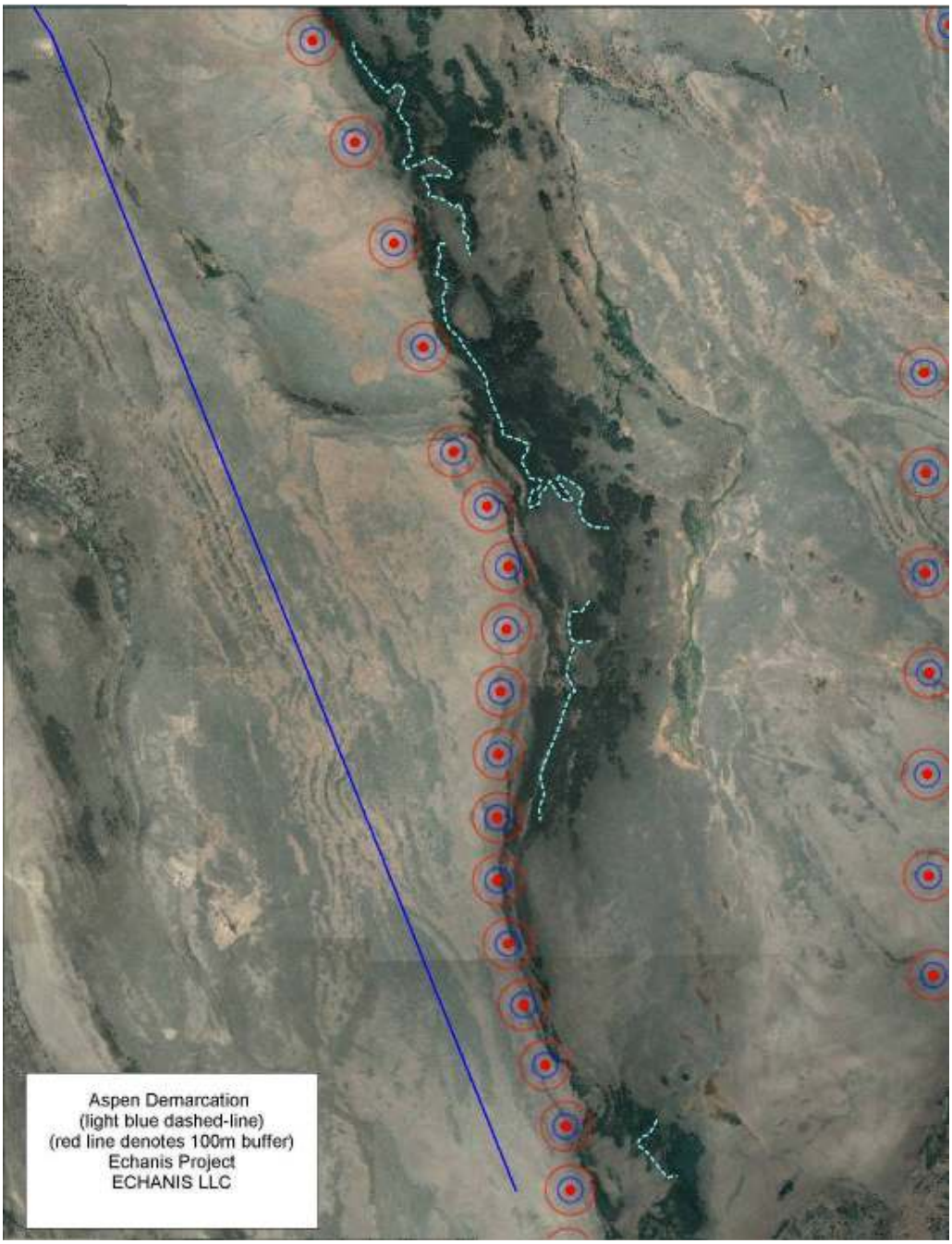

Figure 7: Aspen Delineation Border

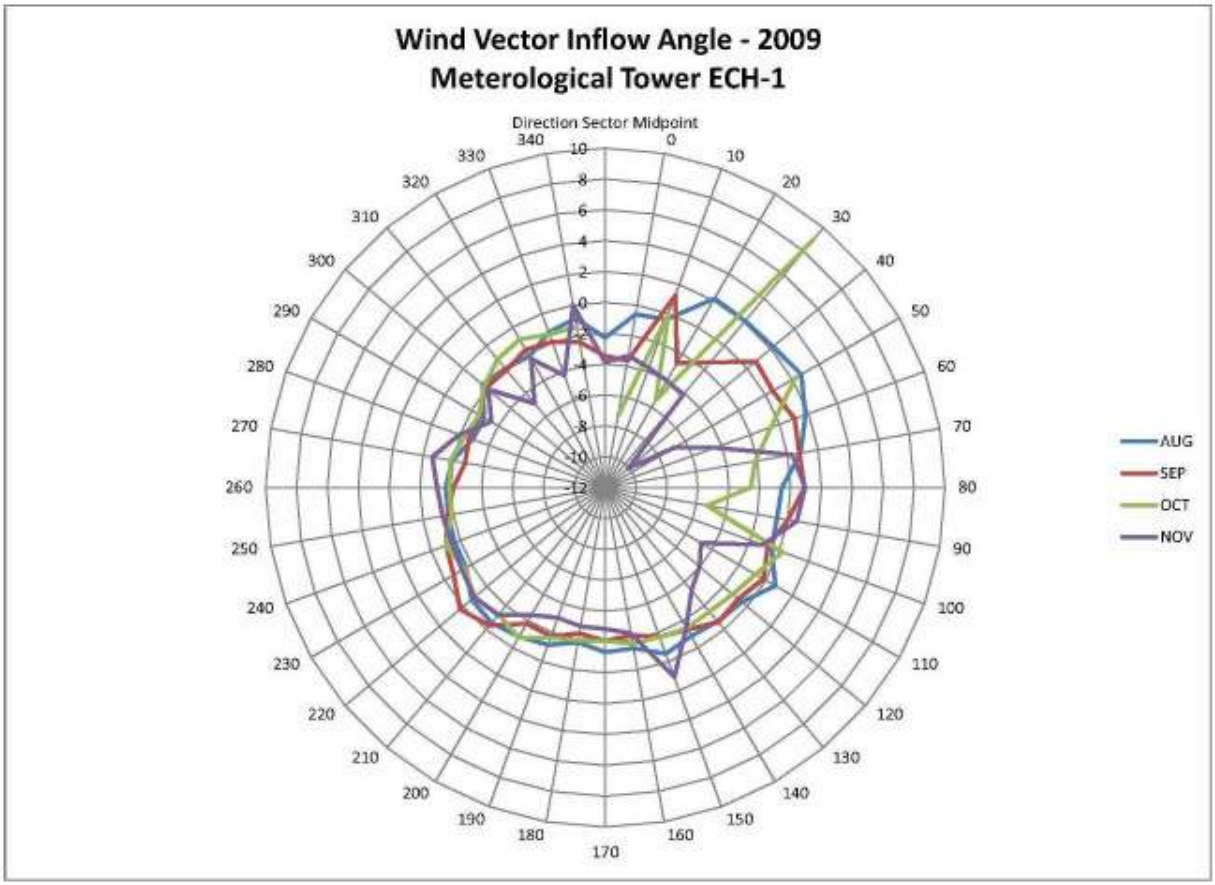

Figure 8: Wind Inflow Angle

2.4 Stage 4: Avoidance and Minimization of Risk using Advanced Conservation Practices and Compensatory Mitigation

The process for addressing potential impacts to Golden Eagles from implementation of the Project is divided into four sections: (a) Initial Advanced Conservation Practices ("ACPs") (*i.e.*, project design, power line/pole retrofits, research, habitat enhancement, etc.); (b) implementation of construction and operation ACPs; (c) Adaptive Management based on the results of the monitoring protocols established in Section 6; and (d) Compensatory Mitigation measures.

Initial ACPs have been developed to address impacts that are likely to occur to Golden Eagles as discussed in the EIS. Adaptive management has been designed to use monitoring data to evaluate whether impacts to Golden Eagles are nearing or exceeding the thresholds set forth herein, and if so, to implement measures to reduce such impacts to acceptable levels or consider some other type of minimization or mitigation.

2.4.1 *Pre-Construction Advanced Conservation Practices*

Echanis shall implement Advanced Conservation Practices ("ACPs") for Golden Eagles to be employed before and during the construction of the Project. The Service might recommend additional ACPs for Golden Eagles. ACPs shall include, at a minimum:

- Minimizing the area and intensity of disturbances during pre-construction activities, such as monitoring and site reconnaissance, by keeping at least ¾ mile away from all active nests;
- If activities need to take place within ¾-mile, then Echanis will undertake real-time monitoring of proximate occupied nest sites, and curtail activity if eagles exhibit signs of distress;
- Keep natural areas between the project footprint and the nest site or communal roost by avoiding disturbance to natural landscapes.
- Utilize existing transmission corridors and roads to the greatest extent possible;
- Avoiding, to the greatest extent possible, vegetation removal and construction during the eagle breeding season;
- Avoiding other activities that may disturb eagles;
- Avoiding siting turbines in areas where eagle prey are abundant and conduct practices that do not enhance prey availability at the Project site.
- Designing the Project layout to reduce eagle collision and electrocution by:
    - Set turbines back from ridge edges at least 100 m where soaring by eagles may occur (note that Echanis has implemented this ACP by relocating turbines off the ridge by 150 meters);
    - Spacing turbines widely to allow occasional eagles to safely navigate between turbines (*see* Figure 6);
    - Avoiding forested habitats that might concentrate eagle prey items (*see* Figure 7);
    - Avoiding locations where wind resource create increased eagle-wind turbine conflicts (*see* Figure 8);
    - Site structures away from high eagle use areas and the flight zones between them;
    - Dismantle nonoperational meteorological towers;
    - Follow the Avian Power Line Interaction Committee (APLIC) guidance on power line construction (APLIC 2006) and power line siting (APLIC 1994);
    - Develop a transportation plan, including road design, locations and speed limits to minimize habitat fragmentation and wildlife collisions and minimize noise effects; and
    - Minimize the extent of the road network.
- Select project features that minimize effects to eagles, such as:
- Avoiding use of lattice or structures that are attractive to birds for perching.

- Avoiding construction designs (including structures such as permanent meteorological towers) that increase the risk of collision, such as guy wires. If guy wires are used, Echanis shall mark them with bird flight diverters (according to the manufacturer's recommendation);

2.4.2 *Additional Surveys*

Additional surveys will include (a) observational studies of all identified currently occupied eagle nests within ten miles of the Project boundary; (b) a spring 2013 survey of eagle nests within ten miles of any WTG at the Project to determine territory occupancy and nest productivity; (c) observational studies in the spring, summer and fall of 2013 placing 5-8 800-meter point counts along the turbine footprint, placed in consultation with the Service. All surveys will be conducted in accordance with guidance issued by the Service. Based on the results of these additional surveys and in coordination with the Service, Echanis shall determine whether or not it is appropriate to consider implementing any additional pre-construction and post-construction ACPs that might further avoid or minimize eagle fatalities.

