# LIME WIND PROJECT
# Serial Number OR-64395

## Decision Record
## Finding of No Significant Impact (FONSI)

## Environmental Assessment
## OR-035-08-01

Prepared by:

U.S. Department of the Interior
Bureau of Land Management
Baker Resource Area

December 2009

## TABLE OF CONTENTS

**DECISION RECORD**…….…..1

**Finding of No Significant Impact (FONSI)**……...27

**1) Introduction**…….33
1.1 Background……33
1.2 Type of Action……...33
1.3 Purpose of and Need for the Proposed Action……...33
1.4 Location of Proposed Action…….34
1.5 Conformance with Applicable Land Use Plans…….34
1.6 Relationship to Statutes, Regulations, or other plans……34
1.7 Scoping……..35

**2) Proposed Action and Alternatives**…….36
2.1 Description of Proposed Action……....36
2.1.1 Sequence of Construction Activities…….37
2.1.2 Wind Turbine Pad Area Construction……...38
2.1.3 Meteorological Monopole Tower Pad Construction…….....39
2.1.4 Transformer and Electrical Pad Construction……...…40
2.1.5 Underground Transmission Line Construction……...…..40
2.1.6 Collection System Construction……....41
2.1.7 Turbine Installation……...44
2.1.8 Road Design Factors……44
2.1.9 Surface Disturbance Summary……..44
2.1.10 Road Construction……45
2.1.11 Construction Waste Disposal……47
2.1.12 Site Reclamation……...47
2.1.13 Fire Protection……..47
2.1.14 Operation and Maintenance……..47
2.1.14.1 Operation and Maintenance of Road System……...47
2.1.14.2 Operation and Maintenance of Wind Turbine Generators……...48
2.1.15 Mitigation Measures…….49
2.1.15.1 Measures Common to Several Resources……50
2.1.15.2 Measures Regarding Cultural/Archeological Resources…….51
2.1.15.3 Measures Regarding Visual Resources……....51
2.1.15.4 Measures Regarding Biological Resources……..52
2.1.15.5 Measures Regarding Geology/Soils……..54
2.1.15.6 Measures Regarding Health, Safety, and Noise……55
2.1.15.7 Measures Regarding Land Use and Recreation……55
2.2 No Action Alternative……...55
2.3 Alternatives Considered but Eliminated From Detailed Study……56

**3) Affected Environment**…….56
3.1. General Setting……..56
3.2. Critical Elements……....57
3.2.1 Air Quality…….58
3.2.2 Areas of Critical Environmental Concern – Oregon Trail ACEC…….58
3.2.3 Cultural Resources…….58
3.2.4 Invasive, Non-Native Species……...59
3.2.5 Plants, Endangered/Threatened/Sensitive/Strategic……..60
3.2.6 Wastes, Hazardous or Solid……...61
3.2.7 Surface Water and Groundwater Quality……..61
3.2.8 Wilderness…….61
3.2.9 Wildlife……..61
3.2.9.1 Migratory and Neotropical Birds……...61
3.2.9.2 Upland Game Species……62
3.2.9.3 Endangered/Threatened/Sensitive/Species of Concern……63
3.3 Other Elements of the Human Environment……68
3.3.1 Availability of Access/Need to Reserve Access……69
3.3.2 Recreation……..69
3.3.3 Existing and Potential Land Uses……..69
3.3.4 Vegetation……69
3.3.5 Soils……...72
3.3.6 Visual Resources……...72
3.3.7 Economic and Social Values……74
3.3.8 Noise……74
3.3.9 Public Health and Safety……...75
3.3.10 Indian Trust Resources……..75

**4) Environmental Consequences**……75
4.1 Introduction……...75
4.2 Impact Assessment Process……...76
4.3 Impacts Associated with Critical Elements of the Human Environment……..76
4.3.1 Air Quality……76
4.3.2 Areas of Critical Environmental Concern……77
4.3.3 Cultural Resources……77
4.3.4 Invasive, Non-Native Species……78
4.3.5 Plants, Endangered/Threatened/Sensitive/Strategic……..78
4.3.6 Wastes, Hazardous or Solid……...79
4.3.7 Surface Water and Groundwater Quality……...79
4.3.8 Wilderness……..80
4.3.9 Wildlife……..80
4.3.9.1 Migratory and Neotropical Birds……...84
4.3.9.2 Upland Game Species……88
4.3.9.3 Threatened/Endangered/Sensitive/Species of Concern……90
4.4 Impacts Associated with Other Elements of the Human Environment……95
4.4.1 Availability of Access/Need to Reserve Access……95

4.4.2 Recreation……..95
4.4.3 Existing and Potential Land Uses……..96
4.4.4 Vegetation……96
4.4.5 Soils……...97
4.4.6 Visual Resources……...98
4.4.7 Economic and Social Values……...101
4.4.8 Noise……101
4.4.9 Public Health and Safety……102
4.4.10 Indian Trust Resources……103
4.5 Cumulative Impacts……104
4.7 Summary……109

**5) Consultation and Coordination……110**
5.1 Persons and Agencies Consulted
5.2 List of Preparers

**6) Bibliography……...…111**

**7) Exhibits and Attachments**
Exhibit I - Ownership Map, Section 36……...115
Exhibit II - Full Project Map……116
Exhibit III - Close-up Project Map……..117
Exhibit IV - Anticipated Visual……...118
Exhibit V - Turbine Specifications……..119
Exhibit VI - Critical Elements of the Human Environment Worksheet……..120
Exhibit VII - TES Wildlife as Identified by ODFW……121
Exhibit VIII - Federally Listed TES Species……...124
Exhibit IX – Letter from Baker County Planning and Community Development……..126
Exhibit X - Letter from ODFW Regarding Sage Grouse……127
Exhibit XI - Mule Deer Use Area Map……128
Exhibit XII- Wind Resource Assessment……129
Exhibit XIII – Baker County Industrial Zone Map……..142
Exhibit XIV - Letter from ODFW, Comment on Project……144
Exhibit XV – Letter from ODFW, Comment on EA……...145

Attachment A - Visual Resource Information……...…..147
Attachment B - Wilderness Characteristics Map……165
Attachment C – Bird and Bat Carcass Survey……166
Attachment D – Burrowing Owl Survey……169
Attachment E – Survey for Resident Bats……...187
Attachment F – Survey for Migratory Bats……193

**UNITED STATES**
**DEPARTMENT OF THE INTERIOR**
**BUREAU OF LAND MANAGEMENT**

# DECISION RECORD

Lime Wind Project OR-64395
Environmental Assessment OR-035-08-01

This decision record documents my decision to adopt the Lime Wind Project as presented under the Proposed Action Alternative.

There are no federally listed threatened or endangered plant or animal species known or suspected to occur within the project area therefore, no consultation was required with the U.S. Fish and Wildlife Service and/or the National Oceanic and Atmospheric Administration.

The project area has been surveyed for cultural resources and no archaeological resources were found. There is one cultural feature 919 feet outside of the project Area of Potential Effect but it is within the view shed of the project. The Oregon State Historic Preservation Office (SHPO) reviewed the survey reports and concurred with the finding of no effect and determined that no further archaeological research is needed with the project. The proposed project ROW on BLM lands would have no effect on archaeological properties eligible or potentially eligible for the National Register of Historic Places.

## BACKGROUND

The Baker Field Office, Bureau of Land Management (BLM), received an application from Joseph Millworks, Inc., on June 6, 2007. The application was to obtain a right-of-way (ROW) grant authorizing the development of a wind power facility on Federal Lands near Lime, Oregon in section 36, T. 13 S., R. 44 E., Willamette Meridian.

The Lime Wind Project Environmental Assessment (EA# OR-035-08-01) was prepared to disclose and analyze the environmental consequences of issuing a ROW for the installation, operation, and maintenance of a wind development facility on BLM-administered public lands.

There have been changes made from the original proposal and the EA that was submitted for public comment. The changes are listed below:

| **Original proposal** | **Changes made** |
|---|---|
| Twelve 250 kilowatt WTGs mounted on 30 meter towers | 7 – 12 WTGs mounted on towers no higher than 40 meters |

| Original proposal | Changes made |
|---|---|
| No meteorological tower | 30.5 meter (100 foot) tall meteorological tower included |
| Overhead transmission line from the existing line on private property across BLM lands to the Lime Wind Project. This would have required the issuance of a ROW to Idaho Power Company. | Transmission line would now be underground as described in section 2.1.5 and a ROW would not be issued to Idaho Power Company. The proponent would install this underground line in the same footprint where the overhead line would have been located. |
| Bridge over Marble Creek would be re-decked | Deck and guardrails would be removed and channel filled as detailed in section 2.1.10 of the EA. |
| Total rotor swept area of 8478 $m^2$ | Total rotor swept area of 9237 $m^2$ |
| Table 8 Comparison of Bat Mortality Rates based on rotor swept area (RSA) | Table 8 was changed to show bat fatalities based on tower height. |
| Initial disturbance of 8.89 acres and 3.20 for life of project* | Initial disturbance of 8.85 and 3.16 disturbed for life of project* |

*In the original EA, there was an error calculating the road disturbance acreages. The surface disturbance summary table in the original EA that showed 8.89 acres of initial disturbance and 3.20 acres disturbed for the life of the project was in error. The table shown in the current EA, section 2.1.9, which shows 8.85 acres of initial disturbance and 3.16 acres of disturbance for the life of the project is accurate. Also, Exhibit IV from the original EA, which showed the proposed roads, has been removed. The roads are now described in table 2.1.9 and shown on Exhibit III.

The EA was updated to include these changes. The BLM believes that the changes made were sufficiently addressed in the EA and were within the scope of analysis that was done for the original EA therefore, another public comment period was not necessary.

## PUBLIC INVOLVEMENT

The BLM has received input from the public and interested parties since the BLM and Joseph Millworks conducted a public scoping meeting. The meeting was held in Baker City, Oregon on October 17, 2007, in order to identify issues and concerns with the project. On October 29, 2007, a letter describing the project and requesting input on the project was sent to: the agencies having jurisdiction and/or specific interest within the proposed project area, landowners within the proposed project area and the Oregon California Trails Association (OCTA), the SHPO, the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), the Burns Paiute Tribe, and the Nez Perce Tribe.

In response to this scoping, the BLM received four comments. The issues identified were:

| **Comment Summary** | **Response from BLM** |
|---|---|
| Mitigation for loss of big game habitat | Thank you for your comment; your input will be considered in the EA. |
| Request ground monitoring and annual reporting of bird and bat strikes | Thank you for your comment; your input will be considered in the EA. |
| No development within two miles of a sage grouse lek | The project area is located on the fringe of the current and historic range. However, in April 2006 the project area was part of an aerial sage-grouse survey conducted by the ODFW. No active sage-grouse leks were located within a 5 mile radius of the project site (Nick Myatt, ODFW, 2007. **Exhibit X**). Although there is available habitat for sage-grouse life cycles, there are no known resident populations within the project area. |
| Concerns with cumulative impacts of development | Thank you for the comments. The cumulative analysis will be included in the EA. |
| Access to private property | No roads will be closed as a result of this project. The public will continue to have access. |
| Access to BLM lands | No roads will be closed as a result of this project. The public will continue to have access to the resources. |
| How will BLM mitigate loss to the lease holders? | The BLM concluded that there would be no effect to the cattle grazing animal unit months. |
| Analysis indicates that the project will not have a significant impact on the Oregon Trail or its view shed | Thank you for the information. |
| CTUIR would like the opportunity to comment on the area of potential effect once an analysis has been done for the view shed. | The view shed analysis was sent to CTUIR on February 4, 2008. |

On June 17, 2008, the BLM sent the archaeological survey report, botanical survey field notes, the view shed analysis maps and the archaeological survey addendum for the Lime Wind Project to the SHPO, the CTUIR, the Burns Paiute Tribe, and the Nez Perce Tribe for review and comment. A letter was also sent to OCTA with information and a request for comments regarding the archaeological surveys and view shed analysis. The BLM received no responses.

After the EA was prepared, it was available for a formal 30-day public comment period. A legal notice was placed in the Baker City Herald on October 21, 2008, requesting comments on the EA and the proposed Finding of No Significant Impact (FONSI). An announcement and the EA were also placed on the District's Internet site and letters were sent to known interested parties requesting comments.

The BLM received five responses in reply to this request:

| Comment Summary | Response from BLM |
|---|---|
| Strong support for the project. The proposed project site looks to be perfectly suited for a project such as this. The land can be co-developed for its renewable, carbon-neutral, and domestic wind energy potential, and almost 95% of the land can still be used for grazing. | Thank you for the information |
| Detailed surveys of wildlife use (especially birds and bats, including nocturnal use) of the project area should be conducted. | The BLM concluded that the analysis that was done in the EA (sections 4.3.9.1, 4.3.9.2, and 4.3.9.3) was adequate. |
| Wildlife displacement should be more carefully considered. | Thank you for your comment; your input has been provided to the decision maker. |
| Are there alternate locations that would have less environmental impact? | The EA considered reasonable alternatives to the proposed actions. Section 2.3 of the EA discusses those alternatives that were eliminated. The project area was chosen due to the wind resource, access, and the ability to interconnect to existing electrical distribution lines. |
| Recommend surveys be conducted by an experienced biologist for raptor and other sensitive species nests | The EA states that a monitoring program shall be developed to determine bird and bat strikes during the operational phase of the project. |
| Restoration of the impacted site should include two years of rest from grazing. | The BLM will consider the project when authorizing grazing in the area. |
| Recommend on-site mitigation to compensate for loss of wildlife habitat. | Mitigation will be required on 6.4 acres of BLM lands within the mule deer use area as shown on Exhibit XI of EA (EA section 2.1.15.4). The mitigation consists of planting bitter brush seedlings at a rate of 1200 seedlings per acre. If seedling survival is less than 400 seedlings per acre at the end of the third growing season, replanting will be done to bring the total to 800 seedlings per acre. The exact location of the 6.4 acres will be determined after consultation with ODFW. The planting will be completed within a year of the ROW being granted. |
| Recommend all construction activities take place outside of the wintering big game periods from December 1 to April 15. | BLM agreed that big game populations are susceptible to disturbance during the winter period. A stipulation is now included that no construction activities will take place from December 1 to April 15. |

| Comment Summary | Response from BLM |
|---|---|
| Recommend a monitoring plan for bird and bat strikes be established and monitoring be conducted by experienced biologist. | The EA states that a monitoring program shall be developed to determine bird and bat strikes during the operational phase of the project. |
| Recommend the development of a Wildlife Handling and Reporting System. | The EA states that a monitoring program shall be developed to determine bird and bat strikes during the operational phase of the project. This program would include the reporting of any mortality to the BLM authorized officer immediately after identification by ODFW. |

On December 16, 2009, SHPO sent a letter of concurrence on BLM's no effect determination for the Lime Wind Project.

Due to a misunderstanding, CTUIR thought this project was no longer being considered and therefore, submitted their comments after the comment period ended. Below is the summary of their comments and BLM's responses:

| December 19, 2008 letter from CTUIR | January 30, 2009 BLM response letter |
|---|---|
| No site specific studies on elk, mule deer, pronghorn or other big game species were conducted. | Section 4.3.4.2 of the EA states: There would be initial impacts to 8.89 acres of habitat that could be used by deer, elk or antelope, 5.7 acres of which would be revegetated for no long term loss of this habitat, leaving 3.2 acres permanently disturbed. Theoretically, multiple rows of wind turbines placed across a travel corridor could affect ungulate movements in the area. However, the Lime Wind Energy project would consist of a single row of turbines through which these species could easily navigate. Additionally, studies of ungulate movement at the larger Foote Creek Rim project in Wyoming have not demonstrated any ungulate displacement impacts (Johnson et al. 2000). There would be a total permanent loss of 3.2 acres of habitat, with no additional loss of habitat through displacement. This would be too small of an area to affect a population-level response. |
| Concern of impacts from travel to wintering big game. | BLM agreed that big game populations are susceptible to disturbance during the winter period. A stipulation is now included that no construction activities will take place from December 1 to April 15.<br><br>The winter months (December, January, February and March) are the least productive months of the year at the project site. This allows for reduced maintenance schedules during the winter months minimizing disturbance to upland game species.<br><br>Turbine controls and equipment will provide for remote monitoring and start-up/shutdown of turbines. Scheduled winter onsite maintenance will occur one – two days per month. |

| December 19, 2008 letter from CTUIR | January 30, 2009 BLM response letter |
|---|---|
| No studies conducted on impacts to bats in the area | The BLM concluded that the analysis that was done in the EA (section 4.3.9.3) was adequate and that due to the time of construction and distance from roosting sites to the turbines, resident bats would be minimally impacted during sensitive times such as hibernation, emergence from hibernation , or return from migration.<br><br>Also, the BLM concluded that the analysis done in the EA was sufficient to show there would be no significant adverse effect to migratory bat populations.<br><br>The EA states that a monitoring program shall be developed to determine bird and bat strikes during the operational phase of the project. A stipulation will be added that during the first year of operation, the monitoring of bird and bat strikes will be done by an experienced biologist and if no unacceptable levels of mortality occur during this times subsequent monitoring will be under the direction of an experienced biologist. |
| Address direct and cumulative impacts of the project to trust resources | The EA listed all the plant species and their relative abundance found within the project area. The BLM was not aware of any impacts from this project on CTUIR's first foods resources. |
| Concern regarding impacts to village sites along the Snake River | The BLM acknowledged that the village sites are a concern to the Tribes. BLM noted that these village sites are outside the one mile zone of research required by the SHPO and State regulations. A complete SHPO search was conducted and visual and auditory concerns were covered in sections 3.3.6, 4.4.6, 3.3.8 and 4.4.8 of the EA. The BLM concluded that the analysis was sufficient to show that the turbines will not be an impact to the known village sites located along the Snake River. |
| It is not clear in the EA what criteria the BLM is basing a no adverse effect to the Oregon Trail on. | The BLM stated that the Oregon Trail is well outside the project area of potential effect (APE), although some turbines may be seen from portions of it. The BLM concluded that the visual resource management analysis that was completed in the EA found that the project would not have a significant impact to the Oregon Trail view shed. The Oregon-California Trails Association also concluded the same (letter dated November 5, 2007). |
| The BLM has not gathered sufficient information on site BK 630 or historic properties of religious and cultural significance to Indian Tribes | Site BK 630 is a rock cairn 919 feet outside of the project APE as described within the EA; however it is within the view shed of the proposed project. The BLM archaeologist analyzed the site and based on the appearance of the lichens concluded that it is a relatively recent site. The SHPO issued a concurrence on the "no effect" finding by the Baker BLM on December 16, 2008. The BLM stated that if CTUIR disagrees or has information to suggest that the site is older, their input would be |

| | |
|---|---|
| The BLM has not gathered sufficient information on site BK 630 or historic properties of religious and cultural significance to Indian Tribes (contd) | appreciated.<br>The BLM also concluded that the visual mitigation requirement (using non reflective paint and no symbols on structures) would reduce the visual impacts to the site.<br><br>Noise levels were also analyzed and the BLM concluded that operational sounds would not be discernable from the sound of wind at 100 feet from the project area. |
| After the expiration of ROW, site should be returned to its natural setting. | The BLM will include a condition in the ROW requiring that prior to termination of the ROW, the holder and the BLM must agree on an acceptable termination (and rehabilitation) plan. This plan shall include, but is not limited to, removal of facilities, drainage structures, or surface material, recontouring, topsoiling, or seeding. The authorized officer must approve the plan in writing prior to the holder's commencement of any termination activities.<br><br>The BLM also noted that the holder is required to have a minimum bond in the amount of $10,000 per turbine in place to facilitate the BLM's reclamation requirements if needed. |
| No statement indicating lights will not be utilized. | A term will be included that states no nighttime illumination will be authorized and FAA lighting is not required for turbines of the size this project permits (EA section 2.1.15.3). |
| Requests that "affected tribes" be added to bullets 1 and 3 in section 2.1.14.2. | The BLM will add "affected tribes" as suggested. |
| Concern regarding disturbance to General Land Office or BLM right of way markers | The BLM knows of no General Land Office markers in the area APE so there should be no impact on any markers. The BLM will require that if markers are discovered and adversely impacted, the work will cease and the BLM archaeologist will be contacted before any work can continue and all Oregon and Federal laws and regulations will be followed. |

CTUIR then responded to BLM's letter on February 26, 2009. The BLM and CTUIR met in Mission, Oregon on March 19, 2009, to discuss the project and CTUIR's concerns. The BLM then responded via letter on July 10, 2009.

| **February 26, 2009 letter from CTUIR** | **July 10, 2009 BLM response letter** |
|---|---|
| Stated concern regarding conversion of big game habitat to non-habitat | The EA was modified and the BLM will require mitigation to be performed on 6.4 acres of BLM lands within the mule deer use area as shown on Exhibit XI of EA. The mitigation consists of planting bitter brush seedlings at a rate of 1200 seedlings per acre. If seedling survival is less than 400 seedlings per acre at the end of the third growing season, replanting will be done to bring the total to 800 seedlings per acre. The exact location of the 6.4 acres will be determined after consultation with ODFW. The planting will be completed within a year of the ROW being granted. |

| February 26, 2009 letter from CTUIR | July 10, 2009 BLM response letter |
|---|---|
| Conversion of potential root-foods habitat to non-habitat | The BLM concluded that the analysis of Indian Trust Resources in section 4.4.10 of the EA was sufficient to conclude that the project would not affect these plants' potential numbers significantly. |
| Stated concern regarding increased vehicle travel and associated disturbance of big game. | The BLM modified the EA and the ROW will include a stipulation that prevents construction activities between December 1st and April 15th each year to prevent disturbance to big game populations during the winter. |
| Increased vectors for noxious weeds introductions | Section 2.1.15.4 of the EA requires the ROW holder to seed all disturbed areas with a seed mixture and rate specified by the BLM, using an agreed upon method. The BLM concluded that this will sufficiently reduce the vectors for noxious weeds introductions. |
| Net loss of big game habitat and habitat use | The BLM concluded that Section 4.5 of the EA sufficiently addressed cumulative impact to wildlife. The BLM, along with support from the Oregon Department of Fish and Wildlife (ODFW) found that the project area is too small to affect a population –level response from big game species.<br><br>The EA was modified and the BLM will require mitigation to be performed on 6.4 acres of BLM lands within the mule deer use area as shown on Exhibit XI of EA. The mitigation consists of planting bitter brush seedlings at a rate of 1200 seedlings per acre. If seedling survival is less than 400 seedlings per acre at the end of the third growing season, replanting will be done to bring the total to 800 seedlings per acre. The exact location of the 6.4 acres will be determined after consultation with ODFW. The planting will be completed within a year of the ROW being granted. |
| Net loss of potential traditional root-food production areas | The BLM revisited the analysis in section 4.5 of the EA and reaffirmed the conclusion that the project would have a minimal effect to CTUIR's Trust Resources. |
| Establishment of noxious weeds colonies contributing to decreased vegetative diversity and subsequently decreased amount of big game forage and roots | Disturbed areas would be reseeded with native vegetation prescribed by the BLM as noted in section 4.4.4 of the EA. BLM currently has no additional projects proposed for this section of public land. The project design features include annual inspections to identify any future influx of non-native weed species, reseeding of disturbed areas with certified weed-free seed mixes, and the prescribed treatment of weed spraying described in section 4.4 of the EA. Due to these precautions, the BLM concludes that the effects on resources from noxious weed introductions will be kept below the level of significance. |
| Net loss of Treat-reserved resources and the ability to access those resources | The BLM concluded that Section 4.5 of the EA sufficiently addressed cumulative impact to wildlife. The BLM, along with support from the Oregon Department of Fish and Wildlife |

| | |
|---|---|
| Net loss of Treat-reserved resources and the ability to access those resources (contd) | (ODFW) found that the project area is too small to affect a population–level response from big game species.<br><br>The EA was modified and the BLM will require mitigation to be performed on 6.4 acres of BLM lands within the mule deer use area as shown on Exhibit XI of EA. The mitigation consists of planting bitter brush seedlings at a rate of 1200 seedlings per acre. If seedling survival is less than 400 seedlings per acre at the end of the third growing season, replanting will be done to bring the total to 800 seedlings per acre. The exact location of the 6.4 acres will be determined after consultation with ODFW. The planting will be completed within a year of the ROW being granted.<br><br>The BLM revisited the analysis in section 4.5 of the EA and reaffirmed the conclusion that the project would have a minimal effect to CTUIR's Trust Resources. No roads will be closed as a result of this project. The public will continue to have access to the resources. |
| Disagreement with BLM finding of no adverse effect to site BK630. | The BLM stands by the findings (discussed above) regarding the nature of this site and effects to the site from BLM's proposed action (which SHPO concurred with in a December 16, 2008 letter). At this time, the BLM is unaware of any information available to justify a change in the No Effect determination. |
| Consider EIS due to big game habitat loss, lack of discussion of Indian trust resources, and increase in road densities. | BLM feels an EIS is not necessary since we are requiring 6.4 acres of big game mitigation and only 3.2 acres will be lost for the life of the project. The BLM added an Indian Trust Resources section to the EA, sections 3.3.10 and 4.4.10. The project will include a total of 880 feet of new road within a winter deer use area of approximately 35,800 acres. The BLM concludes that the effects to these resources do not warrant the preparation of an EIS. |

On July 27, 2009, the BLM received a letter from the SHPO stating that their initial review and concurrence of no effect was based on impacts to archaeological resources only and encouraged continued consultation with CTUIR. SHPO asked to be kept informed of BLM's progress in addressing these concerns.

The BLM and CTUIR met in Mission, Oregon on July 27, 2009 to further discuss the Lime Wind Project and CTUIR's concerns. CTUIR then responded via letter on August 10, 2009:

| **August 10, 2009 letter from CTUIR** | **Response from BLM** |
|---|---|
| The cultural resource concerns that CTUIR raised have not been adequately addressed. | On August 20, 2009, the BLM sent a letter to CTUIR asking for clarification and for more information about the Tribes concerns (site BK630, village, or other historic properties). The BLM suggested a cultural staff-to-staff meeting in order to clarify CTUIR's concerns and discuss steps to be taken. |

| August 10, 2009 letter from CTUIR | Response from BLM |
|---|---|
| Concern that no baseline data on potential impacted wildlife species will be gathered prior to authorizing the ROW | • A burrowing owl survey completed May, 2009.<br>• A resident bat survey completed August, 2009.<br>• Migratory bat survey completed September/October, 2009.<br>• Preconstruction bird and bat carcass survey completed October, 2009. |
| BLM should place a limitation on how often the proponent can work on the turbines in order to avoid impacts to wintering big game. | Based on the concerns of impacts to Indian trust resources, the design features of the project (Operation and Maintenance of Turbines, section 2.1.14.2) were revised. Yearly scheduled maintenance trips will be conducted in the spring of the year. Quarterly trips are based on annual production and will be scheduled for the months of April, June, August, and October. A monthly maintenance trip will occur throughout the year.<br><br>Remote sensing for troubleshooting purposes will enable remote equipment scans and remote start up of the turbines so a trip to the site is not required. Also, unscheduled maintenance trips can be combined with that scheduled trip or the scheduled trip combined with an unscheduled maintenance trip thereby reducing the total trips to the project site.<br><br>BLM concludes that these design features as described in section 2.1.15.4 of the EA and the mitigation of the mule deer use area shown on Exhibit XI of the EA will protect wintering big game. |
| The EA only contains the ODF&W letter of December 17, 2007. CTUIR requests that the letter of November 15, 2007 and November 10, 2008 be included. | The letters have been included. |
| Develop the bird and bat monitoring and mitigation plan concurrently with the EA and before ROW issuance. | A monitoring program has been developed by the ROW holder and approved by the BLM to determine bird and bat strikes during the pre-construction post-construction and operational phase of the project (within Attachment E and F of the EA).<br><br>Monitoring will be done under the direction of an experienced wildlife biologist and all construction and maintenance personnel will be trained in the methods needed to carry out this plan. This plan will also include the reporting of any mortality to the BLM authorized officer immediately after identification by a biologist experienced in the use of field guides and taxonomic keys to accurately identify bird and bat species. Monitoring will be overseen by an experienced BLM wildlife biologist during the first three years of operation. If and when bat mortality exceeds six (6) anytime during the first three years (approximately one |

| | |
|---|---|
| Develop the bird and bat monitoring and mitigation plan concurrently with the EA and before ROW issuance. (contd) | fatality is expected per year as per sec. 4.3.9.3 of the EA, therefore it takes 2 fatalities per year on average to exceed, times 3 years gives 6 fatalities per 3 year period ) and/or bird mortality exceeds 24 anytime during the first three years (approximately 8 fatalities is expected per year as per sec. 4.3.9.1 of the EA), additional mitigation measures will be implemented, including turbine startup at higher wind speed and/or turbine shutdown during bat migration periods. At the end of each year the BLM and ROW holder will reassess and determine future monitoring needs and/or additional mitigation measures. |
| The BLM has shouldered the entire costs of the EA and wildlife impacts and relied on BLM and ODF&W biologists to do the work – should be done by a consultants. | The proponent reimburses the BLM for costs incurred in the processing of the ROW application according to the terms of the cost recovery agreement signed August 29, 2007.<br><br>The applicant has hired BLM approved biologists to conduct the necessary analysis. |
| The BLM must require that the applicant provide all necessary wildlife monitoring data to adequately assess the impacts. | All the wildlife monitoring data has been received and reviewed by BLM biologists. |
| Restoration of the impacted site should include two years of rest from grazing | The BLM will consider the project when authorizing grazing in the area but no changes to the EA are necessary. |
| Treaty-reserved plants will be impacted by the introduction of noxious weeds due to increased travel, displacing those plants. | The holder will be required to adhere to the following stipulations for the prevention and treatment of invasive plants and noxious weeds:<br><br>▪ The holder shall be responsible for weed control on disturbed areas within the limits of the right-of-way. The holder is responsible for consultation with the authorized officer and/or local authorities for acceptable weed control methods (within limits imposed in the grant stipulations).<br><br>▪ Use of all pesticides (including fungicides, herbicides, insecticides, etc.) shall comply with the applicable Federal and State laws. Pesticides shall be used only in accordance with their registered uses and within limitations imposed by the Secretary of the Interior. Prior to the use of pesticides, the holder shall obtain from the authorized officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the authorized officer. Emergency use of pesticides shall be approved in writing by the authorized officer prior to such use. BLM Policy requires that all applicators be certified or under the direct supervision of a |

| | |
|---|---|
| Treaty-reserved plants will be impacted by the introduction of noxious weeds due to increased travel, displacing those plants. (contd) | certified applicator. Also, Oregon law requires the applicator to possess an Oregon Public Applicator's license when applying pesticides on public land.<br><br>▪ The holder shall seed all disturbed areas with a seed mixture and rate specified by BLM, using an agreed upon method suitable for the location. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS) per acre. There shall be no primary or secondary noxious weed seed in the seed mixture. Seed shall be tested and the viability testing of seed shall be done in accordance with state law and within 9 months prior to purchase. Commercial seed shall be either certified as Oregon weed seed free or registered seed. The seed container shall be tagged in accordance with state law and available for inspection by the authorized officer. The seeding shall be repeated until a satisfactory stand is established as determined by the authorized officer. If mulch is used on seeded areas, it shall be certified weed free straw or hay. |
| Concerned about the economic viability of the project | The applicant provided a letter from the Energy Loan Program Loan Manager of the Oregon Department of Energy (May 31, 2007) that states the project will meet underwriting requirements. Also, the applicant is the recipient of a USDA Renewable Energy for America Program (REAP) Grant of $500,000 and loan guarantee of $2.23 million for the Lime Wind Energy Project. |
| CTUIR requested details of the bonds requirement. | The BLM will require a bond in the amount of $10,000 per wind turbine. The bond will be periodically reviewed at least every 5 years to ensure the adequacy of the bond. |
| Request that BLM share the draft EA with the State of Oregon Energy Facility Siting Council. | The Lime Wind Project falls below the Oregon Department of Energy, Siting Standards for Wind Energy Facilities threshold of 105 Megawatts, therefore the Oregon Energy Facility Siting Standards do not apply. |

In response to BLM's August 20, 2009 letter requesting more information on site BK 630, CTUIR sent a letter on September 17, 2009:

| **September 17, 2009 letter from CTUIR** | **Response from BLM** |
|---|---|
| CTUIR feels the BLM has not adequately reviewed the ethnographic or historic data or conducted an oral history assessment to determine the other types of resources which may be affected. | The BLM obtained the services of the Idaho BLM's State Botanist, Dr. Roger Rosentreter, who is an established expert in the botany of the region and with extensive knowledge and experience studying lichens and their growth rates in the region. On October 9, 2009, the Baker BLM archaeologist and Dr. Rosentreter examined and identified several species of lichens growing on site BK630 rock cairn. Dr. Rosentreter believes that site BK630 is 28-60 years old. |

| | |
|---|---|
| The BLM has not gathered sufficient documentation to support the claim that site BK630 is historic structure.<br><br>CTUIR believes it may be associated with tribal people | At BLM's request, Blue Mountain Consulting collected an oral history with a local sheep ranching family. They indicated that rock cairns were used in historic and modern times for marking springs (Two prominent developed springs are located directly below the cairn) and other important herding locations. BLM also researched other rock cairns in the area and additional historical background of sheepherding in Baker County.<br><br>Coupled with previous examinations, evaluations and consultations the available evidence leads the BLM to reaffirm our original conclusion that the site is historic in age and associated with historic-modern herding activities. |
| Until the CTUIR has a better understanding of all types of resources in the APE and the specific values that make them eligible for the National Register of Historic Places, we cannot conclude that they will not be adversely affected by the proposed undertaking. | |
| CTUIR feels that an inventory and assessment of historic properties of religious and cultural significance needs to be conducted. | |

On September 28, 2009, the BLM received a letter from Baker County with the following comments:

| **Comment Summary** | **Response from BLM** |
|---|---|
| The Lime Wind Project is a small, locally owned operation which fits the State of Oregon and federal guidelines and mandates for renewable energy projects. | Thank you for the information. |
| The cumulative effects of this single project in the Burnt River area are negligible. | The cumulative impacts have been analyzed in section 4.5 of the EA. |
| Data provided by BLM and the ODFW is pertinent and should be used in the Environmental Assessment. | The data has been used in the EA. |
| Placing arbitrary limits on maintenance for small projects is capricious and renders projects unfeasible. | Thank you for your opinion; your input has been provided to the decision maker. |
| The Area of Potential impact should be limited to the surrounding area which actually has the potential to realistically be impacted by the development. | Thank you for your opinion; your input has been provided to the decision maker. |

| Comment Summary | Response from BLM |
|---|---|
| The Lime Wind Project should not be the litmus test for all BLM land wind projects. We agree that BLM should consider cumulative impacts when the need arises for cumulative impacts. This project has no cumulative impacts. | Thank you for your opinion; your input has been provided to the decision maker. The cumulative impacts have been analyzed in section 4.5 of the EA. |

On November 6, 2009, the BLM sent a letter to SHPO informing them of the consultation with CTUIR and updating them to the investigations that have taken place regarding the cultural resources. BLM asked for SHPO to review the information and to concur with the determination of significance and effect. On December 1, 2009, SHPO sent the BLM a letter that reaffirmed their no effect concurrence.

Due to new information received from written and verbal comments and new monitoring data collected by the BLM after the EA was released for public comment, the EA was revised. The BLM added clauses to: disallow construction activities during some winter months, require monitoring of bat and bird strikes at the turbines, and the reporting of any mortality to the BLM authorized officer, require off-site mitigation within the mule deer use area, disallow nighttime illumination of turbines, and to provide for protection of General Land Office markers found during construction.

Some comments that were considered did not result in any revision of the EA. Because of the height of turbines, the color, and lack of lighting, the BLM did not think there would be impact to known historic village sites along the Snake River. These sites were found to be outside the one mile zone of research observance required by the SHPO. Also, BLM concluded that the project would have no effect on a cultural site approximately 900 feet outside of the project area. Additionally, the BLM determined that the project area is outside the area of potential effect for the Historic Oregon Trail, as supported by the Oregon-California Trails Association (OCTA) (letter from David Welch 11-5-07).

## DECISION

My decision is to select the Proposed Action Alternative and grant a ROW to Joseph Millworks for the development of a wind power facility near Lime, Oregon. The Lime Wind Project would include the installation a single 30.5 meter (100-foot) tall, steel monotube meteorological tower along with 7 – 12 wind turbine generators (WTGs) mounted on towers no taller than 40 meters that rest on concrete foundations. Turbine rotors would have a radius no larger than 20.5 meters and the full height of the turbine would be no higher than 60 meters (197 feet). The total rotor swept area of the project would be no more than 9237 $m^2$. The facility would also include six transformers, two electrical collectors, access roads, buried utility corridor and electrical line extensions.

My decision is based on the interdisciplinary analysis contained in the Environmental Analysis OR-035-08-01, field review, public comments, tribal government consultation, the Oregon California Trails Association, SHPO, ODFW, and other entities that have jurisdiction within the project area. Mitigation measures are identified below:

The terms and conditions (described in EA section 2.1.15) of granting a ROW, design features of the project, stipulations and monitoring, as well as measures to mitigate effects, are relative to the decision and incorporated into the project implementation plans. These are:

- Any ROW grant will contain a term and condition that provides that if construction of wind energy facilities has not commenced within 2 years after the effective date of the grant or consistent with the timeframes of the approved Plan of Development (POD), the ROW holder shall provide the BLM good cause as to the nature of any delay, the anticipated date of the construction, and evidence of progress toward commencement of construction. Failure to comply provides the Authorized Officer the authority to terminate the authorization (43 CFR § 2807.17).

- The holder shall construct, operate, and maintain the facilities, improvements, and structures within this right-of-way in strict conformity with the POD which was approved and made part of the grant. Any relocation, additional construction, or use that is not in accord with the approved plan(s) of development, shall not be initiated without the prior written approval of the authorized officer. A copy of the complete ROW grant, including all stipulations and approved plan(s) of development, shall be made available on the ROW area during construction, operation, and termination to the authorized officer. Noncompliance with the above will be grounds for an immediate temporary suspension of activities if it constitutes a threat to public health and safety or the environment.

- The ROW holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, (43 U.S.C. 9601, et seq. or the Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq.) on the ROW (unless the release or threatened release is wholly unrelated to the right-of-way holder's activity on the right-of-way). This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

- Ninety days prior to termination of the ROW, the ROW holder shall contact the authorized officer to arrange a joint inspection of the ROW. This inspection will be held to agree to an acceptable termination (and rehabilitation) plan. This plan shall include, but is not limited to, removal of facilities, drainage structures, or surface material, re-contouring, topsoiling, or seeding, and the costs associated with the rehabilitation of the area. The authorized officer must approve the plan in writing prior to the holder's commencement of any termination activities.

- The ROW holder shall conduct all activities associated with the construction, operations, and termination of the ROW within the authorized limits of the ROW.

**Measures Regarding Cultural/Archeological Resources**

- Any cultural and/or paleontological resource (historic or prehistoric site or object, or fossil) discovered by the holder, or any persons working on his behalf on public or Federal land shall be immediately reported to the authorized officer. The ROW holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the authorized officer. An evaluation of the discovery will be made by the authorized officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The ROW holder will be responsible for the cost of evaluation and mitigation, and any decision as to proper avoidance, protection or mitigation measures will be made by the authorized officer after consulting with the holder, affected Tribes and others under Section 106 of the National Historic Preservation Act.

- Pursuant to 43 CFR 10.4(g), the holder of this authorization must immediately notify the authorized officer, by telephone, with written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), the holder must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the authorized officer. The BLM Authorized Officer will determine avoidance, protection or mitigation measures in consultation with the Holder, Oregon SHPO, and affected Tribes. Costs associated with the discovery, evaluation, protection or mitigation of the discovery shall be the responsibility of the holder.

- The holder shall notify the Authorized Officer at least 90 days prior to any non-emergency activities that would cause surface disturbance in the ROW. The Authorized Officer will determine if a cultural resource inventory, treatment or mitigation is required for the activity. The holder will be responsible for the cost of inventory, avoidance, treatment or mitigation; including any maintenance-caused damage. The Authorized Officer will determine avoidance, treatment and mitigation measures that are necessary after consulting with the holder and under Section 106 of the National Historic Preservation Act.

**Measures Regarding Visual Resources**

- Wind turbines, rotors, visible ancillary structures, and other equipment would be painted with a high quality non-reflective paint in an unobtrusive white or grey color that is found in the natural landscape.

- Commercial symbols, trademarks, and advertising messages would not appear on sites or ancillary structures.

- Tubular shaped towers would be used that present a simpler profile and less complex surface characteristics.

- Where feasible, electrical cables and transmission lines would be placed underground.

- Towers are no taller than 40 meters in height. Rotors are no larger than 41 meters. The overall height is no greater than 60 meters. This height turbine requires no nighttime illumination by the FAA (See DOT/FAA/AR-TN05/50: Development of Obstruction Lighting Standards for Wind Turbine Farms)

**Measures Regarding Biological Resources**

- The ROW holder shall be responsible for weed control on disturbed areas within the limits of the ROW. The ROW holder is responsible for consultation with the authorized officer and/or local authorities for acceptable weed control methods (within limits imposed in the grant stipulations).

- Use of all pesticides (including fungicides, herbicides, insecticides, etc.) shall comply with the applicable Federal and State laws. Pesticides shall be used only in accordance with their registered uses and within limitations imposed by the Secretary of the Interior. Prior to the use of pesticides, the ROW holder shall obtain from the authorized officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the authorized officer. Emergency use of pesticides shall be approved in writing by the authorized officer prior to such use. BLM Policy requires that all applicators be certified or under the direct supervision of a certified applicator. Also, Oregon law requires the applicator to possess an Oregon Public Applicator's license when applying pesticides on public land.

- The ROW holder shall seed all disturbed areas with a seed mixture and rate specified by BLM, using an agreed upon method suitable for the location. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS) per acre. There shall be no primary or secondary noxious weed seed in the seed mixture. Seed shall be tested and the viability testing of seed shall be done in accordance with state law and within 9 months prior to purchase. Commercial seed shall be either certified as Oregon weed seed free or registered seed. The seed container shall be tagged in accordance with state law and available for inspection by the authorized officer. The seeding shall be repeated until a satisfactory stand is established as determined by the authorized officer. If mulch is used on seeded areas, it shall be certified weed free straw or hay.

- The ROW holder shall remove only the minimum amount of vegetation necessary for the construction of structures and facilities. Topsoil shall be conserved during excavation and reused as cover on disturbed areas to facilitate regrowth of vegetation.

- A monitoring program has been developed by the ROW holder and approved by the BLM to determine bird and bat strikes during the pre-construction post-construction and operational phase of the project (within Attachment E and F of the EA):

  Carcass searches will be done to document any fatalities of either residents or migrants. Orloff and Flannery (1992) and Johnson et al. (2002) reported that most bats and birds killed by turbines remained within 63 m of the turbine. Searches will be conducted at least every other week during the period of highest fatality rates (mid-August to mid-October for the Pacific Northwest). Because the Lime Wind Energy Project only has 7 to 12 turbines, a plot will be established around each turbine and sampled every-other week or around every-other turbine and sampled weekly. The procedure below was taken from Young et al. (2003).

1. Searchers walk parallel transects spaced 6-8 m apart at a pace of 45-55 m/min until the entire plot is covered
2. For each casualty, searchers will record species, sex and age when possible, date and time collected, location, and whether the carcass was intact or showed signs of scavenging.
3. Carcasses will be labeled with a unique number, bagged, and frozen for future reference or determination of species, sex, and age, if questionable.

Searches will be made both pre-construction and post-construction. The pre-construction searches provide a baseline of natural deaths that may occur in the area. Numbers of carcasses found in pre-construction searches can be subtracted from those found in post-construction searches to give an estimate of fatalities due to the turbines. When possible, two corrections should be made to both the pre-construction and post-construction data: one based on an estimate of searcher efficiency (the percentage of carcasses present that are found) and one based on an estimate of scavenger loss (the percentage of carcasses present that are removed by scavengers before they are found by searchers). However, determination of both searcher-efficiency and scavenger-removal requires trials using carcasses that are not available at the Lime Wind Energy Project. Thus, the data will have to be reported as uncorrected deaths/turbine/year or uncorrected deaths/MW/year.

Monitoring will be done under the direction of an experienced wildlife biologist and all construction and maintenance personnel will be trained in the methods needed to carry out this plan. This plan will also include the reporting of any mortality to the BLM authorized officer immediately after identification by a biologist experienced in the use of field guides and taxonomic keys to accurately identify bird and bat species. Monitoring will be overseen by an experienced BLM wildlife biologist during the first three years of operation. If and when bat mortality exceeds six (6) anytime during the first three years (approximately one fatality is expected per year as per sec. 4.3.9.3 of the EA, therefore it takes 2 fatalities per year on average to exceed, times 3 years gives 6 fatalities per 3 year period ) and/or bird mortality exceeds 24 anytime during the first three years (approximately 8 fatalities is expected per year as per sec. 4.3.9.1 of the EA), additional mitigation measures will be implemented, including turbine startup at higher wind speed and/or turbine shutdown during bat migration periods. At the end of each year the BLM and ROW holder will reassess and determine future monitoring needs and/or additional mitigation measures.

- Facilities shall be designed to discourage use as perching or nesting substrates by birds.

- All construction employees shall be instructed to avoid the harassment and/or disturbance of wildlife, especially during reproductive (e.g. courtship and nesting) seasons.

- No construction activities will take place between March 1$^{st}$ and June 30$^{th}$ each year to prevent disturbance to several species of birds during mating and/or breeding seasons.

- No construction activities will take place between December 1$^{st}$ and April 15$^{th}$ each year to prevent disturbance to big game populations during the winter.

- Off-site mitigation will be performed on approximately 7 acres of BLM lands within the mule deer use area as shown on Exhibit XI. The mitigation consists of planting bitter brush seedlings at a rate of 1200 seedlings per acre. If seedling survival is less than 400 seedlings per acre at the end of the third growing season, replanting will be done to bring the total to 800 seedlings per acre. The exact location of the 7 acres will be determined after consultation with ODFW. The planting will be completed within a year of ROW being granted.

**Measures Regarding Geology/Soils**

- No construction or maintenance activities shall be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts in excess of 3 inches deep, the soil shall be deemed too wet to adequately support construction equipment.

- If the ROW holder or BLM determine it is necessary, the ROW holder shall construct waterbars on all disturbed areas to the spacing and cross sections specified by the authorized officer. Waterbars are to be constructed to:

    1. Simulate the imaginary contour lines of the slope (ideally with a grade of one or two percent).
    2. Drain away from the disturbed area.
    3. Begin and end in vegetation or rock whenever possible.

- The ROW holder shall recontour disturbed areas, or designated sections of the right-of-way, by grading to restore the site to approximately the original contour of the ground as determined by the authorized officer.

**Measures Regarding Health, Safety, and Noise**

- Construction sites shall be maintained in a sanitary condition at all times; waste materials at those sites shall be disposed of promptly at an appropriate waste disposal site. "Waste" means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment.

- The ROW holder shall take such measures for prevention and suppression of fire on the grant area and adjacent public lands or public lands used or traversed by the holder in connection with operations as are required by applicable laws and regulations.

- No hazardous wastes or fuel will be stored on site at any time.

- A traffic management plan shall be prepared by the ROW holder for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted.

**Measures Regarding Land Use and Recreation**

- The ROW holder shall protect all survey monuments found within the right-of-way. Survey monuments include, but are not limited to, General Land Office and Bureau of Land Management Cadastral Survey Corners, reference corners, witness points, U.S. Coastal and Geodetic benchmarks and triangulation stations, military control monuments, and recognizable civil (both public and private) survey monuments. In the event of obliteration or disturbance of any of the above, the holder shall immediately report the incident, in writing, to the authorized officer and the respective installing authority if known. Where General Land Office or Bureau of Land Management ROW monuments or references are obliterated during operations, the holder shall secure the services of a registered land surveyor or a Bureau cadastral surveyor to restore the disturbed monuments and references using surveying procedures found in the Manual of Surveying Instructions of the Survey of the Public Lands of the Unites States, latest edition. The ROW holder shall record such survey in the appropriate county and send a copy to the authorized officer. If the Bureau cadastral surveyors or other Federal surveyors are used to restore the disturbed survey monument, the holder shall be responsible for the survey cost.

**Alternatives Considered**

In order to address concerns raised in public and agency scoping, while fulfilling BLM's stated purpose and need for the project, BLM explored the following alternatives:

- Construction of new access route – This alternative was based on the Proposed Action, but with a new route to access the project area. This alternative would have required an additional 6300 feet of new construction. New surface disturbance would increase the chance of invasive and noxious weed introduction over an alternative that kept new disturbance minimized. It would have required significant earthwork activities and the construction of an approach off of the Marble Creek road that would have made access for heavy equipment difficult. Although considered, BLM determined that due to this alternative being economically infeasible and technically difficult to implement, it was dropped from further analysis (NEPA Handbook H-1790-1, 6.6.3, pg 52).
- Use of existing route adjacent to Marble Spring - This alternative would have forgone the 480 feet of new road on BLM land plus 400 feet of Baker County local access road. BLM determined that increased utilization of the existing road during construction activities would potentially increase runoff in this area and would increase soil compaction at Marble Spring. Therefore, this alternative would degrade to a greater extent, the resources that any road construction methods being considered for the project would affect. For these reasons this alternative was dropped from further analysis (NEPA Handbook H-1790-1, 8.3.4.2, pg 80).
- No Action – This alternative would deny the applicants request for a BLM ROW grant. Only the existing land management activities would occur.
- Proposed Action – This alternative would issue the applicant, Joseph Millworks Inc. of Baker City Oregon, a ROW grant authorizing the right to install, operate, and maintain a wind development facility on public lands. This ROW would authorize a single 30.5 (100-foot)

tall, steel monotube meteorological tower along with 7 – 12 wind turbine generators (WTGs) mounted on towers no taller than 40 meters that rest on concrete foundations. Turbine rotors would have a diameter no larger than 41 meters. The total height of the turbine would be no higher than 60 meters (197 feet) (**Exhibit V**). The total rotor swept area of the project would be no more than 9237 m². The ROW would also authorized six transformers, two electrical collectors, access roads, buried utility corridor and electrical line extensions. The total capacity for the facility would be 3.6 megawatts (MW).

**Decision Rationale**

The implementation of the Proposed Action best meets the Purpose and Need described in the Lime Wind EA, and as required, BLM considered a No Action Alternative in our analysis. The Proposed Action establishes a renewable energy project on public lands consistent with the guidelines of the Energy Policy Act of 2005 (P.L. 109-58), the Energy Independence and Security Act of 2007 (P.L. 110-140), and the Secretary of the Interior Order No. 3285. Section 211 of P.L. 109-58 states, "It is the sense of the Congress that the Secretary of the Interior should, before the end of the 10-year period beginning on the date of enactment of this Act, seek to have approved non-hydropower renewable energy projects located on the public lands with a generation capacity of at least 10,000 megawatts of electricity." Section 806 of P.L. 110-140 states "It is the sense of Congress that it is the goal of the United States that, not later than January 1, 2025, the agricultural, forestry, and working land of the United States should— (1) provide from renewable resources not less than 25 percent of the total energy consumed in the United States;". Secretary Order 3285 establishes the development of renewable energy as a priority for the Department of the Interior.

The proposed action is authorized by Title V of the Federal Land Policy and Management Act (FLPMA) (43 U.S.C. 1761-1771) and complies with Title 43 of the Code of Federal Regulations, Part 2800. Specifically, BLM finds that granting the ROW will protect the natural resources present in the project area and prevent unnecessary and undue degradation to the public lands, consistent with the objectives of BLM's ROW program listed at 43 CFR § 2801.2. These objectives are:

a) **Protects the natural resources associated with public lands and adjacent lands, whether private or administered by a government entity.** The BLM decision is consistent with this objective. The BLM will add conditions to the ROW which will prohibit construction during certain time periods in order to protect wildlife, require off-site mitigation for mule deer, and require reseeding of the disturbed area and monitor bird and bat strikes during the pre-construction post-construction and operational phase of the project.
b) **Prevents unnecessary or undue degradation to public lands.** This decision is consistent because the ROW will require that the holder reseed the disturbed areas, build 480' of new access road in order to decrease the potential runoff and soil compaction at Marble Spring, and be responsible for weed control on the disturbed areas and prohibit construction or maintenance when the soil is too wet to adequately support construction vehicles.
c) **Promotes the use of rights-of way in common considering engineering and technological compatibility, national security, and land use plans.** The ROW will

contain a condition that reserves the right of the BLM to grant additional rights-of-way or permits for compatible use on, over, under, or adjacent to the land involved in this grant. Road access would remain open to the public. The project area is included within a BLM grazing allotment used by three different public land grazing permittees. Also, mineral extraction may still occur.

d) **Coordinates, to the fullest extent possible, all BLM actions under the regulations in this part with state and local governments, interested individuals, and appropriate quasi-public entities.** Prior to the EA being developed, the BLM and Joseph Millworks conducted a public scoping meeting in Baker City, Oregon on October 17, 2007, in order to identify issues and concerns with the project. A notice of the meeting was published in the local newspapers and a letter describing the project and requesting input on the project was sent to: the agencies having jurisdiction and/or specific interest within the proposed project area, landowners within the proposed project area and the Oregon California Trails Association (OCTA), the SHPO, the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), the Burns Paiute Tribe, and the Nez Perce Tribe.

After the EA was prepared, it was available for a formal 30-day public comment period. A legal notice was placed in the Baker City Herald on October 21, 2008, requesting comments on the EA and the proposed Finding of No Significant Impact (FONSI). An announcement and the EA were also placed on the District's Internet site and letters were sent affected tribes, ODFW, OCTA, SHPO and other known interested parties requesting comments.

The BLM and CTUIR have been in continued government-government consultation regarding the project. This consultation included several letters being exchanges as well as two meetings with BLM and CTUIR.

Also, none of the factors found at 43 CFR § 2804.26(a)(1-4) warrant not granting the ROW. Those factors are:

**a) The proposed use is inconsistent with the purpose for which BLM manages the public lands.** The propose use is consistent with the Baker Resource Management Plan (RMP). The RMP does not contain any explicit discussion on wind energy development, however, it does designate avoidance and exclusion areas (page 23 of the RMP) for rights-of-ways and land use authorizations. The Lime Wind Project is not within a designated avoidance or exclusion area.

**b) The proposed use would not be in the public interest.** The proposed use is in the public interest. The Energy Independence and Security Act of 2007 seeks to move the United States toward greater energy independence, and to increase the production of clean renewable fuels. The Energy Policy Act of 2005 (P.L. 109-58). Section 211 of the Act states, "It is the sense of the Congress that the Secretary of the Interior should, before the end of the 10-year period beginning on the date of enactment of this Act, seek to have

approved non-hydropower renewable energy projects located on the public lands with a generation capacity of at least 10,000 megawatts of electricity."

The analysis that was completed found that the environmental effects of the project are not significant. Where potential impacts were identified, additional mitigation measures were included in order to avoid or minimize the impacts of constructing and operating the proposed project.

**c) The applicant is not qualified to hold the grant. Those requirements are:**

1) An individual, association, corporation, partnership, or similar business entity, or a Federal agency or state, tribal, or local government.
2) Technically and financially able to construct, operate, maintain, and terminate the use of the public lands.
3) Of legal age and authorized to do business in the state where the ROW would be located.

The applicant is a corporation, with the incorporator of legal age and authorized to do business in the state of Oregon. The applicant provided a letter from the Energy Loan Program Loan Manager of the Oregon Department of Energy (May 31, 2007) that states the project will meet underwriting requirements. Also, the applicant is the recipient of a USDA Renewable Energy for America Program (REAP) Grant of $500,000 and loan guarantee of $2.23 million for the Lime Wind Energy Project.

**d) Issuing the grant would be inconsistent with the Act, other laws, or these or other regulations.** Issuing the grant would be consistent with Title V of the Federal Land Policy and Management Act of 1976 as amended (43 U.S.C. 1761). This act authorizes the BLM to grant, issue, or renew rights-of-way over, upon, under, or through such lands for systems for generation, transmission, and distribution of electric energy. It also is consistent with the regulations found in 43 CFR 2800 which govern the granting or denial of ROWs. It is in compliance with the Clean Water Act because there would be no long-term effects from erosion or runoff created by project. It is in compliance with the NHPA and the cultural surveys have been completed. It is in compliance with the Endangered Species Act because there are no threatened or endangered wildlife species in the project vicinity. It is also in compliance with the Clean Air Act because project construction would be required to meet Oregon Fugitive Emission Requirements under OAR 340-208-0200. The project does not contain any Areas of Critical Environmental Concern, designated Wilderness, Wild & Scenic Rivers or prime and unique farmlands.

The BLM concludes that granting the ROW as described in the decision record and with the enumerated terms and conditions meant to reduce impacts and protect other resources is in the public interest and represents multiple-use balancing in the project area that will allow the project to proceed and still protect other existing resources.

While approximately 3.5 acres of potential root production areas would be lost for the life of the project, an approved BLM botanical survey revealed the three known plant species that BLM considers root food sources are commonly found over many square miles in the geographic area

around the proposed project. Also, while an estimated 9 acres of potential root food production areas would be disturbed during construction, few of these root food plants were found in the project area. The surveying botanist determined the project construction area is not a high potential site for biscuitroot or bitterroot habitat nor would construction significantly affect these potential habitats.

Extensive cultural resource surveys of the project area on BLM lands were conducted and no archaeological resources were found. The SHPO reviewed the survey reports and concurred with the finding of no effect and determined that no further archaeological research is needed with the project. The proposed project ROW on BLM lands would have no effect on archaeological properties eligible or potentially eligible for the National Register of Historic Places.

There is one cultural feature 919 feet outside of the project Area of Potential Effect but it is within the view shed of the project. The BLM concluded this project would have no effect on this site and SHPO issued a concurrence on the no effect finding on December 16, 2008. CTUIR does not agree with this determination and believes BLM should gather more information to justify the conclusion. BLM addressed this request by gathering additional information including the relative age range for the feature. The additional information BLM was able to obtain supports the original no effect conclusion and SHPO reaffirmed their no effect concurrence on December 1, 2009. The BLM is not aware of any information to justify a change in our no effect determination (see section 3.2.3, Affected Environment).

**Compliance and Conformance**

This decision is in conformance with the ROW management direction and implementation decision in the Baker Resource Management Plan (RMP) of July 12, 1989 (pp 23-24). The RMP states that public lands are available for local rights-of-way unless within the exclusion/avoidance areas. The exclusion areas are wilderness areas and wild river segments. Avoidance areas are wilderness study areas, areas of critical environmental concern and scenic and recreation river segments. The project is not within the exclusion or avoidance areas.

The analysis in the EA tiers to the Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States of June, 2005.

This decision is in compliance with the Clean Water Act because there would be no long-term effects from erosion or runoff created by an improved road system due to construction and implementation of drainage structures and rolling dips for surface drainage. Also, the locations of the wind turbines would be on ridges and these sites are not within any wetland or riparian zones (EA, section 4.3.7).

This decision is in compliance with the National Historic Preservation Act (NHPA) as described in section 2.1.15.2 of the EA. Any cultural and/or paleontological resource (historic or prehistoric site or object, or fossil) discovered by the holder, or any persons working on his behalf on public or Federal land would be immediately reported to the authorized officer. The Authorized Officer would determine avoidance, treatment and mitigation measures that are necessary after consulting with the holder and under Section 106 of the NHPA.

This decision is in compliance with the Endangered Species Act because there are no threatened or endangered wildlife species in the project vicinity. There are no known vascular plants listed as threatened, endangered, a candidate species, or a species of concern by U.S. Fish and Wildlife Service or the Oregon Natural Heritage Program that potentially occur within the Lime Wind Energy Project.

Compliance with the Clean Air Act would be ensured because project construction would be required to meet Oregon Fugitive Emission Requirements under OAR 340-208-0200 and mitigation measures such as reclamation and re-growth of native vegetation would bring dust back to current levels. After construction there would be an increase of less than .3 acre of new roadway, adding minimal amounts of PM to existing levels (EA at 4.3.1).

The project does not contain any Areas of Critical Environmental Concern, designated Wilderness, Wild & Scenic Rivers or prime and unique farmlands.

The project area has been surveyed for cultural resources. Blue Mountain Consulting conducted the original cultural survey on 92.73 acres on November 17, 2007. On June 13, 2008, the BLM archaeologist conducted a survey of an additional 9 acres and on November 9, 2008, Blue Mountain Consulting conducted an additional survey of 3.02 acres of road access that was previously private land. No archaeological resources were found within the project area. As part of the scoping process and to comply with Section 106 of the NHPA of 1966, a letter requesting input on the proposed project and a proposed project map were sent to the Oregon State Historic Preservation Office (SHPO) and affected tribes on October 29, 2007. SHPO responded on November 14, 2007, suggesting that a cultural resource survey of the project area be completed. CTUIR responded on November 26, 2007, stating that they would like to comment on the area of potential effect once an analysis was done for the view shed.

## CONCLUSION

The BLM recognizes that public lands are an important source of the Nation's energy resources, including renewable energy resources. My decision supports multiple use management of public lands in accordance with the Federal Land Management and Policy Act of 1976 and recognizes that energy development can occur concurrently with other resource uses. The project has been analyzed, the public has been involved, and appropriate stipulations will be included in the ROW to prevent unnecessary degradation, to reduce the effects to the environment and to respond to the public's concerns.

## APPEAL RIGHTS

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR, Part 4 and Form 1842-1. If an appeal is taken, your notice of appeal must be filed in this office (BLM, 3285 11th Street, Baker City, Oregon, 97814) within 30 days from when this decision notice is published in the Baker City Herald. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition pursuant to regulations at 43 CFR § 2801.10 or 43 CFR § 2881.10 for a stay of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed below. Copies of the notice of appeal and petition for a stay must also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (see 43 CFR § 4.413) at the same time the original documents are filed in this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

### Standards for Obtaining a Stay

Except as otherwise provided by law or other pertinent regulations, a petition for a stay of a decision pending appeal shall show sufficient justification based on the following standards:

1. The relative harm to the parties if the stay is granted or denied,
2. The likelihood of the appellant's success on the merits,
3. The likelihood of immediate and irreparable harm if the stay is not granted, and
4. Whether the public interest favors granting the stay.

Ted Davis

Ted Davis
Field Manager
Baker Field Office, Vale District BLM

12-11-09

Date

**UNITED STATES**
**DEPARTMENT OF THE INTERIOR**
**BUREAU OF LAND MANAGEMENT**
**BAKER FIELD OFFICE**

## Finding of No Significant Impact (FONSI)

Lime Wind Project OR-64395
Environmental Assessment Number OR-035-08-01

While any land management activity invariably and by definition entails environmental effects, I have determined, based upon the analysis of environmental impacts contained in the referenced environmental analysis (EA), which is incorporated by reference (OR-035-08-01), that the potential impacts raised by the proposed action (which is to issue Joseph Millworks Inc. a right-of-way (ROW) grant authorizing the right to install, operate, and maintain a wind development project on public lands) will not be significant for those reasons explained below, and that therefore, preparation of an environmental impact statement is not required.

The CEQ regulations explain in 40 CFR § 1508.27: "Significantly" as used in the NEPA requires considerations of both context and intensity: (a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, for a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short-term and long-term effects are relevant.

In relation to context, because of the isolated geographic characteristics currently present in this area and the small size of the facility, I find that the project's affected region is localized and the effects of implementation are relevant to people recreating and living in the area. There would be no significant societal or regional impacts and no significant impacts to potentially affected resources.

(b) Intensity. This refers to the severity of effect. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action…." (40 CFR § 1508.27) The CEQ regulations include the following ten considerations for evaluating intensity.

I have evaluated the effects of the proposed action, together with the proposed mitigating measures, against the tests of significance found at 40 CFR § 1508.27. I have determined that:

1. The proposed action would cause no significant impacts, either beneficial or adverse. Most impacts would be minimal, and most would be of short duration during construction activities and during which time rehabilitation of surface disturbances have taken effect.

    - **Air Quality** - Air quality would be minimally impacted during the construction period from operation of construction equipment. The project construction would be required to meet Oregon Fugitive Emission Requirements under OAR 340-208-0200

and mitigation measures such as reclamation and regrowth of native vegetation would bring dust back to current levels. After construction there would be an increase of less than .3 acre of new roadway, adding minimal amounts of PM to existing levels.

- **Areas of Critical Environmental Concern (ACEC) -** The visual resource management analysis indicates that the Lime Wind project would be visible in the background from vantage points in the Oregon Trail ACEC. However, after the analysis, the BLM concluded that the project would not have a significant impact to the Oregon Trail view shed. The Oregon-California Trails Association also concluded the same (letter dated November 5, 2007).
- **Cultural Resources** - Cultural resource surveys of the project area on BLM lands were conducted and no archaeological resources were found. The proposed project ROW on BLM lands would have no effect on archaeological properties eligible or potentially eligible for the National Register of Historic Places. There is one cultural feature 919 feet outside of the project Area of Potential Effect but it is within the view shed of the project. The BLM concluded this project would have no effect on this site and SHPO issued a concurrence on the no effect finding on December 16, 2008. SHPO reaffirmed their no effect concurrence on December 1, 2009.
- **Invasive, Non-native Species** - The introduction and spread of invasive, non-native species will not be significant due to the requirement that reseeding of the disturbed areas would be as prescribed by the BLM with weed free seed. Also, any noxious or invasive weed species would be sprayed with approved herbicides as needed and in accordance with the Vale District Weed Control Plan Environmental Analysis OR-030-89-19.
- **Plants, Endangered/Threatened/Sensitive/Strategic** - The project would have no effect on any known federally listed threatened, endangered, or strategic plant species populations because there are no known federally listed threatened, endangered, or strategic plant species in the project area. Also, there are no threatened or endangered wildlife species in the project vicinity.
- **Wastes, Hazardous or Solid** - No hazardous material, substance, or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, et seq., or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, et seq.) shall be used, produced, transported, released, disposed of, or stored within the right-of-way at any time by the applicant. If accidental spills during construction from machinery or vehicles could occurred, would be short term and localized.
- **Surface Water and Groundwater Quality** - The locations of the project is not within any wetland or riparian zones. There would be potential positive impact to Marble Creek Spring during the road construction phase due to the proposed access route constructed 80 feet east of the existing route. This route would decrease runoff and impaction to the spring due to the increase distance between road traffic and the spring. There would also be no long-term effects by erosion or runoff created by an improved road system due to construction and implementation of drainage structures and rolling dips for surface drainage.
- **Wilderness/Wilderness Study Area/Wilderness Characteristics** - No Wilderness, Wilderness Study Area, or areas with wilderness characteristics would be impacted because none are present.

- **Wildlife -** Effects to wildlife would not be significant because the design features of the project, such as tower design and height as shown in section 4.3.9 of the EA, reduce the impacts to wildlife. Also, construction must take place outside of sensitive time periods such as breeding or wintering. Also, off-site mitigation will take place for mule deer and bird and bat populations will be monitored to determine if further mitigation is needed.
- **Availability of Access/Need to Reserve Access -** The proposed action would improve road access to the site and would not restrict public access.
- **Recreation -** There would be visual and audible impacts to those recreationists who utilize the immediate project area. However, these impacts are expected to be minimal due to the remote access and the minimal amount of resources existing in the area of the proposed project that normally attract recreational use.
- **Existing and Potential Land Uses -** The project area lies within a grazing allotment. Cattle grazing is authorized each spring and scheduled from April first thru the end May of each year. Spring grazing would not be impacted during the year of construction due to the timing of construction. Grazing in following years would be minimally impacted due to reseeding and mitigation of vegetation loss. Because this range is rated at three acres per AUM, permanent loss of vegetation on approximately 3.5 acres would affect 1.07 AUMs. These 1.07 AUMs affected is approximately one fifth of one percent of total AUMs grazing. Road access would be open to the public and the permittees).
- **Vegetation and Rangeland Resources -** Road construction and the operation of machinery and vehicles during construction of wind turbine foundations would result in the direct loss and alteration of up to approximately nine acres of native plant communities within the disturbed area. The disturbed area would be reseeded with a certified weed-free native grass mix as prescribed by the BLM. Requirement to reseed the site would be determined by BLM. In the long term beyond five to ten years, density of native plant species should recover completely except for the turbine foundation footprint, transformer pads, and roads necessary to the project totaling approximately 3.5 acres.
- **Soils -** The project area would be revegetated immediately after construction and long term monitoring would occur, therefore minimal impact to soils is expected.
- **Visual Resources -** After utilizing the Visual Contrast Rating Analyses to determine the impacts of the Lime Wind Project, it was determined that the project design would not detrimentally impact the visual resource management objectives of the area. Though the project would be visible in areas of higher VRM classifications (highest being a Class II), the impact from the project would be in compliance with the management direction for Class II which states that "management activities may be seen, but should not attract the attention of the casual observer." This project, through the visual resource analysis process, is expected to fall within those established guidelines due to the location, depth of scale/distance zones, color, terrain, and size of the proposed project (EA section 4.4.6). The proposed turbines would be visible, but would not dominate the view shed for any Class III VRM ratings, nor is it expected to attract the attention of the casual observers of the Class II areas.

- **Economic and Social Values** - The proposed Lime Wind Project is based on the idea of creating a community-based renewable energy source within Baker County. The installation costs are projected at $4.9 million to provide the infrastructure, turbines, erection, and road work. Twenty five percent of the projected installation cost would enter the local economy as wages and locally purchased materials for the construction of roads, foundations, and the erection of turbines. The Lime Wind Project would be taxed at the appropriate rate by Baker County. The effect to economic and social values is not significant.
- **Noise** - Noise from the turbines would not be audible from any nearby recreational points of interest or residences and construction noise would be temporary, therefore minimal impacts from noise is expected.
- **Public Health and Safety** - Safety precautions such as flaggers and speed limits would be taken during construction. All turbines are remotely located on ridge tops. Access up to the project site would be open to those accessing the BLM property. There is no inherent danger (after construction) associated with exterior access as towers, transformers, and electrical collectors would be locked at all times and access would only be available to the Applicant or its agent. Because of these precautions, there is minimal effect to public health and safety.
- **Indian Trust Resources** - The effects to the Indian Trust Resources would be minimal. There would be initial impacts to approximately 9 acres of habitat that could be used by deer, elk or antelope, an estimate 5.5 acres of which would be revegetated for no long term loss of this habitat, leaving approximately 3.5 acres disturbed for the life of the project. This disturbance would be mitigated by planting bitter brush on approximately seven acres within the same deer use area. An approved BLM botanical survey found three plants in the project area that BLM believes to be of interest to affected tribes. These are common over many square miles in this geographic area around Lime Hill, Morgan Mountain, and Lookout Mountain. While 8.9 acres of potential root food production areas would be disturbed during construction, few of these root food plants were found in the project area. The surveying botanist determined the project would not affect these plants' potential numbers significantly.

2. The proposed action would have no effect on public health or safety because precautions will be followed during construction activities with traffic controllers and speed limits at the site. Turbines would be remotely located and protected from unauthorized access.

3. The proposed action would not affect unique characteristics of the geographic area. The project area contains no Wilderness Study Areas or areas possessing wilderness characteristics. There are also no ACECs. The visual resource management analysis indicates that the Lime Wind project would be visible in the background from vantage points in the Oregon Trail ACEC. However, after the analysis, the BLM concluded that the project would not have a significant impact to the Oregon Trail view shed. The Oregon-California Trails Association also concluded the same (letter dated November 5, 2007).

There is one cultural feature 919 feet outside of the project Area of Potential Effect but it is within the view shed of the project. The BLM concluded this project would have no effect on this site and SHPO issued a concurrence on the no effect finding on December 16, 2008 and reaffirmed their no effect concurrence on December 1, 2009.

4. The proposed action would have no highly controversial effects because the public and special interests have been involved and consulted from the beginning of the project. Controversy in this context means disagreement about the nature of the effects, not expressions of opposition to the proposed action or preference among the alternatives. There will always be some disagreement about the nature of the effects for land management actions, and the decision-maker must exercise some judgment in evaluating the degree to which the effects are likely to be highly controversial. Substantial dispute within the scientific community about the effects of the proposed action would indicate that the effects are likely to be highly controversial (H-1790-1, at 72). Appropriate stipulations will be included in the ROW to prevent unnecessary or undue degradation, to reduce the effects to the environment, and to respond to the public/special interest's concerns and issues. BLM added clauses to: disallow construction activities during some winter months, require monitoring of bat and bird strikes at the turbines, and the reporting of any mortality to the BLM authorized officer, require off-site mitigation within the mule deer use area, disallow nighttime illumination of turbines, and to provide for protection of General Land Office markers found during construction.

5. While the proposed action presents us with no reason to believe that uncertain effects and unique or unknown risks are present, all actions pose a certain level of uncertainty. Should new information come to light during implementation of the project, the Bureau of Land Management (BLM) believes that the terms and conditions of the project's ROW, design features of the project, and mitigation measures presented in the EA and in the Decision Record authorizing the ROW, reduces the uncertainty and risk to the affected environment to a level that is not significant.

6. The proposed action is a routine and common project and does not establish a precedent for future actions. While the Lime Wind Energy ROW application is the first to propose wind development on public lands in BLM's Vale District, processing ROW applications for access and maintenance roads, power lines, and physical structures on public land is commonplace. Any future ROW applications, for wind energy development or otherwise, will be analyzed on a case-by-case basis, and approval/denial criteria would not be based upon the Lime Wind Energy ROW. Each ROW application is processed according to the BLM ROW regulations.

7. The proposed action as described and analyzed in the EA is not related to any other action being considered by BLM.

8. The proposed action would have no adverse effect to any property listed on or potentially eligible for listing on the National Register of Historic Places. The BLM concluded this project would have no effect on a cultural feature outside of the project area, and the Oregon State Historic Preservation Office (SHPO) issued a concurrence on the no effect finding on December 16, 2008 and re-concurred on December 1, 2009.

9. The proposed action would not significantly adversely affect an endangered or threatened species, or any habitat critical to an endangered or threatened species because although potential habitat would be disturbed during construction and operation (approximately nine acres and 3.5 acres, respectively), there are no known federally listed threatened, endangered, or strategic plant species in the project area. Also, there are no threatened or endangered wildlife species in the project vicinity. However, there is the potential for these species to be present in the project area or adjacent to the area and the impacts were analyzed according to the methods in section 4.3.9.3 of the EA. The burrowing owl would be susceptible to such impacts if active nests occurred in or near the project vicinity, since no burrowing owls were encountered during the survey of May 2009, no impacts are expected.

   The project area is located on the fringe of the current and historic range for greater Sage-grouse. An aerial Sage-grouse survey was conducted by the Oregon Department of Fish and Wildlife in April, 2006. No active leks were found within a 5-mile radius of the project site (Nick Myatt, 2007). The lek is considered to be the center of year-round activity for resident Sage-grouse populations and most nesting/brooding sites are located within 4 miles of a lek (Nowak 2004). Although there is available habitat for Sage-grouse life cycles, there are no known resident populations in the area. Considering the above data, survey results, and the acreage of project disturbance, BLM concludes that effects to Sage-grouse populations and habitat would be insignificant.

10. The proposed action does not violate any law or requirement imposed for the protection of the environment.

Ted Davis

12-11-09

Ted Davis
Field Manager
Baker Field Office, Vale District BLM

Date

# 1) INTRODUCTION

## 1.1 Background:

On June 6, 2007 Joseph Millworks Inc., of Baker City Oregon, submitted a Right-of-Way (ROW) application to install wind turbines on Federal Lands to the Bureau of Land Management's (BLM) Baker Field Office. The total capacity for the wind energy development facility would be 3.6 megawatts (MW). The project location is near Lime Oregon on BLM administered lands in section 36, T.13S., R. 44 E, Willamette Meridian, Oregon.

Joseph Millworks, Inc held a Right-of-Way Grant issued by the BLM for a wind test tower (OR-63195) at the Lime Wind Project area from 2006 - 2009.

## 1.2 Type of Action:

Issuance of a Right-of-Way (ROW) Grant for a wind energy development facility.

## 1.3 Purpose of and Need for Proposed Action:

On August 8, 2005, President Bush signed into law the Energy Policy Act of 2005 (P.L. 109-58). Section 211 of the Act states, "It is the sense of the Congress that the Secretary of the Interior should, before the end of the 10-year period beginning on the date of enactment of this Act, seek to have approved non-hydropower renewable energy projects located on the public lands with a generation capacity of at least 10,000 megawatts of electricity."

The BLM encourages the development of wind energy within acceptable areas, consistent with the Energy Policy Act of 2005 and the BLM Wind Energy Development Policy (IM No. 2009-043).

The purpose of the action would be to determine whether and how to provide Joseph Millworks Inc. with legal access to, and use of public land managed by the BLM for the purposes of installing, operating, and maintaining WTGs on the described public land. The need for the action is established by the BLM's responsibility under the Federal Land Policy and Management Act (FLPMA) to respond to a request for a Right-of-Way Grant for legal access to public lands and to manage public lands resources under FLPMA.

Decision to Be Made: The BLM will decide whether or not to grant the right-of-way, and if so, under what terms and conditions. This Environmental Assessment (EA) will analyze the environmental effects that would result from granting a ROW to the applicant which would result in the installation, operation, and maintenance of WTGs in the described area.

## 1.4 Location of Proposed Action:

Baker County, Oregon.
Township 13 S., Range 44 E., N½ of Section 36
**(See Exhibit I)**

## 1.5 Conformance with Applicable Land Use Plan:

The proposed action is located within the boundaries of the BLM's Baker Field Office of the Vale District. The Baker Resource Management Plan (1989) (RMP) was written to include the project area which is in the Baker County Geographic Unit. On page 117, the plan specifies "Maintain the availability of public lands for utility and transportation corridors and local rights-of-way."

The BLM initiated the preparation of a Programmatic Environmental Impact Statement (EIS) in October 2003 to address the impacts of the future development of wind energy resources on public land. A Record of Decision (ROD) was signed on December 15, 2005, to implement the Best Management Practices (BMP) and land use plan amendments identified in the Programmatic EIS. A Notice of Availability of the ROD was published in the Federal Register on January 11, 2006. The Baker RMP was not amended by the EIS due to the fact that the Baker RMP is currently undergoing a revision that will address wind energy development. The RMP does not contain any explicit discussion on wind energy development, although the RMP designates avoidance and exclusion areas (page 23 of the RMP) for rights-of-way and land use authorizations. The Lime Wind Project is not within a designated avoidance or exclusion area. This EA tiers to the appropriate sections of the Programmatic EIS.

The proposed action is in conformance with the terms and conditions of the applicable BLM Land Use Plan as required by 43 CFR 1610.5.

## 1.6 Relationship to Statutes, Regulations or Other Plans:

The subject application was made in accordance with Title V of the Federal Land Policy and Management Act of 1976 as amended (43 U.S.C. 1761) and the regulations found in 43 CFR 2800. These regulations govern the granting or denial of the ROW, determination of cost reimbursement, determination of the rental value, and the compliance and monitoring requirements.

ROW decisions become effective upon approval by the authorized officer (43 CFR 2801.10 (b)).

This document has been prepared in accordance with the National Environmental Policy Act (NEPA) (42 United States Code [USC] §4321 et seq.); CEQ regulations, as amended (40 Code of Federal Regulations [CFR] §1500 et seq.); Department of the Interior NEPA Manual Part 516; BLM NEPA Handbook (BLM Manual H-1790-1); and BLM Wind Energy Development Policy Instruction Memorandum (IM) 2006-216 which was

replaced with IM 2009-043. IM 2006-216 and IM 2009-043 provides guidance on implementing the Record of Decision for the Final Programmatic EIS on Wind Energy Development (BLM 2005) and guidance on processing ROW applications for wind energy projects on public lands administered by BLM. This EA tiers to the Programmatic EIS and may, in whole or in part, be used to fulfill other federal, state, and/or local requirements.

During construction, operation, maintenance, and termination of the Lime Wind Project, Joseph Millworks shall, to the extent practicable, comply with all existing and subsequently enacted, issued, or amended Federal laws and regulations and state laws and regulations applicable to the project.

Prior to construction, Joseph Millworks, Inc. would obtain all relevant federal, state, and local government permits and/or licenses. Below is a list of agencies that would be involved:

1. Federal Energy Regulatory Commission: Form 556 Certification of Qualifying Facility Status
2. Oregon Department of Environmental Quality: National Pollution Discharge Permit
3. Baker County: Upgrade of Marble Creek Road
4. State Building & Electrical Inspectors in affiliation with Baker City/County Building Department
5. Oregon Building Codes Division administered by Baker City/County Building Department

Baker County Zoning & Subdivision Ordinance #83-3 Section 105 does not apply to land managed by agencies of the federal government i.e. Lime Wind Project (**Exhibit IX**).

The Lime Wind Project falls below the Oregon Department of Energy, Siting Standards for Wind Energy Facilities threshold of 105 Megawatts, therefore the Oregon Energy Facility Siting Standards do not apply. (Oregon Department of Energy, 2007) Wind energy facilities under 105 Megawatts fall under local jurisdiction, however as this project is located on federal land, Baker County Zoning and Subdivision Ordinances do not apply. The project would be required to meet building code and electrical code requirements approved by the Oregon Building Codes Division as administered by Baker County (Baker County Planning and Community Development Department, 2008).

## 1.7 Scoping

Several issues were identified as a result of interdisciplinary team discussions, input from Joseph Millworks Inc., and public scoping. BLM and Joseph Millworks Inc. conducted a public scoping meeting in Baker City, Oregon on October 17, 2007 to identify issues, concerns, and opportunities. A notice of the meeting was published in the local

newspapers and a letter and map describing the proposed project, requesting input on the proposed project, and identifying the meeting time and place, were sent to the following groups:

- Agencies having jurisdiction and/or specific interest within the proposed project area
- Landowners within the proposed project area
- Oregon California Trails Association

The information gathered from these activities helped to identify issues and plan mitigation for the proposed Project. The following is a description of those issues:

- Minimize impacts to local grazing schedules
- Evaluate visual impacts
- Avoid negative impacts to resident and migrating wildlife

As part of the scoping process and to comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, a letter requesting input on the proposed project and a proposed project map were sent to the Oregon State Historic Preservation Office and the following tribal governments with an interest in the area:

- Confederated Tribes of the Umatilla Indian Reservation
- Burns Paiute
- Nez Perce

# 2) PROPOSED ACTION AND ALTERNATIVE(S)

## 2.1 Description of Proposed Action:

The proposed action is to issue the applicant, Joseph Millworks Inc. of Baker City, Oregon, a ROW grant authorizing the right to install, operate, and maintain a wind development facility on public lands. This ROW would authorize a single 30.5 meter tall (100-foot), steel monotube meteorological tower along with 7 – 12 wind turbine generators (WTGs) mounted on towers no taller than 40 meters that rest on concrete foundations. Turbine rotors would have a diameter no larger than 41 meters. The total height of the turbine would be no higher than 60 meters (197 feet) (**Exhibit V**). The total rotor swept area of the project would be no more than 9237 $m^2$. The ROW would also authorized six transformers, two electrical collectors, access roads, buried utility corridor and electrical line extensions. The total capacity for the facility would be 3.6 megawatts (MW).

Anticipated annual electrical power production would be 8,229 megawatt hours. This is enough power to supply 800 homes with electricity annually. Generated electrical power would be sold to or through Idaho Power Company under the guidelines of the Public Utility Regulatory Policy Act (PURPA).

The applicant requests a thirty year right-of-way term renewable for an equal term thereafter.

The foundations and towers would have a fifty to one hundred year working life with regular maintenance.

There have been changes made from the original proposal and the EA that was submitted for public comment. The changes are listed below.

| **Original proposal** | **Changes made** |
|---|---|
| Twelve 250 kilowatt WTGs mounted on 30 meter towers | 7 – 12 WTGs mounted on towers no higher than 40 meters |
| No meteorological tower | 30.5 meter tall (100 foot) meteorological tower |
| **Original proposal** | **Changes made** |
| Bridge over Marble Creek would be re-decked | Deck and guardrails would be removed and channel filled |
| Total rotor swept area of 8478 m² | Total rotor swept area of 9237 m² |
| Table 8 Comparison of Bat Mortality Rates based on rotor swept area (RSA) | Table 8 was changed to show bat fatalities based on tower height. |
| Initial disturbance of 8.89 acres and 3.20 for life of project* | Initial disturbance of 8.85 and 3.16 disturbed for life of project* |

*In the original EA, there was an error calculating the road disturbance acreages. The surface disturbance summary table in the original EA that showed 8.89 acres of initial disturbance and 3.20 acres disturbed for the life of the project was in error. The table shown in the current EA, section 2.1.9, which shows 8.85 acres of initial disturbance and 3.16 acres of disturbance for the life of the project is accurate. Also, Exhibit IV from the original EA, which showed the proposed roads, has been removed. The roads are now described in table 2.1.9 and shown on Exhibit III.

The EA was updated to include these changes. The BLM believes that the changes made were sufficiently addressed in the EA and were within the scope of analysis that was done for the original EA therefore, another public comment period was not necessary.

### 2.1.1 Sequence of Construction Activities

Joseph Millworks Inc. would not initiate any construction or other surface disturbing activities on the public land portion of the ROW until after issuance of the BLM grant by the Authorized Officer. Such authorization would consist of a written Notice to Proceed (form 2800-15). Joseph Millworks would conduct all activities associated with the construction and operation of the ROW within the authorized limits of the ROW and in strict conformity with the Plan of Development (POD). A copy of the complete right-of-way grant, including all stipulations and approved plan(s) of development, shall be made available on the right-of-way area during construction.

The construction of the proposed project would follow the sequence of:

1. Geologic sampling
2. Baker County road work and bridge removal and fill
3. Turbine foundation excavation and fencing
4. Graveling of road system with overburden from excavation
5. Forming and pouring of turbine foundations
6. Backfilling and tamping of turbine foundations
7. Excavation, forming, and pouring of pads for electrical collectors and transformers
8. Trenching for electrical wiring
9. Laying of wire, backfilling and tamping trenches
10. Installation of electrical collectors and transformers
11. Transportation of turbines to respective sites
12. Installation of turbines
13. Turbine wiring and connection
14. Reseeding and reclamation
15. Commissioning of turbines

**Table 1** shows this preliminary construction schedule

| **Table 1. Preliminary Construction Schedule 2010** | | | | | | |
|---|---|---|---|---|---|---|
| **Task** | **Time Frame (Months)** | | | | | |
| | May | June | July | August | September | October |
| County Road/Bridge Work | 7/1 -----7/15 | | | | | |
| Excavation | 7/15 ---- 8/1 | | | | | |
| Rocking Road System | 7/15 ---- 8/1 | | | | | |
| Foundation Pouring | 7/15 ---------- 8/15 | | | | | |
| Foundation Backfilling | 7/15 ---------- 8/15 | | | | | |
| Collector/Transformer Pads | 8/1 ---8/15 | | | | | |
| Trenching | 7/15----- 8/1 | | | | | |
| Laying Wire | 8/1 -- 8/15 | | | | | |
| Collector/Transformer Installation | 8/15 ------9/1 | | | | | |
| Turbine Transport | 8/1 ---------- 9/1 | | | | | |
| Turbine Installation | 8/15 ----------10/1 | | | | | |
| Meteorological Monopole Tower Installation | 8/15 ----------10/1 | | | | | |
| Turbine Wiring | 9/1 ---------- 10/1 | | | | | |
| Reseeding and Reclamation | 10/1 ------- 11/1 | | | | | |
| Turbine Commissioning and testing | 10/1 ---- 12/31 | | | | | |

### 2.1.2 Wind Turbine Pad Area Construction

WTG pad areas (pad area is total area needed for equipment to excavate and construct turbine foundations, access wind turbine components and erect wind turbines) would be prepared by clearing approximately 40 feet by 120 feet (0.11 acre) for individual pads. See **Exhibit III** for specific wind turbine locations. Turbine pad locations would be cleared of vegetation and topsoil (up to 12 inches), which would be stockpiled for future use in reclamation. The turbine pad location would be leveled using standard cut-and-fill construction techniques. The typical turbine pad would disturb approximately 0.11 acres

during construction. Once construction activities are complete and when production ensues, turbine pads would be partially reclaimed (for operational purposes) resulting in life-of-project disturbance of approximately 0.03 acres per turbine pad.

Foundations for wind turbines would require excavation within the turbine pad area. These excavations would be approximately 10 feet deep by 25 feet long by 25 feet wide. The depth of the excavation may vary depending on the parent material encountered. Below are photos of the type of foundation that would be utilized for the project wind turbines.

During foundation construction activities, a 5 foot high chain-link fence, or equivalent, would be installed to prevent wildlife and recreationalists from entering the excavation.

### 2.1.3 Meteorological Monopole Tower Pad Construction

A single 100-foot tall, steel monotube tower would be installed to monitor wind conditions during the wind farm's production to measure and evaluate wind turbine productivity. A pad would be prepared by clearing an area approximately 50 feet by 20 feet (0.02 acre) for the pad. The pad would be cleared of vegetation and topsoil (up to 12 inches), which would be stockpiled for future use in reclamation. The pad location would be leveled using standard cut-and-fill construction techniques. Once construction activities are complete and when production ensues, the meteorological pad would be partially reclaimed (for operational purposes) resulting in life-of-project disturbance of approximately 0.003 acres.

The foundation for the meteorological monopole tower would require excavation within the pad area. The size of the concrete foundation will depend on the soil and rock conditions encountered. The worst case scenario would require a 12ft x 12ft x 3ft deep mat foundation. If conditions allow, a 5-foot diameter x 8ft deep foundation would be sufficient, reducing the initial and long-term disturbance. For the purposes of this analysis, it is assumed a mat foundation will be required.

During foundation construction activities, a 5 foot high chain-link fence, or equivalent, would be installed to prevent wildlife and recreationalists from entering the excavation.

### 2.1.4 Transformer and Electrical Collector Pad Construction

Transformer and Electrical Collector pads would be prepared by clearing an area approximately 25 feet by 25 feet (0.01 of an acre) for individual pads. See **Exhibit III** for specific pad locations. These locations would be cleared of vegetation and topsoil (up to 12 inches), which would be stockpiled for future use in reclamation. The pad location would be leveled using standard cut-and-fill construction techniques. The typical pad would disturb no more than 0.01 of an acre during construction. Once construction activities are complete and when production ensues, pads would be partially reclaimed (for operational purposes) resulting in life-of-project disturbance of approximately 0.005 of an acre per transformer and electrical collector pad.

Foundations for transformer structures would require minor excavation within the pad area. These excavations would be 1 to 2 feet deep by 15 feet long by 15 feet wide. A concrete slab to support the 12 foot x 12 foot prefabricated structure would be cast in place.

### 2.1.5 Underground Transmission Line Construction

The electrical connection from the wind generator step-up transformers to the point of interconnection with the serving utility would be constructed according to current electric utility practices using high-voltage underground cable and associated components.

Three conductors, one for each of the three phases, each rated for the applied voltage, insulated, jacketed, and with a grounded concentric neutral, would be run from transformer to transformer. Depending on the geologic conditions encountered, the cables may be buried in the soil or installed in direct-buried or concrete-encased conduit. Conduit and cables would be buried to meet the National Electric Code.

At each transformer, high-voltage fully-insulated terminations would be installed to mate the cable to the connections on the transformers. Transformers would thus be connected in a daisy-chain fashion. The daisy-chains of transformers would meet at a an above-ground electrical collector in the approximate center of the development near turbine 8 or at the fork in the road 1/3 mile south of the BLM gate. This location would be determined after consideration of geologic conditions, engineering parameters and constructability at the site.

This insulated, locked and sealed cabinet would provide a means to connect the transformer circuits together and then continue on to the point-of-service. Also at this central location would be installed a pad-mounted grounding transformer. This transformer would assure that excessive voltages do not occur when the generators are disconnected from the grid during operation.

From the electrical collector, three underground cables would continue toward the point-of-service, approximately 3000 feet away. Because of limitations in the length of cable that can be shipped, up to two additional junction cabinets would be installed to provide

safe above-ground points for connecting the cables. All underground electrical cable routes would be placed in trenches approximately 2 feet wide and 4 feet deep following the access roads as shown in **Exhibit III**.

At the point-of service, the underground cables would be brought above ground through a PVC conduit attached to the final wood pole of the point-of-service. These cables would be terminated with high-voltage terminations about 30 feet above ground and connected to the utility system through individual "cut outs", which are similar to knife switches.

Electrical lines would interconnect to the existing Idaho Power Company distribution lines 500 ft. north of the BLM gate at Marble Springs. The existing distribution line would be rebuilt by Idaho Power to carry the generated electrical power to Idaho Power's Lime substation.

All transmission and utility work on private property is within the Baker County local access road.

### 2.1.6 Collection System Construction

Overview
The proposed Lime Wind project consists of installing WTGs and connecting these generators through a combined underground and overhead high voltage electrical system to the Idaho Power Lime Substation.

Collection System
The WTGs would connect in pairs to 500kVA pad mounted transformers to step up the generator output voltage, 480V, to the Idaho Power standard voltage of 12,470V. These transformers are of a three phase configuration. A similar transformer is shown below.

From each generator to its associated step-up transformer would be installed four direct buried 600Vrated insulated wires (shown below). These wires would have 500kcmil aluminum conductors and cross linked polyethylene (XHHW) insulation. Depth of burial for the conductors would be in accordance with the National Electric Code of 24" cover.

At each step-up transformer, the high voltage collector wires would connect inside the pad mounted transformer enclosure and extend to the next pad mounted transformer or device in the system. This cable would be 15kV jacketed concentric neutral cable with 220mil ethylene propylene rubber insulation and a #2 AWG aluminum conductor. The three direct buried high voltage wires would be installed at a depth as required by the National Electric Safety code of 30” minimum cover. A single typical high voltage wire is shown below.

All underground electrical cable routes would be placed in trenches approximately 2 feet wide and 4 feet deep following the access roads to facilitate installation and maintenance as shown in **Exhibit III.**

At the point of interconnection to the Idaho Power overhead power line, two pad mounted devices may be required by Idaho Power. One would be a high voltage metering cabinet. The other would be a high voltage fault interrupter. The metering cabinet would provide the electric metering required by the interconnection agreements between Lime Wind and Idaho Power. See a photo of a typical device below.

The fault interrupter would provide protection of the Idaho Power electric system from faults in the Lime Wind electrical equipment. See a photo of a typical device below.

Near the meter and fault interrupter, the three underground cables would rise in a conduit mounted to an Idaho Power electrical pole for attachment to the Idaho Power overhead lines.
A typical “riser” on a power pole is shown below.

Foundations for electrical collector structures would require minor excavation within the pad area. These excavations would be 1 to 2 feet deep by 15 feet long by 15 feet wide. A concrete slab to support the 12 foot x 12 foot prefabricated structure would be cast in place.

### 2.1.7 Turbine Installation

The turbines would arrive on trucks via Interstate 84. These trucks would be offloaded at an existing turn-out at the bottom of Marble Creek Road within Baker County's existing 120 foot local access road. Each load would be transferred to a different truck to be driven to its designated position at the site. A crane would be utilized to raise the two base sections of the turbine, the nacelle, and each of the three blades. Flaggers would be utilized on public roads when and where necessary for safe transportation of this equipment and/or materials.

### 2.1.8 Road Design Factors

The proposed action requires the use of existing roads, construction of new access roads, and construction of wind turbine pads, wind turbine foundations, meteorological monopole tower and foundation, transformer pads, electrical collector pads, and underground power-lines.

The proposed road system utilizes an existing Baker County road to access BLM lands at Marble Springs. This road has developed over the years through dispersed recreation and permittee use and, with some minor improvements, would be suitable for necessary construction and maintenance activities required for this project. See **Exhibits II & III** for road and infrastructure locations.

### 2.1.9 Surface Disturbance Summary

The estimated acres of surface disturbance are shown on the table below.

**Table 2:**

| **Facility** | **Length (feet)** | **Width (feet)** | **Initial Disturbance (Acres)** | **Production Disturbance (Acres)** |
|---|---|---|---|---|
| **New and existing two-track roads (Baker County road)** | **1180** | **20 (initial)<br>14 (LOP)*** | **0.54** | **0.38** |
| **New access road 80 feet east of Marble Spring** | **480** | **20 (initial)<br>14 (LOP)** | **.22** | **.15** |
| **Existing two-track roads (Access to turnout and turbines 8-12 and meteorological tower)** | **3225** | **20 (initial)<br>14 (LOP)** | **1.48** | **1.04** |
| **Existing two-track roads (Access to turbines 5-7)** | **1500** | **20 (initial)<br>14 (LOP)** | **0.69** | **0.48** |
| **Existing two-track roads** | **1825** | **20 (initial)** | **0.84** | |

| | | | | |
|---|---|---|---|---|
| **(Access to turbines 1 and 2))** | | **14 (LOP)** | | **0.59** |
| **Proposed Special Purpose Roads (Access to Turbines 3 and 4)** | **280** | **20 (initial)<br>14 (LOP)** | **0.13** | **0.09** |
| **Turnout** | **100** | **14 (LOP)** | **.03** | **.03** |
| **Proposed Utility Corridor From Collectors to Transmission Lines (Paralleling existing roads)** | **5275** | **20 (initial)<br>0 (LOP)** | **2.42** | **0.0** |
| **Proposed Utility Corridor From turbines to transformers (Paralleling existing roads and pads)** | **2350** | **20 (initial)<br>0 (LOP)** | **1.08** | **0.0** |
| **Each Wind Turbine Pad<br>12 total** | **120 (initial)<br>60 (LOP)** | **40 (Initial)<br>20 (LOP)** | **0.11 per pad<br>1.32 total** | **.03 per pad<br>0.36 total** |
| **100-foot meteorological monopole tower pad** | **50 (initial)<br>12 (LOP)** | **20 (initial)<br>12 (LOP)** | **0.02** | **0.003** |
| **Each Transformer Pad<br>6 total** | **25 (initial)<br>15 (LOP)** | **25 (initial)<br>15 (LOP)** | **0.01 per pad<br>0.06 total** | **0.005 per pad<br>0.03 total** |
| **Each Electrical Collector Pad<br>2 total** | **25 (initial)<br>15 (LOP)** | **25 (initial)<br>15 (LOP)** | **0.01 per pad<br>0.02 total** | **0.005 per pad<br>0.01 total** |
| | | | | |
| *** LOP is Life-of-Project** | | | **8.85** | **3.16** |

Following is a general discussion of proposed construction techniques that would be used to implement the Proposed Action. These construction techniques would be generally applicable to roads, wind turbine pads, wind turbine foundations, transformer pads, electrical collector pads, and power lines.

### 2.1.10 Road Construction

No work is needed on existing State or Federal Highways to access the Lime Wind site. The existing bridge on Marble Creek Road spans an old conveyor channel that was used to move material to the lime plant below. The bridge would have the deck and guard rails removed and the conveyor channel would be filled prior to the hauling of heavy equipment or concrete to the site. The bridge was inspected by Cahill Engineering in the spring of 2008 and was determined to have deterioration of the wooden planks and girders sufficient to require filling prior to heavy equipment traffic.

The original EA that was sent out for public comment stated that the bridge would be re-decked. However, the Baker County Road Master inspected the bridge in June, 2009, and recommended the deck and guardrails be removed and the channel be filled. The bridge is owned by Baker County and all work would be done with full knowledge and participation of the Baker County Road Department.

The filled channel would be 20 feet wide at the road surface sloping to 28 feet at the base which is 4 feet below the road surface and is 12 feet in length. The filling of the channel would use approximately 44 cubic yards of material that is adjacent to the bridge and is

the material excavated when the channel was created. Eight cubic yards of 4" minus crushed rock would be hauled in to provide a suitable road base. All work would take place within the Baker County 120 foot right-of way, meet the design criteria in the Baker County Transportation System Plan for a Local Access Road and be inspected by the Baker County Road Master. The existing concrete foundations would be left in place. The heavy equipment used in filling the conveyor channel would work from the existing roadway and would not work outside the 120 foot right-of-way. The life span of the filled channel would be equal to or greater than the life of the project.