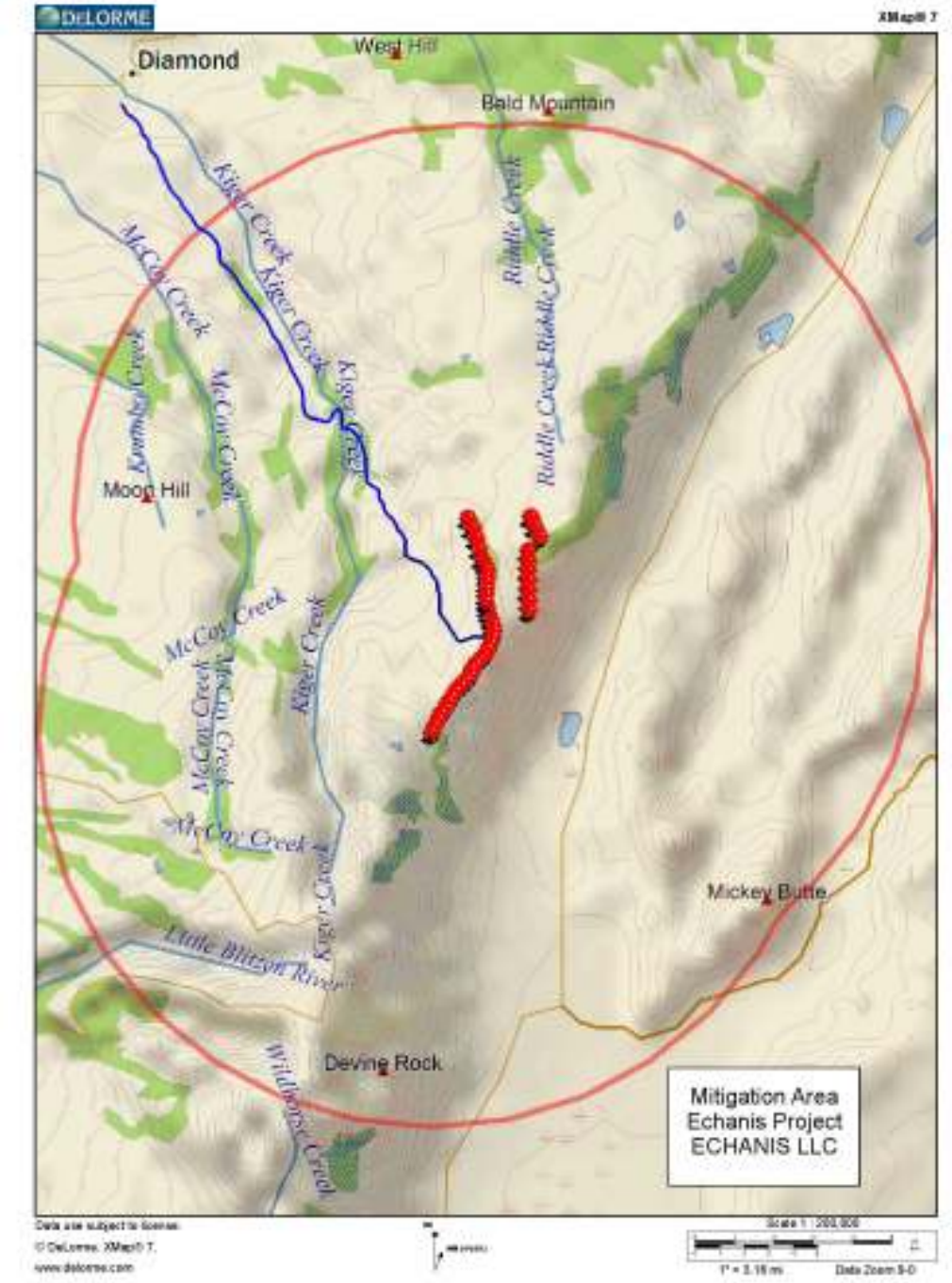

Figure 9: 10-mile Survey and Mitigation Area Around Project Area

2.4.3 *Post-Construction ACPs for Eagles*

Echanis shall employ the following ACPs related to Golden Eagles during and after construction of the Project:

- Minimizing lighting at facilities;
- Require that all security lighting be turned off overnight, and down-shield all security and related infrastructure lights;
- Maintaining facilities to minimize eagle attraction:
    - If rodents and rabbits are attracted to project facilities, identify and eliminate activities that may be attracting them.
    - Avoiding management that indirectly results in attracting raptors to turbines, such as seeding forbs or maintaining rock piles that attract rabbits and rodents.
- Moving stored parts and equipment which could be utilized by small mammals for cover away from wind turbines.
- If mammals burrow near tower footprints, where feasible on a case-by-case basis filling holes and surround pad with gravel at least 2 inches deep and out to a perimeter of at least 5 feet.
- Immediately removing carcasses (other than those applicable to post-construction fatality monitoring; see below) that have the potential to attract raptors from roadways and from areas where eagles could collide with wind turbines.
- Ensure responsible livestock husbandry (e.g. removing carcasses, fencing out livestock) is practiced if grazing occurs around turbines.
- Reducing vehicle collision risk to wildlife:
    - Instruct project personnel and visitors to drive at low speeds (< 25 mph), and be alert for wildlife, especially in low visibility conditions.
    - Plow roads during winter so as not to impede ungulate movement. Snow banks can cause ungulates to run along roads resulting in them colliding with vehicles. Roadside carcasses attract eagles, subjecting them to collision as well.
- Following procedures that reduce risk to wildlife:
    - Instruct employees, contractors, and visitors to avoid disturbing wildlife, especially during breeding seasons and periods of winter stress.
    - Reduce fire hazards from vehicles and human activities (e.g., use spark arrestors on power equipment, avoid driving vehicles off road).
    - Follow federal and state measures for handling toxic substances.

- Minimizing effects to wetlands and water resources by following provisions of the Clean Water Act.

2.4.4 *Public Outreach*

Echanis will provide status updates on construction and operations to local media and the Harney County Chamber of Commerce which can be included in their publications. A project fact sheet describing the project and measures that have been put in place to avoid and minimize risks to eagles (and other birds and bats) will be prepared and made available at the Harney County Court, the Harney County Chamber of Commerce and the local BLM Burns District Office.

2.4.5 *Adaptive Management*

Because Golden Eagles are protected under the BGEPA, development of adaptive management measures must be implemented and monitored by the Service. Accordingly, this Section sets forth the procedures for implementation of Adaptive Management Measures for Golden Eagles at the Project.

(a) *Adaptive Management Process*

The Adaptive Management Measures set forth below shall be implemented upon the discovery of a single Golden Eagle fatality at the site attributable to Project operations. Upon this occurrence, the Service shall identify and require adaptive management measures from the appropriate mitigation phase identified in Section 2.4.5(b). The Service may require one or multiple measures identified for that phase. In lieu of the listed adaptive management measures, other measures of similar type (*i.e*., cost, level of effort, utility) may also be implemented, as long as they provide the same level of protection or compensation and are pre-approved by the Service.

(b) *Summary of Golden Eagle Adaptive Management Measures*

This plan sets forth phased-in adaptive management measures based on actual, verified takes of Golden Eagles. This plan also monitors particularly closely the turbines along the northeastern edge of the project ("Migratory Corridor Turbines"). These turbines are closest to the eastern edge of the rim, and potentially pose the greatest risk to eagles migrating south along the eastern escarpment of Steens Mountain. Tables 4 and 5, below, describe the adaptive management measures that will be applied if Golden Eagles mortalities are found and are attributable to the operation of the Echanis wind turbine site. Phases I through IV will be implemented chronologically over the life of the project, as up to four eagle mortalities are found. If more than four eagles are found during the life of the permit, then consultation with the Service will occur and CEP will commit to additional compensatory mitigation.

Adaptive management measures for Golden Eagles will be applied to the entire site in response to the level of eagle mortality found through post-construction monitoring. CEP commits to implementing four phases of wind turbine curtailment in response to Golden Eagle mortalities to minimize risk of further collisions. Curtailment is defined as the complete cessation of blade rotation of the target turbines. Curtailment will be implemented to coincide as much as possible with those conditions that resulted in the mortality and applied to the turbines nearest the mortality. CEP will consult with the Service in any case, in order to implement the curtailments in times and areas most likely to reduce the chances of future eagle mortalities.

Table 4 provides an example of how curtailments might be implemented by CEP, The Service was most concerned with east wind conditions in the fall that might bring eagles in close proximity to the seven turbines planned to be placed along the east rim (the "Migratory Corridor Turbines"). These seven are nearest a steeply-sloped portion of the eastern escarpment of the Steens, where updrafts from easterly winds, particularly during migration, might lead to soaring or kiting over the project site. Were mortalities to occur here during east wind conditions, increasing hours of curtailment would be phased-in during those conditions (Table 4). Other adaptive management measures include targeted monitoring of high-risk turbine locations and retrofit of electric distribution lines that present a risk to eagles.

Curtailments will occur be applied in four equal-hour phases of 333 turbine-hours up to a total of 1332 hours. This maximum number of hours is based on CEP's evaluation of extensive wind monitoring data on the Steens. Echanis's wind analyses demonstrate that there are, on average, 46 hours during the Fall migratory season (defined as the months of September through November) and 82 hours in the Spring migratory season when winds blow from the East during daylight hours (approximated as 10.4 hours a day). This equals 1,332 turbine-hours. Echanis commits to curtail a percentage of these hours during each Adaptive Management Phase, in four equal increments of 25% each (Table 4).

Table 4 shows how the curtailments, and other adaptive management measures, might be applied to the seven turbines along the east rim. The curtailment effort might be used on other turbines or strings of turbines as appropriate, to be agreed upon by CEP and the Service. If there is some pattern to the mortalities that is revealed over time, the turbines in which curtailments occur might be shifted to maximize the benefit of curtailment to eagles across the project. Regardless of how and where the curtailments are applied to the project, the overall pool of hours available for curtailments will not exceed 1332.