Marble Creek Road would be graded within the existing 120 foot right-of-way and any excess material would be disposed of in an appropriate disposal site.

The existing Baker County local access road to BLM administered lands in Section 36 would be graded and realigned, including 400 feet of new road to the east of the existing route.

Roads constructed and/or improved on BLM lands would include 480 feet of new road 80 feet to the east of Marble Spring, to minimize impact to Marble Spring. The existing 6650 feet of two-track roads required for use by the Lime Wind Project would require some initial pre-construction maintenance to become suitable for construction traffic. Most of this maintenance would be in the form of blading and rolling to smooth and compact the running surface.

The 280-foot access to Turbines 3 and 4 would be via a new road constructed from Turbine 2 to the northwest to Turbine 4 (see **Exhibit III**). This road would be constructed on flat slopes that would require minor brushing or mowing of vegetation and blading a route to the turbine locations.

The final roadway locations would be flagged and staked prior to construction for approval by BLM staff and the roads would be constructed to BLM standards utilizing "Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-03". These specifications can be found at: ' http://www.wfl.fha.dot.gov/design/specs/fp03.htm". These specifications include requirements for safety, and sediment and pollution control.

Road surface drainage would be controlled by out-sloping and constructed rolling dips installed at sufficient intervals to reduce road surface runoff. These road surface drainage techniques keep water from flowing down the roadway and diffuse any connectivity with adjacent stream courses.

Materials required for the surface running course would be obtained from commercial sources outside the project area unless suitable materials from wind turbine foundation excavations or utility corridor construction can be obtained.

Typical road construction equipment and materials would be utilized for the construction of this road. The types of equipment expected for use include; dozers, tracked

excavators, graders, dump trucks and water trucks for dust abatement. Flaggers would be utilized on public roads when and where necessary for safe transportation of this equipment and/or materials.

Construction and maintenance activities would be prohibited during periods when severe rutting (creation of ruts in excess of 3" deep) or resource damage might occur. Preventive and corrective maintenance of roads in the project area throughout the duration of the Proposed Action would be ongoing. This may include shallow grading, cleaning ditches and drainage facilities, dust abatement, noxious weed control, or other requirements as directed by the BLM.

### 2.1.11 Construction Waste Disposal

Construction sites and access roads would be kept in an orderly condition throughout the construction period. Refuse and trash would be removed from the sites and disposed of in an approved manner. Oils or other chemicals would be hauled to an approved site for disposal. No open burning of construction trash would occur.

### 2.1.12 Site Reclamation

Disturbed areas within the ROW, excluding access roads, would be graded and reseeded. The natural drainage pattern along the ROW would be restored as near as practical to the original pattern.

Work sites would be restored using excess materials, vegetation, and topsoil stockpiled for that purpose. Excess soil materials, rock, and other objectionable materials that cannot be used in restoration work would be disposed in a manner approved by the Authorized Officer.

### 2.1.13 Fire Protection

A Fire Plan would be prepared. It would document all the applicable fire laws and regulations to be observed during the construction period, including any BLM notice of restricted activities due to high fire danger. All personnel would be advised of their responsibilities under the applicable fire laws and regulations.

### 2.1.14 Operation and Maintenance

#### 2.1.14.1 Operation and Maintenance of Road System

The newly constructed roads would become part of the BLM's specified road system and maintained according to the stipulations within the ROW.

Maintenance activities would include all work necessary to maintain the roadway to minimize erosion and runoff. The activities would include vegetation removal, surface

replacement and maintenance, and slump and slide removal. A plan to maintain all roads for the proposed action would be submitted annually, or an agreed to interval, prior to use.

The road is not proposed as an all-weather road. Routine maintenance would require the use of track vehicles to access the site in winter and spring. Notification would be given to BLM for any work done requiring access of heavy equipment.

#### 2.1.14.2 Operation and Maintenance of Wind Turbines Generators (hours reflect total time to operate and maintain all of the turbines)

Maintenance trips to the site fall into two categories: Scheduled and unscheduled. Scheduled maintenance trips include monthly, quarterly, and yearly trips. Yearly maintenance trips would be scheduled for the spring of the year. Quarterly trips are based on annual production, and would be scheduled for the months of April, June, August, and October. Monthly maintenance trips would occur once per month.

**Daily** (2 hours, done remotely):
Download production and fault status from the remote communications system for failures that require immediate attention. These include loss of pump pressure, pitch feedback, and excess yaw. In addition to the remote communications system an alarm in the form of a flashing yellow light outside the tower indicates a fault condition during visual inspection.

**Monthly** (4 to 8 hours; 48-96 hours/year):

- Hub bolt torque check
- Wire and cable inspection
- Bearing and spindle grease application
- Generator/gear box coupling check
- Hydraulic and oil filter inspection
- Hydraulic and oil level maintenance

**Quarterly** (8 hours; 32 hours/year):

- Blade inspection
- Oil pump drive inspection
- High-voltage test of generator, yaw motor, and oil pump motor
- Tower bolt inspection, including tower to nacelle, mid-tower, and tower to foundation bolts

**Yearly** (8-40 hours):

- Full electrical and grounding test
- Yaw system check
- Foundation inspection
- Hydraulic system inspection
- Pressure washing of blades and towers

Equipment required for routine turbine maintenance would be limited to a water truck, pressure washer, man lift and truck. All equipment and tools would be kept offsite by the applicant.

Unscheduled trips include those trips that are necessary to perform emergency maintenance on the turbines. Based on the industry standard figure of 3% downtime, there would be 11 days per year per turbine of downtime. Based on December's monthly energy production, which is 5.9% of the total annual energy production (Table 2 Percentage of Annual Theoretical Energy Output by Month, Exhibit XII), anticipated downtime per turbine for the month of December would be .6 days. Based on January's monthly energy production, which is 4.2% of the total annual energy production, anticipated downtime per turbine for the month of January would be .5 days. Based on February's monthly energy production, which is 4.5% of the total annual energy production, anticipated downtime per turbine for the month of February would be .5 days. Based on March's monthly energy production, which is 5.2% of the total annual energy production, anticipated downtime per turbine for the month of March would be .6 days. This equates to a total of 2.2 days of downtime per turbine for the winter season. Based on a wind farm of 12 turbines, there is an estimate of 26 days of downtime for the 17 week winter period, equaling 1.53 days per week of downtime.

Not all unscheduled maintenance requires a trip to the site. The remote Supervisory Control And Data Acquisition (SCADA) system would allow remote equipment scans and remote start-up of the turbines. Also, downtime occurrences may strike multiple turbines simultaneously, allowing for a consolidation of trips. Since there would be a scheduled trip once per month, unscheduled maintenance can be combined with that scheduled trip or the scheduled trip combined with an unscheduled maintenance trip. All of these factors would reduce the number of unscheduled trips to the site during the winter months.

A component of the 3% downtime figure is attributable to major breakdowns. Major breakdowns are often not able to be fixed quickly, meaning that the turbine sits idle while parts are being repaired or shipped and no trips are made to the turbine. Repairs on major breakdowns may also require the use of a crane, which would not be accessible to the site until after the winter season, putting off repairs to the spring.

Based on this data, there would be estimated 2 - 4 trips per month to the site for maintenance procedures during the winter season.

### 2.1.15 Mitigation Measures

The mitigation measures discussed in this section are measures that the applicant would include as a part of the proposed project. These measures, designed to avoid or reduce the impacts of the proposed project, are organized by resource topic and discussed in detail in Sections 2 and 4 – Project Description and Environmental Consequences.

#### 2.1.15.1 Measures Common to Several Resources

- Any ROW grant would contain a term and condition that provides that if construction of wind energy facilities has not commenced within 2 years after the effective date of the grant or consistent with the timeframes of the approved POD, the ROW holder shall provide the BLM good cause as to the nature of any delay, the anticipated date of the construction, and evidence of progress toward commencement of construction. Failure to comply provides the Authorized Officer the authority to terminate the authorization (43 CFR 2807.17).

- Any ROW grant would contain a term and condition that provides that the holder shall construct, operate, and maintain the facilities, improvements, and structures within this right-of-way in strict conformity with the POD(s) which was approved and made part of the grant. Any relocation, additional construction, or use that is not in accord with the approved plan(s) of development, shall not be initiated without the prior written approval of the authorized officer. A copy of the complete ROW grant, including all stipulations and approved plan(s) of development, shall be made available on the ROW area during construction, operation, and termination to the authorized officer. Noncompliance with the above will be grounds for an immediate temporary suspension of activities if it constitutes a threat to public health and safety or the environment.

- The United States retains the right to authorize use of the ROW for other compatible uses (including the subsurface and air space).

- The ROW holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, (43 U.S.C. 9601, et seq. or the Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq.) on the ROW (unless the release or threatened release is wholly unrelated to the right-of-way holder's activity on the right-of-way). This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

- Ninety days prior to termination of the ROW, the ROW holder shall contact the authorized officer to arrange a joint inspection of the ROW. This inspection will be held to agree to an acceptable termination (and rehabilitation) plan. This plan shall include, but is not limited to, removal of facilities, drainage structures, or surface material, re-contouring, topsoiling, or seeding. The authorized officer must approve the plan in writing prior to the holder's commencement of any termination activities.

- The ROW holder shall conduct all activities associated with the construction, operations, and termination of the ROW within the authorized limits of the ROW.

### 2.1.15.2 Measures Regarding Cultural/Archeological Resources

- Any cultural and/or paleontological resource (historic or prehistoric site or object, or fossil) discovered by the holder, or any persons working on his behalf on public or Federal land shall be immediately reported to the authorized officer. The ROW holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the authorized officer. An evaluation of the discovery will be made by the authorized officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The ROW holder will be responsible for the cost of evaluation and mitigation, and any decision as to proper avoidance, protection or mitigation measures will be made by the authorized officer after consulting with the holder and others (including affected tribes) under Section 106 of the National Historic Preservation Act.

- Pursuant to 43 CFR 10.4(g), the holder of this authorization must immediately notify the authorized officer, by telephone, with written confirmation, immediately upon the discovery of human remains, funerary items, sacred objects, or objects of cultural patrimony. Further, pursuant to 43 CFR 10.4(c) and (d), the holder must stop activities in the vicinity of the discovery and protect it for 30 days or until notified to proceed by the authorized officer. The BLM Authorized Officer will determine avoidance, protection or mitigation measures in consultation with the Holder, Oregon SHPO, and affected Tribes. Costs associated with the discovery, evaluation, protection or mitigation of the discovery shall be the responsibility of the holder.

- The holder shall notify the Authorized Officer at least **90** days prior to any non-emergency activities that would cause surface disturbance in the ROW. The Authorized Officer will determine if a cultural resource inventory, treatment or mitigation is required for the activity. The holder will be responsible for the cost of inventory, avoidance, treatment or mitigation; including any maintenance-caused damage. The Authorized Officer will determine avoidance, treatment and mitigation measures that are necessary after consulting with the holder and others (including affected tribes) and under Section 106 of the National Historic Preservation Act.

### 2.1.15.3 Measures Regarding Visual Resources

- Wind turbines, rotors, visible ancillary structures, and other equipment would be painted with a high quality non-reflective paint in an unobtrusive grey or white color that is found in the natural landscape.

- Commercial symbols, trademarks, and advertising messages would not appear on sites or ancillary structures.

- Tubular shaped towers would be used that present a simpler profile and less complex surface characteristics

- Where feasible, electrical cables and transmission lines would be placed underground.

- Towers are no taller than 40 meters in height. Rotors are no larger than 41 meters. The overall height is no greater than 60 meters. This height turbine requires no nighttime illumination by the FAA (See DOT/FAA/AR-TN05/50: Development of Obstruction Lighting Standards for Wind Turbine Farms)

#### 2.1.15.4 Measures Regarding Biological Resources

- The ROW holder shall be responsible for weed control on disturbed areas within the limits of the ROW. The ROW holder is responsible for consultation with the authorized officer and/or local authorities for acceptable weed control methods (within limits imposed in the grant stipulations).

- Use of all pesticides (including fungicides, herbicides, insecticides, etc.) shall comply with the applicable Federal and State laws. Pesticides shall be used only in accordance with their registered uses and within limitations imposed by the Secretary of the Interior. Prior to the use of pesticides, the ROW holder shall obtain from the authorized officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the authorized officer. Emergency use of pesticides shall be approved in writing by the authorized officer prior to such use. BLM Policy requires that all applicators be certified or under the direct supervision of a certified applicator. Also, Oregon law requires the applicator to possess an Oregon Public Applicator's license when applying pesticides on public land.

- The ROW holder shall seed all disturbed areas with a seed mixture and rate specified by BLM, using an agreed upon method suitable for the location. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS) per acre. There shall be no primary or secondary noxious weed seed in the seed mixture. Seed shall be tested and the viability testing of seed shall be done in accordance with state law and within 9 months prior to purchase. Commercial seed shall be either certified as Oregon weed seed free or registered seed. The seed container shall be tagged in accordance with state law and available for inspection by the authorized officer. The seeding shall be repeated until a satisfactory stand is established as determined by the authorized officer. If mulch is used on seeded areas, it shall be certified weed free straw or hay.

- The ROW holder shall remove only the minimum amount of vegetation necessary for the construction of structures and facilities.

- A monitoring program has been developed by the ROW holder and approved by the BLM to determine bird and bat strikes during the pre-construction post-construction and operational phase of the project (within Attachment E and F of the EA):

Carcass searches will be done to document any fatalities of either residents or migrants. Orloff and Flannery (1992) and Johnson et al. (2002) reported that most bats and birds killed by turbines remained within 63 m of the turbine. Searches will be conducted at least every other week during the period of highest fatality rates (mid-August to mid-October for the Pacific Northwest). Because the Lime Wind Energy Project only has 7 to 12 turbines, a plot will be established around each turbine and sampled every-other week or around every-other turbine and sampled weekly. The procedure below was taken from Young et al. (2003).

1. Searchers walk parallel transects spaced 6-8 m apart at a pace of 45-55 m/min until the entire plot is covered

2. For each casualty, searchers will record species, sex and age when possible, date and time collected, location, and whether the carcass was intact or showed signs of scavenging.

3. Carcasses will be labeled with a unique number, bagged, and frozen for future reference or determination of species, sex, and age, if questionable.

Searches will be made both pre-construction and post-construction. The pre-construction searches provide a baseline of natural deaths that may occur in the area. Numbers of carcasses found in pre-construction searches can be subtracted from those found in post-construction searches to give an estimate of fatalities due to the turbines. When possible, two corrections should be made to both the pre-construction and post-construction data: one based on an estimate of searcher efficiency (the percentage of carcasses present that are found) and one based on an estimate of scavenger loss (the percentage of carcasses present that are removed by scavengers before they are found by searchers). However, determination of both searcher-efficiency and scavenger-removal requires trials using carcasses that are not available at the Lime Wind Energy Project. Thus, the data will have to be reported as uncorrected deaths/turbine/year or uncorrected deaths/MW/year.

Monitoring will be done under the direction of an experienced wildlife biologist and all construction and maintenance personnel will be trained in the methods needed to carry out this plan. This plan will also include the reporting of any mortality to the BLM authorized officer immediately after identification by a biologist experienced in the use of field guides and taxonomic keys to accurately identify bird and bat species. Monitoring will be overseen by an experienced BLM wildlife biologist during the first three years of operation. If and when bat mortality exceeds six (6) anytime during the first three years (approximately one fatality is expected per year as per sec. 4.3.9.3 of the EA, therefore it takes 2 fatalities per year on average to exceed, times 3 years gives 6 fatalities per 3 year period ) and/or bird mortality exceeds 24 anytime during the first three years (approximately 8 fatalities is expected per year as per sec. 4.3.9.1 of the EA), additional mitigation measures will be implemented, including

turbine startup at higher wind speed and/or turbine shutdown during bat migration periods. At the end of each year the BLM and ROW holder will reassess and determine future monitoring needs and/or additional mitigation measures.

- Facilities shall be designed to discourage use as perching or nesting substrates by birds.

- All construction employees shall be instructed to avoid the harassment and/or disturbance of wildlife, especially during reproductive (e.g. courtship and nesting) seasons.

- No construction activities will take place between March 1st and June 30th each year to prevent disturbance to several species of birds during mating and/or breeding seasons.

- No construction activities will take place between December 1st and April 15th each year to prevent disturbance to big game populations during the winter.

- Mitigation will be performed on approximately 7 acres of BLM lands within the mule deer use area as shown on Exhibit XI. The mitigation consists of planting bitter brush seedlings at

  a rate of 1200 seedlings per acre. If seedling survival is less than 400 seedlings per acre at the end of the third growing season, replanting will be done to bring the total to 800 seedlings per acre. The exact location of the 7 acres will be determined after consultation with ODFW. The planting will be completed within a year of ROW being granted.

### 2.1.15.5 Measures Regarding Geology/Soils

- No construction or maintenance activities shall be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts in excess of 3 inches deep, the soil shall be deemed too wet to adequately support construction equipment.

- If the authorized officer determines that it is necessary, the ROW holder shall construct waterbars on all disturbed areas to the spacing and cross sections specified by the authorized officer. Waterbars are to be constructed to:

    1. Simulate the imaginary contour lines of the slope (ideally with a grade of one or two percent).
    2. Drain away from the disturbed area.
    3. Begin and end in vegetation or rock whenever possible.

- The ROW holder shall re-contour disturbed areas, or designated sections of the right-of-way, by grading to restore the site to approximately the original contour of the ground as determined by the authorized officer.

#### 2.1.15.6 Measures Regarding Health, Safety, and Noise

- Construction sites shall be maintained in a sanitary condition at all times; waste materials at those sites shall be disposed of promptly at an appropriate waste disposal site. "Waste" means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment.

- The ROW holder shall take such measures for prevention and suppression of fire on the grant area and adjacent public lands or public lands used or traversed by the holder in connection with operations as are required by applicable laws and regulations.

- No hazardous wastes or fuel would be stored on site at any time.

- A traffic management plan shall be prepared by the ROW holder for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted.

#### 2.1.15.7 Measures Regarding Land Use and Recreation

- The ROW holder shall protect all survey monuments found within the right-of-way. Survey monuments include, but are not limited to, General Land Office and Bureau of Land Management Cadastral Survey Corners, reference corners, witness points, U.S. Coastal and Geodetic benchmarks and triangulation stations, military control monuments, and recognizable civil (both public and private) survey monuments. In the event of obliteration or disturbance of any of the above, the holder shall immediately report the incident, in writing, to the authorized officer and the respective installing authority if known. Where General Land Office or Bureau of Land Management ROW monuments or references are obliterated during operations, the holder shall secure the services of a registered land surveyor or a Bureau cadastral surveyor to restore the disturbed monuments and references using surveying procedures found in the Manual of Surveying Instructions of the Survey of the Public Lands of the Unites States, latest edition. The ROW holder shall record such survey in the appropriate county and send a copy to the authorized officer. If the Bureau cadastral surveyors or other Federal surveyors are used to restore the disturbed survey monument, the holder shall be responsible for the survey cost.

## 2.2 No Action Alternative

This alternative considers the environmental consequences of not undertaking the

Proposed Action, and is to be used as a baseline against which the other alternative may be compared. The No Action Alternative would reject the proponent's application for a BLM ROW grant. Therefore, only existing land management activities would occur.

### 2.3 Alternatives Considered but Eliminated from Detailed Study

**Construction of new access route:** This alternative was based on the Proposed Action with a new route to access the project area. This alternative would have required an additional 6300 feet of new construction. New surface disturbance would increase the chance of invasive and noxious weed introduction over an alternative that kept new disturbance minimized. It would have required significant earthwork activities and the construction of an approach off of the Marble Creek road that would have made access for heavy equipment difficult. Although considered, BLM determined that due to the impacts from road construction, it was dropped from further analysis (NEPA Handbook H-1790-1,6.6.3 pg 52).

**Use of existing route adjacent to Marble Spring:** This alternative would have forgone the 480 feet of new road on BLM land plus 400 feet of Baker County local access road. BLM determined that increased utilization of the existing road during construction activities would potentially increase runoff in this area and would increase soil compaction at Marble Spring. Therefore, this alternative would degrade to a greater extent, the resources that any road construction methods being considered for the project would affect. For these reasons this alternative was dropped from further analysis (NEPA Handbook H-1790-1, 8.3.4.2, pg 80).

## 3) AFFECTED ENVIRONMENT

### 3.1 General Setting

The proposed project area is located in Baker County, Oregon on public lands that are administered by the Vale District's Baker Field Office of the Bureau of land Management. The Project area is approximately two miles east of Interstate 84 and 1.5 miles west of Brownlee Reservoir. The town of Huntington, Oregon is located 3 miles southeast of the project area. The Project area is located adjacent to Baker County's industrial zone for the Lime area (Exhibit XIII). The industrial zone is intended to enhance opportunities for small scale low impact and resource related industrial uses. Access to the project area is available from the Lime Exit at Interstate 84, proceeding east 2.75 miles on the county road, referred to as the Marble Creek Road. The county road provides public access to BLM lands north and east of the project site.

Project area elevations range from 3700 feet to 4000 feet above sea level. While the project site is relatively level, adjacent topography is dominated by steep slopes and drainages that feed into the Burnt River to the west and Brownlee Reservoir to the east.

This site is in the area of the Burnt River watershed, which is a sub province of the Columbia Basin. Raymond (1991) indicates that the Blue Mountain physiographic province was formed from lava flows and geologic uplift. “The Grande Ronde valley started forming over 15 million years ago when the Columbia River basalt was erupting and laying down huge lava flows throughout the Columbia Basin. As the valley started to form, the lava filled in very quickly, covering both the valley floor and the surrounding ridges” (Reidel 2003, www.pnl.gov). This resulted in over 42,000 cubic miles of basalt (Orr and Orr 1996) covering the Columbia Plateau. The basalt flows redirected or blocked rivers and streams, creating sediment basins. The topography of the project area is hilly with minimal to steep slopes (ranging from 2-75% slopes) (NRCS 2008).

The proposed project area is within a non-forested rangeland ecosystem where the vegetation consists predominately of native shrubs, forbs, and grasses, with some non-native grasses introduced. The primary land uses are livestock grazing, wildlife habitat, and dispersed outdoor recreation. No cultivated agricultural lands occur within the project area.

Precipitation ranges from 9 to 20 inches annually with a total average annual precipitation of 13 inches per year. The majority of annual precipitation comes in the form of winter snow and spring rains. Summer precipitation is minimal although isolated thunderstorms are common to the area in July and August. In winter, the average temperature at Huntington is 32˚ F while the average summer temperature is 75˚ F.

Winds are common to the area especially on the exposed ridge tops where the wind turbines would be located. The project area has been identified as a Class 5 (Excellent) wind site on the Validated Oregon Wind Power Map (TrueWind Solutions, LLC, 2008). A wind resource assessment for the project area was completed using the data collected at a reference meteorological tower located at the site (Exhibit XII). The estimated mean wind speed is 16.3 mph (7.3 mps) at 30m.

Per BLM policy, Byron Schmidt, Chief, Airspace Management from the Mountain Home Air Force Base in Mountain Home, Idaho was notified to ensure that the proposed project would not interfere with the air space managed by the United States Air Force. No conflicts were indicated. Contact was made with the Idaho National Guard, who manages the adjacent airspace, and no concerns were brought forward.

## 3.2. Critical Elements of the Human Environment

Elements denoted by an “X” in the *not affected* column in the attached lists of Critical Elements of the Human Environment **(Exhibit VI)** are not affected by the proposed action or alternatives and would receive no further consideration. Elements which are present and are likely to be affected are discussed below.

### 3.2.1 Air Quality

The Oregon Department of Environmental Quality (DEQ) has jurisdiction of air quality programs over all counties in the state. The Oregon DEQ is the state regulatory agency whose job is to protect and enhance the quality of Oregon's Environment. DEQ monitors for Federal Clean Air Acts pollutants including Carbon Monoxide (CO), Nitrogen Dioxide ($NO_2$), Ozone ($O_3$), Total Suspended Particulate (TSP), Fine Particulate (PM10 and PM2.5), and Lead (Pb). In support of that job, to protect air quality, the Air Quality Monitoring Section of the DEQ has established a network of monitoring and sampling equipment at sites throughout the state of Oregon. The closest monitoring site from the proposed project area is located in Baker City, Oregon. For 2006, Baker City experienced 329 "Good" air quality days, 25 "Moderate" days, 2 "Unsafe For Sensitive Groups" days, 0 "Unhealthy" days, and 9 days without data (Oregon DEQ, 2006).

### 3.2.2 Areas of Critical Environmental Concern – Oregon Trail ACEC

Portions of the Oregon Trail within the Vale District have been designated as an Area of Critical Environmental Concern for management and protection of historic trail traces and associated landscape. Three components of the Oregon Trail Areas of Critical Environmental Concern (ACEC) are located between 4-15 miles of the Lime Wind project.

The Birch Creek component of the ACEC includes traces of the Oregon Trail with a BLM interpretive wayside along Birch Creek. Existing visual impacts in the vicinity of Birch Creek include a livestock reservoir, buried communication line route, and the wayside located on an improved county road. The Tub Mountain component of the ACEC includes trail traces, the historic trail route, and landscape through the hills between Alkali Springs and Birch Creek. Except for livestock ponds and improvements to the county road, there are few modern intrusions along the Tub Mountain segment. The Chimney Creek component of the ACEC includes route traces on an isolated parcel of BLM land with one buried utilities corridor located about ½ mile to the west. Both Birch Creek and Tub Mountain areas have public access over existing county roads. There is no public access to the Chimney Creek parcel.

The Lime Wind Project is not located on or adjacent to any segment of the Oregon National Historic Trail, nor is it within the boundaries of the Vale District Oregon Trail ACEC components. A view shed analysis under Visual Resources will discuss the relationship between the Lime Wind Project and visibility from segments of the Oregon Trail.

### 3.2.3 Cultural Resources

On November 17, 2007, Blue Mountain Consulting conducted an intensive archaeological survey of 92.73 acres including the project area. The survey included roads, transmission lines and an area surrounding potential turbine locations on the BLM land. The survey also included a corridor along the county road that would be improved

from near Lime, Oregon, to the project location. No archaeological resources were found during this survey. A modern bridge located on the county road would be modified, however the bridge is not considered eligible to the National Register of Historic Places because it is less than 50 years old. A portion of the new access road construction and a segment of the Idaho Power transmission line facility would cross approximately 500 feet of private land. This road segment is a Baker County local access road leading to BLM land. Additional survey of the road was completed on November 9, 2008 by Blue Mountain Consulting. No cultural resources were found during this survey.

On June 13, 2008, a cultural resources survey of 9 acres was conducted by the BLM for a proposed road realignment on the BLM land. One historic debris scatter and a rock feature were recorded, both outside the project area. The rock feature is within the viewshed of the proposed project.

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) expressed concern about the potential effect of the project on the rock feature and other resources important to the Tribe (letters of December 19, 2009, February 26, 2009, July 10, 2009, August 10, 2008 and September 17, 2009 and meetings of March 19, 2009 and July 27, 2009). On July 27, 2009 a letter from the Oregon State Historic Preservation Office also expressed concern and asked BLM to further investigate. In response BLM employed the expertise of Lichenologist, Roger Rosentreter PH.D, to help determine a relative age range for the rock feature. The results of Rosentreter's analysis suggested that the feature's age range is modern, dating from 28 – 60 years old. Based on this age range, Blue Mountain Consulting conducted a literature review and oral history interview with a third generation, Baker County, sheepherding family. The family did not know about the specific feature, but did offer additional information regarding the use of rock features in the past and present for herding practices.

Based on the additional data gathered, BLM maintains that the rock feature is not eligible for the National Register of Historic Places and therefore would not be affected. BLM requested additional information from CTUIR regarding their concerns. CTUIR responded that without further study no additional data could be provided. At this time, the BLM is unaware of any information available to justify a change in the No Effect determination. On November 6, 2009, the BLM sent a letter to SHPO informing them of the consultation with CTUIR and updating them to the investigations that have taken place regarding the cultural resources. BLM asked for SHPO to review the information and to concur with the determination of significance and effect. On December 1, 2009, SHPO sent the BLM a letter that reaffirmed their no effect concurrence.

A discussion of the Oregon Trail Area of Environmental Concern is provided above in Section 3.2.2.

### 3.2.4 Invasive, Non-native Species

In addition to cheat grass (*Bromus tectorum*), there are small amounts of white-top (*Cardaria draba*) on private land and BLM near the north edge of the project area. There

were a few scattered thistles (not identifiable to species in this season) in a draw east of turbines #8-10, but they may be native thistles and not an invasive threat. About 75-200 feet south and southwest of turbine # 1, there were skeletal remains of last year's plants of a few Scotch thistle (*Onopordum acanthium*) and Russian thistle (*Salsola kali*), indicating a seed source which might expand into the project area if not monitored and treated. One substantial pocket of medusahead rye (*Taeniatherum canput-medusae*) occurs in the draw and slopes immediately north of Binder Spring. The medusahead is on both sides of the road that leads uphill to turbines # 1-4, but does not extend onto the hill top where the wind turbines are proposed to be sited.

A native species, curly-cup gumweed (*Grindelia squarrosa*), which tends to be invasive on compacted soils and roadbeds, is already present on all road and trail surfaces, and abundant in the lower basin and crested wheat seeding near Marble Creek Spring.

Heavy infestations of diffuse knapweed (*Centaurea diffusa*) have been identified on private land approximately one mile northeast of the project area. There is also a small infestation of rush skeleton weed (*Chondrilla juncea*) on BLM land approximately one mile from the project area.

### 3.2.5 Plants, Endangered/Threatened/Sensitive/Strategic

There no known vascular plants listed as threatened, endangered, a candidate species, or a species of concern by U.S. Fish and Wildlife Service (USFWS) or The Oregon Natural Heritage Program that potentially occur within the Lime Wind Energy Project. However, there are plant species that are considered Bureau (BLM) sensitive/strategic and State (Oregon Department of Agriculture) agency endangered. The species that are either known to occur or those where habitat is available are: Snake River/ray goldenweed (*pyrrocoma radiate*) and the Oregon princesplume (*Stanleya confertiflora*).

After a clearance survey, there were no known populations of Snake River/ray goldenweed or Oregon princesplume within the project area although there is vegetative habitat that may support these plant populations.

Snake River/ray goldenweed is known to occur on the ridges and slopes near the proposed project area. Recent BLM inventory information documents close populations that range from south of the Powder River near the Snake River to the vicinity of Huntington, and west to Huntington Junction and Malheur Reservoir. The vegetative community in which it occurs includes: bunchgrass and/or sagebrush-bunchgrass communities dominated by big sagebrush (*Artemisia tridentata)*/bluebunch wheatgrass (*Pseudoroegnaria spicata*), Idaho fescue (*Festuca idahoensis*), Great Basin wildrye (*Leymus* cinereus), blue wildrye (*Elymus glaucus*), and Sandberg bluegrass (*Poa secunda*). Elevation consists between 2000 and 4100 feet on all slopes and predominantly north aspects. Degraded plant communities infested with cheatgrass (*Bromus* spp.) may still support the Snake River/ray goldenweed. Although there is not a clearly defined soil type it has been found in sedimentary clays and mudstone, basaltic colluvium derived clay-loam, deep clay-loam in swales, and sites with high components

of argillite bedrock stone on ridge tops. Its sparsely-rayed yellow flowers appear in June. Similar in appearance to young specimens of mule's ear (*Wyethia* spp.), Snake River/ray goldenweed may be identified by its glabrous-persistent leaves at all seasons. This perennial species has a deep taproot that has adapted to survive fire and re-sprouts each year from the root crown. Flower stalks are moderately palatable to livestock, deer, and elk, but the somewhat leathery leaves are rarely grazed until after native grasses have cured and become less palatable. Snake River/ray goldenweed has been observed to colonize the flat surface of old road cuts, indicating an ability to pioneer into disturbed habitat.

Oregon princesplume is a Bureau strategic/sensitive species. It occurs on sparsely vegetated white to yellow or gray clay outcrops. The nearest known population was found along the Snake River near the confluence with the Burnt River in Baker County. It is also known from one occurrence north of Baker City, and at scattered locations in Malheur County. It is an annual or biennial species that may be highly dependent on winter-spring moisture to germinate and develop. Its pale yellow flowers appear in May or June. Oregon princesplume has a large, weedy appearance similar to other species of the genus, but can be distinguished by the form of its leaves whenever present.

### 3.2.6 Wastes, Hazardous or Solid

No wastes, hazardous or solid, have been located within the project area.

### 3.2.7 Surface Water and Groundwater Quality

There are no wetlands, riparian areas, or streams listed as impaired in Oregon's Section 303(d) located on the proposed project site. There is one existing spring (Marble Creek Spring) that is currently fenced off from grazing cattle.

### 3.2.8 Wilderness/Wilderness Study Area/Wilderness Characteristics

There are no Wilderness or Wilderness Study Areas adjacent to or near the proposed project area. In addition, the proposed project area was not identified under any previous intensive wilderness characteristic inventories as an area that had potential to meet the criteria or contain any wilderness characteristic qualities. The map identified as Attachment B shows the area, through GIS data, to be 3,591 acres in size which is below the minimum required acreage of 5,000 to have potential to contain wilderness characteristics.

### 3.2.9 Wildlife

#### 3.2.9.1 Migratory and Neotropical Birds

Oregon lies directly under a bird migration route know as the Pacific Flyway. This flyway covers coastline, mountains, and rivers that provide food, supplies, and a visual "map" for the birds to follow. Although project site is located east of the main migration

corridor, a number of migratory bird species may pass through the project area during the spring or fall migration, or during other seasonal movements. These species can be grouped into five main categories: waterfowl, waterbirds, songbirds, raptors, and nocturnal hunters. Examples of species that likely pass through the area within each of these main categories are listed below in **Table 3**. **Table 3** also provides the type of use likely exhibited by these species. The information in this table is derived from general area knowledge and not site-specific surveys.

**Table 3. Migratory Birds That May Pass Through the Project Area.**

| **Migratory Bird Group** | **Species Examples** | **Type of Likely Site Use** |
|---|---|---|
| Waterfowl | Geese (*Branta canadensis, Chen hyperborea*), Swan (*Olor columbianus*) | Fly over the site; may stop at the nearby Brownlee Reservoir |
| Waterbirds | Curlew (*Numenius americanus*), Great blue heron (*Ardea herodias*) | Fly over the site; may stop at the nearby Brownlee Reservoir |
| Songbirds | Black-capped chickadee (*Parus atricapillus*), Sage sparrow (*Amphispiza belli*), Western meadowlark, (*Sturnella neglecta*). | Fly over the site, may also use site for resting, feeding, breeding |
| Raptors | Red-tailed hawk (*Buteo jamaicensis*), Golden eagle (*Aquila chrysaetos*), American kestrel (*Falco sparverius)* | Fly over the site, may also use site for foraging. Some individuals may use the area year-round and move only locally. There are no known raptor nests in the project area |
| Nocturnal Hunters | Common nighthawk (*Chordeiles minor*) | Fly over the site, may also use site for resting, feeding, breeding, and nesting |

### 3.2.9.2 Upland Game Species

A number of upland game species may occur in the project area. These include:

- Upland game birds, such as chukar (*Alectoris chukar*) and California quail (*Lyphortyx californicus*), and

- Ungulates, such as American pronghorn (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), and elk (*Cervus canadensis*).

Surveys were not conducted for these species and they are listed as examples of upland game species that may occur in the area, with the exception of the deer and pronghorn,

which are known to occur within the project area (personal communication Nick Myatt ODFW Biologist 2008). The proposed project area lies within designated mule deer winter range. A resident herd of pronghorn antelope frequents the area. After additional consultation with Nick Myatt in 2009 it was determined the mule deer using the project area most likely have a total use area as shown in Exhibit XI. This area is approximately 35,513 acres of which 18,155 acres are BLM-managed lands. (While it is likely some mule deer range outside of this area, it is the professional judgment of ODFW and BLM that the majority of the deer stay within this area most of the winter season).

### 3.2.9.3 Endangered/Threatened/Sensitive/Species of Concern

The following terrestrial wildlife are listed as threatened, endangered, a candidate species, or a species of concern by either U.S. Fish and Wildlife Service (USFWS) or the BLM that potentially occur within the Lime Wind Energy project. Species that are either known to occur or those where habitat is available are: greater sage-grouse (*Centrocerus urophasianus*), western burrowing owl (*Athene cunicularia hypugaea* ), bald eagle (*Haliaeetus Leucocephalus*), ferruginous hawk (*Buteo regalis*), California bighorn (*Ovis canadensis californiana*), and several bat species. For a full list of species that fit this criteria within Baker County please see **Exhibit VIII**. Within the USWFS designated lists, Oregon Fish and Wildlife (ODFW) and BLM have identified that 11 of these species may occur within the project area (**Exhibit VII**).

The descriptions of these species, as well as the impact assessments, are based on published data regarding habitat requirements and distribution, as described and cited in each individual species sections and not field surveys.

**Greater Sage-grouse**. The greater sage-grouse is a Bureau sensitive species, and habitat is available throughout the allotment. Sage-grouse are sagebrush obligates which require large areas covered with sagebrush communities to meet life-history needs. The loss of sage-grouse habitat has been the primary reason for the reduction in sage-grouse populations over the past 40 years. Because of the population decline, the USFWS is reviewing the status of the sage-grouse to determine if listing the species under the ESA as threatened or endangered is warranted. ODFW have routinely counted for sage-grouse sites and activity in this area.

Sage-grouse prefer a nesting sagebrush cover class of approximately 15-25% (Hagen 2005). These cover classes have at least 40-80 cm height distribution. Sage-grouse have traditional

breeding sites called leks. Because the leks are traditional, they tend to be used annually for their breeding rituals. Examples of lek sites include old lake beds or playas, low sagebrush flats, and openings on ridges, roads, and burned areas (Schroeder et al. 1999). The lek is considered to be the center of year-round activity for resident sage-grouse populations and most nesting/brooding sites are located within 4 miles of a lek (Nowak 2004). Sage grouse require large areas covered with sagebrush to meet life-history needs. The species uses a wide variety of sagebrush mosaic habitats, as well as steppe

dominated by native forbs and bunchgrasses, with the habitats varying slightly according to the life history stage (e.g., breeding, nesting, brood-rearing, wintering).

Hens typically nest in the same specific area in successive years (Fisher et al. 1993), generally choosing areas dominated by sagebrush (15 to 25 percent canopy cover [sometimes more than 30%], between 0.4 to 0.8 meters [16-32"] tall) and nesting beneath the taller shrubs in stands with greater lateral cover (Wakkinen 1990). Both a sagebrush overstory and an herbaceous understory of grasses and forbs (3 to 30% grass cover [15-25 %], and 0.1 to 0.3 meters in height) are important to provide shade and security (Connelly 1999).

Habitat for brood-rearing in early spring is critical to brood survival. Hens with broods tend to use sagebrush uplands adjacent to nest sites, but distance of movement varies (Connelly et al. 2000). Sagebrush overstory, herbaceous understory, and the presence of plentiful insects that provide a high-protein diet for broods (especially Hymenoptera and Coleoptera [species typical of sagebrush upland steppe]) are the three important factors for successful brooding (Connelly 1999).

During winter, access to sagebrush for food and cover in all snow conditions is critical to sage-grouse survival, and they require a landscape mosaic with a diversity of sagebrush canopy cover and heights tending to select stands with sagebrush above the snow level (Connelly 1999).

The project area is located on the fringe of the current and historic range. However, in April 2006 the project area was part of an aerial sage-grouse survey conducted by the ODFW. No active sage-grouse leks were located within a 5 mile radius of the project site (Nick Myatt, 2007. **Exhibit X**). Although there is available habitat for sage-grouse life cycles, there are no known resident populations within the project area.

**Western Burrowing Owl**. The burrowing owl is a Bureau sensitive species and species of concern for the USFWS. Burrowing owl habitat is typified by short vegetation and presence of fresh small mammal burrows. The species is found in open grasslands, especially prairie, plains, and savanna, and sometimes in open areas near human habitation (such as vacant lots, golf courses, agricultural field edges, irrigation canal banks). The burrowing owl nests and roosts in abandoned burrows dug by mammals (rodents), but rarely excavates its own burrow. Courtship generally occurs during March and April, with incubation and fledging occurring by June or July, although the family group will stay together longer. Burrowing owls tend to exhibit high fidelity to nest areas, although not necessarily to specific burrows within the area (USFWS 2003).

The burrowing owl is affected by habitat fragmentation, and mortality is higher in a fragmented agricultural landscape (> 90% of land area under cultivation) than in an unfragmented rangeland (< 20% cultivation) (Clayton and Schmutz 1997, as cited in USFWS 2003). The owl tends to use sites dominated by snakeweed, cheatgrass and bitterbrush, avoiding sites dominated by perennial bunchgrasses such as bluebunch

wheatgrass or sandberg bluegrass (USFWS 2003). They prefer grasslands grazed by livestock or areas of high rodent activity.

Survival can be enhanced by providing short-grass sites for nesting (<5 cm, or elevated perches for hunting and predator detection if grass is taller), and ensuring the presence of burrowing mammals (e.g., ground squirrels), a prey base of small mammals and large insects, and large open fields for foraging.

While potential owl habitat exists within the project area (north of the ridgeline where the towers will sit), no evidence of their existence were found during a three day survey by a contract wildlife biologist in May, 2009 (Jerofke 2009). This survey included approximately 20 miles of transects traversed with only one animal burrow found of suitable size to accommodate a burrowing owl and this burrow was partially collapsed and not in use by any animals. Calling surveys were also conducted with negative results.

**Bald Eagle.** Bald eagles were officially declared an endangered species in 1967 in all areas of the United States south of the 40th parallel, under a law that preceded the Endangered Species Act of 1973. Until 1995, the bald eagle had been listed as endangered under the Endangered Species Act in 43 of the 48 lower states, and listed as threatened in Wisconsin, Minnesota, Michigan, Washington and Oregon. In July of 1995, the USFWS upgraded the status of bald eagles in the lower 48 states to "threatened." On June 28, 2007 the Interior Department took the American bald eagle off the Endangered Species List. The bald eagle will still be protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The Bald Eagle Protection Act prohibits the take, transport, sale, barter, trade, import and export, and possession of eagles, making it illegal for anyone to collect eagles and eagle parts, nests, or eggs without a permit.

The Bald Eagle prefers habitats near seacoasts, rivers, large lakes, and other large bodies of open water with an abundance of fish. Studies have shown a preference for bodies of water with a circumference greater than 11 km (7 miles), and lakes with an area greater than 10 $km^2$ (3.8 square miles) are optimal for breeding bald eagles.

The bald eagle requires old-growth and mature stands of coniferous or hardwood trees for perching, roosting, and nesting. Selected trees must have good visibility, an open structure, and proximity to prey, but the height or species of tree is not as important as an abundance of comparatively large trees surrounding the body of water. Forests used for nesting should have a canopy cover of less than 60%, and as low as 20%, and be in close proximity to water.

The proposed project area is located approximately 1.5 miles west of Brownlee Reservoir and is located in a habitat type that is typically not supportive of bald eagle populations due to a lack of roost trees. There are no known bald eagle roost or nest sites within the project area. However, the bald eagle could migrate through the project area or use the project area for scavenging during winter. The bald eagle prefers fish when available, but will also prey on a variety of small mammals and birds, and often forages on carrion or cow-afterbirth in the winter or early spring.

**Ferruginous Hawk.** The ferruginous hawk is a Bureau sensitive species. The ferruginous hawk breeds in Oregon but is not a permanent resident. Habitat for the ferruginous hawk generally consists of open grasslands and shrub-steppe communities, but the hawk also uses pastures and cropland for feeding. Ferruginous hawk populations are tied to the abundance of prey, such as jackrabbits, ground squirrels and pocket gophers. The ability of native grasslands and shrublands to support viable prey populations can be compromised by the invasion of non-native species such as cheatgrass, and loss of native grassland (Olendorff 1993).

Nest site selection depends upon available substrates and surrounding land use, and can vary from tall trees or willows along streams, in junipers, on power line towers, sometimes on sloped ground on the plains or on mounds in open desert. Lone or peripheral trees are preferred over densely wooded areas when trees are selected as the nesting substrate. Nests are typically located less than 10 meters (33 feet) from the ground (Green and Morrison 1983). Foraging generally occurs as "still hunting" in which the hawk watches for prey from a low perch or on the ground and then quickly glide to the prey. Aerial hunting is mostly done fairly close to the ground.

Suitable habitat for the hawk occurs in the project area.

**California Bighorn**. The California bighorn is a Bureau sensitive species. The bighorn was extirpated from Oregon around 1915, due to unregulated hunting and diseases contracted from domestic sheep (ODFW, 2002). The first successful effort to re-introduce bighorn sheep to Oregon was completed in 1954, when 20 bighorns were moved from Williams Lake, British Columbia to Hart Mountain (ODFW, 2002). Other introductions followed and the bighorn sheep now occurs in the Eagle Caps of Wallowa County and in the Burnt River and Hell's Canyon areas of Baker County. In total, the bighorn population in Oregon is now estimated at between 3500 to 3700 individuals (ODFW, 2006). The Burnt River population occurs in the Burnt River Canyon west of Interstate 84 between Durkee and Bridgeport. The population was estimated at 70 sheep in 2006, with an additional 9 sheep added to the population by ODFW in 2007.

This species is often referred to as the "grassland bighorn" as it occurs in large expanses of open grasslands or shrub-steppe, often associated with native grasses such as bluebunch wheatgrass and Idaho fescue, and in relatively close proximity to escape terrain (100-800 meters). Escape terrain includes cliffs, rimrock, and rocky outcrops. Dense forests and chaparral that restrict vision are avoided. Bighorns are primarily grazers of grass and forbs, but diet can also include significant amounts of shrubs.

Loss and degradation of habitat, especially key winter forage sites, is a threat to the species. Habitat degradation can occur through overgrazing by domestic stock, excessive off-road vehicle use, spread of rangeland weeds, the usurpation of water sources and fire suppression resulting in shrubland encroachment (Krausman et al. 1999).

The Burnt River bighorn population is located several miles west of the project area. The project area is not mapped as a key winter forage site. It is possible that bighorn sheep could expand into the area in the future.

**Bat species**. In an attempt to determine the species of bats that occur in the project area, a contract wildlife biologist conducted a resident bat survey in August, 2009 and migratory surveys in September and October, 2009 (Attachments E & F). Based on the surveys, habitat, behavior and museum records, eight species of bats are potential residents in the project area. These potential resident species include: Pallid Bat (*Antrozous pallidus*), California Myotis (*Myotis californicus*), Western Small-footed Myotis (*M. ciliolabrum*), Western Long-eared Myotis (*M. evotis*), Little Brown Bat (*M. lucifugus*), Yuma Myotis (*M. yumanensis*), Big Brown Bat (*Eptesicus fuscus*), and Canyon Bat (*Parastrellus hesperus*). **(**Csuti et al. 1997, Verts and Carraway 1998, Betts 2009**).** Of these, 7 are considered 'species of concern' by the BLM (Table 4).

The surveys determined that although unlikely to reside in the area, the Silver-haired Bat (*Lasionycteris noctivagans*), another BLM species of concern, and the Hoary Bat (*Lasiurus cinereus*) are potential long-distance migrants through the project area.

These species tend to forage over water or along canyon walls and over ridges. They roost in caves, abandoned mines, buildings, under bridges, in rock crevices, under tree bark or in tree cavities. In general, bats are active April through September and either migrate or hibernate in mid October. Timing of breeding varies among species, but maternity colonies are generally formed in April with birth in late June to mid July, and the maternity colonies persisting through August or September. Roosts and maternity colonies are typically established near foraging areas to minimize energy expenditure. The exact dates of each life history stage vary with individual species, and also with the year according to weather patterns. Differences among species specific roost requirements (maternity, hibernation, daytime) and migratory/hibernation strategies are listed below in Table 4.

Bats are expected to forage along the adjacent slopes and drainages that feed into the Burnt River to the west and Brownlee Reservoir to the east. There are no roost sites, ie. Trees, caves, mines or rocky outcroppings within the project area, however, there are several caves in the limestone bluffs approximately 1.5 miles to the north of the project area. These caves provide potential roosts to bat species in the area.

There are no historical data available regarding the presence of these bat species in or adjacent to the project area although the eight potential resident species have all been captured in steppe habitat in Eastern Oregon (Verts and Carraway, 1998). The resident and migration studies for the Lime Project Area provide the first data on species composition in this area. Carcass surveys were also conducted and no bird or bat carcasses were found (Attachment C).

| Table 4. Habitat Requirements and Status of Bat Species in theLime Wind Energy Project Area; based on Csuti at al. 1997 and Verts and Carraway 1998 | | | | | |
|---|---|---|---|---|---|
| **Species** | **General Habitat** | **Roosting Habitat** | **Potential Habitat Present** | **Migration Status** | **Bureau Status** |
| **Pallid Bat** | Desert and open grassland, near rocky outcrops and water; open forest | Rock crevices and overhangs, buildings, bridges | Roosting; foraging on ridges and along cliff walls | Unknown; probably a short-distance migrator | Sensitive |
| **California Myotis** | Shrub-steppe, shrub desert, juniper-sagebrush, forest | Rock crevices, tree crevices, caves | Roosting; foraging over Burnt and Snake Rivers | Unknown; probably a short-distance migrator | Sensitive |
| **Western Small-footed Myotis** | Desert and semi-arid areas, cliffs and rocky canyons, forest | Rock crevices, caves, buildings | Roosting; foraging along cliff walls and over rivers | Unknown; probably a short-distance migrator | Sensitive |
| **Yuma Myotis** | Low to mid-elevation forest and forest edge, grassland, desert shrub; highly associated with water for foraging | Buildings, rock crevices, caves, mines, bridges | Roosting; foraging over Burnt and Snake Rivers | Unknown; probably a short-distance migrator | Sensitive |
| **Canyon Bat** | Desert lowlands, rocky canyons, shrub-steppe, juniper woodlands | Crevices in canyon walls, cliffs, rimrock, and caves | Roosting; foraging along cliff walls and over rivers | Unknown; probably a short-distance migrator | |
| **Long-eared Myotis** | Along streams in forests; shrubland near reservoirs, especially with rock outcrops | Trees, buildings, caves, rock fissures | Roosting; foraging over Burnt and Snake Rivers | Unknown; probably a short-distance migrator | Sensitive |
| **Little Brown Bat** | Moist forests, riparian woodlands, in shrub-grassland near water in arid areas and not likely resident in the project area | Buildings, caves, hollow trees | Roosting; foraging over Burnt and Snake Rivers | Unknown; probably a short-distance migrator | |
| **Big Brown Bat** | Forests; uncommon in shrub-steppe and not likely resident in the project area | Buildings, bridges, rock crevices, hollow trees | Roosting; foraging along cliff walls and over rivers | Unknown; probably a short-distance migrator | |
| **Hoary Bat** | Forests and woodlands | Tree foliage | No | Long-distance migrator | Sensitive |
| **Silver-haired Bat** | Forests | Tree cavities and under loose bark | No | Long-distance migrator | Sensitive |

## 3.3 Other Important Elements of the Human Environment

Elements denoted by an "X" in the *not affected* column in the attached lists of Other Important Elements of the Human Environment **(Exhibit VI)** are not affected by the proposed action or alternatives and would receive no further consideration. Elements which are present and are likely to be affected are discussed below.