Table 4: Summary of Adaptive Management Phases for Golden Eagles using–Migratory Corridor Turbines as an Example[1]

Phase	Turbine Curtailment	Direct Mitigation
Phase I	Up to 333 hours of turbine curtailment per year during conditions shown to produce	Retrofit 10 power poles; Targeted monitoring around turbine string where mortality occurred.

	kiting or soaring conditions over the site when Golden Eagles are present	
Phase II	Up to 666 hours of turbine curtailment during conditions shown to produce kiting or soaring conditions over the site when Golden Eagles are present	Retrofit 10 additional power poles; Targeted monitoring around turbine string where mortality occurred.
Phase III	Up to 999 hours of turbine curtailment during conditions shown to produce kiting or soaring conditions over the site when Golden Eagles are present	Retrofit 10 additional power poles ; Targeted monitoring around turbine string where mortality occurred.
Phase IV	Up to 1332 hours of turbine curtailment during conditions shown to produce kiting or soaring conditions over the site when Golden Eagles are present	Retrofit 10 additional power poles; Targeted monitoring around turbine string where mortality occurred.
1 – These measures could be applied to any turbines or turbine strings, to be decided by the Service and CEP		

(c) *Details of Adaptive Management Measures*

This section discusses the specific adaptive management measures in greater detail. The phases could be applied anywhere in the Project where it makes sense based on post-construction monitoring and in consultation with the Service. These measures will be implemented in successive phases based on the level of verified eagle takings attributable to the collisions with Project turbines. If a fifth eagle mortality from turbine operations is discovered, the Project and Service will meet to review and adjust these adaptive management commitments and requirements of the associated Eagle Take Permit.

Phase I Mitigation

TURBINE CURTAILMENT

Implement turbine curtailment on the agreed upon turbines for up to 333 hours per year. Curtailment is determined on a per-turbine basis; for example, if the seven Migratory Corridor Turbines are curtailed for six hours each, this equates to 42 hours of curtailment. If curtailment has been implemented on the Migratory Corridor Turbines because of eagle mortality, then east wind conditions (both hourly and seasonally) and conditions leading to the anticipation of east wind conditions will be tracked by the Project and curtailment will initiate upon east wind event until all curtailment hours are exhausted for this Phase. If this phase is applied to other turbines as agreed to by the Service and CEP, then they will applied during those conditions deemed most likely to pose a mortality risk to eagles. Turbine Curtailment of a specific turbine shall not commence prior to 6:00 hours or after 20:00 hours, and adjusted within that time window depending on the availability of daylight hours within the season.

DIRECT MITIGATION

- As approved by the necessary entities, up to 10 power poles within the mitigation areas shown on Figure 10 determined to be unsafe will be retro-fitted and raptor proofed according to current Avian Power Line Interaction Committee (APLIC) guidelines (APLIC 2006); retrofit of such poles also shall qualify as the mitigation proposed for other avian mortality events (see Section 3.3.4)
- Increase monitoring along at least the 3 turbines in either direction from the turbine nearest the mortality (targeted monitoring). As part of this effort, Echanis, together with the Service, will consider the factors that might have influenced the mortality, including wind speed, direction, seasonality, weather and other factors. Echanis shall implement a different monitoring program at these turbines if the Echanis and the Service agree that the monitoring could be improved, or certain questions emerge that additional monitoring might help answer.

Phase II Mitigation

TURBINE CURTAILMENT

- Implement turbine curtailment as in Phase I, but for up to 666 hours per year.

DIRECT MITIGATION

- As approved by the necessary entities, retrofit an additional 10 power poles within the mitigation areas shown on Figure 10 determined to be unsafe will be retro-fitted and raptor proofed according to current APLIC guidelines (APLIC 2006); retrofit of such poles shall qualify as the mitigation required for mitigation by Section 3.3.4.
- Increase monitoring along at least the 2 to 3 turbines in either direction from the turbine nearest the mortality (targeted monitoring). As part of this effort, Echanis, together with the Service, will consider the factors that might have influenced the mortality, including wind speed, direction, seasonality, weather and other factors.. Echanis shall implement a different monitoring program at these turbines if the Echanis and the Service agree that the monitoring could be improved, or certain questions emerge that additional monitoring might help answer.

Phase III Mitigation

TURBINE CURTAILMENT

- Implement turbine curtailment as in previous phases for up to 999 hours per year.

DIRECT MITIGATION

- As approved by the necessary entities, an additional 10 power poles within the mitigation areas shown on Figure 10 determined to be unsafe will be retro-fitted

and raptor proofed according to current APLIC guidelines (APLIC 2006); retrofit of such poles shall qualify as the mitigation required for mitigation by Section 3.3.4.

- Increase monitoring along at least the 2 to 3 turbines in either direction from the turbine nearest the mortality (targeted monitoring). As part of this effort, Echanis, together with the Service, will consider the factors that might have influenced the mortality, including wind speed, direction, seasonality, weather and other factors.. Echanis shall implement a different monitoring program at these turbines if the Echanis and the Service agree that the monitoring could be improved, or certain questions emerge that additional monitoring might help answer.

Phase IV Mitigation

TURBINE CURTAILMENT

- Implement turbine curtailment as in the previous phases, but for up to 1332 hours per year

DIRECT MITIGATION

- As approved by the necessary entities, an additional 10 power poles within the mitigation areas shown on Figure 10 determined to be unsafe will be retro-fitted and raptor proofed according to current APLIC guidelines (APLIC 2006); retrofit of such poles shall qualify as the mitigation required for mitigation by Section 3.3.4.
- Increase monitoring along at least the 2 to 3 turbines in either direction from the turbine nearest the mortality (targeted monitoring). As part of this effort, Echanis, together with the Service, will consider the factors that might have influenced the mortality, including wind speed, direction, seasonality, weather and other factors.. Echanis shall implement a different monitoring program at these turbines if the Echanis and the Service agree that the monitoring could be improved, or certain questions emerge that additional monitoring might help answer.

For eagle mortalities beyond 4

- CEP commits to retrofitting 10 additional power poles for each of four additional eagles found dead on site and to which the operation of Echanis is responsible, as approved by the necessary entities and within the mitigation area as defined in phases I-IV.
- If a ninth eagle mortality from Migratory Corridor turbine operations is discovered, CEP will meet with the Service to review and adjust these adaptive management commitments and requirements of the associated Eagle Take Permit.

2.4.6 *Upfront Conservation Commitment*

In addition to implementing Adaptive Management Measures and associated mitigation measures, above, upon commencement of operations of the Project, Echanis will place $50,000 in an interest-bearing escrow account to fund additional compensatory mitigation actions for any Golden Eagle mortality. This amount is based on an estimated take of two eagles per year during the first five years of the Project.

Upon the occurrence of a verified non-purposeful take of a Golden Eagle, $5,000 shall be disbursed from such escrow account to be used as follows, as determined mutually by Echanis and the Service:

- Funding a USFWS-approved compensatory project; or
- Paying into a an account, as approved by the Service, established for the sole purpose of improving Golden Eagle conservation through research, monitoring, or other mitigation options.

Any funds not disbursed after the fifth year of operations shall be returned, together with interest as established by the terms of the account, to Echanis. Conversely, if funds are depleted before 5 years then an additional $50,000 will be deposited into this account.

2.4.7 *Power Pole Retrofits*

Echanis will attempt to secure agreements with the local utility who own the distribution line network to allow Echanis to fund the retrofit and maintenance activities prior to commencing development, and share that agreement with the Service. All retrofits will be in accordance with APLIC prescriptions (APLIC 2006), and be maintained for the life of the project if any maintenance is necessary. This might be particularly true if aftermarket line insulators are applied, which have a moderate lifespan. Retrofits that result in the replacement of existing cross-arms with longer ones will likely last longer requiring less maintenance.

Power pole retrofits required under these mitigation phases cover similar commitments under Section 3, as retrofits that benefit eagles benefit all other raptors as well.

2.5 Stage 5 – Post Construction Monitoring

Echanis shall perform post-construction monitoring for Golden Eagle mortality as set forth in Section 4.0 of this Plan. This includes a description of targeted monitoring to be implemented as part of the mitigations described above.

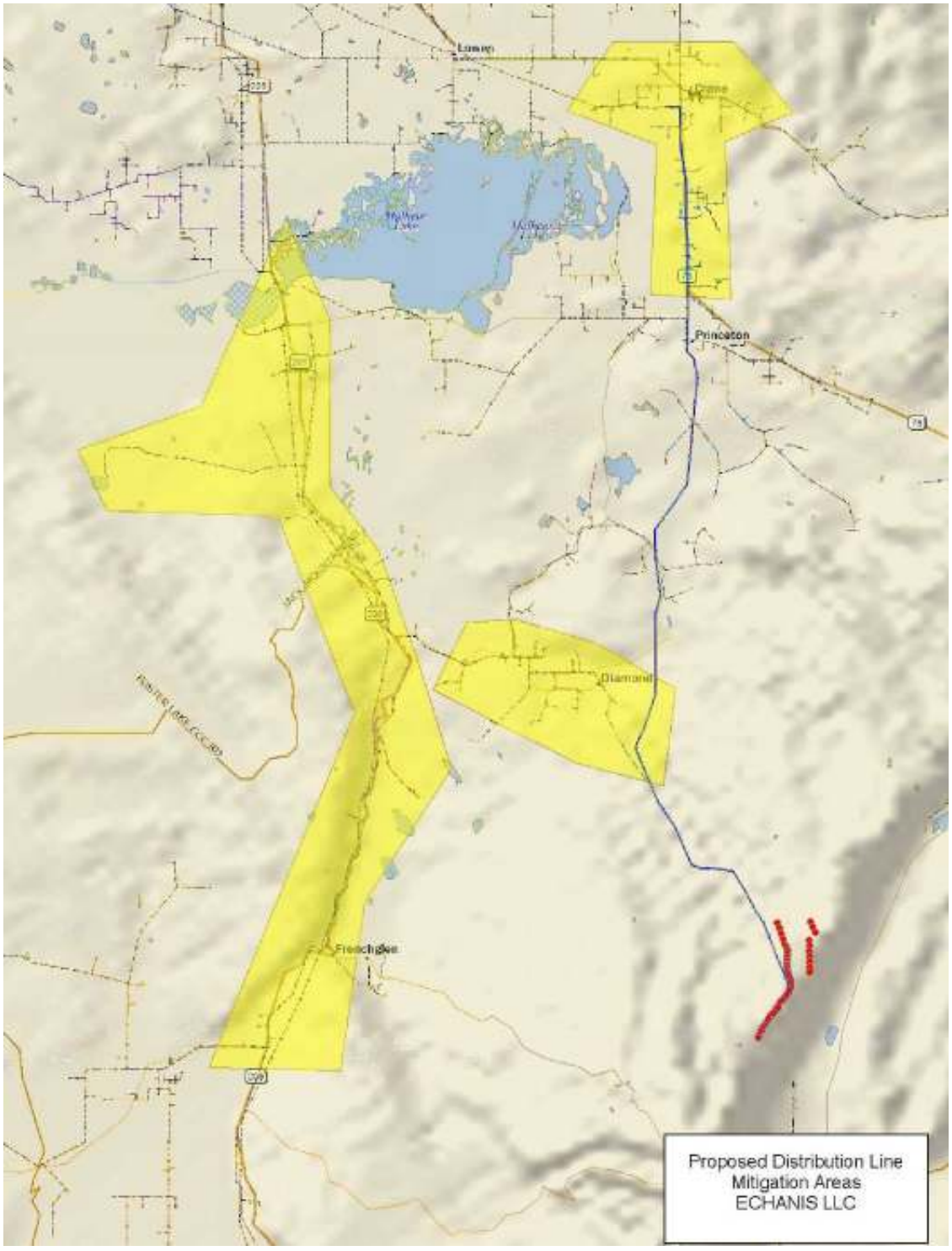

Figure 10: Map of Power Pole Replacement Areas

3.0 CONSERVATION OF AVIAN SPECIES OTHER THAN GOLDEN EAGLES

This section sets forth Echanis's plan to conserve avian species other than Golden Eagles, including bats. While the project was designed to minimize risks to avian species, there is still a risk that avian mortality may exceed certain thresholds. Therefore, Echanis will implement various ACPs designed to avoid, minimize or mitigate risks of avian and bat mortality.