### 3.3.1 Availability of Access/Need to Reserve Access

The site can be accessed from the Marble Creek County Road then across approximately ¼ mile of private land before entering public land. Access via private property is allowed through the Baker County local access road.

### 3.3.2 Recreation

The project site is located within a popular recreation area that provides for a variety of outdoor recreational activities that include dispersed camping, hunting, hiking, boating, and off highway vehicle (OHV) use on existing roads. Hunting is the primary outdoor activity directly associated with the project site and populations of mule deer, pronghorn antelope, coyotes, chukar partridge, and hungarian partridge provide hunting opportunities from August thru March.

### 3.3.3 Existing and Potential Land Uses

The project area is included within a BLM grazing allotment used by three different public land grazing permittees. The project area lies within the South Pasture of Huntington Allotment. Cattle grazing is authorized each spring and scheduled from April 1st through the end of May of each year. Three permittees run a total of 317 cattle in the South Pasture of the allotment during this period, equating to 636 Animal Units Months (AUMs).

Mining for both gold and limestone has occurred outside of the project area and primarily on private lands. Currently there are no active mining claims on BLM lands on or adjacent to the proposed project area.

The Qwest Corporation has an existing right-of-way, OR-44207, for a buried fiber optic line in the NE1/4 of section 36. This grant was authorized in 1988.

The proposed project area is located on public land with split estate. The Bureau of Land Management owns and manages the surface while the subsurface is owned by Baker County.

### 3.3.4 Vegetation

Although the ridge slopes and the top of the project area have been seeded to crested wheatgrass (A*propyron cristatum*), the overall vegetation is dominated by native species as noted in the following sections. The habitat types include: big sagebrush (*Artemisia tridentata* )-rabbitbrush (*Chrysothamnus viscidiflorus* ) / Idaho fescue (*Festuca idahoensis* )-bluebunch wheatgrass (*Pseudoroegnaria spicata*)-Sandberg bluegrass (*Poa secunda* ) / arrowleaf balsamroot (*Balsamorhiza sagitata*) communities in fair (low to mid-seral) condition and a small area on the hill northwest of Binder Spring where threetip sagebrush (*Artemisia tripartita*) is a co-dominant shrub species.

List of Species by Form:

Shrubs:

- Amelanchier alnifolia (serviceberry) - locally uncommon, restricted to several rock outcrops
- Artemisia tridentata (big sagebrush) - common and widely scattered throughout
- Artemisia tripartita (threetip sagebrush) - common in vicinity, concentrated on one hilltop
- Chrysothamnus nauseosus (rubber rabbitbrush) - common and widely scattered throughout
- Chrysothamnus viscidiflorus (green or yellow rabbitbrush) - less common locally
- Eriogonum sphaerocephalum var. sphaerocephalum (rock buckwheat) - few locally
- Leptodactylon pungens (prickly phlox) - few in vicinity, concentrated on one hilltop
- Philadelphus lewisii (mock-orange) - locally uncommon, restricted to rock outcrops
- Tetradymia canescens (gray horsebrush) - common and widely scattered in vicinity

Grasses:

- Agropyrum cristatum (crested wheatgrass) - non-native, seeded, common throughout area
- Bromus tectorum (cheatgrass) - non-native, invasive annual, abundant throughout area
- Elymus elymoides (squirreltail grass) - common, widely scattered on slopes and ridge tops
- Festuca idahoensis (Idaho fescue) - less common in vicinity, limited by range condition
- Poa bulbosa (bulbous bluegrass) - non-native, invasive annual, very abundant throughout
- Poa secunda (Sandberg bluegrass) - very abundant throughout
- Pseudoroegnaria spicata - (Snake River bluebunch wheatgrass) - common in vicinity, limited by range condition
- Taeniatherum caput-medusae (medusahead rye) - noxious non-native annual, abundant, concentrated in one locale

Forbs:

- Achillea millefolium (yarrow) - common, scattered throughout area
- Alysum alyssoides (pale madwort) - common, scattered throughout area
- Antennaria dimorpha (pussytoes) - common, scattered throughout
- Arabis sp. (rockcress) - uncommon locally, scattered throughout
- Astragalus lentiginosus (freckled milkvetch) - common, concentrated on east aspects
- Astragalus purshii (woolypod milkvetch) - common, scattered throughout

- Astragalus salmonis (Trout Creek milkvetch) - common, scattered on ridgetops, south, and west aspects
- Balsamorhiza sagitata (arrowleaf balsamroot) - abundant, scattered throughout vicinity
- Calochortus elegans (elegant mariposa lily) - common, concentrated on east aspects
- Calochortus macrocarpus var. macrocarpus (sagebrush mariposa lily) - common, scattered throughout vicinity
- Cardaria draba (whitetop) - noxious weed, concentrated near Marble Creek Spring and lower (north) basin of seeding.
- Castilleja angustifolia (Indian paintbrush) - uncommon locally, widely scattered
- Ceratocephala testiculata (bur buttercup) - non-native invasive annual, abundant throughout vicinity
- Cirsium sp. (elk thistle) - uncommon, widely scattered
- Collinsia parviflora (blue-eyed Mary) - abundant, scattered throughout
- Commandra umbellata ssp. pallida (bastard toadflax) - common, concentrated in moist swales
- Cordylanthus ramosus (bushy bird's beak) - uncommon locally, scattered on west aspects and ridges
- Crepis acuminata (tapertip hawksbeard) - common, scattered throughout
- Crepis sp. (hawksbeard) - common, scattered throughout
- Cymopterus sp. (springparsley) - abundant, scattered throughout
- Delphineum nuttallii (upland larkspur) - common, scattered throughout
- Draba verna (spring draba) - common, scattered
- Ericameria nana (dwarf goldenbush) - common, scattered on rocky slopes and ridge tops
- Erigeron lonchophyllus (shortray fleabane) - common, scattered on slopes and ridges
- Eriogonum niveum (snow buckwheat) - common, scattered on slopes and ridges
- Fritillaria pudica (yellow bells) - common, scattered throughout
- Grindelia squarrosa (curlycup gumweed) - common, scattered throughout (invasive on road surfaces)

- Hydrophyllum capitatum (ballhead waterleaf) - common, scattered on east and north aspects
- Lewisia rediviva (bitterroot) - unusual to few, restricted to shallow, rocky soils near ridge tops
- Lithophragma bulbiferum (bulbous woodland star) - common, scattered throughout
- Lithophragma parviflorum (smallflower woodland star) - common (but less than bulbous), scattered on east aspects
- Lithospermum ruderale (puccoon) - common, scattered on slopes
- Lomatium dissectum (biscuitroot) - common, scattered on north and east aspects
- Lomatium triternatum var. triternatum (nine-leaf biscuitroot) - abundant throughout vicinity

- Lupinus sericeus (silky lupine) - abundant, scattered throughout
- Mertensia oblongifolia (bluebells) - common, scattered throughout
- Microseris troximoides (prairie dandelion) - few to common, scattered throughout
- Onopordum acanthium (Scotch thistle) - noxious weed, few, southwest margin of area, and north on private land.
- Orogenia linearifolia (turkey peas) - common, scattered throughout
- Penstemon speciosus (royal penstemon) - locally uncommon, scattered at southwest end of project area
- Phacelia hastata (silverleaf phacelia) - common, scattered
- Phlox hoodii (Hood's phlox) - common, scattered on slopes and ridges
- Phlox longifolia (longleaf phlox) - common, scattered throughout
- Phoenicaulis cheiranthodes (daggerpod) - common scattered on ridgetops and rocky slopes
- Salsola kali (Russian thistle) - noxious weed, very unusual in project area, southwest edge of project area
- Senecio integerrimus (lambstongue ragwort) - common, scattered throughout
- Sidalcea oregana (Oregon checkerbloom) - unusual, restricted to moist swales
- Sysimbrium altissimum (tumble-mustard) - uncommon, rodent and cattle disturbed microsites
- Tritelia grandiflora (largeflower tritelia or brodiaea) - abundant, scattered throughout
- Viola nuttallii (Nuttall's violet)

### 3.3.5 Soils

There are three major soil types identified in the project area by the Natural Resources Conservation Baker County Soil Survey. The following soil types are well drained and the hazard of water erosion range from slight to very high.

- Lickskillet gravelly sand loam. A shallow, well drained soil with moderate permeability. Runoff is rapid, and the hazard of water erosion is very high.

- Redcliff gravelly loam. A moderately deep, well drained soil with moderate permeability. Runoff is rapid, and the hazard of water erosion is very high.

- Ukiah silty clay loam. A moderately deep, well drained soil with moderate permeability. Runoff is slow or medium, and the hazard of water erosion is slight or moderate.

### 3.3.6 Visual Resources

Visual sensitivity is dependent on scenic quality, sensitivity levels, and distance zones along with public attitudes, types of activities people are engaged in, and the distances from which the site would be visible.

In order to meet its responsibility to maintain the scenic values of the public lands, the BLM has developed a Visual Resource Management (VRM) system. The VRM inventory stage involves identifying the visual resources of an area and assigning them to inventory classes using BLM's visual resource inventory process. The process involves rating the visual appeal of a tract of land, measuring public concern for scenic quality, and determining whether the tract of land is visible from travel routes or observation points. The process is described in detail in BLM Handbook H-8410-1, Visual Resource Inventory (BLM 1986). Visual resources are then assigned to management classes with established objectives:

- Class I Objective: To preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.

- Class II Objective: To retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

- Class III Objective: To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

- Class IV Objective: To provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

The Baker Field Office has designated lands in the project area as a Visual Resource Management (VRM) Class IV under the 1989 Baker RMP. However, the project's viewshed includes adjacent VRM Class II & III areas. Although the BLM lands located within the project area are primarily visible only by users of those lands, the height of the turbine project as well as the location of the towers could be visible from neighboring BLM lands.

### 3.3.7 Economic and Social Values

Baker County is located in northeast Oregon with an area of 3,068 square miles and a population of 16,243 (2006 estimated) equating to 5.5 people per square mile with a State average of 35.6 people per square mile. From April 1st 2000 to July 1st 2006, Baker County's population declined by 3% while the State of Oregon's population grew by 8.2%. Persons 65 years of age and older comprise 20.5% of the County's population and only comprise 12.9% of the State's population. While home ownership is higher in Baker County than the State of Oregon (70.1% vs. 64.3%), the median value of owner-occupied housing is $84,700 vs. $152,100. Median household income for 2004 was $31,737 in Baker County compared to $42,568 for the State of Oregon and per capita money income for 1999 was $15,612 in Baker County vs. $20,940 for the State of Oregon with 15.2% of the County's population below the poverty line compared to 12.9% below the poverty line for the State (US Census Bureau QuickFacts).

Huntington, the closest town to the Lime Wind Project, has a median household income of $25,132, a per capita income of $13,396 and 17.7% of the population is below the poverty line (Wikipedia).

### 3.3.8 Noise

Noise is generally defined as unwanted sound. The basic unit of measurement for sound is the decibel (dB). The decibel system of measuring sound provides a simplified relationship between the intensity of sound and its perceived loudness to the human ear. The decibel system is logarithmic, meaning sound intensity increase or decreases exponentially with each decibel change. Therefore, a 10 dB level is ten times more intense than 1 dB, while a 20 dB level is one hundred times more intense and a 30 db level is one thousand times more intense. **Table 5** provides a range of common sounds.

**Table 5** (Australian Wind Energy Association, 2007)

| **Source/Activity** | **Indicative noise level dB (A)** |
|---|---|
| Threshold of hearing | 0 |
| Rural night-time background | 20-50 |
| Quiet bedroom | 35 |
| Wind farm at 350m | 35-45 |
| Busy road at 5km | 35-45 |
| Car at 65 km/h at 100m | 55 |
| Busy general office | 60 |
| Conversation | 60 |
| Truck at 50km/h at 100m | 65 |
| City traffic | 90 |
| Pneumatic drill at 7m | 95 |
| Jet aircraft at 250m | 105 |
| Threshold of pain | 140 |

Natural noise sources include the wind, which is prevalent in the project are, and are expected to be in the range of 45 – 55 dBA. Other noise sources in the project area are vehicle traffic and hunting activities.

Noise-sensitive receptors are facilities or areas where excessive noise may cause annoyance or loss of business. There are no sensitive receptors in or near the project area.

### 3.3.9 Public Health and Safety

There are no known health or safety issues other than those common to a rural, rangeland setting.

### 3.3.10 Indian Trust Resources

Seven federally recognized Native American Tribes have indicated interest in the public lands managed in this area. Confederated Tribes of the Umatilla Indian Reservation (CTUIR) has expressed specific interest in this proposed project and how it may affect treaty rights and cultural resources of interest to the Tribe. CTUIR has provided comments to the EA and the BLM and CTUIR have been in government-to-government consultation regarding the project. BLM is aware of big game habitat and potential root production areas present within the Lime Hill area. Impacts to treaty resources are addressed in sections 4.3.9.2, 4.4.4, and 4.4.10.

An approved BLM botanical survey found three plants in the project area that BLM believes may be of interest to CTUIR. These are common over many square miles in this geographic area around Lime Hill, Morgan Mountain, and Lookout Mountain. Biscuitroot (*Lomatium dissectum*) can be found scattered on north and east aspects of hills, Nine-leaf biscuitroot (*Lomatium triternatum var. triternatum*) is also common in this same greater area, and diffusely spread over the mountain areas. Lewisia rediviva, or bitterroot, was rated as unusual to few in occurrence in the project area, restricted to shallow, rocky soils near ridge tops. (personal communication with Clair Button, contract botanist, June 29, 2009).

BLM is unaware of any additional plants that are found in the proposed project area that may be of interest to CTUIR or any other affected tribe.

## 4) ENVIRONMENTAL CONSEQUENCES

### 4.1. Introduction

The potential environmental consequences, or impacts, described in this chapter are based on the environmental effects that would result from the proposed Lime Wind Project. The largest rotor swept area (RSA), greatest number and tallest turbines were analyzed in order to show what the maximum impacts of the project could be. The proposed project includes wind turbines and their associated transformer and collection

system facilities, plus an estimated 8590feet of roads (on county and BLM lands) that have to be built or upgraded to construct and maintain the proposed project facilities. The BLM would grant a ROW for those portions of the project that are on public land.

## 4.2 Impact Assessment Process

This EA evaluates the direct and reasonably foreseeable indirect impacts that may result from the proposed project. The nature and area of these potential impacts are described in detail later in this chapter.

Under the implementing regulations of the National Environmental Policy Act (NEPA) of 1969 (CFR 1500-1508) a determination concerning whether or not a particular action would cause a significant effect on the environment must consider the context and intensity of the effect of the action. "Context" refers to the region affected by the proposed project. It is also defined as relative importance of impact to the resource affected. For example, the resource affected may have national significance or may be locally important. "Intensity" refers to the severity of the impact or effect.

Where potential impacts to a resource were identified, an evaluation was conducted to determine if one or more mitigation measures would be effective in avoiding or reducing (e.g. intensity and/or duration) the potential impact. The proposed project (refer to Chapter 2) includes many mitigation measures committed to by Joseph Millworks to avoid or minimize the impacts of constructing and operating the proposed project. These mitigation measures are generally applied throughout the proposed project during construction and operation or to specific locations, and are considered part of the proposed project description. Refer to section 2.1.15 for a list of these measures.

Impact assessments were conducted for the proposed project and the No Action Alternative.

## 4.3 Impacts Associated with Critical Elements of the Human Environment

### 4.3.1 Air Quality

<u>Proposed Action</u>

Implementation of the Proposed Action would generate low levels of emissions of reactive organic gases, nitrogen oxides, and PM2.5 and PM10 during the 3-4 month construction period. These emissions would be generated by gasoline and diesel fuel combustion. Operation of vehicles on exposed soils would release some fugitive PM10 dust and may release some PM2.5 dust. Impacts from the operation of construction equipment would be reduced by maintaining a maximum speed limit of 20 miles per hour while traveling on unpaved access roads and by providing dust control measures during construction of the proposed project. Project construction would be required to meet Oregon Fugitive Emission Requirements under OAR 340-208-0200 and mitigation measures such as reclamation and regrowth of native vegetation would bring dust back to current levels. After construction there would be an increase of less than .3 acre of new roadway, adding minimal amounts of PM to existing levels.

No Action Alternative

Under the No-Action alternative, CO2 would not be emitted by vehicles and equipment during construction. Dust matter would not be increased by road and turbine pad construction and would remain at current levels. The production of clean renewable electricity would not be provided.

### 4.3.2 Areas of Critical Environmental Concern

Proposed Action

See section 4.4.6 - Visual Resources, for impacts to Oregon Trail and ACECs.

No Action Alternative
Under the No-Action alternative, the wind turbines would not be erected therefore there would be no visual impact to scenic or cultural areas. Current conditions and trends would continue.

### 4.3.3 Cultural Resources

Proposed Action

Cultural resource surveys of the project area on BLM lands were conducted and no archaeological resources were found. The SHPO reviewed the survey reports and concurred with the finding of no effect and determined that no further archaeological research is needed with the project. The proposed project ROW on BLM lands would have no effect on archaeological properties eligible or potentially eligible for the National Register of Historic Places.

There is one cultural feature 919 feet outside of the project Area of Potential Effect but it is within the viewshed of the project. The BLM concluded this project would have no effect on this site and SHPO issued a concurrence on the no effect finding on December 16, 2008. CTUIR does not agree with this determination and believes BLM should gather more information to justify the conclusion. BLM addressed this request by gathering additional information including the relative age range for the feature. The additional information BLM was able to obtain supports the original no effect conclusion and SHPO reaffirmed their no effect concurrence on December 1, 2009. The BLM is not aware of any information to justify a change in our no effect determination (see section 3.2.3, Affected Environment).

No Action Alternative

Current condition and trend for cultural resources in the vicinity of the project would continue.

### 4.3.4 Invasive, Non-native Species

Proposed Action

Soil disturbance and vegetation removal provide opportunity for the introduction and spread of invasive, non-native species. Spreading gravel, road fill, and top soil can also introduce or cause increases of these species. Disturbed areas would be reseeded with native vegetation prescribed by the BLM as noted in section 4.4.4. There shall be no primary or secondary noxious weed seed in the seed mixture. Seed shall be tested and the viability testing of seed shall be done in accordance with state law and within 9 months prior to purchase. In addition, annual inspections would take place to identify any future influx of non-native weed species. Any noxious or invasive weed species would be sprayed with approved herbicides as needed and in accordance with the Vale District Weed Control Plan Environmental Analysis OR030-89-19. Minor presence of cheatgrass, which is already distributed in the local ecosystem, would not be treated unless it appears sufficiently dense to interfere with re-establishment of native vegetation. During the above-mentioned annual inspections for presence of non-native weeds, particular attention would be given to ensure that the present infestations of white-top and medusahead rye would not spread along the road system.

In the long term, beyond five to ten years, density of native plant species should recover completely except for the turbine foundation footprint, transformer pads, and roads necessary to the project.

No Action Alternative

Under the No Action alternative, plant communities within the project area would continue to be dependent on ecological processes currently in place if no action is taken.

### 4.3.5 Plants, Endangered/Threatened/Sensitive/Strategic

Proposed Action

The project would have no effect on any known federally listed threatened, endangered, or strategic plant species populations. However, potential habitat would be disturbed throughout the project site.

Snake River/ray goldenweed (*Pyrrocoma radiata*), and Oregon princeplume (*Stanleya confertiflora*) have been identified as Bureau Sensitive and the former is also Oregon Department of Agriculture listed as an endangered. Both species were thought to have potential to occur within the project area. A botanical survey conducted in the spring of 2008 by a contract botanist determined that neither species is present and chances of disturbance from the project would be unlikely. While the habitat type may be suitable for Snake river/ray goldenweed, the survey determined that no suitable soil substrate or habitat was present for Oregon princeplume.

Approximately 3.5 acres would be removed from potential Snake river/ray goldenweed habitat. This would result in no Snake river/ray goldenweed growing on these acres for the life of the project.

No Action Alternative

Under the No-Action alternative, no construction would take place therefore there would be no effects to plants from construction activities. Current conditions and trends would continue.

### 4.3.6 Wastes, Hazardous or Solid

Proposed Action

No hazardous material, substance, or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S. C 9601, et seq., or the Resource Conservation and Recovery Act, 42 U.S.C 6901, et seq.) shall be used, produced, transported, released, disposed of, or stored within the right-of-way at any time by the applicant.

No Action Alternative

Under the No Action Alternative, current conditions would continue.

### 4.3.7 Surface Water and Groundwater Quality

Proposed Action

The locations of the WTGs would be on ridges and these sites are not within any wetland or riparian zones. There would be potential positive impact to Marble Creek Spring during the road construction phase due to the proposed access route constructed 80 feet east of the existing route (**Exhibit III**). This route would decrease runoff and impaction to the spring due to the increase distance between road traffic and the spring.

There would also be no long-term effects by erosion or runoff created by an improved road system due to construction and implementation of drainage structures and rolling dips for surface drainage (section 2.1.8). Surface drainage and erosion during construction would be at a minimum due to the time of year.

No Action Alternative

Under the No Action alternative the existing road would continue to be used and current trends, including negative impacts to Marble Creek Spring, would continue.

### 4.3.8 Wilderness/Wilderness Study Area/Wilderness Characteristics

Proposed Action

Under the proposed action, no Wilderness, Wilderness Study Area, or areas with wilderness characteristics would be impacted by its implementation.

No Action Alternative

Under the No Action alternative current conditions would continue.

### 4.3.9 Wildlife

Proposed Action

Wind energy projects can affect wildlife species through a number of different mechanisms. According to the BLM (2005), key impact issues include:

- Introduction of pollutants and fugitive dust into habitats, especially into wetlands or streams
- Injury or mortality during construction
- Construction noise
- Habitat disturbance, loss, or alteration
- Operational noise
- Operational injury or mortality

The methods to assess impacts to wildlife are similar and described below for all wildlife species/groups. Impacts are subsequently described according to the species groups discussed in section 3.1.5 for general wildlife and by individual species for those species listed as threatened, endangered, sensitive or species of concern (TES species) by either the BLM or USFWS.

**Introduction of contaminants:** Accidental spills during construction from machinery or vehicles could occur. These spills, if they occurred, would be short term and localized. Measures to prevent such accidents would be addressed in a safety plan which would be developed to minimize any potential impacts to wildlife and are not discussed further here.

**Direct injury or mortality:** Death or injury to wildlife is possible during construction as the turbine pads are cleared and access roads constructed. Impacts could occur by being buried, run-over by a vehicle or by striking a vehicle. Potential impacts are assessed based on the species' mobility, likelihood of being in the project area during the construction time period of July to November, and flight patterns.

**Construction Noise:** Noise can affect wildlife by startling and stressing individuals, but the most common effect of noise is through masking of vocal communication and other sounds necessary for breeding, navigation, social organization and both prey location and

predator avoidance. The effects of noise on wildlife is species-specific, and specific details as to how noise affects individuals (e.g., reduced density, reduced reproductive success, area avoidance) are unknown due to the multitude of variables.

Data obtained from other wildlife studies were reviewed to identify threshold levels of noise at which wildlife activities could be disrupted. Most of these studies have looked at breeding bird response to highway noise. Jones and Stokes (2004) modeled the potential responses of several breeding birds including waterfowl, songbirds, raptors, nocturnal hunters, and upland game birds to various levels of highway and associated construction noise. This study identified that noise levels greater than 45 decibels generally had the potential to affect most breeding birds, whereas noise levels less than 45 decibels generally did not disrupt breeding. Other studies have suggested that impacts generally occur at 47 decibels, but that they can occur at noise levels as low as 42 decibels for the most sensitive birds (BLM 2005).

For purposes of this assessment, potential impacts to wildlife were based on breeding bird data. The potential impact area was defined as the area in which the noise level could exceed 45 decibels. Noise levels of 85 decibels during construction of the Lime Wind Project and 55 decibels for associated truck traffic were used to calculate impacts[1].

Noise attenuation with linear distance was calculated using the methods described in Reagan and Grant (1977). Without any sound barriers, such as canyon walls or irregular topography, construction noise would be reduced to a level below 45 decibels 1.2 miles from the source; truck noise would be attenuated within 200 feet of the road.

**Habitat disturbance, loss, or alteration:** There would be a total estimated 9 acres of grassland and open sagebrush steppe initially disturbed during construction and an estimated 3.5 acres of habitat disturbed for the life of the project. An estimated 5.5 acres of the initially disturbed area would be reseeded with native species to re-establish the pre-construction habitats and to help prevent the establishment of nonnative or invasive plants.

The potential impacts of this disturbance are discussed in conjunction with the impacts of operational noise to determine the total acreage of habitat affected by either direct habitat loss or indirect displacement effects.

**Operational Noise:** Operational noise is different than construction noise, as wind turbines produce noise over a larger range of frequencies, thereby adding noise more evenly across the noise spectrum. Turbines make noise when the wind is blowing creating a strong relationship between turbine noise and wind noise. As a result, the distinction between ambient or background noise in windy conditions is often blurred (Dooling 2002).

---

1 Noise levels during construction would generally be between 81-85 decibels within 50 feet of construction and during access road clearing. The exception would be during the time period in which the turbines are erected, as the crane noise levels can reach up to 90-100 decibels at 50 feet.

There have been few studies of wind facility noise on wildlife with most of the operational noise data obtained from breeding bird studies (including: songbirds, raptors, upland game birds, and other birds) on a mix of utility projects. These studies have shown that in general:

- Bird density can be reduced with continuous noise levels of 40-50 decibels or greater (transmission lines, gas well compressors), but that birds may not be able to distinguish turbine noise from ambient noise so that the results from different utilities are not directly transferable to wind energy projects (BLM 2005).
- from the turbine (Boeing 2002) and turbine noise is lost at a distance of 82 feet
- Grassland songbirds have exhibited area avoidance in some utility studies (Leddy et al. 1999); conversely pre and post monitoring at the Stateline Wind project (454 turbines) in eastern Oregon and Washington demonstrated very small changes in grassland songbird densities which was mostly attributed to construction disturbance, the natural slowness of revegetation, and not operational disturbance (Erickson et al. 2003). The primary displacement distances tended to occur within 25-50 meters from the turbines (approx 82-166 feet), with a potential to decrease over time as the area revegetates.
- Few studies have shown an operational effect on nesting raptors or ungulates (Johnson et al. 2000, Erickson et al. 2003, 2004).

Based on these studies, the combined permanent impact area for noise-sensitive species (songbirds, some upland game birds, and some TES species) could extend 82 to 166 feet from the turbines for large projects with more than 100 turbines. The Lime Wind Energy project is a small project with only a single line of turbines, so the lower end of the impact scale was assumed. A potential combined displacement area with a radius of 82 feet around each turbine was used to calculate impacts. This would result in a total turbine impact area of approximately 6.5 acres (approximately 3.5 acres of direct permanent habitat disturbance and an additional 3.0 acres of potential habitat displacement disturbance).

The combined permanent impact area for species in which operational studies have shown no effect (ungulates, raptors, waterfowl, and waterbirds) was identified to be just the direct area of habitat disturbance (approximately 3.5 acres).

**Operational Injury or Mortality**

**Tower/Rotor Strikes:** Wildlife can be affected by collisions with wind turbines, particularly the rotors. Because the rotors would be elevated 15 meters (approximately 50 feet) above the ground, this impact type is generally limited to wildlife that flies well above ground level, such as waterfowl, waterbirds, songbirds, raptors, and bats.

Factors affecting the potential for bird and bat collisions are listed below in **Table 6**. Design factors that are included in the project to minimize collisions are tubular towers, single row of turbines, low (43 revolutions per minute) rotor speed, unlit towers and wind turbines below 200 feet. These factors apply to all birds and bats.

| Table 6. Factors Affecting Bird and Bat Collisions with Wind Turbines. | | |
|---|---|---|
| **Factor Affecting Collisions** | **Factor Description** | **Lime Wind Design Measures to Minimize Factor Effects** |
| The number of turbines | Higher mortality with increased turbine numbers | 7 - 12 turbines |
| Turbine Height | Dramatic increase in bat fatalities > 65 meter towers | Towers < 40 meters |
| Capacity of Wind Farm | Larger wind farms have higher mortality numbers | Small project - 3.6 megawatt |
| Habitat types around the towers | Towers within key breeding areas or known concentrations of birds can result in higher mortalities | Tower siting outside of key breeding areas |
| Construction activities that increase prey abundance | Increased bare ground can increase visibility of small mammal populations which attract raptors near the towers | Area around towers to be revegetated with native bunchgrasses, not left bare or surrounded by rock piles, to avoid attracting rodents and rabbits |
| Spatial arrangement of turbines | Multiple rows of turbines can be harder to navigate through | Single row of turbines |
| Tower design | Bird mortality is higher on the older lattice design towers which enable raptors to perch or nest on the cross-beams than on the "new generation" tubular towers. | Tubular tower design preventing raptor nesting |
| Presence or absence of lights | Mortality can be higher near lit towers | Towers to be unlit |

Even with incorporation of these design, siting, and operational features, bird and bat fatalities through tower collisions or rotor strikes may occur. Fatality data from other wind farms operating in the Pacific Northwest was used to estimate the likely magnitude of impacts that could occur during the Lime Wind Project operation (Table 7). The data used to address impacts to different groups of birds is described below in section 4.3.9.1. The data used to address bat impacts is described separately in section 4.3.9.3.

#### 4.3.9.1 Migratory and Neotropical Birds

Proposed Action

The impact analysis in this section is described by species group: waterfowl, waterbirds, songbirds, and raptors.

**Direct injury or mortality:** During construction, as the turbine pads are cleared and access roads constructed, injury or mortality may occur.

- ***Waterfowl:*** There is no waterfowl habitat on site and waterfowl primarily migrate through the area by flying over the site during the spring and fall. There would likely be no impact to waterfowl during construction.

- ***Waterbirds:*** There is no waterbird habitat on site and waterbirds primarily migrate through the area by flying over the site during the spring and fall. There would likely be no impact to waterbirds during construction.

- ***Songbirds:*** Injury or mortality through burial or being run-over could occur to nesting or young birds during construction, as they have limited mobility during the nesting period. However, the potential impacts would be minimal as construction would be scheduled after June 30, which is after the nesting season has ended.

- ***Raptors:*** Raptors are highly mobile birds that are not known to nest on-site and would not be subject to being buried or run-over by vehicles.

**Construction Noise:** As described in section 4.3.9, nominal noise levels of 85 decibels during construction of the Lime Wind Project and 55 decibels for associated truck traffic were used to calculate impacts. Without any sound barriers, such as canyon walls or irregular topography, construction noise would be reduced to a level below 45 decibels 1.2 miles from the source; truck noise would be attenuated within 200 feet of the road.

- ***Waterfowl:*** There is no waterfowl habitat on site and waterfowl primarily migrate through the area by flying over the site during the spring and fall. Waterfowl may use Brownlee Reservoir, which is located 1.5 miles from the project site for feeding or resting during migration or during the summer or early fall months. Construction would occur outside of the spring migration period, and construction noise levels would be attenuated below 45 decibels at Brownlee Reservoir. There would likely be no impact to waterfowl during construction.

- ***Waterbirds:*** Impacts to waterbirds would be the same as described for waterfowl.

- ***Songbirds:*** Communication disruption during breeding could occur for those songbirds breeding within 1.2 miles of the site. However, construction would not

occur during the breeding or nesting season so that breeding disruption or nest abandonment is not anticipated.

- ***Raptors:*** There are no known raptor nests within 1.2 miles of the project area that could be disrupted by construction noise

**Combined habitat disturbance, loss, or alteration/displacement:** There would be a total estimated 9 acres of grassland and open sagebrush steppe initially disturbed during construction and approximately 3.5 acres of habitat disturbed for the life of the project. There would be an additional displacement area of approximately 3.0 acres for some species due to noise. The combined effects of habitat loss and displacement are discussed below.

- ***Waterfowl:*** There is no waterfowl habitat on site and waterfowl primarily migrate through the area by flying over the site during the spring and fall. There would be no loss of waterfowl habitat or displacement of waterfowl from occupied habitat. The nearest waterfowl habitat is at Brownlee Reservoir (1.5 miles from the site) which is well outside the estimated displacement distance of 82 feet identified in section 4.3.9.

- ***Waterbirds:*** Impacts to waterbirds would be the same as described for waterfowl.

- ***Songbirds:*** There would be initial impacts to approximately 9 acres of songbird habitat that could potentially be used for breeding, approximately 5.5 acres of which would be revegetated for no long term loss of this habitat, leaving approximately 3.5 acres permanently disturbed. As described in section 4.3.9, studies have shown a displacement area for some songbirds extending 82 feet from wind turbines which would equate to a total displacement area of 3.0 acres. As a result, there would be a combined permanent loss or displacement of breeding birds within approximately 6.5 acres of potential breeding habitat. This would be too small of an area to affect a population-level response for any individual species because the project is not located in key breeding, nesting, brooding, and/or fledging habitat.

- ***Raptors:*** There would be initial impacts to approximately 9 acres of habitat that could be used for raptor foraging, approximately 5.5 acres of which would be revegetated for no long term loss of this habitat, leaving approximately 3.5 acres permanently disturbed. As described in section 4.3.9, no studies have indicated an operational displacement effect on raptors. There would be a total estimated loss of 3.5 acres of foraging habitat for the life of the project, with no additional loss of habitat through displacement. This would be too small of an area to affect a population-level response for any individual raptor species because the project is not located in key breeding, nesting, brooding, and/or fledging habitat.

**Operational Injury or Mortality**

**Tower/Rotor Strikes:** Erickson et al. (2001) estimated that, on average throughout the US, there are an estimated 2.10 bird fatalities per wind turbine per year (including all bird species groups), with a range from 0 bird fatalities per turbine per year to 4.45 bird fatalities per turbine per year. This range reflects the variation in wind farm design, and types/composition of habitat and bird communities among sites, as well as differences in monitoring studies. Excluding data from California, (which has a number of older lattice design turbines with higher mortality rates and some problematic siting issues), fatalities average 1.83 birds per turbine per year. Because of differences in turbine sizes among sites, the rotor swept area (or RSA) is considered a better metric to compare fatality rates among facilities with different turbine sizes. The RSA is expressed in terms of 100,000 m of area[2].

**Table 7** compares the bird mortality rates for four sites in eastern Oregon and Washington. Although in a slightly different ecological region along the Columbia River, these facilities are all in grassland/shrub steppe habitat (although with cropland mixed in with some of the sites). It may not be possible to completely and accurately predict mortality rates at a new site from other sites (Kunz et al. 2007), as there are some differences between predicted pre-construction and actual fatality rates. However, the relationships between predicted vs. actual fatalities have been fairly close (Strickland 2008) and this data can be used to generate an idea of the likely magnitude of impacts. Based on the existing data from eastern Oregon and Washington, approximately 7.8 total bird fatalities could occur per year at the proposed Lime Wind Project site.

**Table 7. Comparison of Bird Mortality Rates (number of bird fatalities per turbine per year) at Wind Farm Sites in Eastern Oregon and Washington.**

| **Site Name** | **Turbines (#)** | **All Birds/100,000 m² RSA per year** | **Raptors/100,000 m² RSA per year** |
|---|---|---|---|
| Klondike | 16 | na | na |
| 9Canyon | 37 | 119.8 | 2.6 |
| Stateline | 454 | 96.6 | na |
| Vansycle | 38 | 38 | 0 |
| | | | |
| Average | | 84.8 | 1.3 |
| | | **All Birds per Wind Farm per year** | **Raptors per Wind Farm per year** |
| Estimated-Lime* | 12 | 7.8 | .12 |
| * Based on a RSA of 9237 m² | | | |

2 Birds/ RSA is comparable to the newer related metric of birds/nameplate MW, but is used here as the existing, published data is expressed in terms of the RSA and not nameplate MW. Additionally the data reported in the BLM Programmatic EIS are expressed as birds/RSA.

The most recent Oregon bird fatality compositional data available is from the Stateline site monitoring (Erickson et al. 2004). These percentages are fairly similar to nationwide estimates of bird fatalities by species group (Strickland 2008). This data is used to estimate the relative proportion of total bird fatalities that might occur by group on the proposed Lime Wind Project site. Because the total number of projected fatalities is so small (7), these estimates can be used only to assess the general magnitude of impacts to any one bird species group.

- ***Waterfowl and waterbirds:*** Together, waterfowl and waterbirds typically represent 1% of the bird fatalities at a wind site. It is highly unlikely that this level of impact (1% of an estimated total 7 birds) would affect populations of either species group.

- ***Songbirds:*** Songbirds represent the group with the highest operational mortality rates (approximately 75%), which would average an estimated 5 songbirds a year. This number is not sufficient to have population level effects on any individual species.

- ***Raptors***: Raptor strikes range from 0 to 6% of total bird mortality, depending on the site, with an estimated average of 1 raptor fatality every 10 years for the Lime Wind Project. The prevalence of collisions is most related to the raptor hunting style and the degree to which construction results in an increase in prey species. Erickson et al. (2002) concluded that red tailed hawks and kestrels tend to be at a greater risk of collisions than other raptor species due to their tendency to float on updrafts while hunting. Conversely, ground-feeding scavengers, such as turkey vultures are not susceptible to collisions. Golden eagles are susceptible to collisions at the lattice type towers, but not the tubular towers proposed for this project.

  Correlations between nest densities and raptor fatalities are also very low, and very few raptor species observed during nest surveys have been observed as fatalities (see for example, Erickson et al. 2004). Overall, most raptors seem to be generally able to avoid wind turbines and towers, and the BLM (2005) concluded that no monitoring studies of wind energy projects using the tubular design have demonstrated a population effect on raptors. It is unlikely that this level of impact (average of 1 raptor every 10 years) would affect raptor populations.

<u>No Action Alternative</u>

Under the No Action Alternative, migratory and neotropical bird species would not be impacted in the ways described in section 4.3.9. The animal communities would continue to be dependent on ecological processes that are currently in place.

#### 4.3.9.2 Upland Game Species

Proposed Action

The impact analysis in this section is described by species group: upland game birds and ungulates.

**Direct injury or mortality:** Injury or death may occur during construction as the turbine pads are cleared and access roads constructed.

- ***Upland Game Birds:*** Injury or mortality through burial or being run-over could occur to nesting or young birds during construction, as they have limited mobility during the nesting period. However, the potential impacts would be minimal as construction would be scheduled after June 30, which is after the nesting season has ended.

- ***Ungulates:*** Ungulate species, such as mule deer, elk or antelope are highly mobile and would likely move into adjacent areas during construction.

**Construction Noise:** As described in section 4.3.9, nominal noise levels of 85 decibels during construction of the Lime Wind Project and 55 decibels for associated truck traffic were used to calculate impacts. Without any sound barriers, such as canyon walls or irregular topography, construction noise would be reduced to a level below 45 decibels 1.2 miles from the source; truck noise would be attenuated within 200 feet of the road.

- ***Upland Game Birds:*** Communication disruption during breeding could occur for those upland game birds breeding within 1.2 miles of the site. However, construction would not occur during the breeding or nesting season so that breeding disruption or nest abandonment is not anticipated.

- ***Ungulates:*** Ungulate species, such as mule deer, elk or antelope are highly mobile and would likely move into adjacent areas during construction. With the construction schedule during summer and early fall, construction impacts on wintering ungulates would be minimal.

**Habitat disturbance, loss, or alteration/Displacement:** There would be an estimated 9 acres of grassland and open sagebrush steppe initially disturbed during construction and approximately 3.5 acres of habitat disturbed for the life of the project. There would be an additional displacement area of approximately 3.0 acres for some species due to noise. The combined effects of habitat loss and displacement are discussed below.

- ***Upland Game Birds:*** There would be initial impacts to approximately 9 acres of upland game bird habitat that could potentially be used for breeding, approximately 5.5 acres of which would be revegetated for no long term loss of this habitat, leaving an estimated 3.5 acres disturbed for the life of the project. As described in section 4.3.5.1, studies have shown a displacement area for some

birds extending 82 feet from wind turbines which would equate to a total displacement area of 3.0 acres. As a result, there would be a combined loss or displacement of upland game birds within 6.5 acres of potential breeding habitat for the life of the project. This would be too small of an area to affect a population-level response for any individual species because the project is not located in key breeding, nesting, brooding, and/or fledging habitat.

- ***Ungulates:*** 1) There would be initial impacts to approximately 9 acres of habitat that could be used by deer, elk or antelope, approximately 5.5 acres of which would be revegetated for no long term loss of this habitat, leaving an estimated 3.5 acres disturbed for the life of the project. This disturbance would be mitigated by planting bitter brush on approximately 7 acres within the same deer use area. 2) Multiple rows of wind turbines placed across a travel corridor could affect ungulate movements in the area. However, the Lime Wind Energy project would consist of a single row of turbines through which these species could easily navigate. Additionally, studies of ungulate movement at the larger Foote Creek Rim project in Wyoming have not demonstrated any ungulate displacement impacts (Johnson et al. 2000). 3) Trips to the area to perform maintenance during the critical deer winter season (December 1 thru April 15) could disturb mule deer causing them to flee and use unnecessary energy. As discussed in section 2.1.14.2, there are both scheduled and unscheduled maintenance requirements. Scheduled yearly maintenance trips would be completed in the spring of the year. Quarterly would be scheduled for the months of April, June, August, and October. Monthly maintenance trips would occur once per month. Unscheduled and scheduled maintenance trips would be combined when possible and based on the analysis in section 2.1.14.2, there would be estimated 2 - 4 trips per month to the site for maintenance procedures during the winter season. If any mule deer are in the project vicinity during one of these six days they may be negatively impacted.

**Operational Injury or Mortality**

**Tower/Rotor Strikes:**

- ***Upland Game Birds:*** Upland game birds are generally low-flying species, and studies have indicated that upland game birds represent approximately 15% of the total bird fatalities at a wind site (Erickson et al. 2004). These studies warn though, that it is unclear if upland game bird mortality occurs as a result of tower strikes or raptor attacks. These estimates may also be high for the Lime site as the other sites used to develop these estimates were located in areas with fairly high concentrations of pheasants and partridge which are not likely to occur in the Lime project area. Even at the rate of 15% of the total estimated 7.8 bird strikes a year, it is unlikely that this level of impact would affect upland game bird populations.

- ***Ungulates:*** The ground-dwelling deer, elk and antelope are not susceptible to tower or rotor strikes, especially since the minimum rotor distance above the ground would be 15 meters (approximately 50 feet).

No Action Alternative

Under the No Action Alternative, upland game species would not be impacted in the ways described in section 4.3.9. The animal communities would continue to be dependent on ecological processes that are currently in place.

#### 4.3.9.3 Threatened/Endangered/Sensitive/Species of Concern

Proposed Action

**Introduction**

There are no threatened or endangered wildlife species in the project vicinity. However, there are potential sensitive and species of concern species located adjacent to this project area and there may be instances where these species are within the project area. Wind energy projects could affect sensitive wildlife species through the mechanisms listed in section 4.3.9. Impacts to TES species are analyzed according to the methods described in section 4.3.9.

**Introduction of contaminants:** Accidental spills during construction from machinery or vehicles could occur. These spills, if they occurred, would be short term and localized. Measures to prevent such accidents would be addressed in a safety plan which would be developed and are not discussed further here.

**Direct injury or mortality:** Of the 11 sensitive species considered in detail in this EA, the ground nesting and brooding sage-grouse and burrowing owl would be most susceptible to this type of impact.

- ***Sage grouse:*** No active sage grouse leks exist within 5 miles of the project area so the likelihood of injury or mortality during road construction and excavation is low to nonexistent.

***Burrowing owl:*** The burrowing owl would be susceptible to such impacts if active nests occurred in or near the project vicinity, since no burrowing owls were encountered during the survey of May 2009, no impacts are expected.

**Construction Noise:** As described in section 4.3.9, construction noise would be reduced to a level below 45 decibels 1.2 miles from the source; truck noise would be attenuated within 200 feet of the road. Construction noise would occur during a single 4-5 month construction period or two shorter construction periods spread over two years. Construction would occur in the summer through fall. Potential impacts to sensitive species are discussed below.

- ***Sage grouse**:* Sage-grouse are particularly susceptible to noise during breeding which can result in breeding area abandonment or reduced reproductive success. However, the known leks are located more than 5 miles from the project area, with the nests likely near the leks (see **Exhibit X**), which is well beyond the area potentially affected by construction noise (1.2 miles), thereby minimizing impacts on sage grouse reproductive success.

- ***Burrowing owl:*** Construction would occur outside of the sensitive wintering, mating and breeding seasons so that noise impacts on wintering and reproductive success are not anticipated.

- ***Bald eagle:*** The bald eagle is not known to nest in the project area. Since no nesting habitat exists within the project area, there would be minimal effects of construction noise on the eagle's reproductive success. There could be temporary foraging displacement of the eagle from an approximately 1-mile radius around the turbines during construction.

- ***Ferruginous hawk:*** The ferruginous hawk is not known to nest in the project area. Since no nesting habitat exists within the project area for the hawk, there would be minimal effects of construction noise on the hawk's reproductive success. There could be temporary foraging displacement of the hawk from an approximately 1-mile radius around the turbines during construction.

- ***California bighorn:*** The bighorn sheep herd is located west of highway 84, outside of the construction noise area of influence. There would be no effects of construction noise on the population.

- ***Sensitive bats:*** There are no structures for bat roosting in the turbine construction areas. The caves adjacent to the project that could provide potential roosts are approximately 1.5 miles away and thus any noise from construction activities would most likely dissipate and not impact roosting or hibernating bats. There is potential for some noise disturbance from construction traffic to roosting bats or maternity colonies established in cliffs along the access roads within 1.2 miles of the turbines. Since construction activities will occur during daylight hours there will be no impacts to foraging bats within or adjacent to the project area.

**Habitat Disturbance:** There are no known nests, roosts, breeding areas, or other key habitats for sensitive species in the project area. However, there is habitat that could be used for foraging by these species. The potential impacts of habitat disturbance on sensitive species foraging are discussed in conjunction with the impacts of operational noise.

**Operational Noise:** Operational noise is different than construction noise, as wind turbines produce noise over a larger range of frequencies, thereby adding noise more evenly across the noise spectrum. Turbines make noise when the wind is blowing creating a strong relationship between turbine noise and wind noise. As a result, the

distinction between ambient or background noise in windy conditions is often blurred (Australian Wind Energy Association. 2007).

The total operational habitat loss as a result of both habitat disturbance and noise is estimated as 6.5 acres (approximately 3.5 acres of habitat loss plus an additional avoidance area of 3 acres).

- ***Sage-grouse**:* Sage-grouse are particularly susceptible to noise and visual disturbance but the center of sage-grouse activities occurs greater than 5 miles from the project area (Nick Myatt, 2007. **Exhibit X**). The habitat that would be lost by construction is grassland habitat and not sagebrush. It is not likely that sage grouse would be negatively affected by habitat loss and operational noise of the Lime Wind Project.

- ***Burrowing owl**:* Construction would not occur in an active burrowing owl breeding area, and the loss of 6.5 acres of grassland habitat would not likely affect the species. Burrowing owls have been shown to successfully nest within wind energy farms, nesting as close as 366 feet to turbines, and maintaining similar population levels for two years of operation at the large (454 turbine) Stateline Wind Energy site (Erickson et al. 2004), with natural shifts in burrow use unrelated to the turbine operation. It is not likely that burrowing owls would be adversely affected by habitat loss and operational noise of the Lime Wind Project.

- ***Bald Eagle:*** Loss of approximately 3.5 acres of foraging habitat would not likely affect the bald eagle.

- ***Ferruginous hawk**:* Loss of approximately 3.5 acres of foraging habitat would not likely affect the ferruginous hawk.

- ***California bighorn:*** The bighorn sheep herd is located west of highway 84, outside of the operational area of influence. There would be no effect on the bighorn.

- ***Sensitive bats***: As previously stated in section 4.3.9, the distinction between wind and turbine noise is lost at a distance of 82 feet from the turbine. Therefore, the impacts of operational noise are expected to be limited to those bats that are passing through the project area. Since there are no roosting structures within the project area it is expected that there will be no impacts from operational noise to roosting or hibernating bats. In addition, a loss of approximately 3.5 acres of foraging habitat would not likely affect bat species utilizing the area.

***Operational I*njury or Mortality**

**Tower/Rotor Strikes:** Factors influencing sensitive bird and bat collisions with wind turbines, as well as design and operational measures to reduce collisions are the same as those described in section 4.3.9.1. Approximately 7.8 total bird strikes for the whole

project area could occur on an annual basis, with 1 raptor fatality every 10 years. Potential impacts on the three sensitive bird species are discussed below by species.

- ***Sage-grouse**:* No studies were found indicating that sage grouse are susceptible to collisions with wind turbines.

- ***Burrowing owl**:* Although burrowing owl strikes have been recorded, these fatalities were from collisions with the older, lattice type tower designs in California. There have been no records of fatalities associated with the tubular turbine designs, and the monitoring of the much larger Stateline Wind Project identified no operational impacts of any kind on the burrowing owl. It is highly unlikely that the Lime Wind Project would result in burrowing owl fatalities associated with turbine/rotor strikes.

- ***Bald Eagle:*** There is the potential for bald eagle strikes as the species may forage in the area. Based on data from the Stateline project, none of the recorded strikes were eagles. As a result, although it is possible that this sensitive species could strike one of the towers and there is an estimated 1 raptor fatality every 10 years, the probability of it being a bald eagle is low.

- ***Ferruginous hawk:*** There is the potential for ferruginous hawk strikes as the species may forage in the area and it is somewhat susceptible to tower collisions. Based on data from the Stateline project, only 1 of the 13 raptor fatalities (7% of the total) were ferruginous hawks (Erickson et al. 2004). As a result, although it is possible that this sensitive species could strike one of the towers and there is an estimated 1 raptor fatality every 10 years, the probability of it being a ferruginous hawk is low.

- ***Sensitive bats**:* Over 90% of bat mortalities currently recorded at wind energy developments involve migratory species, while only a small proportion of year-round residents are killed. Most bat fatalities involve species that migrate significant distances between summer feeding and reproductive sites and winter hibernation sites (Curry 2009). Previous studies in Oregon and Washington (eg. Erickson et al. 2002, 2004) have identified that the majority of the impacts to bats are almost exclusively due to turbine strikes during the fall migration period and not other operational impacts. The two migrant species suspected to occur in the area, the hoary bat (*Lasionycteris* noctivagans) and the silver-haired bat (*Lasionycteris* noctivagans), constitute 96% of the bat fatalities at wind energy project areas in the Pacific Northwest (Johnson 2004). There is a possibility that bats could strike a tower as they move through the area, though known occurrences of these types of strikes are less common.

  The impact of wind power facilities on wildlife varies by region and by species. Specifically, studies show that wind power facilities in northern California and in Pennsylvania and West Virginia have killed large numbers of raptors and bats, respectively. Studies in other parts of the country, including the Pacific Northwest

show comparatively lower levels of mortality, although most facilities have killed at least some birds (GAO-05-906). Recent Studies indicate that bat fatalities rates are affected by turbine height (Barclay et al. 2007), geographic location (Arnett et al. 2008), and wind speed with more bats being killed on low-wind-nights (Fiedler 2004, Arnett 2005, Arnett et al. 2008. Horn et al. 2008). An analysis of data collected from North American wind energy facilities revealed that bat fatalities increased exponentially with tower height (Barclay et al. 2007). Reducing tower height may reduce bat fatalities. Thus, the shorter towers used in the Lime Wind Energy Project should have reduced impacts as compared to other wind energy projects in the Pacific Northwest with taller towers.

A method to predict fatality rates uses data calculated from the Barclay et al. 2007. About 1.5 bat fatalities per megawatt per year is the average for the four wind projects in Oregon and Washington for which there are data (calculated from data summarized in Barclay et al. 2007). Applying the same bat fatality statistics from the four wind projects in Oregon and Washington to the 3.6 megawatt Lime Project would suggest there could be about 5.4 fatalities of migrating bats per year. However, the analysis completed by Barclay et al. (2007) found that tower height had a significant effect on the rate of bat fatalities with fewer fatalities at short towers such as those in the Lime Project. The low tower height of the Lime Wind Project turbines could reduce the estimate of resident fatalities even further.

Barclay et al (2007) present data for four wind project areas with turbine heights <40 m (a fifth area, Tehachapi, CA, is clearly an outlier); the average fatality rate of these 4 areas was used to estimate fatality rates for the 30 – 40 m towers proposed for the Lime Wind Energy Project. Barclay et al (2007) also present data for five wind projects with turbine heights between 35 m and 45 m; the average fatality rate for these 5 areas was used to estimate fatality rates for the 40-m towers proposed at the Lime Wind Energy Project.

**Table 8. Bat Fatalities Based on Tower Height**

| Tower Height | Fatalities per MW per year (from Barclay) | Estimated Total Annual Bat Fatalities at Lime | Estimated Annual Resident Bat Fatalities at Lime (4%) | Estimated Annual Migratory Bat Fatalities at Lime (96%) |
|---|---|---|---|---|
| 30 m | 0.067 | 0.2412 | 0.0096 | 0.2316 |
| 40 m | 0.178 | 0.6408 | 0.0256 | 0.6152 |

Although an increase in tower height from 30 m to 40 m roughly triples the expected bat fatality rates, the latter are still very low at 0.64 bats/year for the entire project. Thus, there is little reason to expect any significant impact on either resident or migratory bat populations in the Lime Wind Energy Project with turbines of 30 to 40 meters. area regardless of turbine height.

No Action Alternative

Under the No Action Alternative, threatened/endangered/sensitive/species of concern would not be impacted in the ways described in section 4.3.9. The animal communities would continue to be dependent on ecological processes that are currently in place.

## 4.4 Impacts Associated with Other Important Elements of the Human Environment

### 4.4.1 Availability of Access/Need to Reserve Access

Proposed Action

The proposed action would improve road access to the site and would not restrict public access. There is a Baker County local access road that provides access to BLM administered lands in Section 36.

No Action Alternative

Under the No-Action alternative, present forms of access to the public would continue.

### 4.4.2 Recreation

Proposed Action

Since the project site occupies a relatively small area and wind turbines would be located on ridges that see only dispersed recreational uses (primarily in the form of hunting, off highway vehicles (OHV) and some remote camping), there would be no significant impact to this dispersed recreational use. There would be visual and audible impacts to those recreationists who utilize the immediate project area and these visual and audible intrusions could deter recreational activities and cause that use to relocate to adjacent areas. However, these impacts are expected to be minimal due to the remote access and the minimal amount of resources existing in the area of the proposed project that normally attract recreational use. Game herds may avoid the site during the construction phase in summer and early fall, potentially moving fall hunters to adjacent locations within the immediate area. However, the impact to this recreational activity should be minimal as the native wildlife becomes accustomed to the turbines and return to the area.

Public access into the area would not be restricted and could potentially increase recreational use on a small scale by the improved road access and curiosity people have about wind turbines. Section 36 is, by most standards, remote and the distance from any town or populated area keeps its recreational use relatively low. Any increased impact of OHVs, dispersed camping, and general recreational use due to improvement to the access road is expected to be minimal.

No Action Alternative

Under the No-Action alternative, current conditions for recreationalists and hunters would continue.

### 4.4.3 Existing and Potential Land Uses

Proposed Action

The project area lies within the South Pasture of Huntington allotment. Cattle grazing is authorized each spring and scheduled from April 1st thru the end May of each year. The construction period is planned to start July 1st after the spring grazing period. Therefore spring grazing would not be impacted during the year of construction. Grazing in following years would be minimally impacted due to reseeding and mitigation of vegetation loss. Because this range is rated at three acres per AUM, loss of vegetation on 3.5 acres would affect 1.07 AUMs for the life of the project. 1.07 AUMs affected is approximately one fifth of 1 % of total AUMs grazing.

Road access would be open to the public and the permittees (see Availability of Access).

After reclamation, approximately 3.5 acres would be removed from production for the life of the project. Reseeding of disturbed areas would mitigate any loss of forage to grazing permittees. The applicant would install a cattle guard at the Private/BLM boundary to mitigate grazing conflicts.

Prior to construction Qwest would be called on site to locate their fiber optic line. There would be no activity by the applicant or the construction process within 20 feet of this located line.

As managers of the surface estate in this split estate situation, the BLM recognizes the superior right to the mineral estate. If the owner of the mineral estate wishes to extract their minerals, the BLM would consider the surface values which need protection from the mineral extraction operation and restrict these actions accordingly, however the mineral extractions would not be altogether denied.

No Action Alternative

Under the No-Action alternative, approximately 3.5 acres would not be removed from grazing production for the life of the project. Existing conditions would continue.

### 4.4.4 Vegetation and Rangeland Resources

Proposed Action

Road construction and the operation of machinery and vehicles during construction of wind turbine foundations would result in the direct loss and alteration of up to an

estimated 9 acres of native plant communities within the disturbed area. The disturbed area would be reseeded with a certified weed-free native grass mix as prescribed by the BLM. The planned seed mix would include bluebunch wheatgrass, Sandberg's bluegrass, and Idaho fescue. Applicant would continue to monitor the site annually and reseed as needed to approximate the pre-existing cover densities. Requirement to reseed the site would be determined by BLM. When re-vegetation occurs, seeded native grass species are expected to increase over time. Additional natural regeneration of shrub and wildflower species would also occur from seed sources in near proximity to the disturbance. In the long term beyond five to ten years, density of native plant species should recover completely except for the turbine foundation footprint, transformer pads, and roads necessary to the project totaling an estimated 3.5 acres. Road surfaces not regularly graded or graveled, but used for routine access and maintenance would partially revegetate.

No Action Alternative

Under the No Action alternative, vegetation and rangeland resources would be subject only to current conditions.

### 4.4.5 Soils

Proposed Action

During the short-term construction process, approximately 9 acres would be initially impacted. Due to reclamation procedures and long-term monitoring, only an estimated 3.5 acres are expected to be lost for the life of the project.

Heavy construction equipment, including dozers, excavators, graders and rollers would be used to build or improve roads, and construct wind turbine foundations. The three soil types that would be impacted by activities associated with the proposed action range from a slight to very high water erosion potential. The soils would be impacted through disturbance of heavy machinery, removal for foundations, grading of roadway, and compaction on roadway and in the vicinity of the turbine sites.

Foundation construction would remove topsoil to an adjacent location, for replacement during reclamation. The foundations are expected to displace 1,000 to 1,500 yards of material with concrete. The overburden material would be used to rock project roads.

The impact to soils within the construction zone can be minimized by the time of year construction commences, construction duration, construction practices, and reclamation methods. The construction window would be from July thru October taking advantage of the dry weather conditions. The construction phase is expected to take 3-4 months. Reclamation is expected to take one week and would begin as soon as roads are completed and wind turbine foundations are backfilled. Disturbed areas would be shaped, water-barred, compacted and seeded with native vegetation prescribed by the BLM. The Applicant would provide long term monitoring and reseeding as necessary. The project

area would be revegetated immediately after construction and long term monitoring would occur, therefore minimal impact to soils is expected.

No Action Alternative

Under the No-Action alternative soils would be subject only to current conditions.

### 4.4.6 Visual Resources

Proposed Action

The VRM analysis stage involves determining whether the potential visual impacts from proposed surface-disturbing activities or developments would meet the management objectives established for the area, or whether design adjustments would be required. A visual contrast rating process is used for this analysis, which involves comparing the project features with the major features in the existing landscape using the basic design elements of form, line, color, and texture. This process is described in BLM Handbook H-8431-1, Visual Resource Contrast Rating (BLM 1986). The analysis can then be used as a guide for resolving visual impacts.

The proposed turbines would be located near the tops of ridgelines where they would have impacts on visual resources or scenic vistas seen from the adjacent VRM Class II areas of Farewell Bend, Spring Recreation Site, and the Brownlee Reservoir. Therefore, the impact analysis examines the following potential results:

- Result in substantial damage to scenic resources, such as trees, rock outcroppings, or historic resources along a designated state scenic highway;
- Substantially degrade the existing visual character or quality of a site and its surroundings.
- Create a new source of light or glare that affects day or nighttime views in an area.

A view shed analysis (Appendix A of Attachment A) indicates that the Lime Wind project would also be visible in the background from vantage points in the Oregon Trail ACEC at Birch Creek and Tub Mountain to the south and at Chimney Creek to the north. The analysis is based upon a calculation using an observation height of 60 meters for the wind turbines and a 10 meter digital elevation model raster image to identify locations on the surrounding landscape where the project, or portions of the project, may be visible.

From Birch Creek, the Lime Wind Project is about 9.25 miles to the northwest, and would be visible from several locations along the Oregon Trail route. From a portion of the historic Oregon Trail route north of Tub Mountain Reservoir, the Lime Wind Project may be visible at a distance of about 15 miles to the north. The Chimney Creek area is located about 4.87 miles northwest of the Lime Wind Project. The turbines may be visible from a small area at the extreme southeast portion of the Oregon Trail route where it crosses BLM land at Chimney Creek.

For all locations, the Small Angle Formula (see Appendix D of Attachment A) was used to simulate the turbines visual impact. This formula gives each location's viewable height of the turbines measured 30 inches from the eye. **Table 8** gives relative heights of the turbines for each KOP.

**Table 8: KOP Turbine Heights using the Small Angle Formula**

| Location | Distance to Lime Wind Site (air miles) | Height at Arms Length (inches)^ | Height at Arms Length (inches)* |
|---|---|---|---|
| Spring Recreation Area | 2.5 | .33 | 0.45 |
| I 84 South Bound | 3.5 | .23 | 0.32 |
| I 84 North Bound | 4.25 | .19 | 0.26 |
| Farewell Bend State Park | 7 | .11 | 0.16 |
| Birch Creek ACEC | 9.25 | .09 | 0.12 |
| Tub Mountain ACEC | 15 | .05 | 0.07 |
| Brownlee Reservoir South (first view) | 6 | .13 | 0.19 |
| Brownlee Reservoir North (first view) | 2.75 | .29 | 0.41 |
| Brownlee Reservoir (closest) | 1.75 | .17 | 0.64 |
| Lookout Mountain | 15 | .05 | 0.07 |
| ^Based on a turbine height of 145 feet to tip of vertical blade | | | |
| *Based on a turbine height of 197 feet to tip of vertical blade | | | |

Construction of the project would require 3-4 months. These construction activities may be visible from nearby roads and Interstate 84. These would be short term impacts to the visual resources due to construction requirements to place the turbines. Once installed, the turbines would be left in place for 30 years, at which time an extension for another 30 years may be requested.

See **Appendix C** of **Attachment A**, for a list of Key Observation Points (KOP) and their relation to the proposed project site.

The turbines could be visible from many areas and high points within the Baker Field Office boundaries at a variety of distances due to the height and location of the towers. However, the analysis of the visual impacts utilizes the Key Observation Points identified earlier which take into account sensitive areas as well as those areas with high concentrations of visitor use that would be able to see the Lime Wind Project.

The turbines would be visible at different points from the Spring Recreation Site, Farewell Bend State Park, and Lookout Mountain areas. They would also be able to be seen by the boating traffic on the Brownlee Reservoir from 6 river miles along the reservoir from points 2.5 miles north of Spring Recreation Area to 3.5 miles south of Spring Recreation Area. All of these viewpoints are located within VRM Class II areas adjacent to the project area. The turbines would also be visible from the northbound lanes of I-84 from milepost 345 to 358 and from the southbound lanes from milepost 340 to 342, which fall under VRM Class IV management. In addition, the turbines would be visible from parts of Birch Creek ACEC, Tub Mountain ACEC, and Chimney Creek ACEC, all of which are components of the National Historic Oregon Trail. Although the

Birch Creek ACEC and Tub Mountain ACEC are contained within the Malhuer Field Office boundaries with a VRM Class II classification, the analysis incorporated the impacts of these sensitive sites as well as the sites contained within the Baker Field Office boundary to ensure a comprehensive VRM analysis.

Visual Contrast Rating Analyses have been completed for each of the previously mentioned sites, excluding Lookout Mountain, Chimney Creek and the Brownlee Reservoir. Lookout Mountain was inaccessible due to winter road conditions at the time this document was produced, Chimney Creek is not accessible via public roads and the private road is gated and locked not allowing access for an on site analysis. The Brownlee Reservoir analysis would be comparable to Farwell Bend and Spring Recreation Areas due to the minimal change in distance zones from these KOP's and the center of the reservoir where the analysis would take place. Therefore Visual Contrast Rating Worksheets were not completed specifically for these areas. The viewshed analysis (see **Appendix A** of **Attachment A**) indicates that the Lime Wind Project may be visible for 6 river miles along the Brownlee Reservoir from points 2.5 miles north of Spring Recreation Area to 3.5 miles South of Spring Recreation Area.

After utilizing the Visual Contrast Rating Analyses to determine the impacts of the Lime Wind Project, it was determined that the project design would not detrimentally impact the visual resource management objectives of the area (see **Appendices E – J** of **Attachment A**). Though the project would be visible in areas of higher VRM classifications (highest being a Class II), the impact from the project would be in compliance with the management direction for Class II which states that "management activities may be seen, but should not attract the attention of the casual observer." This project, through the visual resource analysis process, is expected to fall within those established guidelines due to the location, depth of scale/distance zones, color, terrain, and size of the proposed project. The proposed turbines would be visible, but would not dominate the viewshed for any Class III VRM ratings, nor is it expected to attract the attention of the casual observers of the Class II areas.

One of the primary impacts from the turbines which is not covered under the usual Visual Contrast Rating Analysis is the "motion" created by the turbine blades. Motion is always noticed and draws the attention and eyes of public users and travelers. However, with the large distance zones at which the turbines would be visible and the reduced scale of the project due to that distance, the spinning motion of the turbines is not expected to have a significant impact.

<u>No Action Alternative</u>

Under the No-Action alternative, there would be no visual impact to the recreational or scenic areas.

### 4.4.7 Economic and Social Values

Proposed Action

The proposed Lime Wind Project is based on the idea of creating a community-based renewable energy source within Baker County. There are broad advantages as a result of the wind turbines themselves, as well as the economic impact of the construction project.

The installation costs are projected at $4.9 million to provide the infrastructure, turbines, erection, and road work. Twenty five percent of the projected installation cost would enter the local economy as wages and locally purchased materials for the construction of roads, foundations, and the erection of turbines.

The State of Oregon would complete an assessment of the Lime Wind Project to determine the tax value after construction of the project is completed. The Lime Wind Project would be taxed at the appropriate rate by Baker County.

The State of Oregon and the Federal Government have made renewable energy on public lands a priority. This project would create approximately 8,229 Megawatts of electricity annually, enough to power 800 homes in the Pacific Northwest. An equivalent amount of power generated from the Lime Wind Project, if produced from a coal-fired power plant, would emit approximately 3,000 tons of greenhouse gases annually.

No Action Alternative

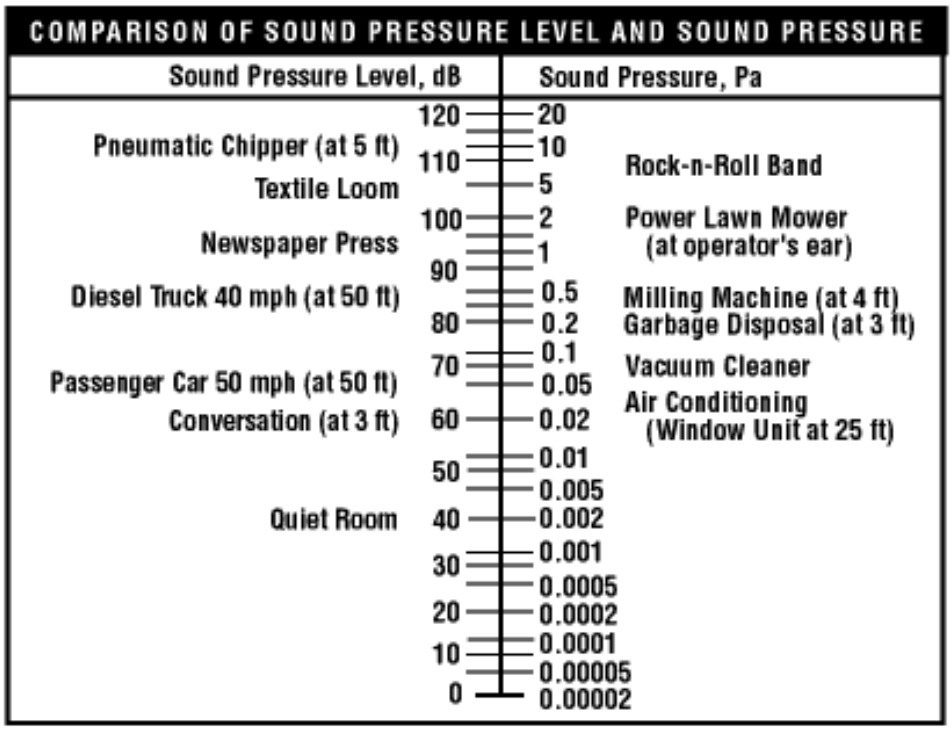
Under the No-Action alternative, over $3 million would not be added to local tax roles, 8,229 megawatt hours (MWH) of electricity would not enter the grid annually, and over one million dollars would not enter the local economy for wages and materials. Other non-hydropower renewable energy projects located on public lands would need to be created in order to be in accordance with the Energy Policy Act of 2005. BLM would continue to consider opportunities to meet the goals set by the Energy Policy Act at other locations should this application for ROW not be granted.

### 4.4.8 Noise

Proposed Action

The WTGs would create noise which would be audible at the site to wildlife and the general public that access the site. The wind turbines would create broadband noise as their revolving rotor blades encounter turbulence in the passing air. Broadband noise is usually described as a "swishing" or "whooshing" sound. Noise levels would range between 35-45 dB at 350 feet (The Scottish Office 1994). Turbines do not seem exceptionally noisy close because the sound does not come from a concentrated spot but from the large area of the rotor.

Below is **Table 9**, showing the loudness ("sound pressure level") of some common noises
**Table 9:** (Canadian Centre for Occupational Health and Safety, 2008)




Noise from the turbines would not be audible from any nearby recreational points of interest or residences.

See “Wildlife” for impacts of projected noise on wildlife, birds, and bats.

<u>No Action Alternative</u>

Under the No-Action alternative, noise levels would not be increased by construction or wind turbines. Noise levels would continue at current levels.

### 4.4.9 Public Health and Safety

<u>Proposed Action</u>

Flaggers and traffic controllers would be provided by the applicant during the construction phase. A speed limit of 20 mph would be posted and enforced during this time.

All turbines are remotely located on ridge tops. Access up to the project site would be open to those accessing the BLM property. There is no inherent danger (after

construction) associated with exterior access as towers, transformers, and electrical collectors would be locked at all times and access would only be available to the Applicant or its agent.

No Action Alternative

Under the No-Action alternative, there would be no increase of traffic from construction and therefore no increase of the possibility of traffic injuries. Health and safety concerns would continue at current levels.

### 4.4.10 Indian Trust Resources

Proposed Action

With the required mitigation measures as described in section 2.1.15.4, big game habitat should not be measurably impacted. The small increase in vehicle traffic during the crucial winter months has the potential to negatively affect big game, but as stated in the design features of the project (Operation and Maintenance of Turbines, section 2.1.14.2), traffic that results from maintenance during winter and spring months would be limited to six total trips during this time period (5 regular monthly and one quarterly).

There would be initial impacts to approximately 9 acres of habitat that could be used by deer, elk or antelope, approximately 5.5 acres of which would be revegetated for no long term loss of this habitat, leaving an estimated 3.5 acres disturbed for the life of the project. This disturbance would be mitigated by planting bitter brush on approximately 7 acres within the same deer use area.

An approved BLM botanical survey found three plants in the project area that BLM believes to be of interest to CTUIR and other affected tribes. These are common over many square miles in this geographic area around Lime Hill, Morgan Mountain, and Lookout Mountain. Biscuitroot (*Lomatium dissectum*) can be found scattered on north and east aspects of hills, Nine-leaf biscuitroot (*Lomatium triternatum var. triternatum*) is also common in this same greater area, and diffusely spread over the mountain areas. Lewisia rediviva, or bitterroot, was rated as unusual to few in occurrence in the project area, restricted to shallow, rocky soils near ridge tops. While 8.9 acres of potential root food production areas would be disturbed during construction, few of these root food plants were found in the project area. The surveying botanist determined the project construction area is not a high potential site for biscuitroot or bitterroot habitat nor would construction affect these plants. Therefore the project would not affect these plants' potential numbers significantly (personal communication with Clair Button, contract biologist on 6-29-09). We are unaware of any additional plants that are found in the proposed project area that are of interest to CTUIR or any other affected tribe.

No Action Alternative

Under the No-Action alternative, Indian Trust Resources would remain the same.

## 4.5 Cumulative Impacts

The Council on Environmental Quality (CEQ) defines cumulative effects as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7). A June 2005 CEQ memorandum states:

> The environmental analysis required under NEPA is forward-looking, in that it focuses on the potential impacts of the proposed action that an agency is considering. Thus, review of past actions is required to the extent that this review informs agency decision making regarding the proposed action. This can occur in two ways:
>
> First, the effects of past actions may warrant consideration in the analysis of the cumulative effects of a proposal for agency action. CEQ interprets NEPA and CEQ's NEPA regulations on cumulative effects as requiring analysis and a concise description of the identifiable present effects of past actions to the extent that they are relevant and useful in analyzing whether the reasonably foreseeable effects of the agency proposal for action and its alternatives may have a continuing, additive and significant relationship to those effects. In determining what information is necessary for a cumulative effects analysis, agencies should use scoping to focus on the extent to which information is "relevant to reasonably foreseeable significant adverse impacts," is "essential to a reasoned choice among alternatives," and can be obtained without exorbitant cost (40 CFR 1502.22). Based on scoping, agencies have discretion to determine whether, and to what extent, information about the specific nature, design, or present effects of a past action is useful for the agency's analysis of the effects of a proposal for agency action and its reasonable alternatives. Agencies are not required to list or analyze the effects of individual past actions unless such information is necessary to describe the cumulative effect of all past actions combined. Agencies retain substantial discretion as to the extent of such inquiry and the appropriate level of explanation (*Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 376-77 [1989]). Generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.
>
> Second, experience with and information about past direct and indirect effects of individual past actions may also be useful in illuminating or predicting the direct and indirect effects of a proposed action. However, these effects of past actions may have no cumulative relationship to the effects of the proposed action. Therefore, agencies should clearly distinguish analysis of direct and indirect effects based on information about past actions from a cumulative effects analysis of past actions.

The following cumulative impact analysis is limited to past, present, and reasonably foreseeable future actions that involve impacts to a resource value that overlaps temporally and/or spatially with the Proposed Action's impacts to that same resource value. Thus, not all actions identified are discussed for each resource.

The analysis of effects from the Proposed Action on cultural resources, paleontological resources, hazardous or solid wastes, air quality, surface water and groundwater quality, or availability of access indicated that the Proposed Action would not affect these elements. Therefore, implementation of the Proposed Action would have no cumulative effects on these elements.

There would be no cumulative effects on wild and scenic rivers, wilderness areas, floodplains, wetlands/riparian zones, environmental justice, farm lands, threatened/endangered fish, threatened or endangered or Bureau Sensitive plant species, fisheries, forest resources, wild horse and burro designated herd management areas or mineral resources because these resources do not occur in or immediately adjacent to the Project area, and the effects to these resources of interest from the proposed action are confined to the immediate project area, specifically, the described section 36 of public land.

**Visual Resources**

The visual resource cumulative effects area is defined by the area from which the twelve wind turbines can be seen. Currently, one other wind project with the potential to contribute to impacts to visual resources around Lime, Oregon has been identified. This project is Elkhorn Valley Wind Farm (Horizon Wind Energy) which has constructed larger turbines east of North Powder, Oregon, approximately 60 miles north of the Proposed Action, and analyzed in this document. Visually, the distance and drive time between these two projects, as well as the inability to see both projects simultaneously from Key Observation Points, lends to minimizing cumulative impacts.

The development of the Lime Wind Project would be the first wind energy site in this general area. However, other studies are being performed on adjacent and surrounding lands, as well as one POD located in the Burnt River area that could lead to additional wind energy developments in the future.

The cumulative impacts from future developments not yet proposed could have more pronounced visual effects if planned in adjacent areas to the proposed Lime Wind project. Each future project would be assessed through additional NEPA analysis using the VRM analysis process and based on the VRM Classifications of the lands in which projects are proposed. Any future NEPA analysis would re-assess cumulative impacts, including those occurring from the Lime Wind project if it exists at that time.

High voltage power lines within a ROW corridor are in the Lime, Oregon area. Also, a high voltage power line that is proposed by Idaho Power Company may have an overlapping visual effect with the proposed wind turbines in the future. While the Idaho Power Company power line project is proposed, a ROW has not yet been granted by

BLM. A power line routing process for this has begun through a citizen's advisory group and, although BLM encourages new power line installations to be within existing corridors, it is possible to locate them outside of a corridor. If the power line were to be located within the existing corridor, it and the wind turbines would both be visible from points along Interstate 84 by travelers passing through the area. At the time of this analysis, BLM does not know where the power line ROW would be or the power line design features. However, it can be assumed that if the ROW were granted, there would be additional cumulative impacts to the visual resource when added to the impacts from the Lime Wind proposed project (See Attachment A for VRM worksheets and visual simulations).

**Cultural Resources**

Although BLM determined there would be no effect to Cultural Resources (section 4.3.3), it is worth repeating here that there is one cultural feature 919 feet outside of the project Area of Potential Effect but it is within the viewshed of the project. The BLM concluded this project would have no effect on this site and SHPO issued a concurrence on the no effect finding on December 16, 2008. CTUIR does not agree with this determination and believe BLM should gather more information to justify our conclusion. BLM addressed this request by gathering additional information including the relative age range for the feature. The additional information BLM was able to obtain supports the original no effect conclusion and SHPO reaffirmed their no effect concurrence on December 1, 2009. The BLM is not aware of any information available to us to justify a change in our no effect determination (see section 3.2.3, Affected Environment).

**Indian Trust Resources**

There is big game habitat and potential root production areas present in the proposed project analysis area. Cumulative impact analysis for big game habitat is addressed below in the Wildlife section. Impacts to the trust resources are addressed in sections 4.3.9.2, and 4.4.10, above. The botanical survey conducted in the proposed project area found three plants in the project area that BLM believes to be of interest to CTUIR and other affected tribes. These three plants are common over many square miles in this geographic area around Lime Hill, Morgan Mountain, and Lookout Mountain. Biscuitroot can be found scattered on north and east aspects of hills, Nine-leaf biscuitroot is also common in this same greater area, and diffusely spread over the mountain areas. Bitterroot was rated as unusual to few in occurrence in the project area. The public land within this geographic area is approximately 36,000 acres. It is, roughly, that public land located in townships 11, 12, 13 and 14 south, ranges 44 and 45 east. The BLM does not have a comprehensive list of all past actions in this area that may have residual effects on these root food sources. As earlier stated from CEQ, generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without researching the historical details of individual past actions. We concluded that these plants are commonly found in healthy populations over these many square miles. Currently, there are no other proposed projects within this analysis area that would have an additive effect to these root food sources. We also conclude that the proposed project would not disrupt any potential habitat (habitat that may in the future support

these plants) other than that measured in the analysis of effects. Finally, we conclude that removing approximately 3.5 acres of this potential habitat for the life of the project, as the result of this project would not have a significant effect.

**Migratory Birds**

As analyzed in 4.3.9.1, effects to birds include mortality from construction and operation. Table 7 compares those estimated rates of bird mortality to other wind energy developments in eastern Oregon and Washington. Bird mortality rates per 100,000 meters squared of rotor-swept area per year for the four cited wind developments indicate an average of 85 birds. The proposed Lime Wind project would include a maximum total rotor-swept area of 9,237 square meters. Using these figures, the Lime Wind proposal would average an annual bird mortality rate of 7.8 birds per year. The four cited wind developments average 1.83 birds killed per turbine per year without a measureable decrease in local populations. The Final Programmatic EIS on wind energy development (June 2005) indicates the mid-range expected mortality for passerine would be about 1.2 to 1.8 birds per turbine per year. On that basis, the PEIS states that this level of mortality may not have any population-level consequences for individual species. However, population effects may be possible for some species, although no studies to date have documented such effects (PEIS, 5.63). Using the figures above, the BLM concluded that the Lime Wind development should have bird mortality rates less than those rates analyzed in the Programmatic Wind EIS, which concluded that those higher rates would likely have no population-level consequences for individual species.

**Wildlife**

Cumulative effects to large game species such as mule deer and pronghorn from this proposed development are of special concern to affected Tribes. The geographic scope of the cumulative effects analysis area for large game species is depicted in Exhibit XI. This is an area identified as the local mule deer use area. It is approximately 16 miles long by 6 miles wide, and lies on a North/South axis. Its narrowest portion is about 3 miles wide. The Lime Wind proposal is roughly centered in this 3-mile wide portion of the mule deer use area. About 23,000 acres of the approximately 35,800 acres of the use area are public lands. There are no other proposed projects on this public land acreage, and BLM is unaware of any proposals on the balance of private land (about 12,500 acres) that would have additive effects to this habitat. As stated in the EA (4.3.9.2), studies of ungulate movement at the larger Foote Creek Rim project in Wyoming have not demonstrated any displacement impacts (Johnson et al. 2000). Oregon Department of Fish and Wildlife supported BLM's position that the project area is too small to affect a population-level response from big game species.

**Sage-grouse**

As described in section 3.2.9.3, and analyzed in section 4.3.9.3 of this document, the proposed project area is located on the fringe of current and historic sage-grouse range, and there is available habitat for sage-grouse life cycles. The analysis uses data acquired from an ODFW survey from April 2006, the time of year when sage-grouse leks are active. ODFW has routinely counted for sage-grouse sites and activity in this area. The analysis also draws on data cited from other published sources. These sources of data

conclude that, because the leks are traditional, they tend to be used annually for their breeding rituals. Examples of lek sites include old lake beds or playas, low sagebrush flats, and openings on ridges, roads, and burned areas (Schroeder et al. 1999). The lek is considered to be the center of year-round activity for resident sage-grouse populations and most nesting/brooding sites are located within 4 miles of a lek (Nowak 2004). Sage-grouse require large areas covered with sagebrush to meet life-history needs. The ODFW survey found no active leks within a 5-mile radius of the project area during the 2006 survey. No known populations are within the project area. The BLM does not conclude that the proposed project would not affect sage-grouse or their available habitat. Instead, we conclude that the effects to these are small enough to not be measureable.

**Noxious Weeds**

The total area of disturbed public land from the proposed action that is susceptible to the spread of noxious weeds is approximately 9 acres. There are no known past actions having current effects on the spread of noxious weeds except for the existing road, which can, as pointed out by CTUIR, become a vector for spreading weeds into an area. No additional access routes to the area would be established as the result of this proposed project's implementation. Also, BLM currently has no additional projects proposed for this section of public land. The effects would be confined to the section of public land where the proposed project would be sited, plus that area of private land where buried transmission lines would lead to the point-of-service at the existing overhead power lines. Disturbed areas would be reseeded with native vegetation prescribed by the BLM as noted in section 4.4.4. In the long term, beyond five to ten years, density of native plant species should recover completely except for the turbine foundation footprint, transformer pads, and roads necessary to the project totaling approximately 3.5 acres. The project design features include annual inspections to identify any future influx of non-native weed species, reseeding of disturbed areas with certified weed-free seed mixes, and the prescribed treatments of weed spraying described in section 4.4. With these built-in precautions, we conclude that the effects on resources from noxious weed introductions would be kept below the level of significance.

**Other Biological Resources**

The analysis of effects of the Proposed Action on other biological resources (e.g., plants, threatened and endangered species), and recreation, existing and potential land uses, vegetation, soils indicated that effects to these elements would be minor as identified in the relevant sections above. These effects would be confined to the section of public land where the proposed project would be sited. There are no known past actions having current effects on these resource values. Also, BLM has no additional projects proposed for this section of public land in the future.

The Proposed Action would result in approximately 9 acres of initial disturbance but would likely cause negligible cumulative impacts because of the rehabilitation of the disturbed area resulting in only an estimated 3.5 acres disturbed for the life of the project as well as the lack of other projects in the vicinity.

## 4.6 Summary

Given the potential for additional wind development in eastern Oregon, it may be that when cumulative effects are analyzed in future proposals, different conclusions could be reached. As stated earlier, the development of the Lime Wind Project would be the first wind energy site in this general area, but other studies are being performed on adjacent and surrounding lands as well as one Plan of Development (POD) located in the Burnt River area that could lead to additional wind energy developments. A 30 year life expectancy of a development like Lime Wind would have residual effects over that time period and those effects would be added to additional effects analysis from future wind development proposals. The isolated geographic characteristics currently present in this area may also change over time if recreation activities increase.

# 5) CONSULTATION AND COORDINATION

## 5.1. Persons and Agencies Notified or Consulted:

Allen Phillips – Baker County Assessor's Office
Antone Minthorn - Chair, Board of Trustees, Confederated Tribes of the Umatilla Indian Reservation
Baker City – Building Department
Burr J. Betts, PhD - Betts Enterprises, LLC
Catherine Dickson – Cultural Resources, Confederated Tribes of the Umatilla Indian Reservation
David Welch – National Preservation Officer, Oregon-California Trails Assoc.
Dr. Dennis Griffin – Oregon State Historic Preservation Office
Erik Harvey - Blue Mountain Consulting; Archaeology and Public History
Josiah Pinkham – Tribal Historic Preservation Officer, Nez Perce Tribe
Kerry Savage – Baker County Assessor's Office
Linda Jerofke PhD - Blue Mountain Consulting; Archaeology and Public History
Mark Bennett - Baker County Planning Department
Nick Myatt – Baker District ODFW
Richard Jerofke - Blue Mountain Consulting; Archaeology and Public History
Roger Rosentreter PhD - Idaho Bureau of Land Management
Samuel Penney – Chair, Nez Perce Tribal Executive Committee, Nez Perce Tribe
Stafford Hazelett – Oregon-California Trails Association
State of Oregon – Building Codes Division
Wanda Johnson – Council Chair, Burns Paiute Tribe

## 5.2. List of Preparers:

Becky Lazdauskus – Baker BLM Realty Specialist
Brian Harden – Oregon Power Solutions
Bruce Haase – Baker BLM GIS Specialist
Clair Button
Courtney James- Baker BLM Realty Specialist
Craig Martell – Baker BLM Range Conservationists
Dale Eckman
Eric Mayes- Vale BLM Planning and Environmental Coordinator
Jennifer Cohen – Joseph Millworks
Katherine Coddington – Baker BLM Archeologist
Kelly Cahill – Cahill Engineering and Energy, LLC
Kevin McCoy – Baker BLM Outdoor Recreation Planner/River Ranger
Leslie Gecy- EcoWest Consulting, Inc.
Linda Joseph – Joseph Millworks
Loran Joseph – Joseph Millworks
Mary Oman – Baker BLM Archeologist
Melissa Yzquierdo - Baker BLM Wildlife Biologist/Botanist
Michelle Caviness – Vale BLM Wildlife Biologist
Mike Beanland – Triaxis Engineering
Randy Joseph – Joseph Millworks
Richard Chaney – Baker BLM Geologist
Ted Davis – Baker BLM Assistant Field Manager
Todd Kuck – Baker BLM Supervisory Natural Resource Specialist

# 6) BIBLIOGRAPHY

Archaeological Survey of Bridge 09354 (Highway 84 over Lime Interchange Connection at MP 343), Baker County, Oregon, UO Museum of Natural and Cultural History, Research Report No. 2005-16.

Arnett, E.B. 2005. Relationships between bats and wind turbines in Pennsylvania and West Virginia: an assessment of bat fatality search protocols, patterns of fatality, and behavioral interactions with wind turbines. The Bats and Wind Energy Cooperative, Bat Conservation International, Austin, Texas.

Arnett, E.B., W.K. Brown, W.P. Erickson, J.K. Fiedler, B.L. Hamilton, T.H. Henry, A. Jain, G.D. Johnson, , J. Kerns, R.R.Koford, , C.P. Nicholson, T. J. O'Connell, M. D. Piorkowski, and R.D. Tankersley, Jr. 2008. Patterns of Bat Fatalities at Wind Energy Facilities in North America. Journal of Wildlife Management 72:61-78.

Australian Wind Energy Association. 2007.
http://www.auswind.org/accreditation/windinfo/assets/6Noise.pdf

Baker County Planning and Community Development Department. 2008. Zoning and Subdivision Ordinance #83-3 Section 105.

Barclay, R.M.R., E.F. Baerwald, J.C. Gruver. 2007. Variation in bat and bird fatalities at wind energy facilities: assessing the effects of rotor size and tower height. Canadian Journal of Zoology 85: 381-387.

Baxter, Paul W. 1988. HRA Letter Report 88-2, Cultural Resource Survey of Bureau of Land Management Lands Crossed by the Proposed Baker to Huntington Pacific Northwest Bell Fiber Optic Cable Route.

Betts, Burr. 2009. Lime Wind Project: Results of a Survey for Migrating Bats.

Betts, Burr. 2009. Lime Wind Project: Results of a Survey for Resident Bats.

Bureau of Land Management. 2005. Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM-Administered Lands in the Western United States.

Bureau of Land Management. 2008. National Environmental Policy Act Handbook.

Cabebe, Teresa E. 2006. Archaeological Survey of Bridges 01788 and 01789 (Oregon Highway 30 over the Burnt River at Lime, MP 0.46, and Huntington, MP 3.90), Baker County, Oregon. University of Oregon, Museum of Natural and Cultural History Research Report No. 2006-54.

Canadian Centre for Occupational Health and Safety, 2008.
www.ccohs.ca/oshanswers/phys_agents/noise_basic.html

Colorado Division of Wildlife. 2007. Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls When Conducting Prairie Dog Control. Denver, Colorado.

Connelly, J. 1999. What do we know about sage grouse needs? Presentation given to the Western Sage Grouse Status Conference, Jan. 14-15, 1999, Boise, ID.
Available: http://www.rangenet.org/projects/grouse.html.

Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines to manage sage grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.

Csuti, B., A. J. Kimmerling, T. A. O'Neil, M. M. Shaughnessy, E. P. Gaines, and M.M.P. Huso. 1997. Atlas of Oregon wildlife: distribution, habitat, and natural history. Oregon State University Press, Corvallis.

Curry A. 2009. Deadly flights. Science 325:386-387.

Dooling, R. 2002. Avian hearing and the avoidance of wind turbines. NREL/TP-500-30844, National Renewable Energy Laboratory, Golden, Colorado.

Erickson, W.P., G.D. Johnson, M.D. Strickland. 2002. Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information and Comparisons to Other Sources of Avian Collision Mortality in the United States. Technical Report Prepared for Bonneville Power Administration Portland, Oregon.

Erickson, W.P., K Kronner, and B. Gritski. 2003. Avian and Bat Fatality Monitoring Report for the Nine Canyon Wind Project, Benton County, Washington. Technical Report Prepared for Nine Canyon Technical Advisory Committee and Energy Northwest.

Erickson, W.P., J. Jeffrey, K Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Final Report. Prepared for FPL Energy, Stateline Technical Advisory Committee and Oregon Department of Energy.

Fiedler, J. K. 2004. Assessment of bat mortality and activity at Buffalo Mountain Windfarm, Eastern Tennessee. M. Sc. thesis, Department of Wildlife and Fisheries Science, University of Tennessee, Knoxville.

Fischer, R. A., A. D. Apa, W. L. Wakkinen, K. P. Reese and J. W. Connelly. 1993. Nesting-area fidelity of sage grouse in southeastern Idaho. Condor 95:1038-1041.

Horn, J. W., E. B. Arnett, and T. H. Kunz. 2008. Behavioral responses of bats to operating wind turbines. Journal of Wildlife Management 72:123-132.

Green, G.A., and M.L. Morrison. 1983. Nest-site selection of sympatric Ferruginous and Swainson's hawks. Murrelet 64:20-22.

Green, G. A., and R. G. Anthony. 1989. Nesting success and habitat relationships of burrowing owls in the Columbia Basin, Oregon. Condor 91:347-354.

Huster, Angela. 2005. Binder and Huntington Spring Developments, Baker Resource Area, Vale District, Bureau of Land Management, August 18.

Jerofke, Linda and Erik Harvey. June, 2008. Lime Wind Project Archaeological Survey, Blue Mountain Consulting. Report prepared for Randy Joseph, Joseph Millworks.

Jerofke, Linda and Erik Harvey. November, 2008. Lime Wind Project Survey Addendum: New Baker County Land Section, Blue Mountain Consulting. Report prepared for Randy Joseph, Joseph Millworks.

Jerofke, Richard. July, 2009. Lime Wind Project Burrowing Owl Survey, Blue Mountain Consulting. Report prepared for Randy Joseph, Joseph Millworks.

Johnson, G. D., M.K. Perlik , Erikson, W.P., and M.D. Strickland. 2004. Bat activity, composition, and collision mortality at a large wind plant in Minnesota. Wildlife Society Bulletin. 32:1278-1288.

Johnson, G.D., W.P. Erickson and M.D. Strickland. 2000. Wildlife Monitoring Studies Sea West Windpower Project, Carbon County, Wyoming 1995-1999. Technical Report prepared for Sea Rawlins, Wyoming.

Jones and Stokes. 2004. Legacy Parkway Wildlife Impacts Analysis. Technical Memorandum prepared for the Federal Highway Administration and the US Army Corps of Engineers.

Joseph, Randy. October, 2009. Lime Wind Project Bird and Bat Carcass Survey, Joseph Millworks.

Kunz, T., A. Edward, B. Cooper, W. Erickson, R. Larkin, T. Mabee, M. Morrison, D. Strickland, M. Dale, and J. Szewczak. 2007. Assessing impacts of wind energy development on nocturnally active birds and bats: a guidance document. Journal of Wildlife Management 71(8):22449-2486.

Leddy, K., K.F. Higgins and D.E. Naugle. 1999. Effects of wind turbines on upland nesting birds in Conservation Reserve Program grasslands. Wilson Bulletin 111(1):100-104.

McDonald, D., N.M. Korfanta, and S.J. Lantz. 2004. The Burrowing Owl (Athene cunicularia): A Technical Conservation Assessment. USDA Forest Service, Rocky Mountain Region.

Nowak, C. 2004. Editor. Draft Burnt River Subbasin Watershed Plan. Prepared for the Northwest Power Planning Council.

Olendorff, R. R. 1993. Status, biology, and management of ferruginous hawks: a review. Special Report, Raptor Research and Technical Assistance Center, Bureau of Land Management, U. S. Department of the Interior, Boise, Idaho.

Oman, Mary. June, 2008. Lime Wind Project Survey Addendum, Bureau of Land Management.

Oregon Department of Energy. 2007. Energy Facility Siting Standards.
http://www.oregon.gov/ENERGY/SITING/juris.shtml

Reagan, J.A. and C.A. Grant. 1977. Special Report Highway Construction Noise: Measurement, Prediction and Mitigation. Federal Highways Administration, Washington, DC.

Schroeder, M.A., J.R. Young, and C.E. Braun. Leonard, D.L. 1999. Sage Grouse (Centrocerus urophasianus). No. 425 IN A. Poole and F. Gill, editors. The Birds of North America, Inc., Philadelphia, PA.

The Scottish Office, Environment Department, 1994. “Noise From Wind Turbines” PAN 45, Annex A: Wind Power, A.27. Renewable Energy Technologies.

Shoemaker, Jessica A., Anderson Brekken, C. August 2006. Community Wind A Review of Select State and Federal Policy Incentives. A Publication of Farmers’ Legal Action Group, Inc.

Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States. Biological Technical Publication BTP-R6001-2003, Washington, DC.

Strickler, D. 2008. Overview of avian interactions with wind energy development. Webinar held April 8, 2008.

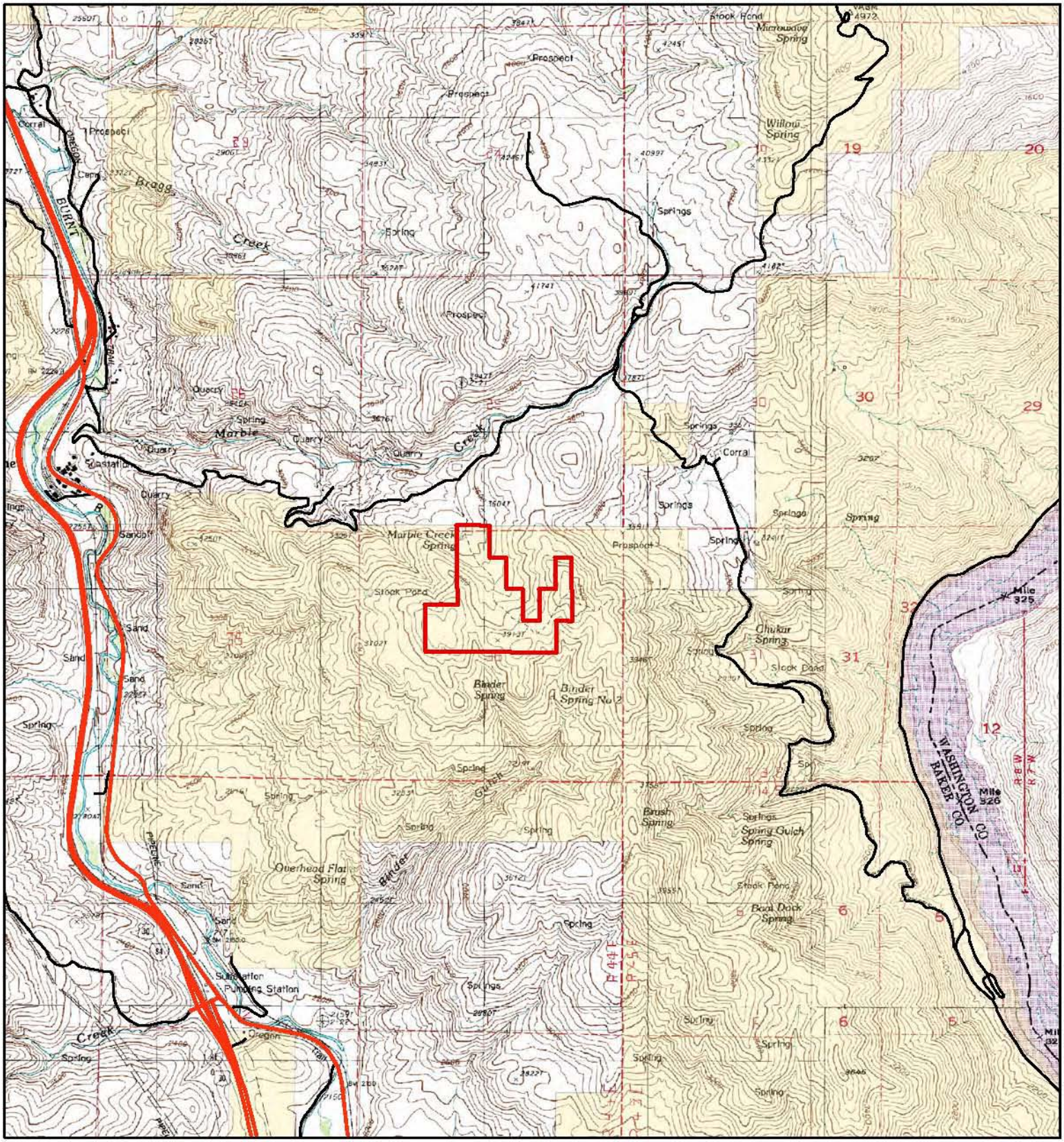
TrueWind Solutions, LLC. 2008. Sponsored by National Renewable Energy Labs, Bonneville Power, and US Department of Energy. www.windpowermaps.org.