In summary, Echanis will implement various ACPs before, during and after construction. In addition, Echanis shall convene a Technical Advisory Committee ("TAC") that will, *inter alia*, review mortality data to determine whether pre-established thresholds are exceeded. If such thresholds are exceeded, the TAC will recommend the implementation of various mitigation measures as described herein.

3.1 Existing Studies

Surveys conducted at the Project and associated transmission line routes are shown on Table 1 and a map showing the areas covered by these surveys is shown in Figure 4. All of the surveys are included in Appendix A.

These studies demonstrated that while avian species are present on the site, the risk of impacts to such species is low. There were, however, indentified potential risks from turbines on the East Rim and potential risks to raptors at occupied nests near preliminary turbine locations.

To minimize these risks, NWC recommended design modifications to the Project in order to avoid avian collisions. Specifically, NWC's Rick Gerhardt suggested that the Migratory Corridor Turbines be moved west off of the rim by 100 meters. Rick also suggested that no facilities be placed within two miles of an occupied raptor nest.

3.2 Risk Assessment

Echanis designed the Project (as shown on Figure 1) in such a manner as to avoid the risk factors identified in the avian use survey and the raptor nest survey for the Echanis site. This included (a) siting the Migratory Corridor Turbines 100 meters from the East Rim and (b) not siting turbines within 2 miles of an occupied raptor nest. Based on these actions and the overall site design, NWC determined that the Project site presents a low risk to avian species.

3.3 Avoidance and Minimization of Risk using Advanced Conservation Practices

The process for addressing potential impacts to bird and bat species from implementation of the Project is divided into three sections: (a) Initial Advanced Conservation Practices ("ACPs") (*i.e.*, project design, power line/pole retrofits, research, habitat enhancement,

etc.); (b) implementation of construction and operation ACPs; and (c) Adaptive Management based on the results of the monitoring protocols established in Section 4.

Initial ACPs have been developed to address impacts that are likely to occur as discussed in the EIS. Adaptive management has been designed to use monitoring data to evaluate whether impacts are nearing or exceeding the thresholds set forth herein, and if so, to implement measures to reduce such impacts to acceptable levels or consider some other type of minimization or mitigation.

3.3.1 *Technical Advisory Committee*

To help ensure that impacts to avian and bat species (other than Golden Eagles) from routine operations of the Project do not reach levels of significance, a Technical Advisory Committee ("TAC") will monitor Project activities, including mortality data, to determine the need for Project mitigation. The TAC will consist of one representative from the Service, BLM, Oregon Department of Fish and Wildlife, Echanis, and Harney County. The TAC will provide recommendations on developing and implementing effective measures to monitor, avoid, minimize, and mitigate impacts to avian species related to operations.

A TAC Lead will be designated for the TAC whose duties will include disseminating Project data, including data on mortality events, setting up and moderating meetings, reviewing bi-weekly mortality data, and documenting mitigation recommendations for the Project. The TAC lead shall be appointed by Echanis. Because it is the TAC Lead's responsibility to coordinate meetings and involve all TAC members, the TAC Lead reserves the right to make recommendation decisions under extraordinary circumstances or when all TAC members are unable to meet.

A Memorandum of Agreement ("MOA") will be signed by each party to the TAC to ensure participation in the TAC. Unless there is a failure on the part of any of the TAC representatives to respond or agree to participate, the TAC shall be formed prior to Project operations.

The guiding principles, duties, and responsibilities of the TAC include the following:

- Approve the TAC charter and sign the MOA.
- Make recommendations based on best available science and to address specific issues resulting from this Project.
- In the event decisions cannot be made by consensus, decisions of the TAC shall be made by simple majority vote.
- Provide sufficient flexibility to adapt as more is learned about the Project as well as strategies to reduce avian and bat impacts.

- Review initial and any subsequent revised monitoring protocols for mortality monitoring studies.

- Complete an annual review of predetermined mortality thresholds for mitigation and provide recommendations to Echanis regarding any necessary adjustments to those thresholds.

- Review results of mortality monitoring.

- Require appropriate phased mitigation measure(s) set forth in Section 3.3.4 to Echanis for implementation in the event that thresholds for bats and/or birds other than Golden Eagles have been exceeded.

- Review species-specific mortality and recommend mitigation to Echanis, if any, in the event that the species-specific thresholds for special-status species other than Golden Eagles are exceeded.

- Review annual report on status of compliance with mitigation measures and permit conditions and provide recommendations, as necessary.

- Develop and recommend additional mitigation measures or research to Echanis if predetermined mitigation is outdated or deemed ineffective or "unexpected fatalities" occur.

- Evaluate effectiveness of implemented mitigation strategies and formulate Echanis with recommendations based on findings.

- If selected as part of phased mitigation, recommend compensatory mitigation funding opportunities for implementation of off-site species or habitat enhancement or protection/conservation measures.

The TAC shall hold the first meeting prior to the commencement of Project operations to develop and approve the charter and requirements of this Plan. The charter will include an MOA ensuring participation in the TAC and agreeing to how funds provided in this Plan would be accessed. Thereafter, the TAC shall meet annually, unless data reveal that mortality thresholds have been exceeded. Attendance at TAC meetings shall be by invitation of its members only.

To ensure the TAC is fully functional, Echanis will provide $100,000 over a period of ten years not to exceed $10,000 per year in the first three years, to assist with operational costs. Remaining funds would be contributed at an approximate rate of $10,000 per year during the remaining seven years. Funds would be deposited into an agreed upon interest bearing account and marked specifically for purposes of TAC operational expenses.

Through an MOA, all TAC members would develop a cooperative agreement plan for how the funds are utilized. Any unused funds shall go back to Echanis.

3.3.2 *Initial Advanced Conservation Practices*

ACPs will be implemented prior to commencement of operation of the Project, as described in more detail in the following subsections.

(a) Additional Surveys

Additional surveys will include (a) observational studies of all identified currently occupied raptor nests within two miles of the Project boundary; (b) a spring 2013 survey of raptor nests within two miles of any WTG at the Project; and (c) observational studies in the spring, summer and fall of 2013 using 800-meter point counts. Echanis shall also evaluate advanced conservation practices that may avoid or minimize fatalities.

(b) Development of Pre-Construction Advanced Conservation Practices

Echanis, in consultation with the TAC, shall develop Advanced Conservation Practices ("ACPs") to be employed before and during the construction of the Project. Such ACPs shall include:

- Minimizing the area and intensity of disturbances during pre-construction activities, such as monitoring and site reconnaissance, by keeping at least 3/4 mile away from all active raptor nests.
- Undertaking monitoring of proximate occupied nest sites, and curtailing activity if raptors exhibit signs of distress, as determined by a biologist. In so doing, Echanis will insure that adults are allowed to incubate, brood young, or feed young uninterrupted, and will not inadvertently cause young birds to fledge prematurely;
- Activities near nests will be delayed until after fledging if there appears to be no way to work near the nest and not cause disturbance;
- If Echanis anticipates unresolvable nest/construction conflicts along the construction corridor prior to nesting, they will contact the Service about options (although less desirable) to dissuade raptors (other than eagles) from nesting close to construction zones in the first place; utilize existing transmission corridors and roads to the greatest extent possible;
- Avoiding, to the greatest extent possible, vegetation removal and construction during the breeding season;
- Designing the Project layout to reduce collision and electrocution by:
    - Site structures away from high avian use areas and the flight zones between them;
    - Dismantle nonoperational meteorological towers;

  - Follow the Avian Power Line Interaction Committee (APLIC) guidance on power line construction (APLIC 2006) and power line siting (APLIC 1994);
  - Develop a transportation plan, including road design, locations and speed limits to minimize habitat fragmentation and wildlife collisions and minimize noise effects; and
  - Minimize the extent of the road network.
- Select project features that minimize effects to raptors, such as:
  - Avoiding use of lattice or structures that are attractive to birds for perching.
  - Avoiding construction designs (including structures such as permanent meteorological towers) that increase the risk of collision, such as guy wires. If guy wires are used, Echanis shall mark them with bird flight diverters (according to the manufacturer's recommendation);
  - Minimizing lighting at facilities; Require that all security lighting not be left "on" overnight, and down-shield all security and related infrastructure lights.
- During construction, implementing spatial and seasonal buffers to protect individual nest sites/territories and/or roost sites, including:
  - Maintaining a 1/8-mile buffer area between construction activities and nest of non-raptors;
  - Keep natural areas between the project footprint and the nest site or communal roost by avoiding disturbance to natural landscapes.
  - Consult with the Service if construction is anticipated to be, or found to be, closer than 1/8 mile to active nests of non-raptors.

(c) Public Outreach

Echanis will provide quarterly status updates on construction and operations to local media and the Harney County Chamber of Commerce which can be included in their publications. A project fact sheet describing the project and measures that have been put in place to avoid and minimize risks to eagles (and other birds and bats) will be prepared and made available at the Harney County Court, the Harney County Chamber of Commerce and the local BLM Burns District Office.

3.3.3 *Post-Construction ACPs*

Echanis shall employ the following ACPs after construction of the Project:

- Minimizing lighting at facilities; Require that all security lighting not be left "on" overnight, and down-shield all security and related infrastructure lights.
- During site operations, avoid prolonged activities in the vicinity of nesting raptors.
  - Maintain a ¾ -mile buffer area between operational activities and raptor nests or communal roost sites as much as possible; if disturbances occurs,

they should be of short duration, infrequent, and not endanger the success of the nest (e.g. by over-exposing eggs or young to sun or weather, or by causing premature fledging);
    - Keep natural areas between the project footprint and the nest site or communal roost by avoiding disturbance to natural landscapes.
- Maintaining facilities to minimize raptor effects:
    - If rodents and rabbits are attracted to project facilities, identify and eliminate activities that may be attracting them.
    - Avoiding management that indirectly results in attracting raptors to turbines, such as seeding forbs or maintaining rock piles that attract rabbits and rodents.
- Moving stored parts and equipment, which may be utilized by small mammals for cover, away from wind turbines.
- If mammals burrow near tower footprints, where feasible on a case-by-case basis filling holes and surround pad with gravel at least 2 inches deep and out to a perimeter of at least 5 feet.
- Immediately removing carcasses (other than those applicable to post-construction fatality monitoring; see below) that have the potential to attract raptors from roadways and from areas where eagles could collide with wind turbines.
- Ensure responsible livestock husbandry (e.g. removing carcasses, fencing out livestock) is practiced if grazing occurs around turbines.
- Reducing vehicle collision risk to wildlife:
    - Instruct project personnel and visitors to drive at low speeds (< 25 mph), and be alert for wildlife, especially in low visibility conditions.
    - Plow roads during winter so as not to impede ungulate movement. Snow banks can cause ungulates to run along roads resulting in them colliding with vehicles, e.g. create cuts that allow them to escape roadways. Roadside carcasses attract eagles, subjecting them to collision by vehicles or by turbines.
- Following procedures that reduce risk to wildlife:
    - Instruct employees, contractors, and visitors to avoid disturbing wildlife, especially during breeding seasons and periods of winter stress.
    - Reduce fire hazards from vehicles and human activities (e.g., use spark arrestors on power equipment, avoid driving vehicles off road).
    - Follow federal and state measures for handling toxic substances.
- Minimizing effects to wetlands and water resources by following provisions of the Clean Water Act.

3.3.4 *Adaptive Management for Species other than Eagles*

The Adaptive Management techniques described in this section have been developed to ensure that potentially significant levels of mortality from operation of the Project are effectively mitigated. This section describes different Adaptive Management phases that will be applied based on mortality thresholds for avian and bat species. Changes in federal or state status for wildlife species occurring within the Project area may result in the addition of, or changes to, Adaptive Management strategies, as determined by the USFWS through TAC recommendations.

(a) Adaptive Management Process

A set of mortality thresholds has been designated for avian and bat species (see Section 3.3.5(b)). During Project monitoring activities, the TAC Lead will be provided by the searchers or the search coordinator a running mortality count every two weeks for review. The TAC will meet to discuss mitigation needs if the TAC Lead determines that a mortality threshold has been exceeded. At a minimum, the TAC will meet annually to review data and determine whether designated thresholds are still appropriate or whether they should be adjusted.

If mortality thresholds are exceeded, the TAC will be responsible for identifying and requiring Adaptive Management measures from the appropriate mitigation phase identified in Section 3.3.4). The TAC may require one or multiple measures identified for that phase. In lieu of the listed Adaptive Management measures, other measures of similar type (i.e., cost, level of effort, utility) may also be implemented.

The first instance in which mortality thresholds are exceeded, mitigation will be selected from Phase I Measures, if determined necessary by the TAC. If the mortality thresholds are exceeded for a second time (threshold count starts over at zero each time a new mitigation measure is implemented), measure(s) from Phase II Measures would be available for selection. All previously implemented measures would continue to be implemented as well, unless a higher-phase measure replaces a prior measure, i.e., increasing the amount of curtailment. Measures from earlier phases that have not been implemented may also be recommended for implementation by the TAC. This process would continue until thresholds are no longer exceeded. If thresholds are still exceeded following implementation of all mitigation measures for all phases, the TAC and Echanis shall determine necessary management strategies.

(b) Overall Avian and Bat Mortality Thresholds for Species

Yearly mortality thresholds for overall avian and bat species were determined using a regional average of 10 mortality monitoring projects that occur in similar habitat (Table 6). It is understood that mortality estimates for these projects have been adjusted to account for both searcher efficiency and scavenging rates.

It is assumed that these thresholds are a starting point and that the TAC will review them annually to determine their effectiveness as well as to determine whether new data are available that would help refine them; it is also assumed that the TAC will provide recommendations whether or not to increase or decrease them. Additionally, if new mortality estimators are used, thresholds may need to be adjusted to be consistent with new methods.

Table 5. Comparison of 10 Operating Wind Projects with Habitat Types Similar to Echanis

WEF Study Area Location	**Turbines in WEF**	**Turbine/Project MW**	**Avian Mortality per Turbine per year**	**Bats Mortality per Turbine per year**	Turbine size (MW)	Estimated birds/MW	Estimated bats/MW
Foote Creek Rim, WY	69	600 kilowatt (kW) / 41.4 MW	1.5	1.34	0.6	2.50	2.23
Nine Canyon, WA	37	Bonus 1.3 MW / 48.1 MW	3.59	3.21	1.3	2.76	2.47
Stateline, OR/WA	454	Vestas 660 kW / 299.64 MW	1.93	1.12	0.66	2.92	1.70
Klondike, OR	16	Enron 1.5 MW / 24 MW	1.42	1.16	1.5	0.95	0.77
Vansycle, OR	38	Vestas 660 kW / 24.9 MW	0.63	0.74	0.66	0.95	1.12
Klondike II, OR	50	GE / 75 MW	4.71	0.63	1.5	3.14	0.42
Combine Hills, OR	41	Mitsubishi MWT-1000A / 41 MW	2.56	1.88	1	2.56	1.88
Big Horn, WA	133	GE / 199.5 MW	3.81	2.86	1.5	2.54	1.91
Wild Horse, WA	127	V80 / 229 MW	2.79	0.71	1.8	1.55	0.39
Hopkins Ridge, WA	83	Vestas / 150 MW	2.21	1.13	1.8	1.23	0.63
		Average	**2.52**	**1.48**		**2.11**	**1.35**

If any of the criteria below are met, Adaptive Management measures will be required and the TAC will meet to determine the appropriate measure to be required:

- Average mortality across all surveyed WTGs in the Project (15 WTGs) exceeds the average for bird mortality per MW per year (2.70) identified in Table 5.

- Average mortality across all surveyed WTGs in the Project (15 WTGs) exceeds the average for bat mortality per MW per year (2.56) identified in Table5.

- Mortality at any representative WTG surveyed exceeds 10.0 bats /or birds per year.

(c) *Avian Mortality Adaptive Management Phases*

One or multiple measures under an Adaptive Management phase may be applied if mortality thresholds for birds or bats are exceeded. Phases are to be implemented chronologically as avian and/or bat thresholds are repeatedly exceeded, until thresholds are no longer exceeded. Mortality thresholds for birds and bats may be exceeded at different periods throughout the project; therefore, mitigation phases for birds and bats may differ. In the instance that a similar mitigation type (i.e., turbine curtailment) for birds and bats is selected, only the highest phase would apply (i.e., if in Phase I for birds and Phase III for bats, Phase III applies for both). Mitigation phases are summarized in Table 3 and described in detail below.

Table 6: Summary of Adaptive Management Phases for species other than eagles

Phase	Turbine Curtailment	Additional Monitoring	Compensatory Mitigation
Phase I	**Avian Species[1]:** None **Bat Species[2]:** 360 hours of night time cut-in speed curtailment[3] August 1 – November 30.	Implement more intensive monitoring at specific turbines or strings if mortalities follow geographic pattern. Problem turbines or turbine clusters shall be monitored for remainder of the year of fatality and for the following year. Same as Avian Species monitoring	**Avian Species:** Species-specific habitat enhancement as mitigation for lost habitat during construction, and other direct species-specific mitigation as recommended by the TAC (riparian and/or aspen habitat protection or restoration potentially; can occur in mitigation area specified under the Habitat Mitigation Plan for the Project); retrofit 10 power poles **Bat Species:** None
Phase II	**Avian Species:** None **Bat Species:** 700 hours of night time cut-in speed curtailment August 1 – November 30.	Targeted monitoring – see Phase I above.	**Avian Species:** Additional species-specific habitat enhancement as mitigation for lost habitat during construction, and other direct species-specific mitigation as recommended by the TAC (riparian habitats potentially; can occur in mitigation area specified under the Habitat Mitigation Plan for the Project); retrofit 10 additional power poles **Bat Species:** Direct species-specific mitigation focusing on habitat enhancement that benefits bats: manage/restore 5 acres of aspen groves for large structure and cavity retention/creation; manage/maintain old growth forest structure within the migratory corridor. Specific location and methodology will be developed in coordination with the TAC. Seasonal and daily timing of the cut-in speed curtailment may be adjusted based on results of fatality surveys.
Phase III	**Avian Species:** None **Bat Species:**	Targeted monitoring – see Phase I above.	**Avian Species:** Additional species-specific habitat enhancement as mitigation for lost habitat during construction, and other direct species-specific mitigation as recommended by the TAC (riparian habitats potentially; can occur in mitigation area specified under the Habitat Mitigation Plan for the Project); retrofit 10 additional power poles. **Bat Species:**

	1,080 hours of night time cut-in speed curtailment August 1 – November 30.		Direct species specific mitigation of 5 additional acres as described in Phase II above.
Phase IV	**Avian Species:** None **Bat Species:** 1,440 hours of night time cut-in speed curtailment August 1 – November 30.	Targeted monitoring – see Phase I above.	**Avian Species:** Additional species-specific habitat enhancement as mitigation for lost habitat during construction, and other direct species-specific mitigation as recommended by the TAC. (Riparian habitats potentially; can occur in mitigation area specified under the Habitat Mitigation Plan for the Project); retrofit 10 additional power poles. **Bat Species:** Direct species specific mitigation of 5 additional acres as described in Phase I above.
Phase V	**Avian Species:** **Bat Species:** 1,800 hours of night time cut-in speed August 1 – November 30.	Targeted monitoring – see Phase I above.	**Avian Species:** Additional species-specific habitat enhancement as mitigation for lost habitat during construction, and other direct species-specific mitigation as recommended by the TAC (riparian habitats potentially; can occur in mitigation area specified under the Habitat Mitigation Plan for the Project); retrofit 10 additional power poles. **Bat Species:** Direct species specific mitigation of 5 additional acres as described in Phase I above.

[1] Avian species threshold is 219 non-raptor avian fatalities (2.11 fatalities/MW/yr for 104 megawatts) and 5 raptor fatalities (0.05 fatalities/MW/yr for 104 megawatts). (Raptor mortality rate was the national average in 2001, WEST, 2001.)
[2]Bat species threshold is 140 bats (1.35 fatalities/MW/yr for 104 megawatts)
[3]Cut-in speed curtailment defined as increasing the cut-in speed from 3.5 meters per second (mps) to 5 mps.