United States Fish and Wildlife Service. 2003. Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines. US Department f the Interior, Wind Turbine Siting Working Group, Washington D.C.
http://www.fws.gov/habitatconservation/Service%20Interim%20Guidelines.pdf

United States Government Accountability Office. 2005. Wind Power. Impacts on Wildlife and Government Responsibilities for Regulating Development and Protecting Wildlife. GAO-05-906. p.64.

Wakkinen, W. L. 1990. Nest site characteristics and spring-summer movements of migratory sage grouse in southeastern Idaho. M.S. thesis, University of Idaho, Moscow, ID.

Wakkinen, W. L., K. P. Reese, and J. W. Connelly. 1992. Sage grouse nest locations in relation to leks. Journal of Wildlife Management 56:381-383.




# Lime Wind Energy Proposal
## Exhibit I

U.S. Department of Interior
Bureau of Land Management

Lime Wind Energy Project Area
BLM
Private

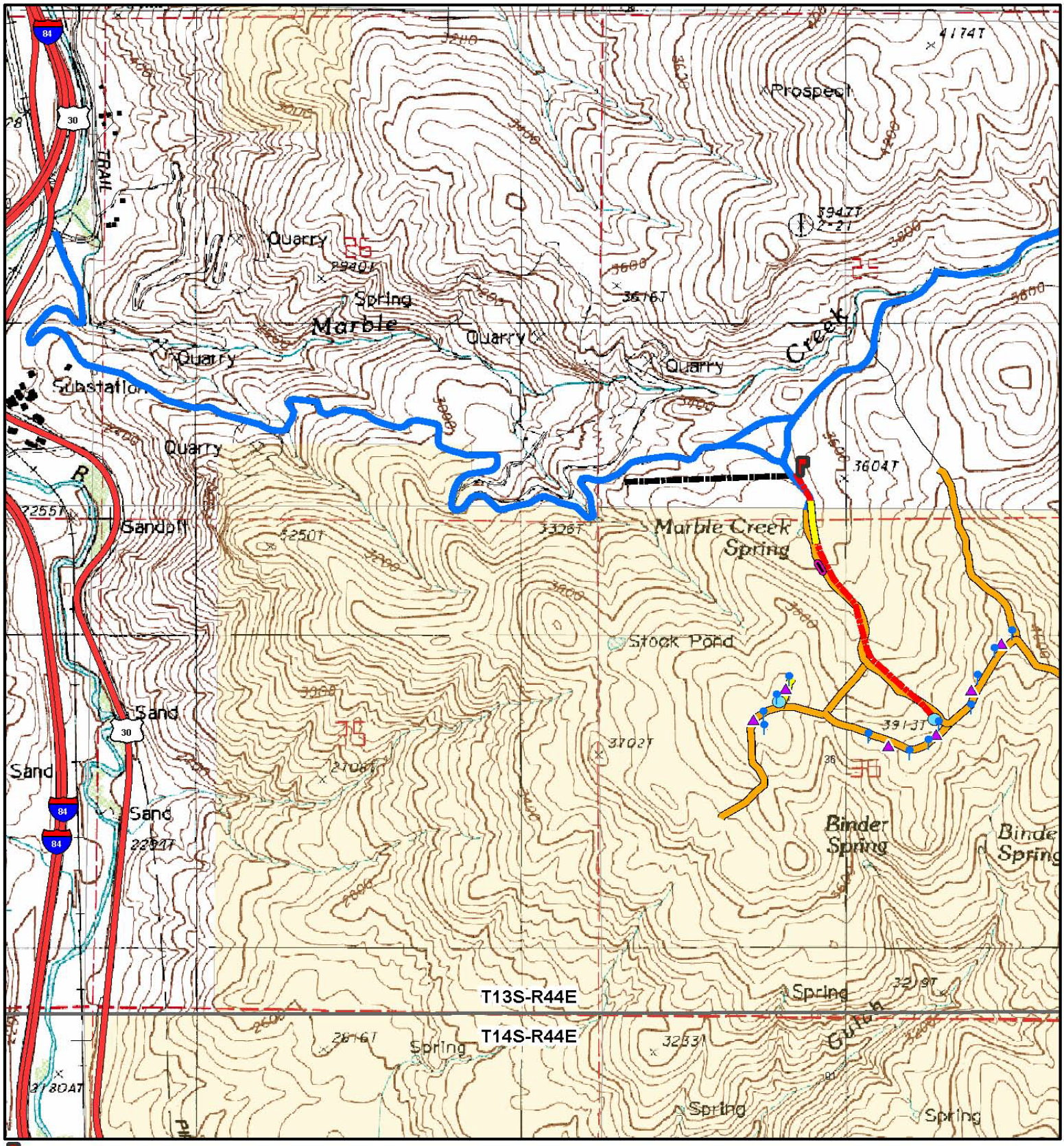
0 625 1,250 Meters

0 0.150.3 Miles

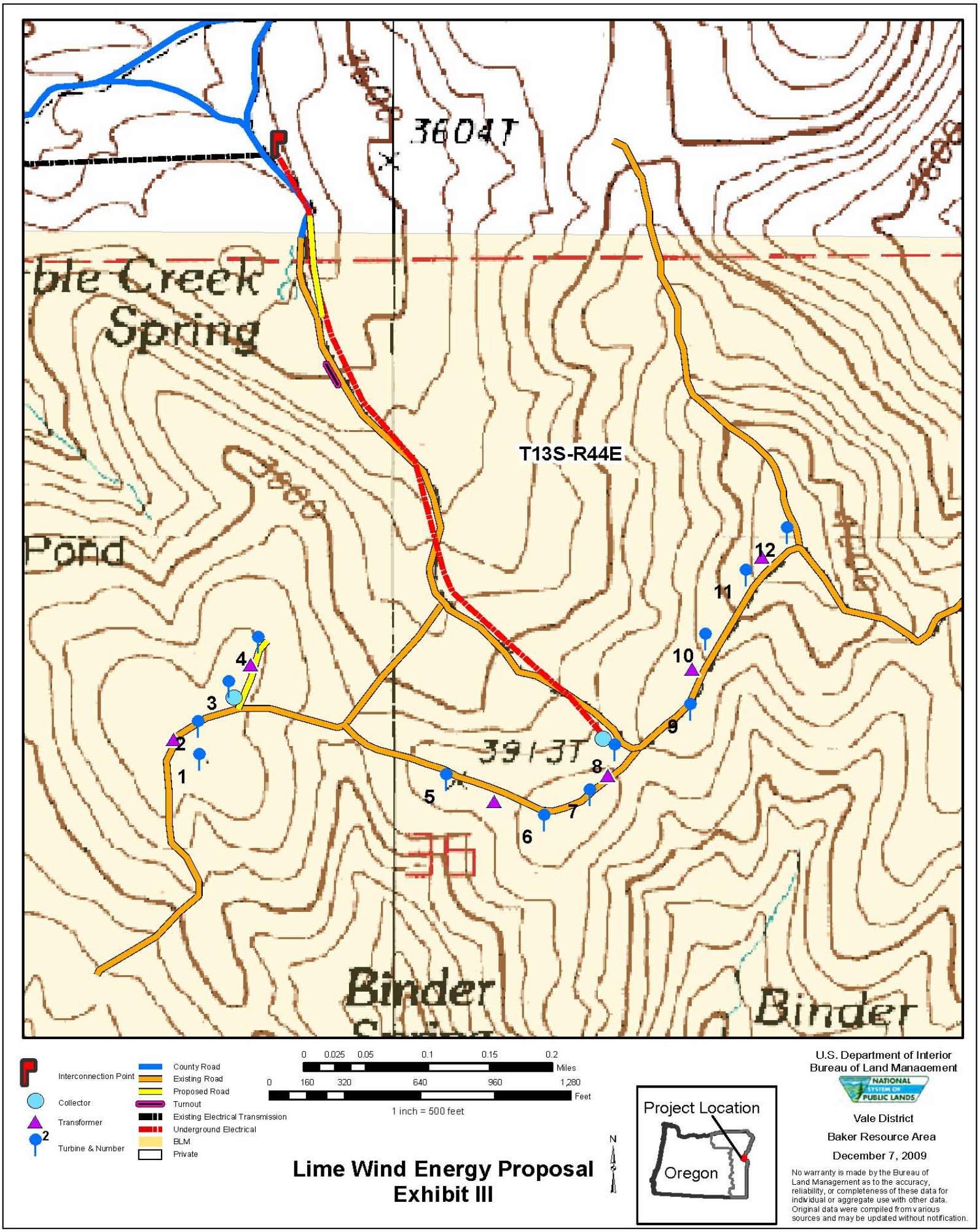
Vicinity Map

Vale District
Baker Resource Area
July 08, 2009

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.




**Lime Wind Energy Proposal**
**Exhibit II**




**Lime Wind Energy Proposal**
**Exhibit III**

Exhibit IV

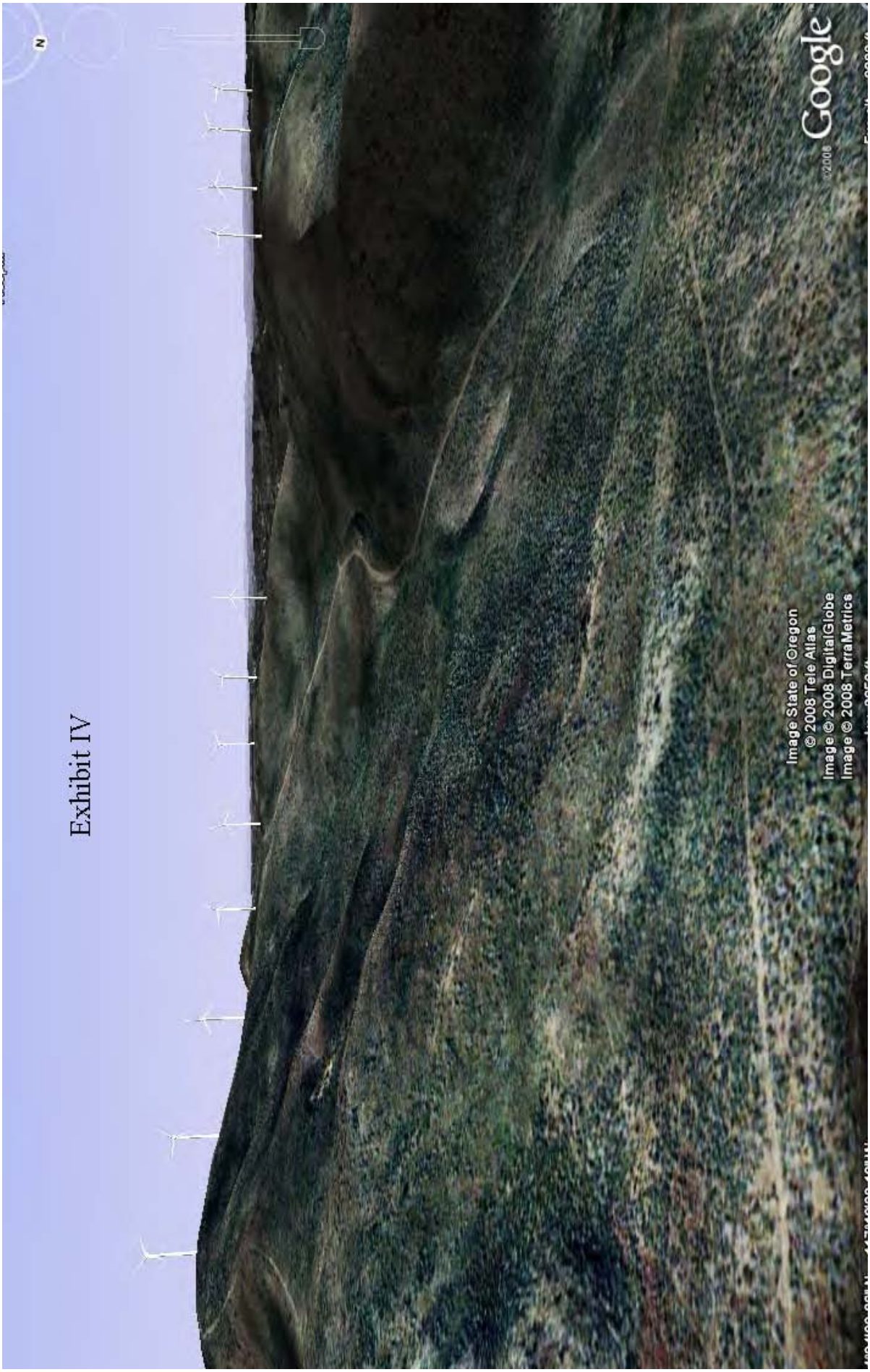


Image State of Oregon
© 2008 Tele Atlas
Image © 2008 DigitalGlobe
Image © 2008 TerraMetrics
Google

## Exhibit V

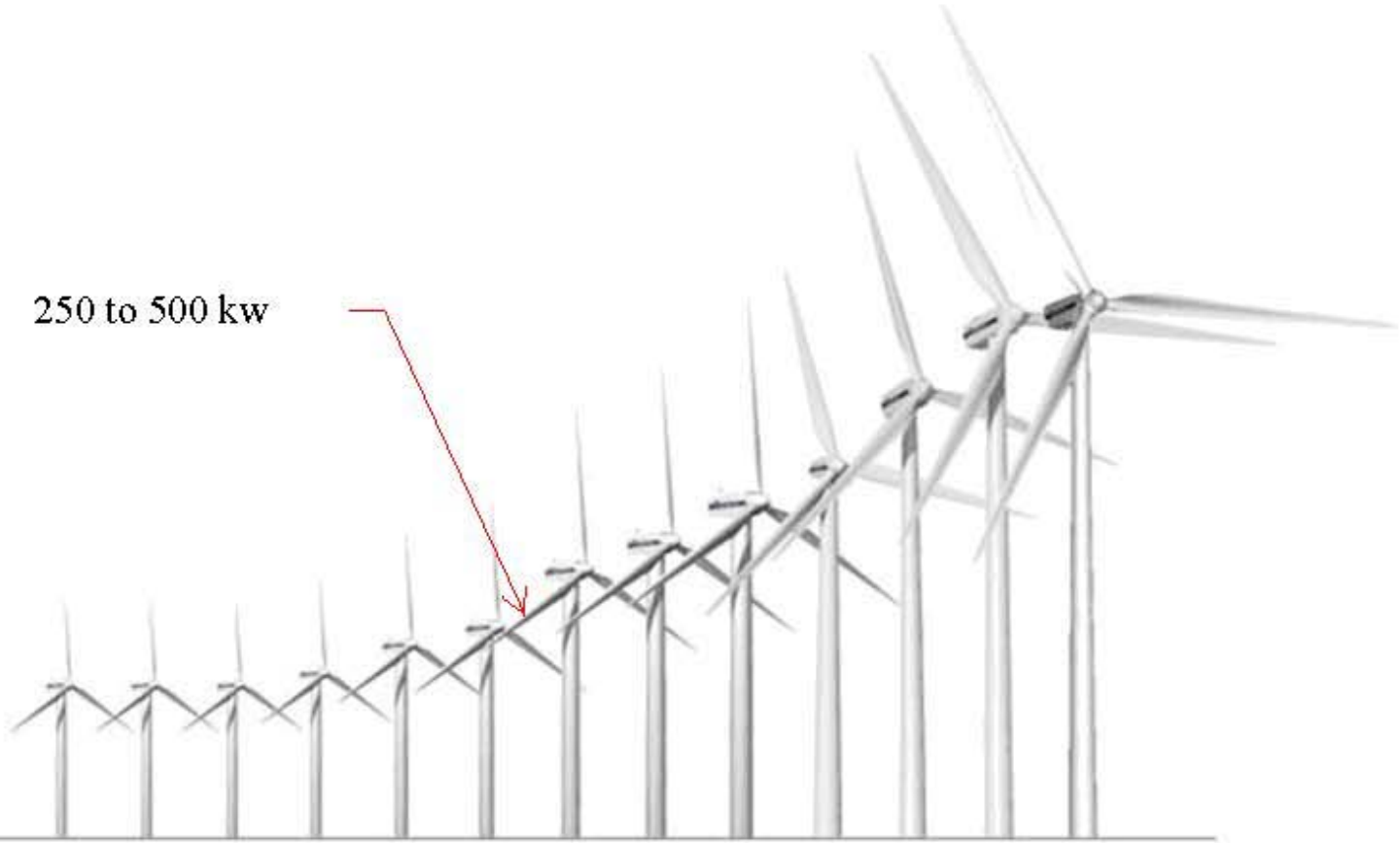
Photographs of Wind Turbine Generators by kw rating

250 kw turbine

300 kw turbine

400 kw turbine

500 kw turbine




| Product/Rotor diameter (m) | V15 | V17 | V19 | V20 | V25 | V27 | V39 | V44 | V47 | V52 | V66 | V80 | V90 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year of installation | 1981 | 1984 | 1986 | 1987 | 1988 | 1989 | 1991 | 1995 | 1997 | 2000 | 1999 | 2000 | 2002 |
| Capacity (kW) | 55 | 75 | 90 | 100 | 200 | 225 | 500 | 600 | 660 | 850 | 1750 | 2000 | 3000 |
| MWh/year | 217 | 265 | 301 | 346 | 481 | 647 | 1304 | 1581 | 1947 | 2530 | 4705 | 6768 | 9152 |

Exhibit VI

| CRITICAL ELEMENTS OF THE HUMAN ENVIRONMENT | OTHER IMPORTANT ELEMENTS OF THE HUMAN ENVIRONMENT |
|---|---|
| The following elements of the human environment are subject to requirements specified in treaty, statute, regulation, or executive order and must be considered in all environmental assessments | The elements of the environment listed below are not included on the "critical elements" list, but are important to consider in assessing all impacts of the proposal(s). |

All the following elements have been analyzed. Elements denoted by an "X" in the *not affected* column are not affected by the proposed action or alternatives and would receive no further consideration.

| Elements | Not Affected | Affected | Elements | Not Affected | Affected |
|---|---|---|---|---|---|
| Air Quality | | X | Paleontological Resources | X | |
| Areas of Critical Environmental Concern | EA will discuss | | Indian Trust Resources | EA will discuss | |
| Cultural Resources | EA will discuss | | Availability of Access/Need to Reserve Access | | X |
| Environmental Justice (EO 12989) (minority and low-income populations) | X | | Recreation Use, Existing and Potential | | X |
| Farm Lands (prime or unique) | X (none present) | | Existing and Potential Land Uses | | X |
| Floodplains | X (none present) | | Vegetation types, communities; vegetative permits and sales; Rangeland resources | | X |
| Invasive, Non-native Species | | X | Fisheries | X (none present) | |

| | | | | | |
|---|---|---|---|---|---|
| Native American Religious Concerns | None Known | | Forest Resources | X (none present) | |
| Threatened/Endangered Plants; Sensitive Plants | | X | Soils | | X |
| Threatened/Endangered Fish; Sensitive Fish | X (none present) | | Wild Horse and Burro Designated Herd Management Areas | X (none present) | |
| Wastes, Hazardous or Solid | | X | Visual Resources | | X |
| Water Quality – Surface | | X | Economic & Social Values | | X |
| Wetlands/Riparian Zones (including uplands) | X (none present) | | Mineral Resources | X | |
| Wilderness | EA will discuss | | Noise | | X |
| Wild & Scenic Rivers | X | | Public Health & Safety | EA will discuss | |
| Wildlife (including Migratory Birds and Threatened/Endangered/Sensitive/Species of Concern) | | X | | | |

| **Exhibit VII. TES Wildlife Species Potentially Occurring Within the Lime Wind Energy Project Area as Identified by ODFW.** | |
|---|---|
| **Species** | **Status** |
| **BIRDS** | |
| Western burrowing owl<br>*Athene cunicularia hypugaea* | Species of Concern |
| Greater sage-grouse<br>*Centrocerus urophasianus* | Species of Concern |
| Ferruginous hawk<br>*Buteo regalis* | Species of Concern |
| Bald eagle<br>*Haliaeetus Leucocephalus* | Species of Concern |
| **MAMMALS** | |
| Pallid Bat<br>*Antrozous pallidus pacificus* | Species of Concern |
| Silver-haired bat<br>*Lasionycteris noctivagans* | Species of Concern |
| Small-footed myotis<br>*Myotis ciliolabrum* | Species of Concern |
| Long-eared myotis<br>*Myotis evotis* | Species of Concern |
| Fringed myotis<br>*Myotis thysanodes* | Species of Concern |
| Yuma myotis<br>*Myotis yumanensis* | Species of Concern |
| Desert Bighorn<br>*Ovis canadensis nelsonii* | Species of Concern |

**Exhibit VIII**

| **Table 1. Federally Listed Threatened, Endangered or Candidate Species that May Occur in Baker County.** | | | |
|---|---|---|---|
| **Scientific Name** | **Federal Status** | **Habitat Summary** | **Habitat in Lime Project Area of Influence** |
| **Fish Species** | | | |
| *Salvelinus confluentus* (Bull tout [Columbia River Basin]) | Threatened | Cool, clear tributaries to the Powder and North Power Rivers. Not known from the Burnt River Basin. | No |
| **Amphibians and Reptiles** | | | |
| *Rana luteiventris* (Columbia spotted frog) | Candidate | Open, non-turbid, slack or ponded water. Often found in association with seeps and springs, open water with floating vegetation, and larger bodies of ponded water such as lakes and stream backwaters. | No |
| **Plant Species** | | | |
| *Thelypodium howelli* spp. *spectabilis* (Spectacular thelypody) | Threatened (also OR Endangered) | Moist, alkaline meadows within valley bottoms between 3,000-3,500 feet | No |

| **Table 2. Other Federal Species of Concern that May Occur in Baker County.** | | | |
|---|---|---|---|
| **Common Name** | **Scientific Name** | **Habitat Summary** | **Habitat in Lime Project Area or Vicinity** |
| **BIRD SPECIES** | | | |
| Northern goshawk | *Accipiter gentilis* | Mature or old growth forest | No |
| Western burrowing owl | *Athene cunicularia hypugea* | Open grasslands | Yes |
| Ferruginous hawk | *Buteo regalis* | Open grassland and shrub-steppe | Yes |
| Greater sage-grouse | *Centrocercus urophasianus* | Sagebrush steppe or occasionally grassland | Yes |
| Olive-sided flycatcher | *Contopus cooperi* | High elevation coniferous forest | No |
| Willow flycatcher | *Empidonax trailli adastus* | Riparian scrub shrub | No |
| Yellow-breasted chat | *Icteria virens* | Dense deciduous shrubs | No |
| Lewis' woodpecker | *Melanerpes lewis* | Open ponderosa pine forest | No |
| Mountain quail | *Oreortyx pictus* | Tall, very dense shrubs in steep canyons, near water | No |
| White-headed woodpecker | *Picoides albolarvatus* | Coniferous forest | No |

| | | | |
|---|---|---|---|
| Columbian sharptailed grouse | *Tympanuchus phasianellus columbianus* | Shrub steppe, meadow steppe, deciduous shrub; extirpated from OR and only known from re-introductions in Wallowa County | No |
| **FISH SPECIES** | | | |
| Pacific lamprey | *Lampetra tridentata* | Columbia River tributaries below dams; does not occur in Burnt or Powder Rivers. | No |

| | | | |
|---|---|---|---|
| **AMPHIBIANS AND REPTILES** | | | |
| Tailed frog | *Ascaphus montanus* | Very cold, swift moving streams at high elevation | No |
| Northern sagebrush lizard | *Sceloporus graciosus graciosus* | Sagebrush and bitterbush communities on sandy soil | No |
| **INVERTEBRATE SPECIES** | | | |
| Blue Mountains cryptochian caddisfly | *Cryptochia neosa* | Shaded, high gradient, headwater streams with abundant small wood and bark. | No |
| **MAMMAL SPECIES** | | | |
| Pygmy rabbit | *Brachylagus idahoensis* | Dense sagebrush habitat in deep, loose soils | No |
| Pallid bat | *Antrozous pallidus pacificus* | | |
| Pale western big-eared bat | *Corynorhinus townsendii pallescens* | | |
| Townsends's western big-eared bat | *Corynorhinus townsendii townsendii* | | |
| Silver-haired bat | *Lasionycteris noctivagans* | | |
| Small-footed myotis (bat) | *Myotis ciliolabrum* | | |
| Long-eared myotis (bat) | *Myotis evotis* | | |
| Fringed myotis (bat) | *Myotis thysanodes* | | |
| Long-legged myotis (bat) | *Myotis volans* | | |
| Yuma myotis (bat) | *Myotis yumanensis* | | |

| | | | |
|---|---|---|---|
| California wolverine | *Gulo gulo luteus* | Subalpine forest and alpine meadows and fellfields | No |
| Gray wolf | *Canus lupus* | Known only from forested habitats in Oregon | No |
| Preble's shrew | *Sorex preblei* | Marshes and creeks within shrub-grass associations | No |

Exhibit IX

**Baker County Planning & Community Development Department**

March 24, 2008

Randy Joseph
Joseph Millworks
37123 Hansen Lane
Baker City OR 97814

RE: Lime Wind Project located T13S, R44E, Sec. 36 USDOI/BLM property

Dear Mr. Joseph:

The Baker County Zoning and Subdivision Ordinance #83-3 Section 105, (Application) states the following: This Ordinance shall apply to all land in the County outside the incorporated cities and their adopted urban growth boundaries except:

A. Land managed by agencies of the federal government.

The theory behind this exception is the federal government land use approval system exceeds the oversight by the county. Additionally the federal government through intergovernmental agreements with the county and NEPA requirements provides numerous opportunities for the county to participate in the decision making process.

In the event that Baker County can provide further assistance please feel free to contact our office.

Sincerely

Mark Bennett, Director
Planning and Community Development
Office: 541.523.8219

Oregon
Theodore R. Kulongoski, Governor

**Department of Fish and Wildlife**
Baker City Field Office
Grande Ronde Watershed District
2995 Hughes Lane
Baker City, OR 97814
(541) 523-5832
FAX (541) 523-5874

December 17, 2007

Nancy K. Lull
Bureau of Land Management
Baker Field Office
P.O. Box 947
Baker City, OR 97814

Re: Randy Joseph application for wind development project on BLM land

Dear Nancy:

The purpose of this letter is to provide a correction to the comment letter I submitted on Randy Joseph's application to the BLM for a right-of-way for a wind development project near Lime, OR.

In my original letter, I said that "minimal effort has been made to survey the area for the presence of sage grouse leks" and I recommended "the project area and surrounding areas be intensively surveyed for the presence of sage grouse leks before the initiation of the project". After submitting the letter, it came to my attention that my statement was incorrect.

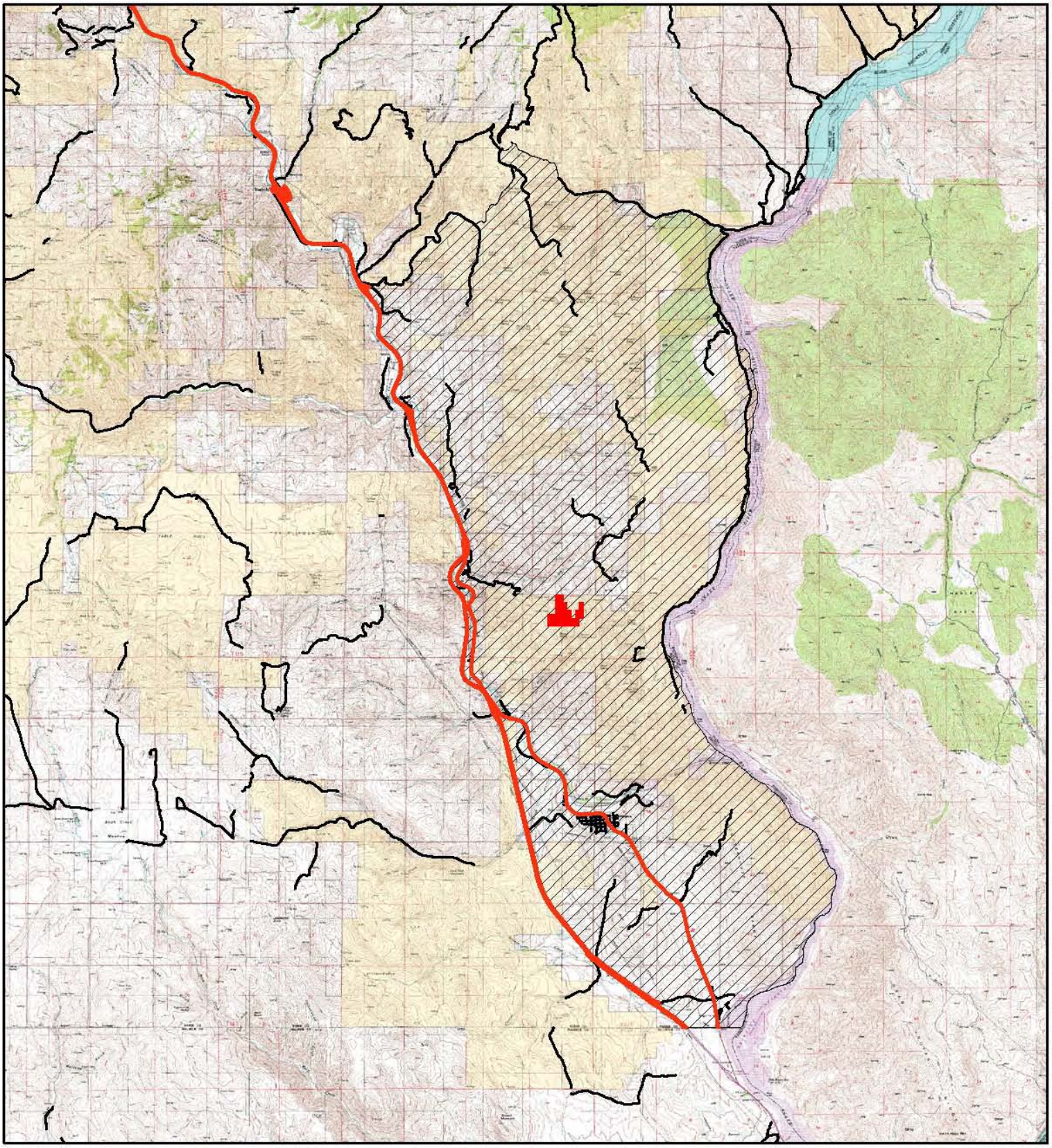
The area of proposed development was surveyed by ODFW for the presence of sage grouse from the air during April 2006. No active sage grouse leks were located within a 5 mile radius of the project site.

I apologize for this oversight. If you have any questions or need further information please contact me at (541) 523-5832.

Sincerely,

Nick Myatt
District Wildlife Biologist

cc: Bruce Eddy, ODFW Grande Ronde Watershed Manager



Lime Wind Energy Project Area
deer_range
BLM
Private

**Lime Wind Energy Proposal**
**Mule Deer Use Area**
**Exhibit XI**

0 2,500 5,000 Meters
0 2 4 Miles

Vicinity Map

U.S. Department of Interior
Bureau of Land Management

Vale District
Baker Resource Area
July 08, 2009

No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.

# Wind Resource Assessment for the Lime Wind Power Project

## Summary

A wind power project is being proposed for the Burnt River valley, south of the Pyle Canyon area near Lime, in Baker County, Oregon, near the Idaho border. A large windfarm was installed in the Pyle Canyon area in 2007, about 45 miles north of the proposed project. The Lime wind power project would consist of 12 Mitsubishi 250-kW turbines on 30m towers. This report summarizes wind data collected at a reference meteorological tower located at the proposed site. Long-term wind speed and energy estimates have been made for the proposed Lime wind power project. The estimated mean wind speed at 30m is 16.3 mph (7.3 mps). The estimated net capacity factor is 26.2% for the standard 28m rotor and 28.5% if the turbines have one meter hub extenders.

## Analysis

The Lime Wind Power Project site is located on a ridgeline in the Lime, OR area. The area lies between two mountain ranges; the Blue Mountains to the west and the Wallowa Mountains to the north and east. The Valley has a north-south axis and winds are channeled up and down the valley. The ridge in the Project area ranges in elevation from 3,800 feet to 4,000 feet, and the valley floor is about 2,200 feet. The prevailing winds in the summer are from the north, when cooler modified marine air is drawn inland from the Columbia Gorge to the hotter interior Snake River Plain. In the winter, the flow sometimes reverses and the prevailing winds are from the north or southeast, and these winds are generally storm related or drainage flows.

One 33.5m tower was installed in the proposed wind power project area in July 2007 and data have been collected for a one-year period. We have also obtained wind data from Morgan Mountain, Dead Indian Ridge, Flagstaff Hill, and several other long term reference sites. To make long term speed and energy estimates, wind data from the on-site met tower have been correlated to the various references. Wind speed data are collected at 110-ft and 55-feet above ground level at the on-site met tower.

**Monthly and diurnal analysis**. Table 1, attached, is a monthly diurnal wind speed summary for the one-year period of record at the Lime, Oregon site. The met tower is near the western end of the proposed project and is used extensively in the subsequent analyses. The table is a 12 by 24 matrix of monthly and diurnal (time-of-day) mean speeds. The table shows that the monthly mean speeds (bottom row) are quite consistent all year around. The mean speed is shown at the bottom of the table and is 16.4 mph (7.3 mps). The bottom of the table shows the monthly and total data recovery, which is 96.5%. Figure 1 is a bar chart which graphically depicts the monthly mean speeds listed on the bottom of Table 1. The chart shows that the monthly mean speeds are fairly uniform throughout the year, with highest winds in mid-summer. Figure 2 is a plot which shows the diurnal mean wind speeds for January and July. The graph shows that there is a distinct diurnal peak in July, in the night time hours, with lowest winds in the early afternoon. However, in January there is very little diurnal variation in the winds.

**Wind Rose**. The windrose for the site shows that the prevailing winds blow from the north and north-northwesterly (summer conditions), and southeast and south-southeast directions (winter). Over 80% of the annual energy budget comes from the north sectors. The highest wind speeds are from the north direction. The ridgeline is oriented quasi-normal to the prevailing directions, and the windrose shows that less than 1% of the annual energy budget comes from wind directions that would be parallel to the proposed turbine rows. This will result in low array or wake losses.

## Methodology and Estimates

The methodology used in making the long-term speed and energy estimates includes the following steps. (1) Quality check the wind data for icing, failed sensors, etc. (2) calculate the vertical shear exponent at the met tower (change in wind speed with height), (3) correlate the Lime site to the various reference sites and estimate mean speed at Lime, and (4) using the vertical shear exponent, adjust the 33.5m mean speed to 30m, (5) based on the met tower data and the terrain, estimate hub height wind speed at the turbine string, (6) generate a wind speed distribution to estimate gross energy at the turbine string and (7) estimate array losses, icing and other losses. The results of these steps are the long-term mean speed estimates and gross and net energy output estimates for the 12 proposed turbines, which include array icing, and all other losses.

The wind data were collected and supplied by the project developer. I have screened and quality checked the data by several techniques including visual scans and inter-site correlations. Some invalid data occurred during periods of icing. These invalid data have been deleted from the dataset. All remaining data in the dataset are believed to be valid. The data collected use the U.S. Industry standard Maximum type 40 cup anemometer and NRG data loggers. The NREL recommended slope and offset (transfer functions) have been used for all wind data collected at the Lime Project. The Morgan Mountain, Dead Indian Ridge and Flagstaff Hill reference towers are RAWS sites, and are part of a large network of remote meteorological stations, but their sensor heights are only five meters. Other reference sites include Boise and Baker City airports.

**Vertical wind shear**. The measured vertical shear exponent at the 33.5m tower site was 0.08. The vertical shear is the change of wind speed with respect to height above ground, and is expressed as an exponent, known as alpha. This relatively low value is due to a combination of low ground cover and well exposed terrain. I have used the measured shear value between 17m and 33.5m to extrapolate to 30 meters.

**Correlation to references.** Wind data from the Lime site have been correlated to five reference towers. Unfortunately the various reference locations yielded varying results. Some of the long term reference towers showed that the one-year measurement period was below normal. Other towers showed exactly the opposite. Because of the lack of concensus on the climatology of the one-year measurement period, it was decided to use the one-year period without any climatological adjustment as the best estimate for the long term average. This will result in a potential error of plus/minus 10% in the long term wind speed estimate at the site. Table one showed that the observed wind speed was 16.4 mph at 110-ft. Using the measured

shear at the site, that translates to 16.3 mph at 30m hub-height or 7.3 mps. Thus the long term wind speed estimate at 30m is 7.3 mps, plus or minus 10%.

**Energy Calculations**. The wind speed distribution for calculating theoretical energy is based on the dataset from the on-site met tower. Table 2 attached, is the frequency distribution for the 30m level, adjusted to a mean speed of 7.3 mps. It has been integrated with the density corrected Mitsubishi MWT-250 28m power curve. The air density at the site is 1.08 kg/m3. At the bottom of the table, the theoretical energy is normalized to one full year and the table shows that the annual gross energy yield is 695.3 MWh for the Mitsubishi turbine. The bottom of the page shows the data in graphical format. This is equivalent to a gross capacity factor of 28.9%.

If 1m hub extenders are installed, the effective rotor diameter will be 30m instead of 28m and therefore the increase in swept area will be 14.8%. This translates to an annual increase in energy of 8.7%. The energy increase is less than 14.8% because about a third of the energy is generated at or above rated wind speed. In these conditions, the output of the turbine will not be increased, it will remain at 275-kW. The estimated gross capacity factor is 31.4% with the hub extenders.

Based on the local topography and elevation, an energy estimate for the turbine string has been made. This estimate is based on subjective analysis of the topography. The Lime reference tower is located near proposed turbine 1 at the west end of the row. It appears that the met tower is at a representative location for the entire string. It is possible that turbines 11 and 12 at the east end of the Project, which are on higher terrain, may be slightly more productive than the met tower location. Additional monitoring at the east end of the string would help to determine if there is some upside to the estimates.

**Losses and net estimates**. The next step is the estimate of the array losses. The array loss estimates are based on the alignment and spacing between turbines and the wind energy rose. The proposed spacing between turbines is slightly higher than 2-D, in the crosswind (east – west) direction. The array loss estimate is 0.6% for the 12 turbines.

Other loss factors that are related to meteorology are icing and controller losses due to high speed shutdowns. Based on the missing winter data due to ice, I estimate that the losses due to icing will be 1%. Based on the wind speed distribution shown on table 2, there are practically no hours near cut-out speed for the Mitsubishi turbine. Therefore I estimate that the losses due to high wind speed cut-out will be negligible. Other loss assumptions are 4% for availability, 1% for electrical, and 3% for power curve/blade soiling. Therefore the net estimates are 630.8 MWh for the 28m rotor and 685.7 MWh for the 30m rotor (hub extenders). These are equivalent to net capacity factors of 26.2% for the 28m rotor and 28.5% for the 30m rotor.

**Monthly Diurnal Capacity Factors.** Based on the long term datasets and the Lime met tower, a monthly diurnal capacity factor table, similar in format to table one is attached as an excel file. The table lists the adjusted gross capacity factor estimates for each hour of the day for each month. The table also shows the breakdown of the annual energy output by month.

As mentioned above, the estimated error in wind speed is on the order of +/- 1.6 mph (10%), and +/- 18% on gross energy content for the Mitsubishi turbine. Given the uncertainties

related to the performance of refurbished, but 20-year old turbines, and the exact impact of the hub-extenders on the power curve, the estimated error band on net energy is plus or minus 25% at the P90 level.

## Conclusions

Wind data from one on-site meteorological tower have been analyzed and long-term wind speed and energy estimates have been made for the proposed Mitsubishi turbines at the Lime Wind Power Project. The estimated mean wind speed is 16.3 mph (7.3 mps) at 30m for the 12 turbines. The estimated net capacity factor is 26.2% for the 28m rotor. For 30m rotor the estimated capacity factor is 28.5%. The error band is +/- 25% at the P90 level.

Ron Nierenberg
July 17, 2008

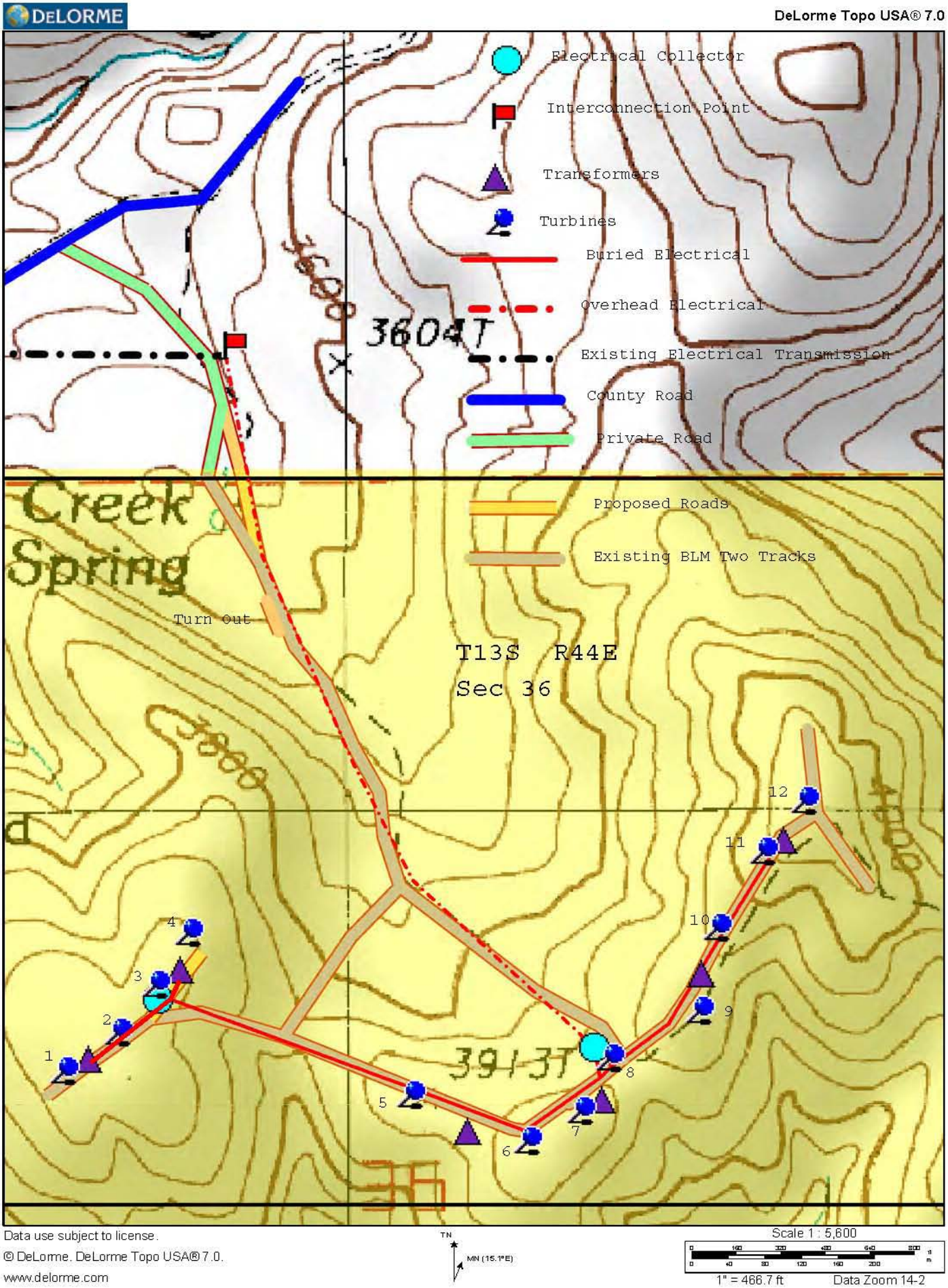

DeLorme Topo USA® 7.0
Electrical Collector
Interconnection Point
Transformers
Turbines
Buried Electrical
Overhead Electrical
Existing Electrical Transmission
County Road
Private Road
Proposed Roads
Existing BLM Two Tracks
Turn Out
T13S R44E
Sec 36
3604T
3913T
Creek
Spring
1
2
3
4
5
6
7
8
9
10
11
12
Data use subject to license.
© DeLorme. DeLorme Topo USA® 7.0.
www.delorme.com
TN
MN (15.1°E)
Scale 1 : 5,600
1" = 466.7 ft
Data Zoom 14-2

**Table 1** Monthly Diurnal Mean Wind Speeds

# Burnt River, OR
# Lime Wind 110-ft level (MPH)

## Jul 8, 2007 - Jul 9, 2008

| Hour | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **01** | 16.2 | 12.8 | 13.3 | 16.2 | 19.5 | 24.1 | 29.6 | 26.7 | 21.9 | 15.9 | 12.1 | 16.0 | **18.9** |
| **02** | 16.1 | 12.5 | 12.8 | 16.0 | 19.4 | 24.6 | 29.8 | 26.0 | 20.6 | 16.0 | 12.2 | 16.5 | **18.7** |
| **03** | 15.4 | 12.8 | 12.7 | 16.3 | 20.7 | 25.3 | 28.5 | 25.6 | 22.6 | 16.4 | 12.5 | 16.2 | **18.9** |
| **04** | 16.1 | 12.7 | 13.0 | 15.9 | 20.7 | 24.9 | 27.6 | 24.5 | 22.4 | 15.3 | 12.6 | 15.0 | **18.5** |
| **05** | 16.3 | 13.2 | 14.5 | 16.9 | 20.3 | 23.9 | 26.9 | 24.2 | 21.7 | 16.0 | 12.6 | 14.4 | **18.6** |
| **06** | 16.8 | 11.9 | 14.3 | 16.2 | 20.1 | 23.0 | 26.0 | 23.3 | 21.8 | 16.3 | 13.0 | 14.6 | **18.3** |
| **07** | 17.2 | 11.8 | 13.7 | 16.2 | 19.5 | 22.6 | 25.2 | 22.5 | 20.2 | 15.3 | 12.4 | 14.5 | **17.8** |
| **08** | 16.2 | 11.6 | 13.3 | 15.1 | 18.6 | 21.2 | 23.1 | 22.0 | 19.9 | 15.2 | 12.0 | 13.8 | **17.0** |
| **09** | 16.3 | 11.6 | 12.0 | 15.8 | 17.3 | 18.8 | 20.1 | 19.7 | 18.5 | 15.2 | 13.0 | 13.4 | **16.1** |
| **10** | 15.1 | 10.9 | 11.9 | 15.3 | 16.1 | 16.6 | 17.1 | 15.7 | 16.7 | 15.8 | 12.3 | 13.0 | **14.8** |
| **11** | 15.3 | 11.4 | 11.6 | 14.4 | 15.3 | 14.8 | 15.2 | 13.2 | 15.4 | 15.9 | 13.1 | 13.4 | **14.1** |
| **12** | 15.4 | 11.6 | 11.6 | 13.7 | 15.1 | 13.1 | 14.2 | 11.4 | 15.8 | 15.5 | 13.0 | 14.5 | **13.7** |
| **13** | 14.3 | 12.0 | 12.2 | 13.3 | 15.3 | 13.0 | 14.3 | 11.3 | 15.4 | 15.7 | 12.1 | 15.4 | **13.7** |
| **14** | 13.6 | 12.8 | 12.6 | 14.2 | 16.2 | 12.9 | 14.0 | 11.6 | 15.9 | 16.3 | 11.9 | 15.6 | **14.0** |
| **15** | 12.4 | 12.1 | 12.6 | 14.5 | 17.4 | 12.6 | 14.6 | 12.2 | 17.1 | 16.4 | 11.8 | 15.3 | **14.1** |
| **16** | 12.9 | 12.6 | 12.7 | 15.2 | 18.5 | 14.3 | 15.1 | 13.3 | 17.9 | 15.4 | 12.3 | 15.4 | **14.7** |
| **17** | 12.8 | 13.0 | 13.2 | 15.4 | 18.4 | 15.7 | 15.6 | 13.2 | 17.6 | 14.8 | 12.1 | 15.3 | **14.8** |
| **18** | 13.2 | 12.9 | 12.6 | 17.0 | 18.7 | 17.0 | 17.8 | 14.4 | 17.8 | 14.5 | 12.1 | 16.8 | **15.4** |
| **19** | 13.9 | 13.7 | 12.2 | 17.6 | 18.6 | 19.0 | 19.8 | 15.3 | 18.9 | 14.0 | 12.5 | 16.5 | **16.0** |
| **20** | 14.5 | 13.5 | 12.4 | 17.6 | 18.1 | 20.1 | 21.5 | 16.4 | 19.5 | 14.3 | 11.9 | 15.2 | **16.3** |
| **21** | 13.7 | 13.3 | 12.5 | 17.8 | 19.1 | 20.9 | 24.7 | 18.9 | 19.5 | 13.6 | 12.8 | 15.8 | **17.0** |
| **22** | 13.2 | 14.0 | 13.4 | 17.9 | 20.7 | 22.2 | 26.7 | 21.3 | 21.2 | 13.6 | 12.5 | 15.9 | **17.8** |
| **23** | 14.0 | 15.6 | 14.4 | 16.6 | 19.5 | 23.6 | 28.0 | 24.8 | 23.0 | 14.9 | 12.9 | 15.3 | **18.7** |
| **24** | 15.4 | 13.0 | 14.1 | 17.3 | 19.7 | 23.8 | 29.5 | 25.2 | 22.8 | 15.7 | 12.7 | 15.7 | **18.9** |
| **Mean** | **14.9** | **12.7** | **12.9** | **15.9** | **18.4** | **19.5** | **21.9** | **18.9** | **19.3** | **15.3** | **12.4** | **15.2** | **16.5** |

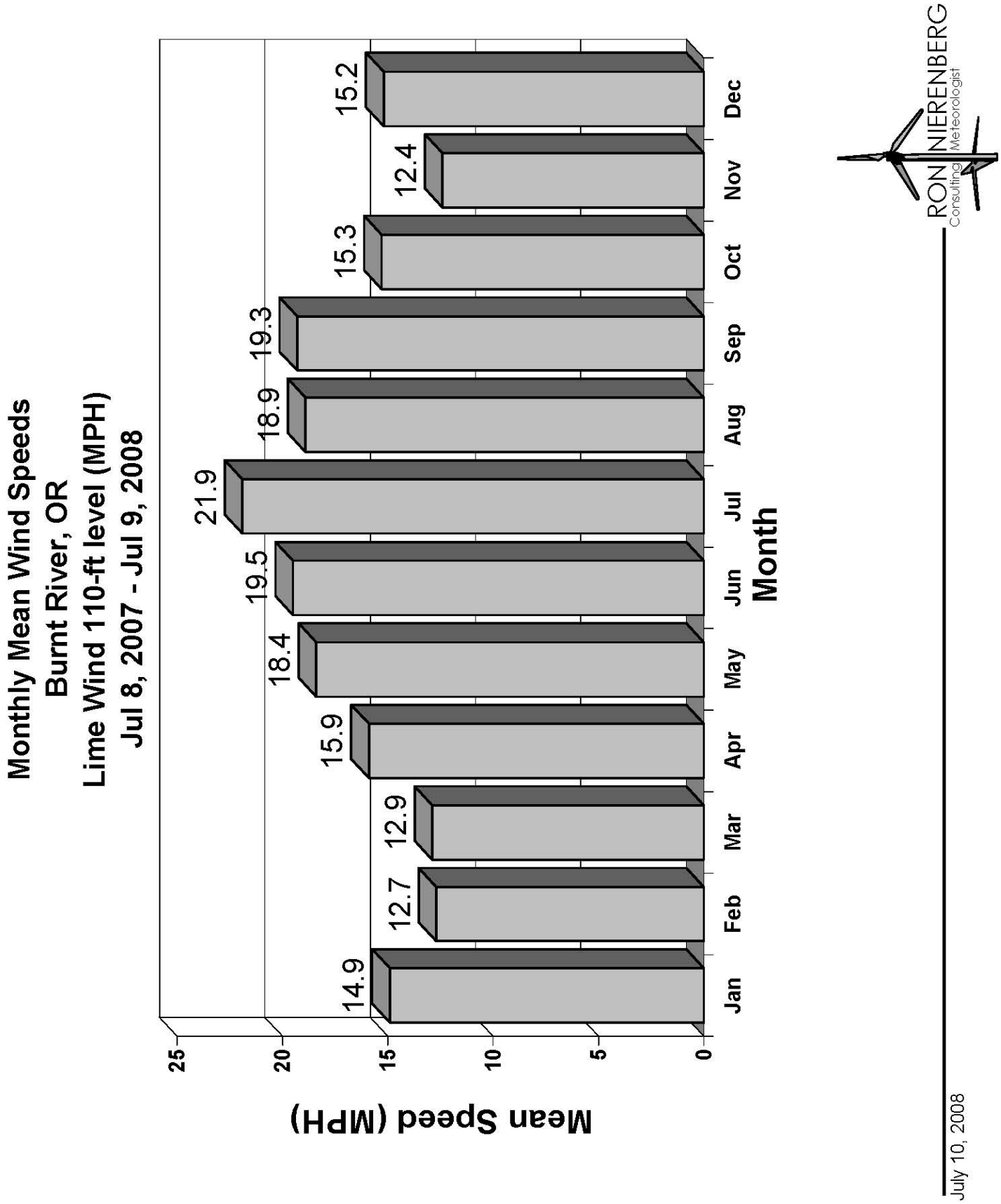
| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Valid Hrs** | 590 | 646 | 744 | 717 | 741 | 719 | 771 | 744 | 713 | 742 | 718 | 677 |
| **Missing Hrs** | 154 | 50 | 0 | 3 | 3 | 1 | 21 | 0 | 7 | 2 | 2 | 67 |

**8,522 hours of valid data, 310 hours missing, 96.5% data recovery**

**Mean of monthly means: 16.4**

July 10, 2008

RON NIERENBERG
Consulting Meteorologist


Monthly Mean Wind Speeds
Burnt River, OR
Lime Wind 110-ft level (MPH)
Jul 8, 2007 - Jul 9, 2008
Mean Speed (MPH)
25
20
15
10
5
0
14.9
12.7
12.9
15.9
18.4
19.5
21.9
18.9
19.3
15.3
12.4
15.2
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
RON NIERENBERG
Consulting Meteorologist
July 10, 2008

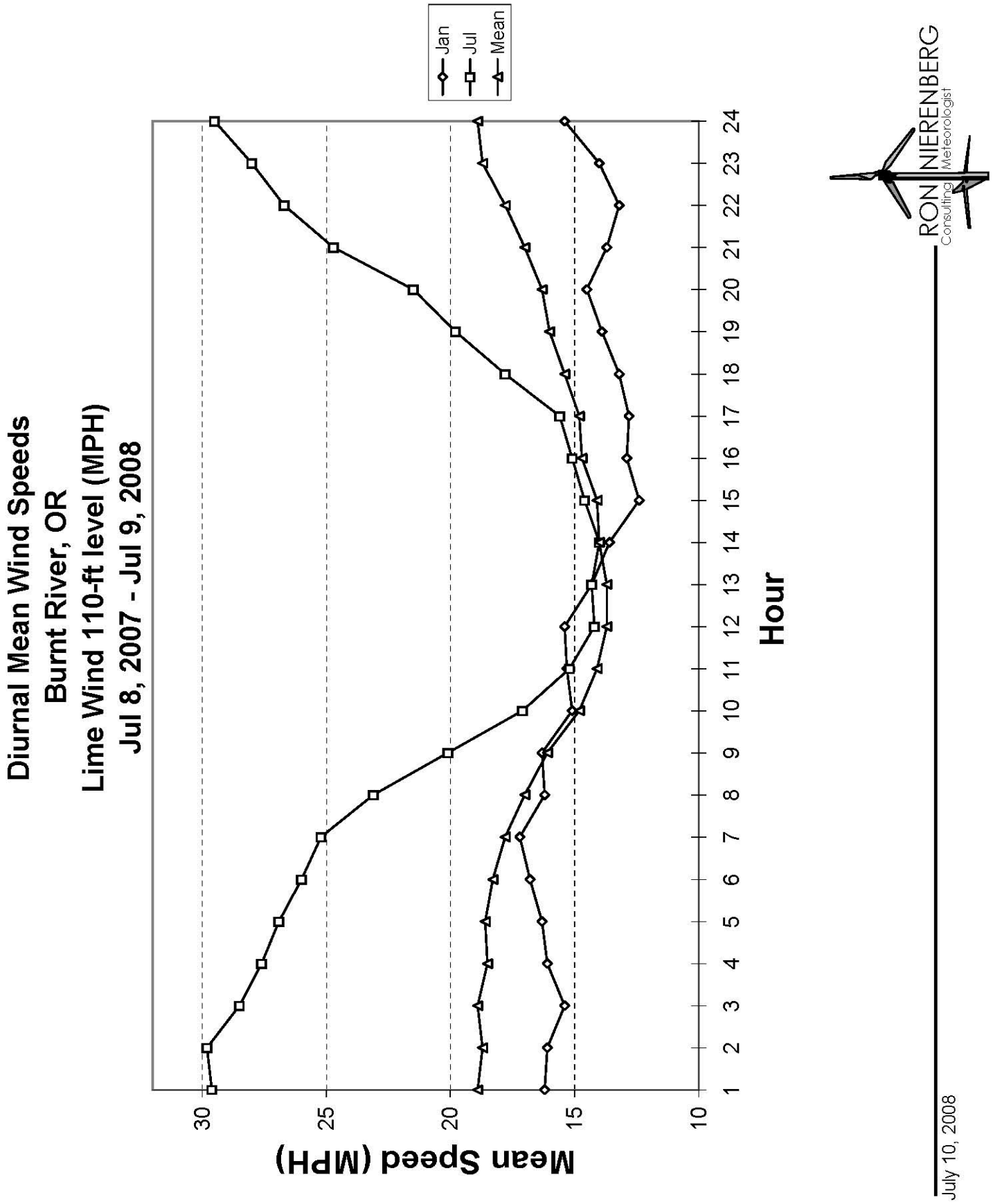

Diurnal Mean Wind Speeds
Burnt River, OR
Lime Wind 110-ft level (MPH)
Jul 8, 2007 - Jul 9, 2008
Jan
Jul
Mean
Mean Speed (MPH)
30
25
20
15
10
Hour
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
RON NIERENBERG
Consulting Meteorologist
July 10, 2008

**Table 2**

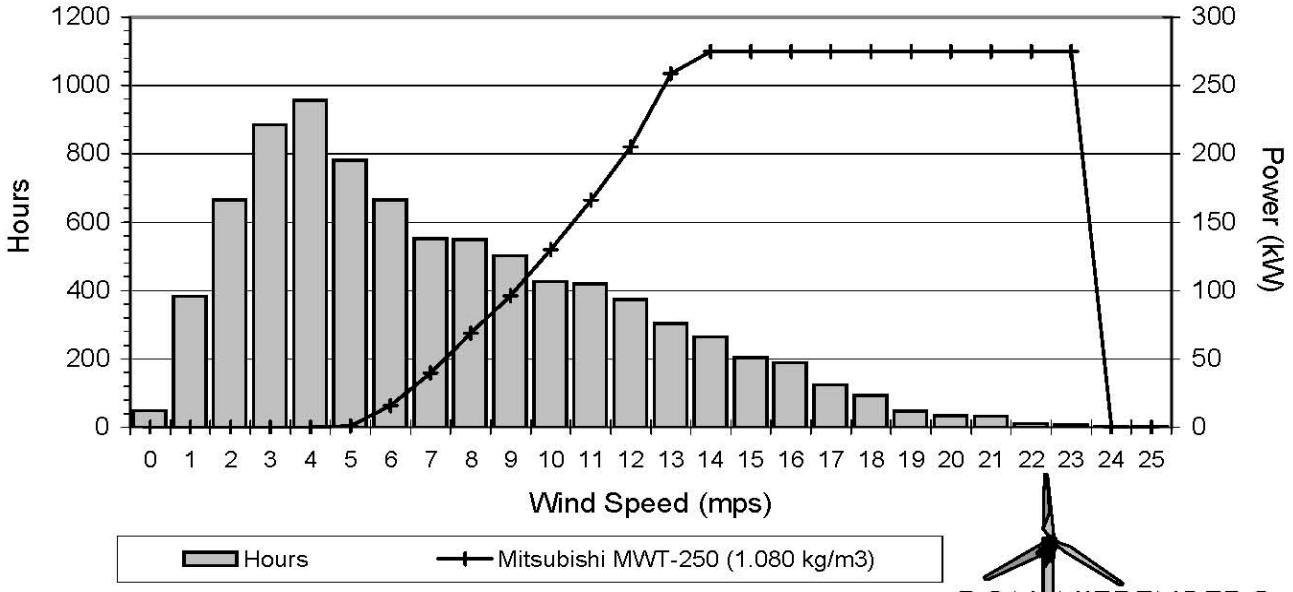
# Linear Adjusted Wind Speed Distribution
## Burnt River, OR
## Lime Wind 110-ft Jul 8, 2007 - Jul 9, 2008

Mitsubishi MWT-250 (1.080 kg/m3)

| Speed (mps) | Hours | Power kW | Energy kWh | |
|---|---|---|---|---|
| 0 | 48 | 0 | 0 | |
| 1 | 383 | 0 | 0 | |
| 2 | 665 | 0 | 0 | |
| 3 | 886 | 0 | 0 | |
| 4 | 957 | 0 | 0 | |
| 5 | 781 | 1 | 689 | |
| 6 | 666 | 16 | 10,508 | |
| 7 | 553 | 40 | 21,949 | |
| 8 | 548 | 69 | 37,700 | |
| 9 | 502 | 96 | 48,350 | |
| 10 | 427 | 130 | 55,438 | |
| 11 | 419 | 166 | 69,477 | |
| 12 | 375 | 205 | 76,999 | |
| 13 | 304 | 259 | 78,668 | |
| 14 | 264 | 275 | 72,600 | |
| 15 | 204 | 275 | 56,100 | |
| 16 | 189 | 275 | 51,975 | |
| 17 | 124 | 275 | 34,100 | |
| 18 | 93 | 275 | 25,575 | |
| 19 | 47 | 275 | 12,925 | |
| 20 | 34 | 275 | 9,350 | |
| 21 | 32 | 275 | 8,800 | |
| 22 | 11 | 275 | 3,025 | |
| 23 | 8 | 275 | 2,200 | |
| 24 | 1 | 0 | 0 | |
| 25 | 1 | 0 | 0 | |
| 26 | 0 | 0 | 0 | |
| 27+ | 0 | 0 | 0 | |
| **Totals:** | 8522 | hrs | 676,426 | kWh |

Adjusted (0.992) mean wind speed = 7.3 mps

**8,522 hours of data, normalized to one year = 695,317 kWh**




RON NIERENBERG
Consulting Meteorologist

July 13, 2008

# Monthly Diurnal Theoretical Power Output (kW)

## Lime Wind 110-ft
## Mitsubishi 250 28m rotor

| Hour | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 40 | 41 | 45 | 80 | 119 | 156 | 192 | 182 | 139 | 72 | 37 | 50 | 96 |
| 02 | 39 | 40 | 41 | 82 | 108 | 159 | 191 | 174 | 125 | 71 | 35 | 57 | 94 |
| 03 | 38 | 42 | 40 | 85 | 119 | 166 | 185 | 172 | 137 | 77 | 38 | 56 | 96 |
| 04 | 42 | 41 | 50 | 79 | 119 | 167 | 180 | 169 | 133 | 72 | 36 | 46 | 95 |
| 05 | 42 | 45 | 63 | 83 | 116 | 157 | 173 | 166 | 128 | 75 | 37 | 45 | 94 |
| 06 | 43 | 40 | 61 | 82 | 114 | 143 | 162 | 160 | 124 | 73 | 42 | 46 | 91 |
| 07 | 42 | 40 | 55 | 80 | 112 | 135 | 157 | 143 | 105 | 62 | 47 | 48 | 86 |
| 08 | 40 | 40 | 50 | 65 | 101 | 118 | 141 | 137 | 102 | 63 | 43 | 37 | 78 |
| 09 | 44 | 36 | 42 | 78 | 89 | 94 | 114 | 109 | 89 | 64 | 51 | 37 | 71 |
| 10 | 37 | 30 | 41 | 69 | 75 | 72 | 75 | 67 | 73 | 75 | 43 | 32 | 57 |
| 11 | 40 | 30 | 36 | 55 | 60 | 54 | 53 | 38 | 60 | 70 | 50 | 40 | 49 |
| 12 | 38 | 31 | 31 | 41 | 57 | 37 | 43 | 26 | 55 | 58 | 45 | 46 | 42 |
| 13 | 35 | 36 | 40 | 36 | 55 | 33 | 36 | 14 | 48 | 56 | 34 | 54 | 40 |
| 14 | 31 | 38 | 38 | 44 | 63 | 30 | 35 | 14 | 49 | 58 | 29 | 54 | 40 |
| 15 | 23 | 39 | 39 | 49 | 68 | 30 | 39 | 18 | 61 | 61 | 31 | 55 | 43 |
| 16 | 25 | 47 | 38 | 51 | 81 | 49 | 43 | 26 | 63 | 54 | 35 | 59 | 48 |
| 17 | 27 | 52 | 41 | 60 | 90 | 60 | 51 | 26 | 70 | 51 | 38 | 54 | 52 |
| 18 | 27 | 48 | 37 | 75 | 94 | 80 | 86 | 40 | 72 | 56 | 37 | 61 | 59 |
| 19 | 32 | 55 | 38 | 84 | 96 | 94 | 107 | 60 | 86 | 50 | 38 | 57 | 66 |
| 20 | 33 | 49 | 38 | 80 | 91 | 105 | 125 | 81 | 95 | 57 | 40 | 48 | 70 |
| 21 | 25 | 45 | 36 | 79 | 103 | 110 | 156 | 107 | 102 | 54 | 48 | 53 | 76 |
| 22 | 28 | 52 | 44 | 94 | 116 | 127 | 182 | 125 | 128 | 56 | 44 | 57 | 88 |
| 23 | 37 | 67 | 52 | 87 | 118 | 140 | 191 | 162 | 155 | 68 | 46 | 50 | 98 |
| 24 | 37 | 38 | 53 | 97 | 121 | 153 | 202 | 161 | 148 | 71 | 46 | 50 | 98 |
| Mean | 35 | 43 | 44 | 71 | 95 | 103 | 122 | 99 | 98 | 64 | 41 | 50 | 72 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % Annual | 4.2 | 4.5 | 5.2 | 8.1 | 11.2 | 11.7 | 14.3 | 11.6 | 11.1 | 7.5 | 4.6 | 5.9 |

**Annual Energy Output: 630.8 MWh**

July 10, 2008

RON NIERENBERG
Consulting Meteorologist

# Monthly Diurnal Theoretical Net Capacity Factor

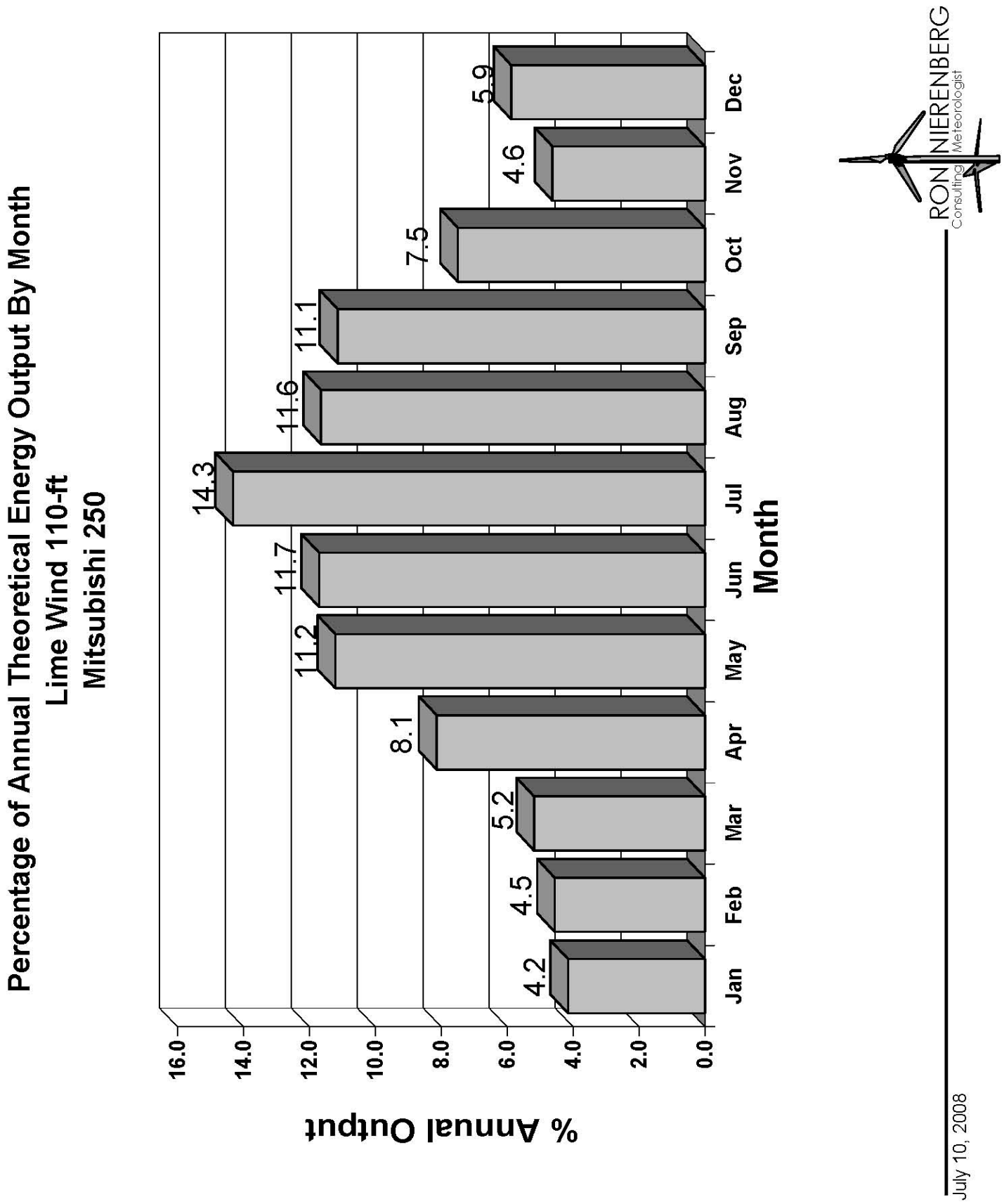
## Lime Wind 110-ft
## Mitsubishi 250 28m rotor

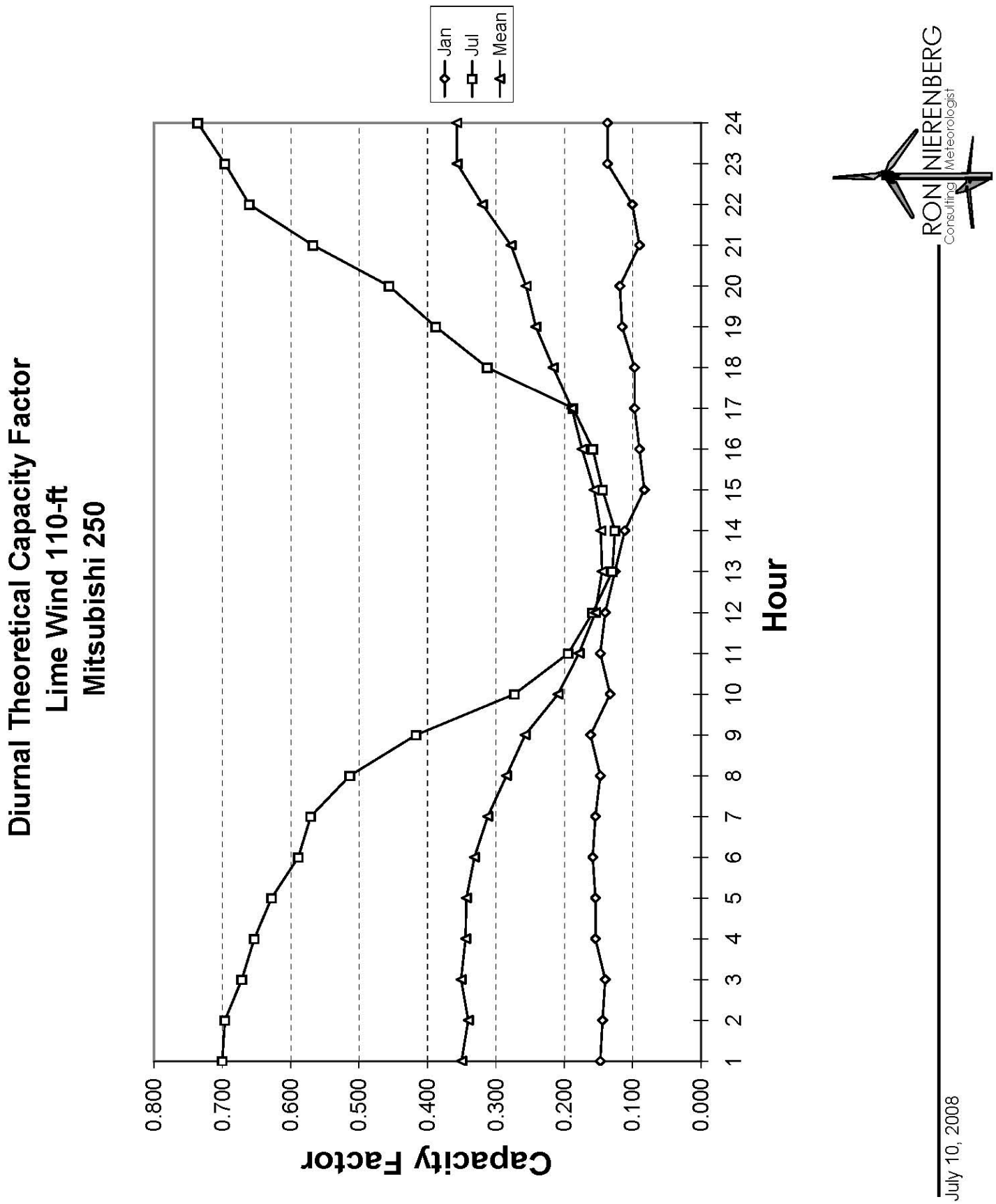
| Hour | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Mean |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **01** | 0.147 | 0.151 | 0.165 | 0.291 | 0.434 | 0.567 | 0.700 | 0.660 | 0.506 | 0.262 | 0.133 | 0.183 | **0.350** |
| **02** | 0.144 | 0.147 | 0.151 | 0.298 | 0.391 | 0.578 | 0.696 | 0.631 | 0.456 | 0.258 | 0.126 | 0.208 | **0.340** |
| **03** | 0.140 | 0.154 | 0.147 | 0.309 | 0.434 | 0.603 | 0.671 | 0.624 | 0.499 | 0.280 | 0.140 | 0.205 | **0.350** |
| **04** | 0.154 | 0.151 | 0.183 | 0.287 | 0.434 | 0.606 | 0.653 | 0.614 | 0.484 | 0.262 | 0.129 | 0.169 | **0.344** |
| **05** | 0.154 | 0.165 | 0.230 | 0.301 | 0.423 | 0.570 | 0.628 | 0.603 | 0.466 | 0.273 | 0.136 | 0.165 | **0.343** |
| **06** | 0.158 | 0.147 | 0.222 | 0.298 | 0.416 | 0.520 | 0.588 | 0.581 | 0.452 | 0.266 | 0.154 | 0.169 | **0.331** |
| **07** | 0.154 | 0.147 | 0.201 | 0.291 | 0.409 | 0.492 | 0.570 | 0.520 | 0.380 | 0.226 | 0.172 | 0.176 | **0.312** |
| **08** | 0.147 | 0.147 | 0.183 | 0.237 | 0.366 | 0.431 | 0.513 | 0.499 | 0.370 | 0.230 | 0.158 | 0.133 | **0.284** |
| **09** | 0.161 | 0.129 | 0.154 | 0.283 | 0.323 | 0.341 | 0.416 | 0.395 | 0.323 | 0.233 | 0.187 | 0.136 | **0.257** |
| **10** | 0.133 | 0.108 | 0.151 | 0.251 | 0.273 | 0.262 | 0.273 | 0.244 | 0.266 | 0.273 | 0.158 | 0.115 | **0.209** |
| **11** | 0.147 | 0.108 | 0.129 | 0.201 | 0.219 | 0.197 | 0.194 | 0.140 | 0.219 | 0.255 | 0.183 | 0.147 | **0.178** |
| **12** | 0.140 | 0.111 | 0.111 | 0.151 | 0.208 | 0.133 | 0.158 | 0.093 | 0.201 | 0.212 | 0.165 | 0.169 | **0.154** |
| **13** | 0.126 | 0.129 | 0.147 | 0.129 | 0.201 | 0.118 | 0.129 | 0.050 | 0.176 | 0.205 | 0.122 | 0.197 | **0.144** |
| **14** | 0.111 | 0.140 | 0.140 | 0.161 | 0.230 | 0.108 | 0.126 | 0.050 | 0.179 | 0.212 | 0.104 | 0.197 | **0.147** |
| **15** | 0.083 | 0.144 | 0.144 | 0.179 | 0.248 | 0.108 | 0.144 | 0.065 | 0.222 | 0.222 | 0.111 | 0.201 | **0.156** |
| **16** | 0.090 | 0.172 | 0.140 | 0.187 | 0.294 | 0.179 | 0.158 | 0.093 | 0.230 | 0.197 | 0.126 | 0.215 | **0.173** |
| **17** | 0.097 | 0.190 | 0.151 | 0.219 | 0.327 | 0.219 | 0.187 | 0.093 | 0.255 | 0.187 | 0.140 | 0.197 | **0.188** |
| **18** | 0.097 | 0.176 | 0.136 | 0.273 | 0.341 | 0.291 | 0.312 | 0.147 | 0.262 | 0.205 | 0.133 | 0.222 | **0.216** |
| **19** | 0.115 | 0.201 | 0.140 | 0.305 | 0.348 | 0.341 | 0.387 | 0.219 | 0.312 | 0.183 | 0.140 | 0.208 | **0.242** |
| **20** | 0.118 | 0.179 | 0.140 | 0.291 | 0.330 | 0.380 | 0.456 | 0.294 | 0.344 | 0.208 | 0.147 | 0.176 | **0.255** |
| **21** | 0.090 | 0.165 | 0.129 | 0.287 | 0.373 | 0.398 | 0.567 | 0.387 | 0.370 | 0.197 | 0.176 | 0.194 | **0.278** |
| **22** | 0.100 | 0.190 | 0.161 | 0.341 | 0.423 | 0.463 | 0.660 | 0.456 | 0.466 | 0.205 | 0.161 | 0.208 | **0.320** |
| **23** | 0.136 | 0.244 | 0.190 | 0.316 | 0.431 | 0.509 | 0.696 | 0.588 | 0.563 | 0.248 | 0.169 | 0.183 | **0.356** |
| **24** | 0.136 | 0.140 | 0.194 | 0.352 | 0.441 | 0.556 | 0.736 | 0.585 | 0.538 | 0.258 | 0.169 | 0.183 | **0.357** |
| **Mean** | **0.128** | **0.156** | **0.160** | **0.260** | **0.347** | **0.374** | **0.442** | **0.360** | **0.356** | **0.231** | **0.147** | **0.181** | **0.262** |

**Annual Energy Output: 630.8 MWh**

July 10, 2008

RON NIERENBERG
Consulting Meteorologist

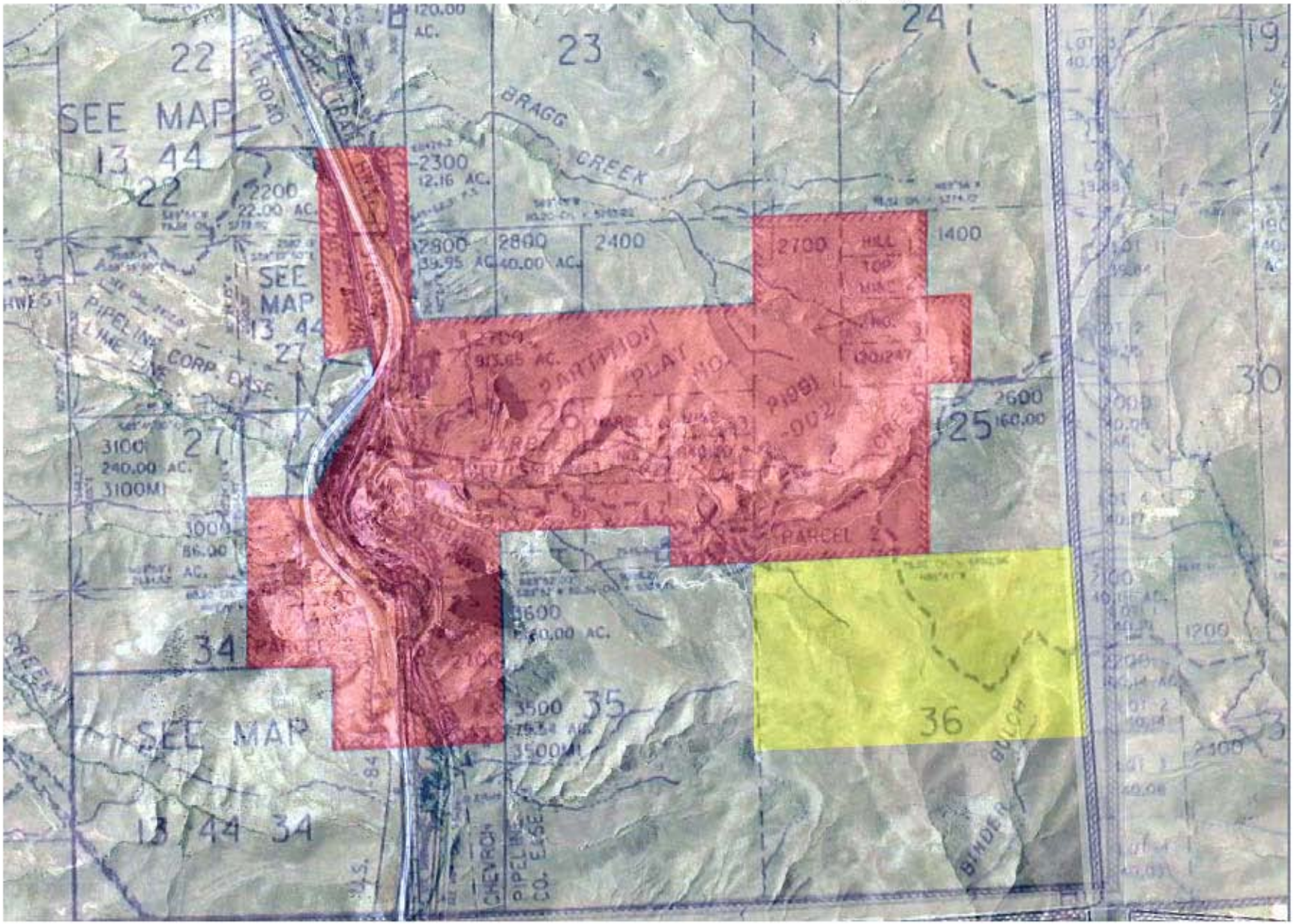

Percentage of Annual Theoretical Energy Output By Month
Lime Wind 110-ft
Mitsubishi 250
% Annual Output
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
4.2
4.5
5.2
8.1
11.2
11.7
14.3
11.6
11.1
7.5
4.6
5.9
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
RON NIERENBERG
Consulting Meteorologist
July 10, 2008


Diurnal Theoretical Capacity Factor
Lime Wind 110-ft
Mitsubishi 250
Capacity Factor
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.000
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour
Jan
Jul
Mean
RON NIERENBERG
Consulting Meteorologist
July 10, 2008

# Exhibit XIII

## Baker County Industrial Zone Lime Oregon

Red - Zoned Industrial  Yellow – Lime Wind Energy Project BLM



Oregon
Theodore R. Kulongoski, Governor

**Department of Fish and Wildlife**
Baker City Field Office
Grande Ronde Watershed District
2995 Hughes Lane
Baker City, OR 97814
(541) 523-5832
FAX (541) 523-5874

November 15, 2007

Nancy K. Lull
Bureau of Land Management
Baker Field Office
P.O. Box 947
Baker City, OR 97814

Re: Randy Joseph application for wind development project on BLM land

Dear Nancy:

The purpose of this letter is to provide comments on Randy Joseph's application to the BLM for a right-of-way for a wind development project near Lime, OR.

While the proposed project is much smaller than many wind development projects in eastern Oregon, our concerns are similar to those of other wind developments in the state.

Our immediate concerns with the proposed wind development are:

- Impacts to big game habitat
- Bird and bat strikes on the wind turbines
- Potential loss of sage grouse habitat
- Cumulative impacts of development on public land

Big Game Habitat

The proposed wind development will potentially impact mule deer and pronghorn antelope herds in the Lookout Mountain Wildlife Management Unit. The project is located in designated mule deer winter range. Mule deer populations in the Lookout Mountain Unit have declined in recent years and are currently well below our management objective for the unit. There is also a resident herd of pronghorn in the project area. Development of the site would lead to direct loss of big game habitat at the impacted site and a potential greater loss of range due to avoidance of the area after development. We recommend mitigation for the loss of big game habitat.

Bird and bat strikes

Wind turbines have been shown to cause bird and bat mortality due to strikes from turbine blades. The frequency of strikes can be reduced by configuration and placement of turbines. We recommend project design to minimize the impact on birds and bats. Furthermore, we recommend on the ground monitoring and annual reporting of bird and bat strikes.

Sage Grouse

Much of the BLM land in Baker County provides habitat for sage grouse and other sagebrush depended species. ODFW does not have any recorded sage grouse leks within a 5 mile radius of the project site, however minimal effort has been made to survey the area for the presence of sage grouse leks. We recommend that the project area and surrounding areas be intensively surveyed for the presence of sage grouse leks before the initiation of the project. If a lek is located in the vicinity we recommend that no development occur within 2 miles of the lek.

Cumulative Impacts of Development

Wildlife populations are continuing to be affected throughout Oregon by development, particularly on private land. ODFW has been involved with other agencies and private individuals to try to mitigate the loss of wildlife habitat from development.

Baker County has seen an increasing trend of development in wildlife habitat, especially in big game winter range. Fortunately, a significant amount of big game winter range in the county is located on public land and has the potential to be protected from development. We are concerned about the precedent that this project would set and the cumulative impacts that future public land developments would have on wildlife populations.

ODFW supports the development of alternative energy resources but hopes that sites are selected and developed to have the least impact on wildlife populations. Development of alternative energy resources on BLM land may not be the best option for Oregon's wildlife resources.

Thank you for considering our comments, if you have any questions or need further assistance please contact me at (541) 523-5832.

Sincerely,

Nick Myatt
District Wildlife Biologist

cc: Bruce Eddy, ODFW Grande Ronde Watershed Manager

Exhibit XV

Oregon
Theodore R. Kulongoski, Governor

Department of Fish and Wildlife
BAKER DISTRICT OFFICE
2995 Hughes Lane
Baker City, OR 97814
(541) 523-5832
FAX (541) 523-5874

RECEIVED
NOV 20 2008
BUREAU OF LAND MANAGEMENT
BAKER CITY, OREGON

November 10, 2008

Nancy K Lull
Filed Manager
Bureau of Land Management
Baker Field Office
P.O. Box 947
Baker City, OR 97814

Dear Nancy:

The purpose of this letter is to provide Oregon Department of Fish and Wildlife (ODFW) comments on the Environmental Assessment (EA) for the Lime Wind Project.

ODFW supports renewable energy development in Oregon, however energy projects need to be sited in areas with minimal impact to wildlife and their habitat. As expressed in our first comment letter, we are concerned about the development of energy projects in native wildlife habitat on Oregon's public land.

Below are our comments related to certain aspects of the EA and the proposed project:

**Pre-project Monitoring**

When sitting wind projects, it is critical to conduct pre-project monitoring to accurately assess the potential impacts to wildlife. The EA provided limited, if any pre-project monitoring data. Text provided contradictory information related to the presence/absence of raptor nest at the project site – some sections said the project is not located in key breeding, nesting, brooding, and/or fledging habitat for songbirds and raptors while other areas said it is unknown if there are active nests in the area. Prior to construction, we recommend surveys be conducted by an experienced biologist for raptor and other sensitive species nests following currently accepted practices.

**Habitat/Mitigation**

The EA identified a direct project impact to 8.89 acres of public land; 5.7 acres will be temporarily impacted and 3.2 acres will be permanently lost. Temporarily impacted acres will be reseed in October but then grazed starting in April. Successful restoration of the impacted site should include two years of rest from grazing. We are also concerned that

the project proposes no mitigation for lost habitat. Development projects that take away public wildlife habitat should be required to provide no-net-loss of wildlife habitat. We recommend on-site mitigation to compensate for the loss of wildlife habitat.

**Work Period**

Big game populations are very susceptible to disturbance during the winter period. Increased disturbance can cause higher use of energy reserves and may lead to higher over-winter mortality. The EA outlines a work period from July 1 to November 1. If this work period is maintained, it should avoid adverse affects to wintering big game populations. We recommend all construction activities take place outside of the wintering big game periods from December 1 to April 15.

**Bird/Bat Strike Monitoring**

The EA states that a monitoring program will be developed to determine bird and bat strikes during the operational phase of the project. No specifics have been outlined as to the frequency and duration of this monitoring. We recommend a monitoring plan be established and monitoring be conducted by experienced biologist following currently accepted practices and frequencies to accurately determine mortality rates.

We recommend the development of a Wildlife Handling and Reporting System. This system is a monitoring program set up for responding to and handling avian and bat casualties found by construction and maintenance personnel during construction and operation of the facility. This monitoring program should include the initial response, the handling and the reporting of bird and bat carcasses discovered incidental to construction and maintenance operations. Construction and maintenance personnel should be trained in the methods needed to carry out this program.

The EA states that "the reporting of any mortality to BLM authorized officer immediately after identification by ODFW". Monitoring should be carried out by biologist experienced in the use of field guides and taxonomic keys to accurately identify bird and bat species. ODFW staff will gladly assist BLM staff with any identification troubles, but we feel that BLM staff should be the first line of contact for identification issues or proofing identification.

We appreciate the opportunity to comment on the EA. If you have any questions or would like to discuss our comments further, please feel free to contact me at (541) 523-5832 or nick.a.myatt@state.or.us .

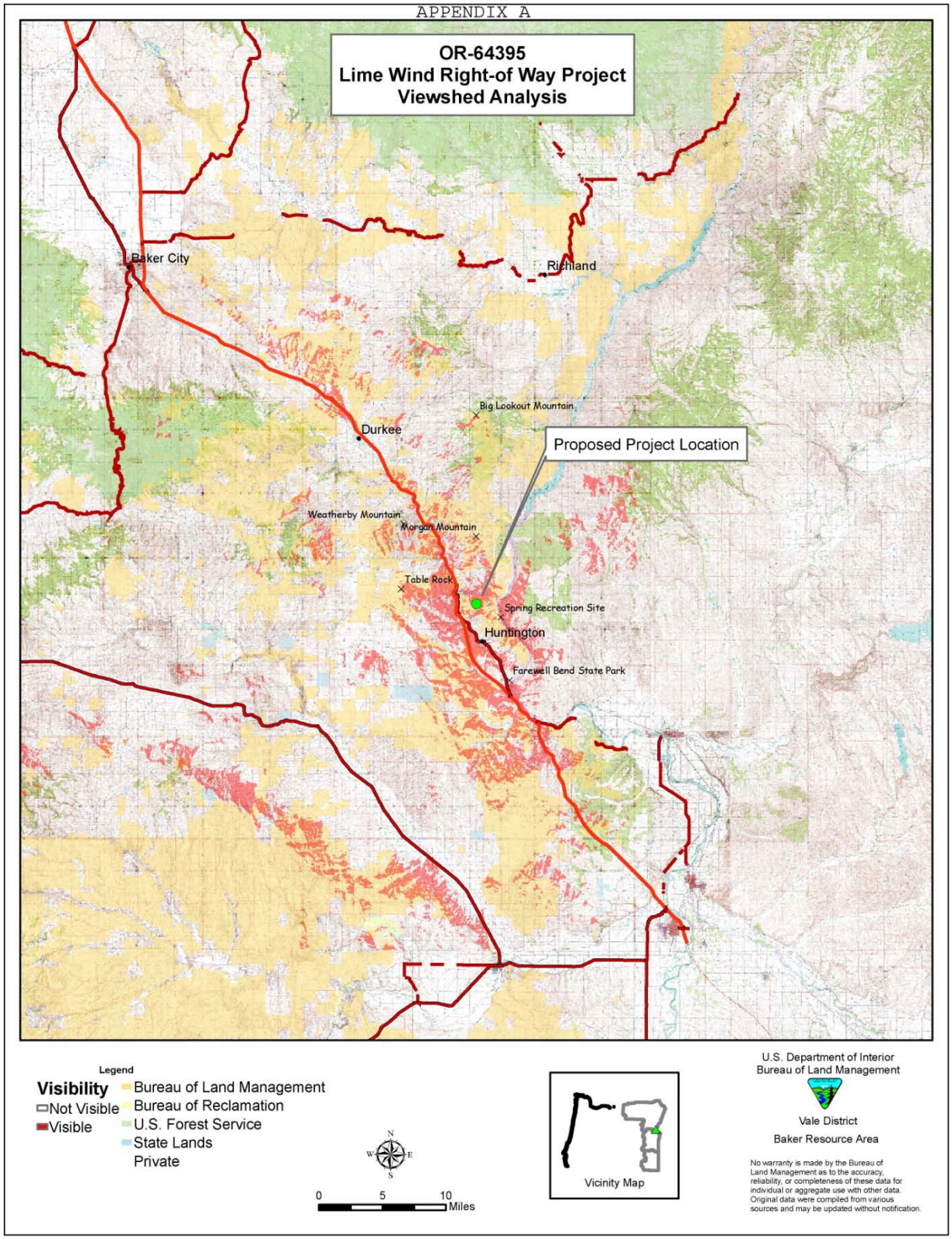
Sincerely,

Nick Myatt
Baker District Wildlife Biologist

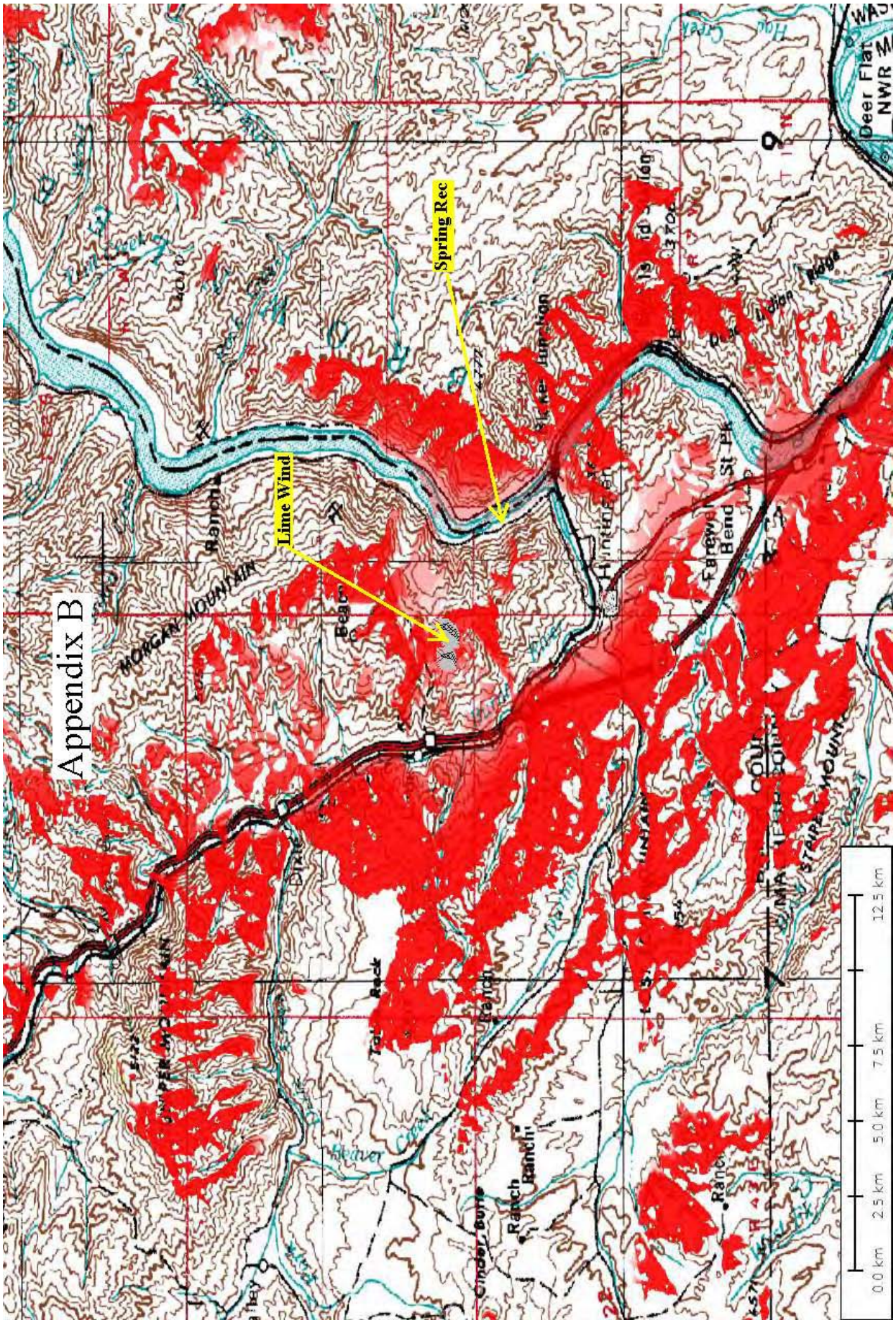
# Attachment A
# Visual Resource Management

| | |
|---|---|
| Appendix A | Visual Resource Analysis Map – BLM large |
| Appendix B | Visual Resource Analysis Map – Oregon Power Solutions |
| Appendix C | Key Observation Points Map – Joseph Millworks |
| Appendix D | Small Angle Formula |
| Appendix E | Visual Contrast Rating Worksheet – Tub Mountain |
| Appendix F | Visual Contrast Rating Worksheet – Birch Creek |
| Appendix G | Visual Contrast Rating Worksheet – Farewell Bend Park Entrance |
| Appendix H | Visual Contrast Rating Worksheet – Spring Recreation |
| Appendix I | Visual Contrast Rating Worksheet – I 84 Southbound |
| Appendix J | Visual Contrast Rating Worksheet – I 84 Northbound |
| Appendix K | Photo I 84 Northbound (with turbines inserted) |
| Appendix L | Photo I 84 Southbound (with turbines inserted) |
| Appendix M | Photo Farewell Bend Entrance (with turbines inserted) |
| Appendix N | Photo Farewell Bend Kiosk |
| Appendix O | Photo Spring Recreation |
| Appendix P | Photo Birch Creek |
| Appendix Q | Photo Tub Mountain |

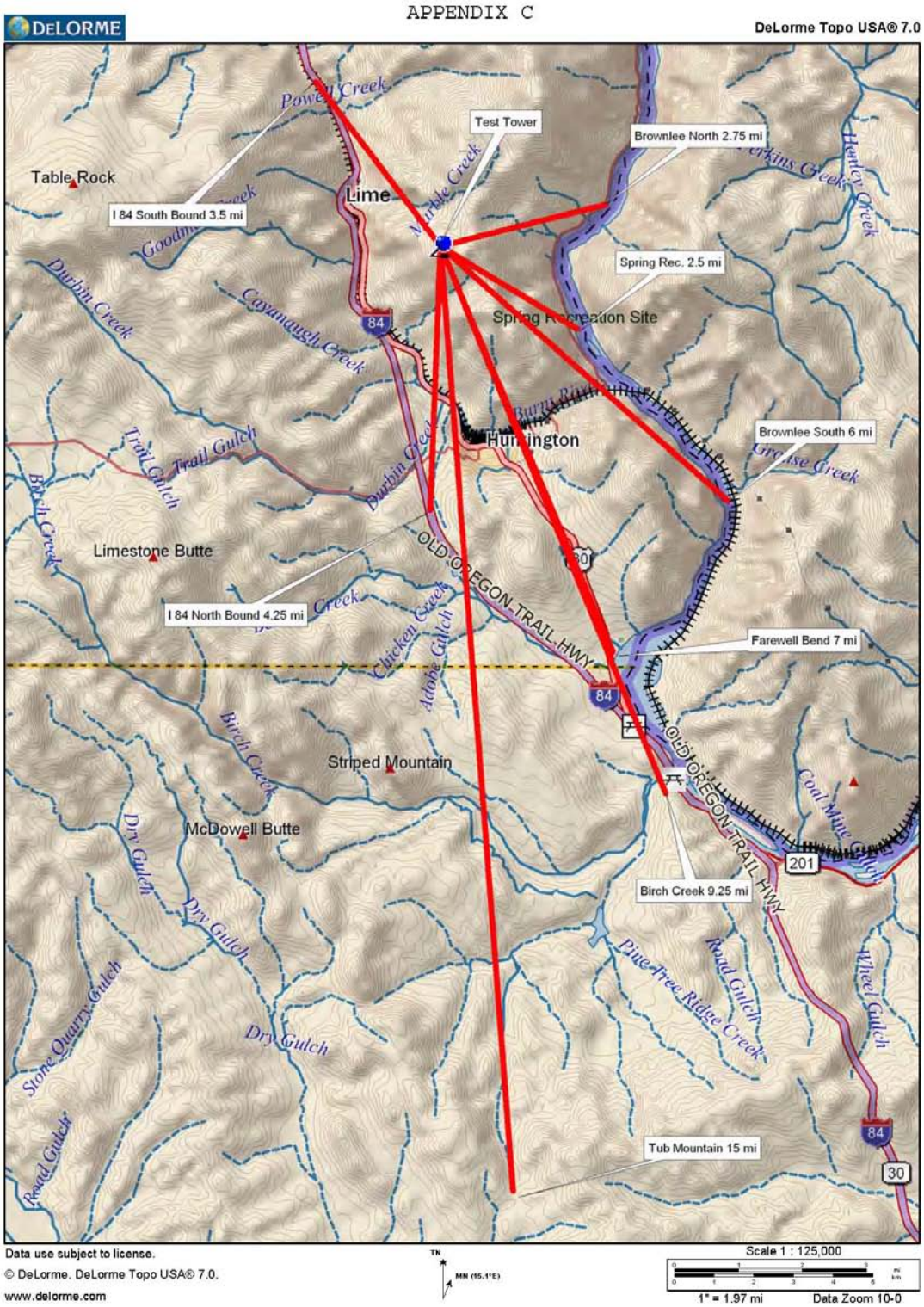
APPENDIX A


OR-64395
Lime Wind Right-of Way Project
Viewshed Analysis
Baker City
Richland
Big Lookout Mountain
Durkee
Proposed Project Location
Weatherby Mountain
Morgan Mountain
Table Rock
Spring Recreation Site
Huntington
Farewell Bend State Park
Legend
Visibility
Not Visible
Visible
Bureau of Land Management
Bureau of Reclamation
U.S. Forest Service
State Lands
Private
N
W
E
S
0
5
10
Miles
Vicinity Map
U.S. Department of Interior
Bureau of Land Management
Vale District
Baker Resource Area
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources and may be updated without notification.