(d) *Details of Adaptive Management Measures for the Migratory Corridor Turbines*

This section discusses the specific adaptive management measures applicable to Project to mitigate for impacts to avian and bat species other than Golden Eagles. Such measures will be implemented in successive phases based on the thresholds specified in this section. Phase I will be implemented in the first year the threshold is exceeded, Phase II will be implemented in the second year the threshold is exceeded, Phase III will be implemented in the third year the threshold is exceeded, Phase IV will be implemented in the fourth year the threshold is exceeded, and Phase V will be implemented in the fifth year the threshold is exceeded. If the threshold continues to be exceeded despite implementation of all of these phases, Echanis will meet with the TAC to discuss further mitigations.

Phase I Mitigation

TURBINE CURTAILMENT

- None

DIRECT MITIGATION

- Additional targeted monitoring will occur at specific turbines or turbine strings if mortalities follow some sort of pattern across the site, e.g. if some turbines or a portion of the site seem to be responsible for increased mortalities.
- Retrofit 10 power poles if raptor mortality exceeds expectations, as for eagle mitigations . Retrofits will follow APLIC guidelines (APLIC 2006); retrofit of such poles shall qualify as the mitigation required for mitigation for any eagle take required by Section 2.4.5.

Phase II Mitigation

TURBINE CURTAILMENT

- Implement Cut-in Speed Curtailment (for purposes of this Section, "Cut-in Speed Curtailment" shall be defined as increasing the cut-in speed for WTGs for which mortality thresholds have been exceeded from 3 m/s to 5 m/s). Cut-in Speed Curtailment is determined on a per-turbine basis; for example, if four turbines are curtailed for one hour each, this equates to four hours of curtailment. Adjustments to seasonal and daily timing may be adjusted based on mortality and AnaBat (for bats only) data. The timing (both hourly and seasonally) of the Cut-in Speed Curtailment shall be developed by the TAC, but in no event shall curtailment occur during hours and seasons when avian and bat use is expected to be minimal.

DIRECT MITIGATION

- As approved by the necessary entities, retrofit an additional 10 power poles within the mitigation areas shown on Figure 10determined to be unsafe will be retrofitted and raptor-proofed according to current APLIC guidelines (APLIC 2005); retrofit of such poles shall qualify as the mitigation required for mitigation for any eagle take required by Section 2.4.5.
- Echanis shall implement a targeted monitoring program to attempt determine the specific reasons for mortality, including wind speed, direction, seasonality, weather and other factors that may have contributed to the mortality event;
- Additional mitigation as recommended by the TAC.

Phase III Mitigation

TURBINE CURTAILMENT

- Implement Cut-in Speed Curtailment for up to 720 hours per year. The timing (both hourly and seasonally) of the Cut-in Speed Curtailment shall be developed by the TAC, but in no event shall curtailment occur during hours and seasons when avian and bat use is expected to be minimal. Additionally, adjustments to seasonal and daily timing may be adjusted based on mortality and AnaBat (for bats only) data.
- Cut-in speed changes should not exceed 12 hours per day.

DIRECT MITIGATION

- As approved by the necessary entities, up to an additional 10 power poles (within the mitigation areas shown on Figure 10 determined to be unsafe will be retro-fitted and raptor proofed according to current APLIC guidelines (APLIC 2005); retrofit of such poles shall qualify as the mitigation required for mitigation for any eagle take required by Section 2.4.5.
- Echanis shall implement a targeted monitoring program to attempt determine the specific reasons for mortality, including wind speed, direction, seasonality, weather and other factors that may have contributed to the mortality event;
- Additional mitigation as recommended by the TAC.

Phase IV Mitigation

TURBINE CURTAILMENT

- Implement Cut-in Speed Curtailment for up to 1,080 hours per year. The timing (both hourly and seasonally) of the Cut-in Speed Curtailment shall be developed by the TAC, but in no event shall curtailment occur during hours and seasons when avian and bat use is expected to be minimal. Additionally, adjustments to seasonal and daily timing may be adjusted based on mortality and AnaBat (for bats only) data.

- Cut-in speed changes should not exceed 12 hours per day.

DIRECT MITIGATION

- As approved by the necessary entities, up to an additional 10 power poles (within the mitigation areas shown on Figure 10 determined to be unsafe will be retro-fitted and raptor proofed according to current APLIC guidelines (APLIC 2005); retrofit of such poles shall qualify as the mitigation required for mitigation for any eagle take required by Section 2.4.5.
- Echanis shall implement a targeted monitoring program to attempt determine the specific reasons for mortality, including wind speed, direction, seasonality, weather and other factors that may have contributed to the mortality event;
- Additional mitigation as recommended by the TAC.

Phase V Mitigation

TURBINE CURTAILMENT

- Implement Cut-in Speed Curtailment for up to 1,440 hours per year. The timing (both hourly and seasonally) of the Cut-in Speed Curtailment shall be developed by the TAC, but in no event shall curtailment occur during hours and seasons when avian and bat use is expected to be minimal. Additionally, adjustments to seasonal and daily timing may be adjusted based on mortality and AnaBat (for bats only) data.
- Cut-in speed changes should not exceed 12 hours per day.

DIRECT MITIGATION

- As approved by the necessary entities, up to an additional 10 power poles (within the mitigation areas shown on Figure 10 determined to be unsafe will be retro-fitted and raptor proofed according to current APLIC guidelines (APLIC 2005); retrofit of such poles shall qualify as the mitigation required for mitigation for any eagle take required by Section 2.4.5.
- Echanis shall implement a targeted monitoring program to attempt determine the specific reasons for mortality, including wind speed, direction, seasonality, weather and other factors that may have contributed to the mortality event;
- Additional mitigation as recommended by the TAC.

3.3.5 *Power Pole Retrofits*

Subject to having appropriate agreements with local utilities in place, Echanis will ensure that all retrofits will be in accordance with APLIC prescriptions (APLIC 2006), and be maintained for the life of the project if any maintenance is necessary. This might be particularly true if aftermarket line insulators are applied, which have a moderate

lifespan. Retrofits that result in the replacement of existing cross-arms with longer ones will likely last longer requiring less maintenance.

Power pole retrofits required under these mitigation phases will cover similar commitments under Section 2 (for eagles), as long as all retrofits meet APLIC standards. That is, if retrofits are undertaken because of the implementation of phases under Section 3 before any eagle mortalities, then they will count toward having met phase 1 under Section 2 (regarding eagle conservation) before having killed any eagles. That is because APLIC standard retrofits are designed to benefit eagles, and any retrofits undertaken because of take in this section will serve eagle conservation as well.

3.4 Post-construction Monitoring

Echanis shall perform monitoring for the Project as set forth in Section 4.0 of this Plan.

4.0 POST-CONSTRUCTION MONITORING

The post-construction fatality surveys for eagles, other birds, and bats is a critical component of this Plan and consists of two phases of monitoring: intensive and operational.

Intensive monitoring consists of surveys involving standardized carcass searches and bias trials for searcher efficiency and carcass removal conducted by consultants familiar with these methods. The monitoring occurs in the one to two years following construction. It serves several purposes: provides baseline mortality information for the site including mortality rate by species; is likely to catch any large mortality events; and helps identify which turbine placements might result in more mortalities than others, which in turn could inform subsequent operational monitoring and lead to adjustments in the operation of the turbines.

Operational monitoring is a series of long-term (four- to five-year increments) standardized surveys using the site's Environmental Compliance Officer (ECO) and Operations personnel. The intent of this monitoring is to systematically monitor and report wildlife fatalities to assess long-term operational impacts (trends) of the project; although carried out at a less intense rate than baseline monitoring, it nonetheless continues to measure the project impacts to birds and bats, by: estimating the overall species composition of causalities; and determines trends in fatalities of eagles, other birds, and for bats.

The observations made during post-construction monitoring will be reported to the TAC and the Service, which will respond with appropriate management decisions should mortalities exceed the thresholds outlined in this Plan for eagles (*see* Section 2.4). The results of the monitoring for other birds and bats might also trigger operational adjustments for the project (*see* Section 3.3). Since post-construction monitoring methods are constantly improving as researchers develop new and more accurate methods of survey, the TAC and the Service should consider recommendations to adopt new survey techniques and protocols as they become available.

As part of these mortality surveys, the searcher efficiency rate (*i.e.*, the ability of a surveyor to locate a mortality) and carcass removal rate (*i.e.*, the average time that a carcass persists before a scavenger removes it) will be determined for bats and small and large bird size classes. For each mortality located, the appropriate (*i.e.*, bat, small bird, large bird) searcher efficiency and scavenger removal rate will be used to estimate the actual number of bird and bat mortalities. Methods for completing post-construction surveys are described below (Section 4.5).

4.1 Fatality Monitoring

4.1.1 *Definitions and Methods*

With respect to seasons, this Plan uses the following dates for defining seasons:

Season	Dates (Duration)
Spring	March 16 to May 15 (2 months)
Summer	May 16 to August 15 (3 months)
Fall	August 16 to October 31 (2 ½ months)

Fatality monitoring will begin one month after commencement of commercial operation of the facility in any of the seasons above. The first monitoring year, however, is the first full year that encompasses all seasons as defined above. Subsequent monitoring years will follow the same schedule (beginning in the same calendar month in the subsequent monitoring years).

In each monitoring year, the searchers shall conduct fatality monitoring searches at the rates of frequency shown below. Over the course of one monitoring year, the searchers will conduct 15 searches per turbine, as follows:

Season	Frequency (Total Number)
Spring	2 searches per turbine per month (4 searches per turbine)
Summer	2 searches per turbine per month (6 searches per turbine)
Fall	2 searches per turbine per month (5 searches per turbine)

4.1.2 *Sample Size*

The sample size for fatality monitoring is the number of turbines searched per monitoring year. Echanis shall conduct fatality monitoring during each monitoring year in search plots at each of the seven migratory corridor turbines, and at 15 of the other turbines. Each turbine will be searched according to the schedule above, thus approximately once every 2 weeks Spring, Summer, and Fall.

4.1.3 *Search Plots*

The searchers shall conduct fatality monitoring within search plots. Echanis, in consultation with the searchers and the ODFW, shall select search plots based on a systematic sampling design that ensures that the plots are representative of the habitat conditions in different parts of the site. Each of the Migratory Corridor turbines will be searched during the intensive survey periods.

Plots will be centered on the turbine location and will have a radius equal to the maximum blade tip height of the turbine contained within the plot. “Maximum blade tip height” is the turbine hub-height plus one-half the rotor diameter. Square search plots will be of sufficient size to contain a circular search plot as described above. Echanis shall provide maps of the search plots to the Service and the TAC before beginning fatality monitoring at the facility. The searchers shall use the same search plots for each search conducted during a single monitoring year.

4.1.4 *Duration of Fatality Monitoring*

Echanis shall perform one complete monitoring cycle during the first full year of facility operation (Year 1) in addition to any partial year that is the period of time between 1 month following commencement of operations and October 31. At the end of this period of monitoring, Echanis shall report the results for joint evaluation by Echanis, BLM, the Service, and ODFW. In the evaluation, Echanis might compare the results for the Project with the thresholds of concern. If the fatality rates for the first year of monitoring at the Project do not exceed any of the thresholds of concern, then Echanis will perform intensive monitoring every five years. In the intervening years, the ECO and onsite personnel will carry out operational monitoring as described below (Section 4.3.1).

If monitoring results in the discovery of a Golden Eagle fatality directly caused by Project Operations, Echanis shall implement the first phase of Adaptive Management Measures set forth in Section 2.4.5 of this Plan. If the eagle mortality has occurred at a Migratory Corridor Turbine, then these turbines will be subject to targeted monitoring (Section 4.4 below). If fatality rates for the first year of monitoring at the Project exceed any of the thresholds of concern for species other than Golden Eagles, then Echanis will implement the first phase of Adaptive Management Measures set forth in Section 3.3.5. With respect to fatalities for species other than eagles, Echanis may opt to perform a second year of fatality monitoring if Echanis believes that the results of Year 1 monitoring were anomalous.

If either (a) there is a Golden Eagle fatality caused by the Project or (b) thresholds for other species are exceeded, Echanis shall complete an additional year of monitoring in the year following the date on which such eagle fatality occurred or the thresholds were exceeded. Such monitoring shall continue until such time as there is no Golden Eagle fatality or the thresholds are not exceeded, at which time the next year of intensive monitoring shall be in Year 5 of Project Operations. Between these years of intensive monitoring, Echanis shall conduct operational monitoring as described below (Section 4.3.1).

4.2 Baseline Fatality Monitoring

Contract biologists Personnel trained in proper search techniques (the “searchers”) will conduct the carcass searches by walking parallel transects approximately 20 feet (6 meters) apart within the search plots. A searcher will walk at a rate of approximately 148 to 197 feet (45 to 60 meters) per minute along each transect, searching both sides out to 10 feet (3 meters) for casualties. Search area and speed may be adjusted by habitat type after evaluation of the first searcher efficiency trial.

Searchers shall flag all avian or bat carcasses discovered. Carcasses are defined as a complete carcass or body part, 10 or more feathers or three or more primary feathers in one location. When parts of carcasses and feathers from the same species are found

within a search plot, searchers shall make note of the relative positions and assess whether or not these are from the same fatality.

All carcasses (avian and bat) found during the standardized carcass searches will be photographed, recorded and labeled with a unique number. Searchers shall make note of the nearest two or three structures (turbine, power pole, fence, building or overhead line) and the approximate distance from the carcass to these structures. The species and age of the carcass will be determined when possible. Searchers shall note the extent to which the carcass is intact and estimate time since death. Searchers shall describe all evidence that might assist in determination of cause of death, such as evidence of electrocution, vehicular strike, wire strike, predation or disease. When assessment of the carcass is complete, all traces of it will be removed from the site. All data will be entered into a database or spreadsheet.

Each carcass will be bagged and frozen for future reference and possible necropsy or (if the carcass is fresh and whole) for use in trials. A copy of the data sheet for each carcass will be kept with the carcass at all times. For each carcass found, searchers will record species, sex and age when possible, date and time collected, location, condition (e.g., intact, scavenged, feather spot) and any comments that may indicate cause of death. Searchers will photograph each carcass as found and will map the find on a detailed map of the search area showing the location of the wind turbines and associated facilities. Echanis shall coordinate collection of state endangered, threatened, sensitive or other state protected species with ODFW. Echanis shall coordinate collection of federally listed endangered or threatened species, Bald and Golden Eagle Protection Act, and Migratory Bird Treaty Act protected avian species with the Service. Echanis shall obtain appropriate collection permits from ODFW and the Service.

The searchers shall calculate fatality rates using statistical methods approved by the TAC. In making these calculations, the searchers may exclude carcass data from the first search of each turbine plot (to eliminate possible counting of carcasses that were present before the turbine was operating).

The searchers shall estimate the number of avian and bat fatalities attributable to operation of the facility based on the number of avian and bat fatalities found at the facility site. All carcasses located within areas surveyed, regardless of species, will be recorded and, if possible, a cause of death determined based on blind necropsy results. If a different cause of death is not apparent, the fatality will be attributed to facility operation. The total number of avian and bat fatalities will be estimated by adjusting for removal and searcher efficiency bias (Section 4.5 below).

On an annual basis, Echanis shall report an estimate of fatalities in eight categories: (1) all birds, (2) small birds, (3) large birds, (4) raptors, (5) grassland birds, (6) nocturnal migrants, (7) state and federally listed threatened and endangered species and State Sensitive Species listed under OAR 635-100-0040 and (8) bats. Echanis shall report annual fatality rates on both a per-MW and per-turbine basis.

4.3 Operational Monitoring

Operational Monitoring consists of the following major steps: Inspections of turbines for dead birds and bats by the ECO during regularly scheduled (weekly) visits; turbine checks by operations personnel during scheduled maintenance visits; incidental observations by operations personnel during daily activities onsite; training of ECO and operations personnel; Permitting and Reporting.

The role of the ECO is critical, as the person hired into this position will act as the representative for wildlife issues and concerns. Duties of the ECO include supporting the Plant Manager and Operations personnel with wildlife-related issues at Echanis. The ECO should be a trained biologist with expertise in bird and bat identification; survey techniques involving point count and transect methods; handling dead birds; efficient at data recording, summary, and reporting; and other procedures to comply with state and federal permits. The ECO should undergo periodic training and testing by independent contractors, upon hire and at regular intervals (e.g. in both years 1 and 2, and every 5 years after that).

The primary duty of the ECO will be to conduct regularly scheduled inspections. Along with inspections, the ECO will be responsible for the following activities: Support recording and reporting of casualties discovered by Operations personnel during turbine checks or incidental observations (see Incidental Observations, below); conduct a small sample of carcass removal trials and seasonal searcher efficiency trials for turbine checks by the Operations personnel. (These trials would be conducted with the same protocol as the baseline monitoring trials, which are described below); process and handling bird and bat fatalities as appropriate under federal and state permits; assist with onsite wildlife/environmental awareness training for Operations personnel, which might include updates, insights from lessons learned, or reminders to personnel at site meetings.

A summary of operational monitoring practices is presented below.

4.3.1 *Environmental Compliance Officer Inspections*

The onsite ECO will conduct weekly inspection of selected turbines for bird and bat causalities. The ECO will survey the areas surrounding the turbines and search an 80-meter (m) long transect along the access road on either side of the turbine. The inspections will be conducted as follows: ECO will conduct 10 inspections per week at systematically selected turbines and at each of the seven Migratory Corridor turbines; upon arriving at a turbine the ECO will conduct a visual scan of the area surrounding the turbine with binoculars for any bird or bat causalities, carcasses, or remains; the ECO will search an 80-m transect along the turbine string access road on either side of the turbine and around the gravel pad surrounding the turbine; the ECO will record appropriate information on the inspection (e.g., date, observer) and for each bird or bat casualties discovered (e.g., location, identification); locations of casualties will be marked with a

GPS unit; the ECO will photograph all discoveries to aid in identification but will not handle or transport carcasses or injured wildlife unless specifically authorized, trained, and permitted; at the conclusion of the daily site inspection, the ECO will report any causalities of birds or bats to the Plant Manager; the ECO will seek the help of wildlife professionals in cases where specimen identification is unclear (and this could involve sending pictures of dead specimens to other professional biologists or contractors skilled in identifying dead animals); state and federal agencies will be notified immediately for any of the following discoveries:

- Threatened or endangered species
- Eagles
- Sage Grouse
- Five or more fatalities at a single turbine

The ECO will retain all unidentified casualties in a freezer until identification can be confirmed. Otherwise the ECO will dispose of carcasses as specified by permit.

4.3.2 *Operations Personnel Turbine Checks*

Operations personnel turbine checks are conducted during the regularly scheduled visits to turbines. On a monthly basis, operations personnel will search for bird and bat carcasses around the base of turbines during routine turbine checks conducted for other reasons. During these checks personnel will also scan as much of the area around the turbine as possible for feathers or carcasses. Project operators and maintenance personnel will be especially vigilant for eagle carcasses. Training and audits of Operations personnel will be conducted by the ECO periodically to ensure quality assurance and quality control (QA/QC) for the program. The effect of this training program shall be to ensure that fatality monitoring for Golden Eagles shall continue for the life of the Project.

The turbine checks are described below: During routine checks of turbines, onsite personnel will conduct a visual check for bird and bat remains by walking around the turbine base – remains include carcasses or parts of carcasses, bones, or groups of feathers (individual feathers could indicate a nearby carcass); the personnel will focus on the area that includes the gravel pad surrounding turbine and (if present) the step up transformer, approximately a 10 to 20-m radius around the turbine; personnel will also scan as much of the area around the turbines as possible for feathers or carcasses; the personnel will record that the turbine was checked (visual search of the perimeter of the turbine) for causalities, and whether or not any bird or bat carcasses were discovered; personnel will mark any carcasses with flags or other indicator to make it easy for the ECO to locate the casualty, but will not handle or transport any birds or bats unless specifically permitted and trained; the personnel will then report any dead or injured birds or bats to the ECO or Plant Manager; based on the notification, the ECO will visit the site to confirm the discovery and to record appropriate information, and follow through with specimen identification and disposal as described above. Such visual surveys, which shall occur each time operators conduct routine maintenance activities on a turbine, shall continue for the life of the Project.

4.4 Targeted Monitoring

Some mitigation phases require the implementation of targeted monitoring. Targeted monitoring will be the focus by the ECO to conduct mortality surveys around specific turbines, or strings of turbines, as decided by the TAC and the Service in the case of increased monitoring in response to eagle mortality. In general, targeted monitoring will be implemented if patterns emerge that suggest certain areas of Echanis are resulting in more mortalities than expected. The ECO will use methods similar to those used contractors during intensive monitoring, i.e., the ECO will add transects across the footprint of each targeted turbine creating a more intensive search of the area. This will be in addition to other turbine inspections (Section 4.3.1).

4.5 Incidental Observations

Along with the inspections by the ECO and turbine checks by operations personnel, any additional wildlife causalities observed incidentally during daily activities by operations personnel will be recorded. Operations personnel should follow essentially the same practices described for routine turbine checks when a bird or bat casualty is discovered incidentally. Mark the location of the casualty, record the location on an incidental observations form, and notify the ECO and/or Plant Manager immediately. Incidentally discovered carcasses will be recorded and reported separately from carcasses discovered as part of either formal baseline searches, operational monitoring by ECOs or routine checks by other personnel.

4.6 Injured Birds

The ECO will coordinate with a local, licensed wildlife rehabilitation center to transport any native injured wildlife found on project site to the center for rehabilitation. Any transport will be done in coordination with appropriate state and federal agencies and permits. The ECO shall develop and follow a protocol for handling injured birds. Any injured native birds found on the facility site will be carefully captured by the ECO and transported to a qualified rehabilitation specialist approved by the TAC. The ECO will be trained in proper techniques for capturing injured birds by qualified wildlife biologists. Echanis shall pay costs, if any, charged for time and expenses related to care and rehabilitation of injured native birds found on the site, unless the cause of injury is clearly demonstrated to be unrelated to the facility operations.

Operations personnel will follow appropriate internal reporting of any dead wildlife (and livestock) discovered. Plant Manager will also coordinate rapid removal of dead livestock or big game (deer, elk) as these may attract raptors, ravens, or vultures.

4.7 Removal Trials

The objective of the removal trials is to estimate the length of time avian and bat carcasses remain in the search area. Estimates of carcass removal rates will be used to

adjust carcass counts for removal bias. “Carcass removal” is the disappearance of a carcass from the search area due to predation, scavenging or other means such as ranching activity.

Professional independent biologists shall conduct carcass removal trials within each monitoring season defined above during the first year of fatality monitoring, and every five years thereafter during baseline monitoring years. For each trial, the searchers shall use 10 to 15 carcasses of small- and large-bodied species. Trial carcasses shall be placed at least 1,000 feet from any search plots and distributed proportionately within habitat categories and subtypes similar to the search plots.

The searchers shall use game birds or other legal sources of avian species as test carcasses for the removal trials, and the searchers may use carcasses found in fatality monitoring searches. The searchers shall select species with the same coloration and size attributes as species found at Echanis. If suitable trial carcasses are available, trials during the fall season will include several small brown birds to simulate bat carcasses. Legally obtained bat carcasses will be used if available.

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

An approximate schedule for assessing removal status is once daily for the first 4 days, and on days 7, 10, 14, 21, 28 and 35. This schedule may be adjusted depending on actual carcass removal rates, weather conditions and coordination with the other survey work. The condition of scavenged carcasses will be documented during each assessment, and at the end of the trial all traces of the carcasses will be removed from the site. Scavenger or other activity could result in complete removal of all traces of a carcass in a location or distribution of feathers and carcass parts to several locations. This distribution will not constitute removal if evidence of the carcass remains within an area similar in size to a search plot and if the evidence would be discernable to a searcher during a normal survey.

Before beginning removal trials for any subsequent year of fatality monitoring, Echanis shall report the results of the first year removal trials to the TAC. In the report, Echanis shall analyze whether four removal trials per year, as described above, provided sufficient data to accurately estimate adjustment factors for carcass removal. The number of removal trials for any subsequent year of fatality monitoring may be adjusted up or down, subject to recommendations by the TAC.

4.8 Searcher Efficiency Trials

The objective of searcher efficiency trials is to estimate the percentage of bird and bat fatalities that searchers are able to find. A pooled estimate of searcher efficiency will be used to adjust carcass counts for detection bias. The trials should take place after an initial training and 'break-in period' of searchers has occurred; standardized search techniques should be learned and employed by all searchers, with the goal of creating an even baseline of searcher efficiency among all searchers before estimating searcher efficiency through trials.

The contract biologists shall conduct searcher efficiency trials within each of the seasons defined above during the years in which the fatality monitoring occurs. The ECO will be trained and tested in this way during the first year of monitoring, as contractors train and test themselves. Each trial will involve approximately 4 to 15 carcasses. The searchers will not be notified of carcass placement or test dates. The searchers shall vary the number of trials per season and the number of carcasses per trial so that the searchers will not know the total number of trial carcasses being used in any trial. In total, approximately 80 carcasses will be used per year, or approximately 15 to 25 per season.

For each trial, the searchers shall use small- and large-bodied species. The searchers shall use game birds or other legal sources of avian species as test carcasses for the efficiency trials, and the searchers may use carcasses found in fatality monitoring searches. The searchers shall select species with the same coloration and size attributes as species found within the site boundary. If suitable test carcasses are available, trials during the fall season will include several small brown birds to simulate bat carcasses. Legally obtained bat carcasses will be used if available. The searchers shall mark the test carcasses to differentiate them from other carcasses that might be found within the search plot and shall use methods similar to those used to mark removal test carcasses as long as the procedure is sufficiently discreet and does not increase carcass visibility.

Echanis shall distribute trial carcasses in varied habitat in rough proportion to the habitat types within the site. On the day of a standardized fatality monitoring search (described below) but before the beginning of the search, searchers will place efficiency trial carcasses randomly within search plots (one to three trial carcasses per search plot) within areas to be searched. If scavengers appear attracted by placement of carcasses, the carcasses will be distributed before dawn.

Efficiency trials will be spread over the entire season to incorporate effects of varying weather and vegetation growth. The number and location of the efficiency trial carcasses found during the carcass search will be recorded. The number of efficiency trial carcasses available for detection during each trial will be determined immediately after the trial by the person responsible for distributing the carcasses. Following plot searches, all traces of test carcasses will be removed from the site.

If new searchers are brought into the search team, additional searcher efficiency trials will be conducted following an appropriate training and break-in period, to ensure that

detection rates incorporate searcher differences. Echanis shall include a discussion of any changes in search personnel and any additional detection trials in the reporting required under Section 4 of this plan.

Before beginning searcher efficiency trials for any subsequent year of fatality monitoring, Echanis shall report the results of the first year efficiency trials to the TAC. In the report, Echanis shall analyze whether the efficiency trials as described above provided sufficient data to accurately estimate adjustment factors for searcher efficiency. The number of searcher efficiency trials for any subsequent year of fatality monitoring may be adjusted up or down as necessary.

The contractors shall conduct searcher efficiency trials for the ECO to measure detection bias in the survey method described under operational monitoring to be conducted by the ECO. The method should especially focus on the ability of the ECO to detect large carcasses, e.g. eagles, at distances from the planned transects. The ECO shall conduct searcher efficiency trials for personnel once per year, using similar techniques, with the goal of providing some measure of detection bias using the sampling scheme devised for operations personnel above.

4.9 Statistical Methods for Fatality Estimates

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

- The observed number of carcasses found during baseline monitoring searches for which the cause of death is attributed to the facility;
- Searcher efficiency expressed as the proportion of planted carcasses found by searchers.
- Removal rates expressed as the estimated average probability a carcass is expected to remain in the study area and be available for detection by the searchers during the entire survey period.

Following the initial years of contractor-run baseline surveys, reports will include estimates of fatalities based on operational monitoring and incidental casualties.

4.10 Raptor Nest Monitoring

The objectives of raptor nest surveys are: (1) to estimate the size of the local breeding populations of raptor species that nest on the ground or aboveground in trees or other aboveground nest locations in the vicinity of the Project, and (2) to determine whether operation of the facility results in a reduction of nesting activity or nesting success in the local populations of the following raptor species: Swainson's hawk, ferruginous hawk, Golden Eagle, and bald eagle.

Echanis shall conduct short-term and long-term monitoring. Echanis's qualified searchers will use aerial and ground surveys to evaluate nest success by gathering data on active

nests, on nests with young, and on young that have fledged. The searchers will analyze the data as described in Section 3(c) and will share the data with state and federal biologists.

4.10.1 *Short-Term Raptor Monitoring*

Short-term monitoring will be done in two monitoring seasons. The first monitoring season will be in the first raptor nesting season after completion of construction of the facility. The second monitoring season will be in the fourth year after construction is completed. Echanis shall provide a summary of the first-year results in the monitoring report. After the second monitoring season, the searchers will analyze two years of data compared to the baseline data.

During each monitoring season, the searchers will conduct a minimum of one aerial and one ground survey for raptor nests in late May or early June and additional surveys as described in this section. The survey area is the area within the facility site and a 2-mile buffer zone around the site. Nests outside the leased project boundary will be checked from an appropriate distance where feasible, depending on permission from the landowner for access.

All nests discovered during pre-construction surveys and any nests discovered during post-construction surveys, whether active or inactive, will be given identification numbers. Nest locations will be recorded on U.S. Geological Survey 7.5-minute quadrangle maps. Global positioning system (GPS) coordinates will be recorded for each nest. Locations of inactive nests will be recorded because they could become occupied during future years.

Determining nest occupancy will likely require at least two visits to each nest. For occupied nests, Echanis will determine nesting success by a minimum of one ground visit to determine species, number of young and young fledged. “Nesting success” means that the young have successfully fledged (the young are independent of the core nest site).

4.10.2 *Long-Term Raptor Monitoring*

In addition to the two years of post-construction raptor nest surveys described above, Echanis will conduct long-term raptor nest surveys at 5-year intervals for the life of the facility. Searchers will conduct the first long-term raptor nest survey in the raptor nesting season of the ninth year after construction is completed and will repeat the survey at 5-year intervals thereafter. In conducting long-term surveys, the searchers will follow the same survey protocols as described above unless the searchers propose alternative protocols that are approved by the TAC. In developing an alternative protocol, the searchers will consult with the TAC and will take into consideration other monitoring conducted in adjacent areas. The searchers will analyze the data and report after each year of long-term raptor nest surveys.

4.10.3 *Raptor Nesting Data Analysis*

The searchers will analyze the raptor nesting data to determine whether a reduction in either nesting success or nest use has occurred in the survey area. If the analysis indicates a reduction in nesting success or nest use by Swainson's Hawks or Ferruginous Hawks, then Echanis will propose appropriate mitigation for the affected species as described in Section 3(d) and will implement mitigation as approved by the TAC.

Reductions in nesting success or nest use could be due to operation of the facility or some other cause. The searchers will attribute the reduction to operation of the facility unless the searchers demonstrate, and the TAC agrees, that the reduction was due to a different cause. At a minimum, if the analysis shows that a Swainson's Hawk or Ferruginous Hawk has abandoned a nest territory within the facility site or within ½ mile of the facility site or has not fledged any young over two successive surveys within that same area, the searchers will assume the abandonment or unsuccessful fledging is due to operation of the facility unless another cause can be demonstrated convincingly.

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

4.10.4 *Raptor Nest Mitigations*

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

Echanis will report wildlife monitoring data and analysis to the TAC at each scheduled meeting of the TAC. Echanis shall notify the Service and ODFW immediately if any federal or state endangered or threatened species are killed or injured on the facility site. Echanis shall report fatality monitoring program data, raptor nest monitoring data, data and analysis from the grassland bird study and data on avian and bat casualties found by facility personnel. Echanis may include the reporting of wildlife monitoring data and

analysis in the annual report or submit this information as a separate document at the same time the annual report is submitted. In addition, Echanis shall provide to the TAC any data or records generated by the searchers in carrying out this monitoring plan upon request by the TAC.

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