# Appendix B


Lime Wind
Spring Rec
MORGAN MOUNTAIN
Ranch
Beaver
Dixie
Rock
Ranch
Ranch
Ranch
Cinder Butte
Beaver Creek
Hunter Ridge
Farewell Bend
St Park
Indian Ridge
Deer Flat
NWR
0.0 km
2.5 km
5.0 km
7.5 km
12.5 km

APPENDIX C


DELORME
DeLorme Topo USA® 7.0
Test Tower
Brownlee North 2.75 mi
I 84 South Bound 3.5 mi
Spring Rec. 2.5 mi
Spring Recreation Site
Brownlee South 6 mi
I 84 North Bound 4.25 mi
Farewell Bend 7 mi
Birch Creek 9.25 mi
Tub Mountain 15 mi
Table Rock
Lime
Huntington
Limestone Butte
Striped Mountain
McDowell Butte
OLD OREGON TRAIL HWY
Powell Creek
Marble Creek
Durbin Creek
Cayuuaugh Creek
Trail Gulch
Birch Creek
Chicken Creek
Adobe Gulch
Dry Gulch
Stone Quarry Gulch
Road Gulch
Pine Tree Ridge Creek
Wheel Gulch
Coal Mine Gulch
Grouse Creek
Henley Creek
Perkins Creek
Data use subject to license.
© DeLorme. DeLorme Topo USA® 7.0.
www.delorme.com
TN
MN (15.1°E)
Scale 1 : 125,000
1" = 1.97 mi
Data Zoom 10-0

# Appendix D

Small Angle Formula: $(\Theta/360) = (s/2\pi r)$

Where $\Theta$ is the angular size of an object in degrees, s is the height of the object, and r is the distance from the object.

By using basic algebra $\Theta$ can be expressed as $\Theta = (360*s) / (2\pi r)$

Using this formula we can determine the angular size of an object if the distance from the object and the height of the object are known.

Angular size can be converted to viewed height by multiplying $\Theta$ by .5236 inches, which gives us the relative height of the object 30 inches from the eye.

Form 8400-4
(September 1985)

APPENDIX E

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

**VISUAL CONTRAST RATING WORKSHEET**

Date April 16th, 2008
District Baker
Resource Area
Activity (program) Wind

**SECTION A. PROJECT INFORMATION**

1. Project Name Lime Wind
2. Key Observation Point Tub Mountain
3. VRM Class Class I viewing Class IV
4. Location
Township 16S
Range 45E
Section 6
5. Location Sketch

**SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION**

| | 1. LAND/WATER | 2. VEGETATION | 3. STRUCTURES |
|---|---|---|---|
| FORM | Flat and rolling to rugged | Complex and short to smooth and indistinct | Smooth |
| LINE | Weak horizontals to complex diagonals | Irregular and complex to soft and smooth | Curved |
| COLOR | Gray and tan to blue and brown | Brown, gray and green | Brown |
| TEX-TURE | Smooth to striated to medium | Medium to smooth | Medium |

**SECTION C. PROPOSED ACTIVITY DESCRIPTION**

| | 1. LAND/WATER | 2. VEGETATION | 3. STRUCTURES |
|---|---|---|---|
| FORM | Flat and rolling to rugged | Complex and short to smooth and indistinct | Short, simple and vertical |
| LINE | Weak horizontals to complex diagonals | Irregular and complex to soft and smooth | Verticals |
| COLOR | Gray and tan to blue and brown | Brown, gray and green | Gray |
| TEX-TURE | Smooth to striated to medium | Medium to smooth | Smooth |

**SECTION D. CONTRAST RATING** ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST

| | FEATURES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LAND/WATER BODY (1) | | | | VEGETATION (2) | | | | STRUCTURES (3) | | | |
| | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| ELEMENTS Form | | | | X | | | | X | | | | X |
| Line | | | | X | | | | X | | | | X |
| Color | | | | X | | | | X | | | | X |
| Texture | | | | X | | | | X | | | | X |

2. Does project design meet visual resource management objectives? ☒ Yes ☐ No (Explain on reverse side)

3. Additional mitigating measures recommended ☐ Yes ☒ No (Explain on reverse side)

Evaluator's Names
Loran Joseph
Linda Joseph

Date
4/16/2008

APPENDIX F

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

**VISUAL CONTRAST RATING WORKSHEET**

Date April 16th, 2008
District Baker
Resource Area
Activity (program) Wind

**SECTION A. PROJECT INFORMATION**

1. Project Name Lime Wind
2. Key Observation Point Birch Creek
3. VRM Class Class I viewing Class IV
4. Location
Township 15S
Range 45E
Section 9
5. Location Sketch

**SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION**

| | 1. LAND/WATER | 2. VEGETATION | 3. STRUCTURES |
|---|---|---|---|
| FORM | Rolling and rounded to rugged and angular | Complex and amorphous to smooth and indistinct | Smooth and linear |
| LINE | Weak horizontals to complex diagonals | Irregular and complex to soft and smooth | Strong diagonals and verticals |
| COLOR | Gray and tan to blue and brown | Grays and greens | Gray |
| TEX-TURE | Fine and smooth to medium | Medium to smooth | Smooth |

**SECTION C. PROPOSED ACTIVITY DESCRIPTION**

| | 1. LAND/WATER | 2. VEGETATION | 3. STRUCTURES |
|---|---|---|---|
| FORM | Rolling/rounded - rugged /angular/short verticals | Complex and amorphous to smooth and indistinct | Short, simple and vertical |
| LINE | Weak/horizontal -complex /diagonal/short/vertical | Irregular and complex to soft and smooth | Verticals |
| COLOR | Gray and tan to blue and brown | Grays and greens | Gray |
| TEX-TURE | Fine and smooth to medium | Medium to smooth | Smooth |

**SECTION D. CONTRAST RATING** ☐ SHORT TERM ☐ LONG TERM

1. DEGREE OF CONTRAST

| | FEATURES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LAND/WATER BODY (1) | | | | VEGETATION (2) | | | | STRUCTURES (3) | | | |
| | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| ELEMENTS Form | | | X | | | | | X | | | X | |
| ELEMENTS Line | | | X | | | | | X | | | | X |
| ELEMENTS Color | | | | X | | | | X | | | | X |
| ELEMENTS Texture | | | | X | | | | X | | | | X |

2. Does project design meet visual resource management objectives? ☒ Yes ☐ No (Explain on reverse side)

3. Additional mitigating measures recommended ☐ Yes ☒ No (Explain on reverse side)

Evaluator's Names
Loran Joseph
Linda Joseph

Date
4/16/2008

APPENDIX G

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

**VISUAL CONTRAST RATING WORKSHEET**

Date April 16th, 2008
District Baker
Resource Area
Activity (program) Wind

**SECTION A. PROJECT INFORMATION**

1. Project Name Lime Wind
2. Key Observation Point Farewell Bend Park Entrance
3. VRM Class Class II viewing Class IV
4. Location
Township 14S
Range 45E
Section 33
5. Location Sketch

**SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION**

| | 1. LAND/WATER | 2. VEGETATION | 3. STRUCTURES |
|---|---|---|---|
| FORM | Rolling and rounded to angular | Tall and irregular to smooth and indistinct | Smooth and linear |
| LINE | Weak horizontals to diagonals | Irregular and complex to soft and smooth | Strong diagonals, verticals, & horizontals |
| COLOR | Green, gray and tan to blue and brown | Grays and greens | Grays and browns |
| TEX-TURE | Fine and smooth to medium | Medium to smooth | Smooth |

**SECTION C. PROPOSED ACTIVITY DESCRIPTION**

| | 1. LAND/WATER | 2. VEGETATION | 3. STRUCTURES |
|---|---|---|---|
| FORM | Rolling and rounded to angular with verticals | Tall and irregular to smooth and indistinct | Short, simple and vertical |
| LINE | Weak horizontals to diagonals with verticals | Irregular and complex to soft and smooth | Verticals |
| COLOR | Green, gray and tan to blue and brown | Grays and greens | Gray |
| TEX-TURE | Fine and smooth to medium | Medium to smooth | Smooth |

**SECTION D. CONTRAST RATING** ☐ SHORT TERM ☐ LONG TERM

1. DEGREE OF CONTRAST

| | | FEATURES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LAND/WATER BODY (1) | | | | VEGETATION (2) | | | | STRUCTURES (3) | | | |
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| ELEMENTS | Form | | | X | | | | | X | | | | X |
| | Line | | | X | | | | | X | | | | X |
| | Color | | | | X | | | | X | | | | X |
| | Texture | | | | X | | | | X | | | | X |

2. Does project design meet visual resource management objectives? ☒ Yes ☐ No (Explain on reverse side)

3. Additional mitigating measures recommended ☐ Yes ☒ No (Explain on reverse side)

Evaluator's Names
Loran Joseph
Linda Joseph

Date
4/16/2008

Form 8400-4
(September 1985)

APPENDIX H

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

**VISUAL CONTRAST RATING WORKSHEET**

Date April 16th, 2008
District Baker
Resource Area
Activity (program) Wind

**SECTION A. PROJECT INFORMATION**

1. Project Name Lime Wind
2. Key Observation Point Spring Recreation
3. VRM Class Class II viewing Class IV
4. Location
Township 16S
Range 45E
Section 6
5. Location Sketch

**SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION**

| | 1. LAND/WATER | 2. VEGETATION | 3. STRUCTURES |
|---|---|---|---|
| FORM | Rounded and rolling | Complex to smooth and indistinct | Defined horizontals and curves |
| LINE | Complex diagonals | Irregular and complex to soft and smooth | Horizontals, verticals |
| COLOR | Green, gray and tan | Brown, gray and green | Gray and brown |
| TEX-TURE | Smooth with coarse spots | Medium to smooth | Medium |

**SECTION C. PROPOSED ACTIVITY DESCRIPTION**

| | 1. LAND/WATER | 2. VEGETATION | 3. STRUCTURES |
|---|---|---|---|
| FORM | Rounded and rolling with geometric shapes | Complex to smooth and indistinct | Geometric and linear |
| LINE | Complex diagonals with verticals | Irregular and complex to soft and smooth | Vertical and diagonal |
| COLOR | Green, gray and tan | Brown, gray and green | Gray |
| TEX-TURE | Smooth with coarse spots | Medium to smooth | Smooth |

**SECTION D. CONTRAST RATING** ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST

| | | FEATURES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LAND/WATER BODY (1) | | | | VEGETATION (2) | | | | STRUCTURES (3) | | | |
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| ELEMENTS | Form | | | X | | | | | X | | | X | |
| | Line | | | X | | | | | X | | | X | |
| | Color | | | | X | | | | X | | | | X |
| | Texture | | | | X | | | | X | | | | X |

2. Does project design meet visual resource management objectives? ☒ Yes ☐ No (Explain on reverse side)

3. Additional mitigating measures recommended ☐ Yes ☒ No (Explain on reverse side)

Evaluator's Names
Loran Joseph
Linda Joseph

Date
4/16/2008

Form 8400-4
(September 1985)

APPENDIX I

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

**VISUAL CONTRAST RATING WORKSHEET**

Date April 16th, 2008
District Baker
Resource Area
Activity (program) Wind

**SECTION A. PROJECT INFORMATION**

1. Project Name Lime Wind
2. Key Observation Point I-84 Southbound
3. VRM Class Class IV
4. Location
Township 13S
Range 44E
Section 12
5. Location Sketch

**SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION**

| | 1. LAND/WATER | 2. VEGETATION | 3. STRUCTURES |
|---|---|---|---|
| FORM | Rolling and rounded | Complex and vertical to smooth and indistinct | Smooth and linear to curving |
| LINE | Complex diagonals | Irregular and complex to soft and smooth | Strong diagonals, verticals, horizontals |
| COLOR | Gray, green and brown | Brown, gray and green | Grays and browns |
| TEX-TURE | Medium to smooth | Medium to smooth | Smooth |

**SECTION C. PROPOSED ACTIVITY DESCRIPTION**

| | 1. LAND/WATER | 2. VEGETATION | 3. STRUCTURES |
|---|---|---|---|
| FORM | Rolling/rounded with short verticals | Complex and vertical to smooth and indistinct | Short, simple and vertical |
| LINE | Complex diagonals with short verticals | Irregular and complex to soft and smooth | Verticals |
| COLOR | Gray, green and brown | Brown, gray and green | Gray |
| TEX-TURE | Medium to smooth | Medium to smooth | Smooth |

**SECTION D. CONTRAST RATING** ☐ SHORT TERM ☐ LONG TERM

1. DEGREE OF CONTRAST

| | | FEATURES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LAND/WATER BODY (1) | | | | VEGETATION (2) | | | | STRUCTURES (3) | | | |
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| ELEMENTS | Form | | X | | | | | | X | | | X | |
| | Line | | X | | | | | | X | | | | X |
| | Color | | | | X | | | | X | | | | X |
| | Texture | | | | X | | | | X | | | | X |

2. Does project design meet visual resource management objectives? ☒ Yes ☐ No (Explain on reverse side)

3. Additional mitigating measures recommended ☐ Yes ☒ No (Explain on reverse side)

Evaluator's Names
Loran Joseph
Linda Joseph

Date
4/16/2008

APPENDIX J

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

**VISUAL CONTRAST RATING WORKSHEET**

Date April 16th, 2008
District Baker
Resource Area
Activity (program) Wind

**SECTION A. PROJECT INFORMATION**

1. Project Name Lime Wind
2. Key Observation Point I-84 Northbound
3. VRM Class Class IV
4. Location
Township 14S
Range 44E
Section 14
5. Location Sketch

**SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION**

| | 1. LAND/WATER | 2. VEGETATION | 3. STRUCTURES |
|---|---|---|---|
| FORM | Flat to rolling and rounded | Complex and short to smooth and indistinct | Smooth and linear |
| LINE | Complex diagonals | Irregular and complex to soft and smooth | Strong horizontals and verticals |
| COLOR | Gray, green and brown | Brown, gray and green | Grays and browns |
| TEX-TURE | Smooth to medium | Medium to smooth | Smooth |

**SECTION C. PROPOSED ACTIVITY DESCRIPTION**

| | 1. LAND/WATER | 2. VEGETATION | 3. STRUCTURES |
|---|---|---|---|
| FORM | Flat to rolling with short verticals | Complex and short to smooth and indistinct | Short, simple and vertical |
| LINE | Complex diagonals with short verticals | Irregular and complex to soft and smooth | Verticals |
| COLOR | Gray, green and brown | Brown, gray and green | Gray |
| TEX-TURE | Smooth to medium | Medium to smooth | Smooth |

**SECTION D. CONTRAST RATING** ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST

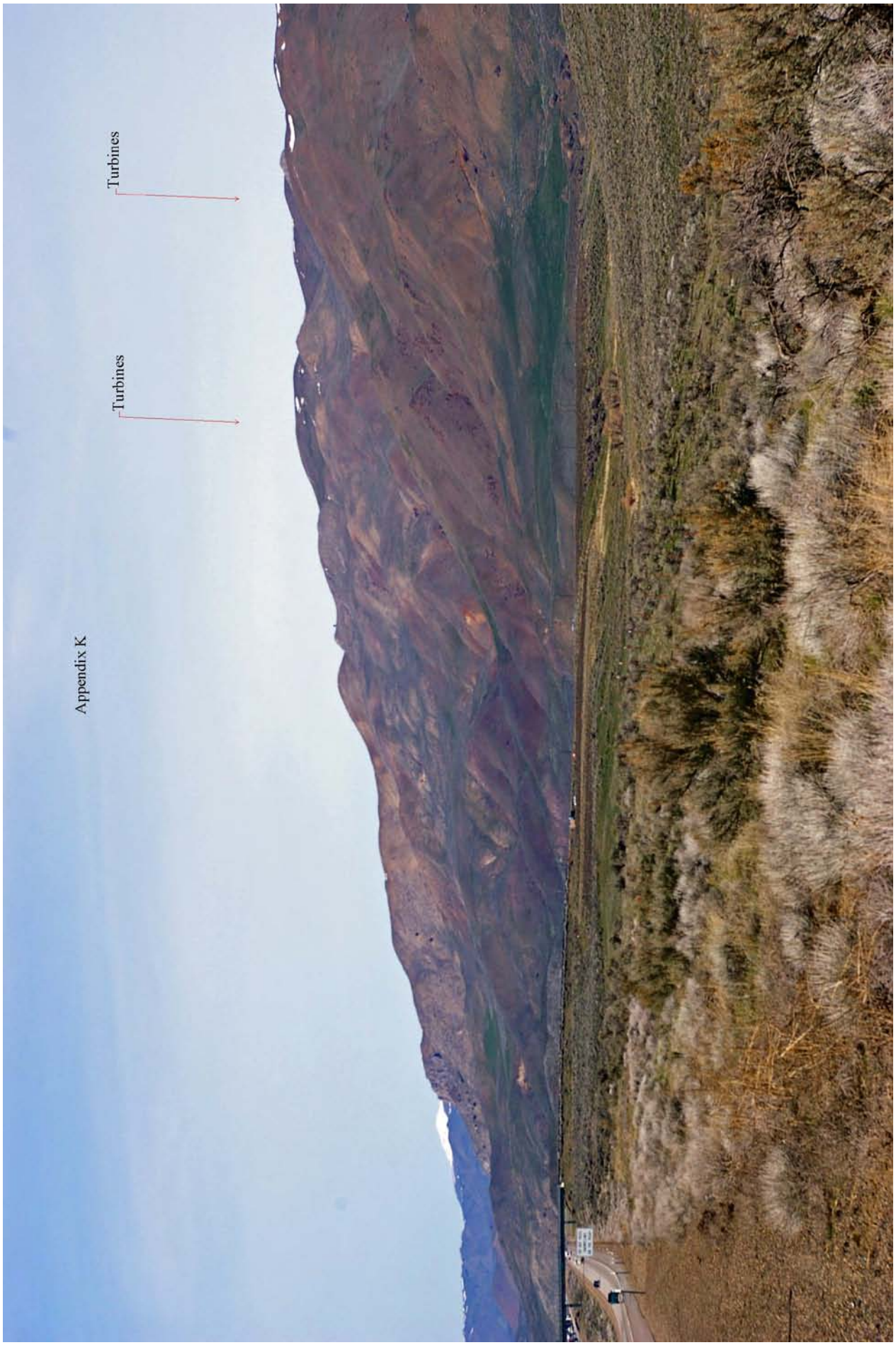
| | | FEATURES | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LAND/WATER BODY (1) | | | | VEGETATION (2) | | | | STRUCTURES (3) | | | |
| | | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None | Strong | Moderate | Weak | None |
| ELEMENTS | Form | | X | | | | | | X | | | X | |
| | Line | | X | | | | | | X | | | | X |
| | Color | | | | X | | | | X | | | | X |
| | Texture | | | | X | | | | X | | | | X |

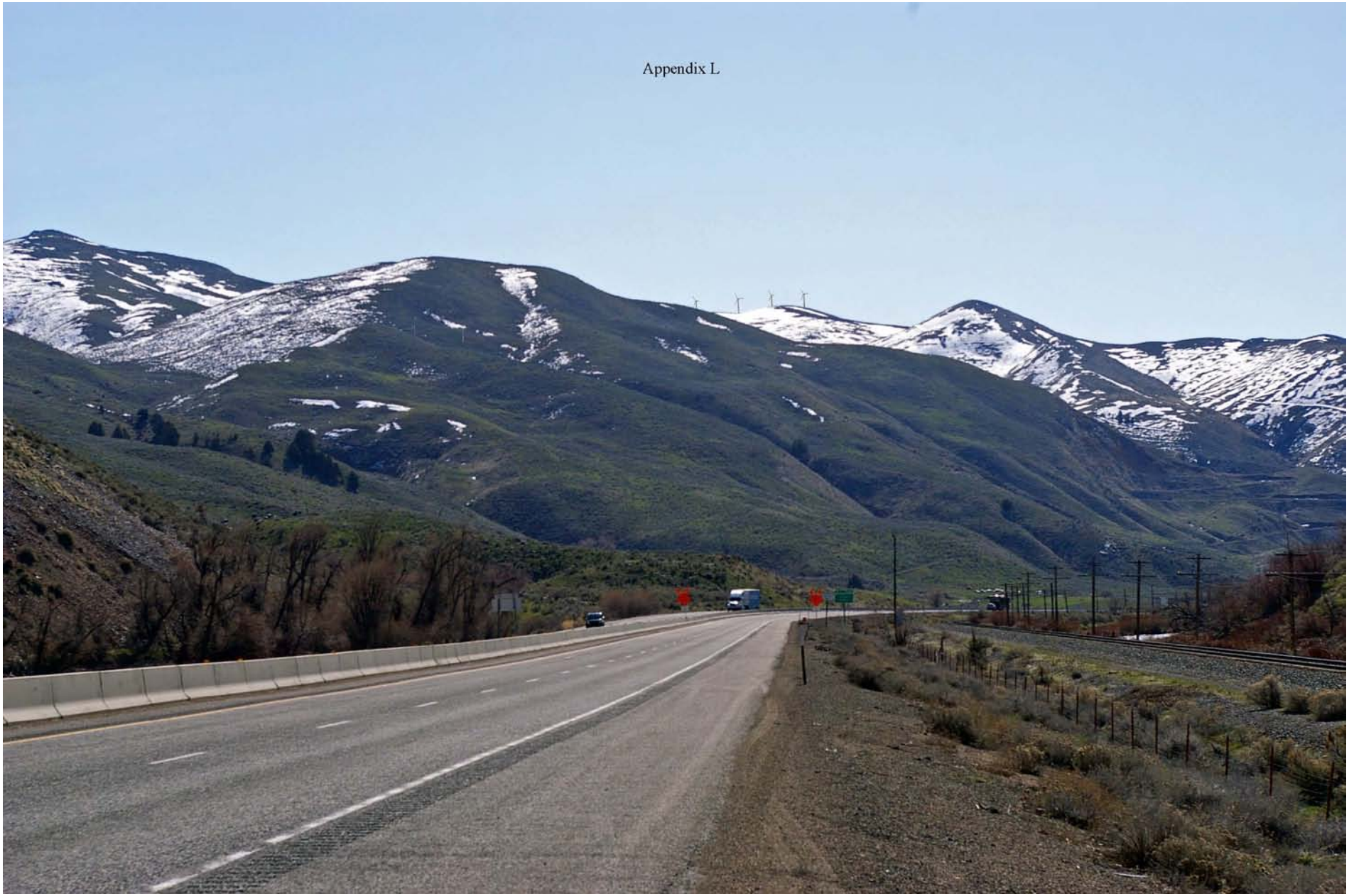
2. Does project design meet visual resource management objectives? ☒ Yes ☐ No (Explain on reverse side)

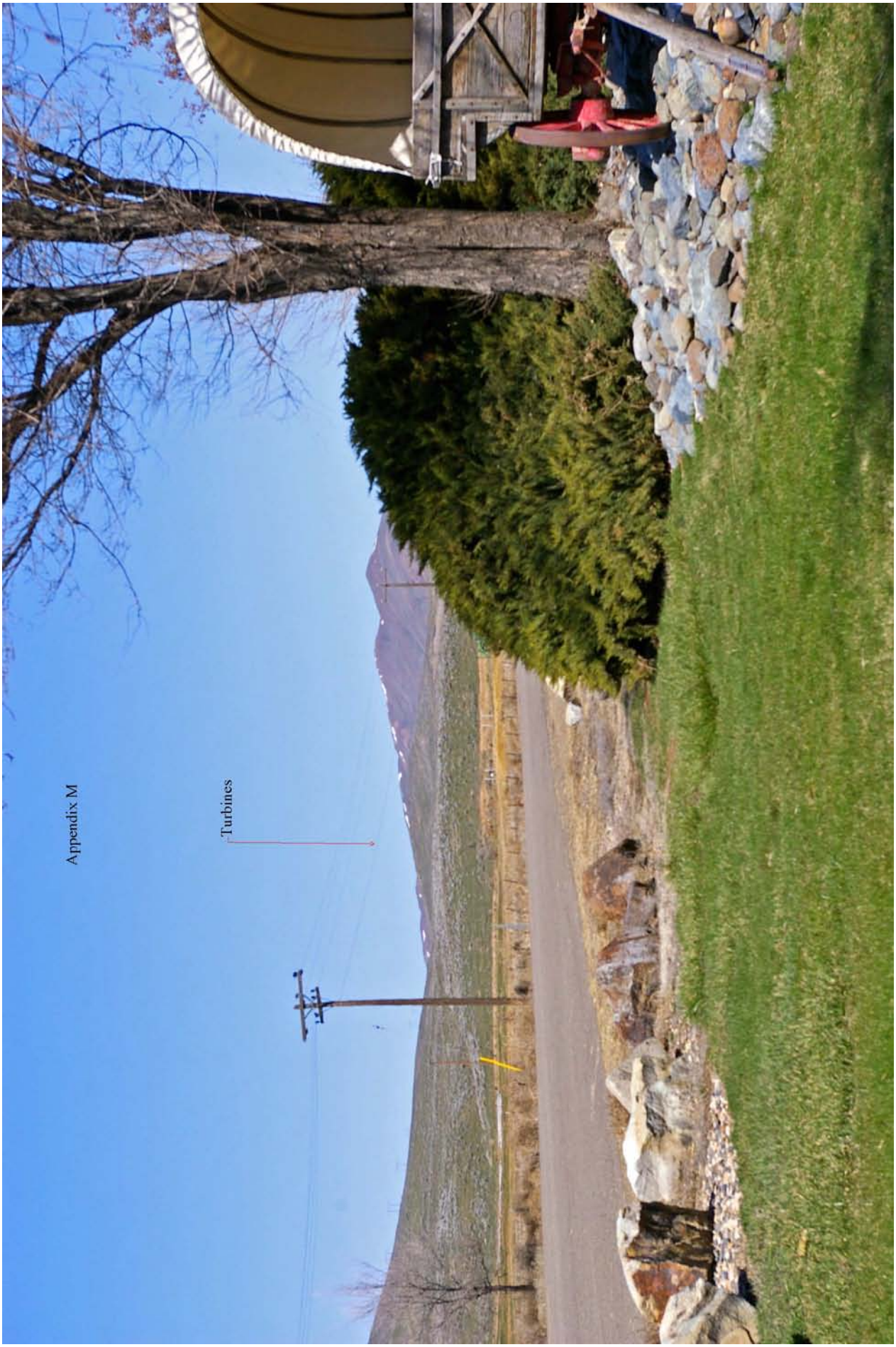
3. Additional mitigating measures recommended ☐ Yes ☒ No (Explain on reverse side)

Evaluator's Names
Loran Joseph
Linda Joseph

Date
4/16/2008


Appendix K
Turbines
Turbines


Appendix L

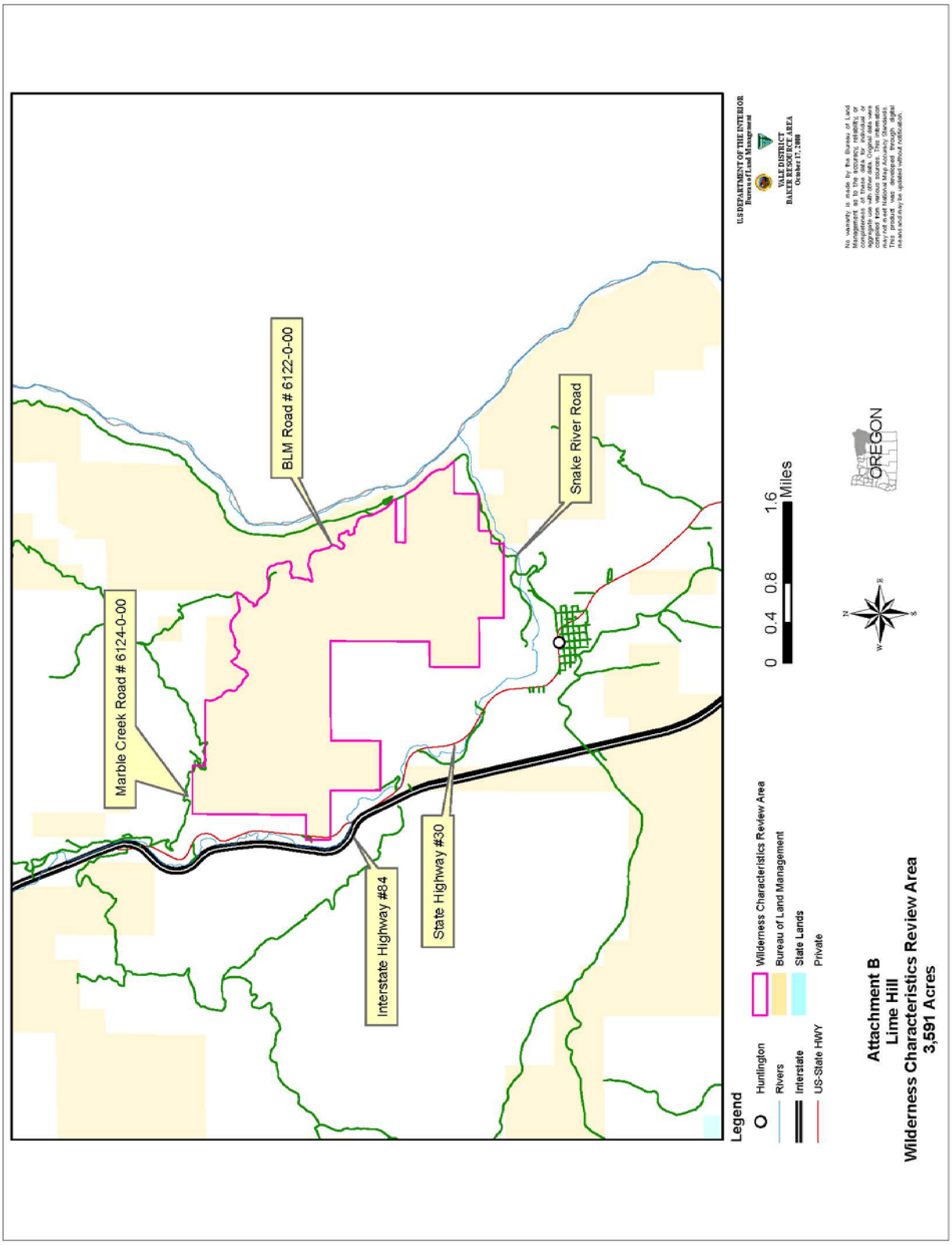

Appendix M
Turbines

Appendix N

Appendix O

Appendix P

Appendix Q


Marble Creek Road # 6124-0-00
BLM Road # 6122-0-00
Snake River Road
Interstate Highway #84
State Highway #30
Legend
Huntington
Rivers
Interstate
US-State HWY
Wilderness Characteristics Review Area
Bureau of Land Management
State Lands
Private
0 0.4 0.8 1.6 Miles
OREGON
N
W
E
S
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management
VALE DISTRICT
BAKER RESOURCE AREA
October 17, 2008
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual or aggregate use with other data. Original data were compiled from various sources. This information may not meet National Mapping Accuracy Standards. This product is updated as time and budget permit and may be updated without notification.
Attachment B
Lime Hill
Wilderness Characteristics Review Area
3,591 Acres

Attachment C

# LIME WIND PROJECT BIRD AND BAT CARCASS SURVEY

**Prepared by:**

**Randy Joseph**
**Joseph Millworks**
**37123 Hansen Lane**
**Baker City OR 97814**
**541-894-2347**
***randy@josephmillworks.com***

**October 13, 2009**

## PROJECT BACKGROUND

On June 6, 2007 Joseph Millworks Inc., of Baker City Oregon, submitted a Right-of-Way (ROW) application to install wind turbines on Federal Lands to the Bureau of Land Management's (BLM) Baker Field Office. The project location is near Lime Oregon on BLM administered lands in section 36, T.13S., R. 44 E, Willamette Meridian, Oregon. The Lime Wind Project would include installation of twelve wind turbines on these lands.

## INTRODUCTION

Although the Lime Wind Energy Project is expected to have no significant impact on resident bat populations (Betts 2009), it may impact migrant species more. Carcass searches should be done to document any fatalities of migrants. Orloff and Flannery (1992) and Johnson et al. (2002) reported that most bats and birds killed by turbines remained within 63 m of the turbine. However the turbines where these studies were conducted were about 50% taller and had rotors about 50% greater in diameter than those proposed for the Lime Wind Energy Project. Thus, an adequate search area for the Lime project should be a circular plot 42 m in radius and centered on each turbine.

Searches should be made both pre-construction and post-construction. The pre-construction searches provide a baseline of natural deaths that may occur in the area. Numbers of carcasses found in pre-construction searches can be subtracted from those found in post-construction searches to give an estimate of fatalities due to the turbines.

## PROJECT LOCATION

The Lime Wind Energy Project lies within the USGS Lime Quad, T. 13 S., R. 44 E., section 36 on Bureau of Land Management (BLM) administered lands. Joseph Millworks plans on locating twelve wind turbines on these lands.

The Study Area (SA) includes an area of16617 square meters made up of twelve 42 meter diameter circles surrounding each proposed turbine location.

## METHODS

The survey utilized three surveyors, each 7 meters apart by a measured length of rope, traversing concentric circles around each proposed turbine site 3.5 meters from the center. The inner person stayed 3.5 meters from the center, the intermediate person stayed 10.5 meters from the center, and the outer person stayed 17.5 meters from the center. This allowed an area 42 meters in diameter to be surveyed.

The outer person walked at a rate of 45 – 55 meters per minute, and visually inspected the area 3.5 meters to either side of their path. The intermediate person walked slightly slower while visually inspecting the area 3.5 meters to either side of their path. The inner person walked slower still while visually inspecting the area 3.5 meters to either side of their path. This was repeated for each proposed turbine location.

## RESULTS

Surveys were conducted at all twelve turbine locations of the proposed Lime Wind Energy Project. Approximately 2374 meters were traversed resulting in an area of 16618 square meters being surveyed. No bird or bat carcasses were found.

## CONCLUSION AND RECOMMENDATIONS

The purpose of this survey was to establish a baseline for bird and bat natural deaths in the project area around turbine locations. It is recommended that a second pre-construction survey take place in the spring after snow is off and before construction begins to gather additional natural death baseline data.

## REFERENCES

BETTS BJ. 2009. Lime wind project: results of a survey for resident bats. Report submitted to Randy Joseph, Lime Wind Energy Project, September 24, 2009.

ORLOFF S, FLANNERY A. 1992. Wind turbine effects on avian activity, habitat use, and mortality in Altamont Pass and Solano County wind resource areas. 1989-1991. BioSystems Analysis, Inc., Tiburon, CA.

## Attachment D

# LIME WIND PROJECT BURROWING OWL SURVEY

**Prepared by**

**Richard Jerofke**

**Wildlife Biologist**

**Blue Mountain Consulting – Archaeology and Public History**

**60500 Bushnell Rd.**

**La Grande, OR 97850**

**Prepared for**

**Randy Joseph**
**Joseph Millworks**
**37123 Hansen Lane**
**Baker City OR 97814**
**541-894-2347**
***randy@josephmillworks.com***

**July 8, 2009**

## PROJECT BACKGROUND

On June 6, 2007 Joseph Millworks Inc., of Baker City Oregon, submitted a Right-of-Way (ROW) application to install wind turbines on Federal Lands to the Bureau of Land Management's (BLM) Baker Field Office. The project location is near Lime Oregon on BLM administered lands in section 36, T.13S., R. 44 E, Willamette Meridian, Oregon. The Lime Wind Project would include installation of twelve 250 Kilowatt (KW) wind turbines on these lands.

Joseph Millworks, Inc currently has an existing Right-of-Way Grant issued by the BLM for a wind test tower (OR-63195).

## INTRODUCTION

The BLM requested that a survey be completed to determine if western burrowing owls (*Athene cunicularia hypugea*) are nesting/using habitat on BLM managed land in the vicinity of the Lime Wind Energy Project. Biological information was obtained by field surveys conducted in the SA and by literature search. This report is intended to summarize the results of a focused survey of the Lime Wind Project for western burrowing owls.

The burrowing owl is a migratory bird species protected by international treaty under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711). In eastern Oregon (Blue Mountain ecoregion), the western burrowing owl is classified as Sensitive-Critical (ODFW 2008) and is listed as a Special Status Species by the BLM (BLM 2009).

From 1994 to 1996, the western burrowing owl was designated by the U.S. Fish and Wildlife Service (USFWS) as a Category 2 species for consideration to be listed as a threatened or endangered species. In 1996, the Category 2 designation was discontinued. In 2002, the western burrowing owl is listed by the USFWS as a National Bird of Conservation Concern (Klute et al. 2003).

The western burrowing owl is a subspecies of burrowing owl found in eastern Texas north to southern Manitoba and west across southern Canada and all of the western United States.

## PROJECT LOCATION

The Lime Wind Energy Project lies within the USGS Lime Quad, T. 13 S., R. 44 E., sections 25, 26, 27, and 36 (Fig. 1). It includes Bureau of Land Management (BLM) land and Baker County roads. Mr. Joseph plans on locating the towers in the region of SW ¼ of the NW ¼, SE ¼ of the NW ¼, NW ¼ of the SW ¼, NW ¼ of the SE ¼, SW ¼ of the NE ¼, SE ¼ of the NE ¼, NW ¼ of the NE ¼, NE ¼ of the NE ¼ of Section 36, which is BLM managed property.

The Study Area (SA) includes the Lime Wind Energy Project site and a 0.5 mile buffer surrounding the project site (Fig. 2). Private land to the north (Section 25) and a small private parcel located in Section 31 were excluded from the SA. The area covered by the 0.5 mile buffer encompassed approximately 820 acres. Areas within the SA that were extremely steep and rugged were also excluded. This reduced the SA to approximately 650

acres located mainly in USGS Lime Quad, T. 13 S., R. 44 E., Sections 35 and 36, and T. 13 S., R. 45 E., Section 31.

## ECOLOGICAL REQUIREMENTS

Burrowing Owls are generally found on the northern breeding grounds from mid-March through September (Haug et al. 1993). In Harney County, the average earliest arrival date of burrowing owls recorded is March 27 (USFWS 2008). It can be assumed that this date represents the average earliest arrival date of burrowing owls throughout much of eastern Oregon.

The western burrowing owl is a small terrestrial owl primarily associated with open country. "The western burrowing owl prefers flat-to-gently-undulating areas that have a high enough rodent population to support its lifecycle. Other needs include burrows in which they can build nests, short or sparse vegetation, and open terrain. The abandoned burrows of ground-dwelling mammals such as badgers, ground squirrels, and prairie dogs are ideal for nesting, resting, and storing food. Short vegetation and tall weedy areas, where insects and rodents are most common, ensure an adequate food supply when they are located within 3 miles of the burrows. Open terrain surrounding the burrows allows the owl to see approaching predators." (BLM 2009). The overriding characteristics of suitable burrowing owl breeding habitat appear to be the presence of preexisting burrows excavated by fossorial (adapted for burrowing or digging) mammal with the owl uses for roosting and nesting and relatively short vegetation with only sparse shrubs and taller vegetation (Klutz et al. 2003). Burrowing owls typically use burrows made by mammals, such as ground squirrels (*Spermaphilus* sp.), badgers (*Taxidea taxus*) or other larger burrowing animals, but also may use artificial burrows.

In Oregon, the burrowing owl breeding range is mainly limited to counties east of the Cascades. Breeding primarily has been recorded in Wasco, Morrow, Umatilla, Malheur, Harney, and Lake counties, but there have also been recorded nesting in Baker, Sherman and Gilliam counties (Klutz et al. 2003). Western burrowing owls have been observed at Virtue Flat, Keating, Huntington, and Richland Valley extending to the Snake River. Although there are recorded observations of the species in the Decision Area, there are no existing records of nesting activity or recruitment (BLM 2009).

Burrowing owls are opportunistic feeders, primarily taking arthropods, small mammals, birds, amphibians and reptiles (Haug et al. 1993).Burrowing owls forage in a variety of habitats, including cropland, pasture, prairie dog colonies, fallow fields, and sparsely vegetated areas (Klutz et al. 2003). Vegetation >1 m tall may be too tall for burrowing owls to locate or catch prey.

## ENVIRONMENTAL SETTING

This SA is in the area of the Burnt River watershed, which is a subprovince of the Columbia Basin. Raymond (1991) indicates that the Blue Mountain physiographic province was formed from lava flows and geologic uplift. "The Grande Ronde valley started forming over 15 million years ago when the Columbia River basalt was erupting and laying down huge lava flows throughout the Columbia Basin. As the valley started to form, the lava filled in very quickly, covering both the valley floor and the surrounding ridges" (Reidel 2003). This

resulted in over 42,000 cubic miles of basalt (Orr and Orr 1996) covering the Columbia Plateau. These basalt flows redirected or blocked rivers and streams, creating sediment basins.

The soils within the SA include Lickskillet very gravelly sandy loam, 30 to 50 percent south slopes, Lickskillet very gravelly sandy loam, 50 to 70 percent south slopes, Redcliff gravelly loam, 30 to 50 percent north slopes, Redcliff gravelly loam, 50 to 75 percent north slopes, and Ukiah silty clay loam, 2 to 12 percent slopes (NRCS 2009). The Lickskillet series consists of shallow, well drained soils that formed in stony colluvium consisting of loess, rock fragments and residuum weathered from basalt and rhyolite (NCSS 2008). The Redcliff series consists of moderately deep well drained soils that formed in colluvium weathered from volcanic or metavolcanic rock with minor ash influence. Redcliff soils are on hills (NCSS 2004). The Ukiah series consists of moderately deep, well drained soils that formed in colluvium from basalt and volcanic tuff (NCSS 2003).

The topography of the SA is hilly with minimal to steep slopes (ranging from 2-75% slopes) (Photo 1). A prominent east-west oriented ridge is situated in the general center of the SA (Photo 2). This ridge is the proposed location of the wind turbine project. Rolling hillslopes, with intermittent narrow benches, steep canyons and draw, and rock outcrops occur to the east, west and south of the ridgeline (Photo 3). A wide sloping bowl is situated to the north of the ridgeline (Photo 4).

Photo 1. Topography in the SA ranges for minimal to more than 50% slopes.

Photo 2. Portion of SA ridgeline viewed for I-84.

Photo 3. Rolling hillslope ending in a small bench.

Photo 4. Gently sloping bowl located north of the ridgeline.

Slopes generally ranging from 2-12% slopes make up approximately 5% of the SA, slopes between 30-50% comprise an additional 10% of the SA and slopes greater than 50% comprise the bulk (85%) of the SA (NRCS 2009). The elevation of the central ridgeline is approximately 4000 feet. The elevation at the outer limits of the SA is approximately 3150 feet.

The vegetation of the Blue Mountain Province of the Columbia Basin physiographic area include ponderosa pine (*Pinus ponderosa* C. Lawson), grand fir (*Abies grandis* (Douglas ex D. Don) Lindl.), Douglas Fir (*Pseudotsuga menziesii* (Mirb.) Franco), western larch (*Larix occidentalis* Nutt.), bluebunch wheatgrass (*Pseudoroegneria spicata* (Pursh) A. Löve ssp. *spicata*), Idaho fescue (*Festuca idahoensis* Elmer) and bitterbrush (*Purshia tridentata* (Pursh) DC.) (Franklin and Dyness 1973).

## EXISTING HABITAT CONDITIONS

**Vegetation:** Vegetative communities present in the SA include primarily Wyoming Big Sagebrush Steppe on slopes with deeper, moister soils and Mixed Grasslands on the

drier, rockier slopes. Common native plants observed include but are not limited to big sagebrush (*Artemisia tridentata* Nutt.), bitterbrush, rabbit brush (*Chrysothamnus* sp. Nutt.), service berry (*Amelanchier* sp. Medik.), Idaho fescue, bunch grasses including bluebunch wheatgrass, and possibly Sandberg bluegrass (*Poa secunda* J. Presl), arrowleaf balsamroot (*Balsamorhiza sagittata* (Pursh) Nutt.), and lupine (*Lupinus* spp. L.). Non-native plant species, mainly grasses, include but are not limited to cheatgrass (*Bromus tectorum* L.), crested wheatgrass (*Agropyron cristatum* (L.) Gaertn.), and intermediate wheatgrass (*Thinopyrum intermedium* (Host) Barkworth & D.R. Dewey). Juniper (*Juniperus* L.) and other tree species are not present in the SA.

**Wildlife:** Wildlife species observed or detected in the SA included larger ranging mammals such as pronghorn antelope (*Antilocapra americana*) and mule deer (*Odocoiles hemionus*), and common mammals such as coyote (*Canis latrans*), and pocket gophers (*Thomomys* sp.). Pronghorn antelope appear to use the entire SA as both winter and summer range, while deer probably use the area mainly as winter range. Deer sign was very limited in the higher elevation of the SA (ridgeline) but was readily found on the lower benches. Additionally, domestic livestock (cattle) were observed grazing on most of the study site. No other mammals or their sign was observed.

Avian species observed included mourning dove (*Zenaida macroura*), American crow (*Corvus brachyrhyncos*), California quail (*Callipepla californica*), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), horned lark (*Eremophila alpestris*), brewers blackbird (*Euphagus cyanocephalus*), lark sparrow (*Chondestes grammacus*), chukar (*Alectoris chukar*), western meadowlark (*Sturnella neglecta*), western kingbird (*Tyrannus verticalis*), raven (*Corvus corax*), great horned owl (*Bubo virginianus*) in rimrocks 1 mile north of SA, American kestrel (*Falco sparverius*), Bullock's oriole (*Icterus bullockii*) in Binder Spring Canyon, black-billed magpie (*Pica pica*), and barn swallow (*Hirundo rustica*). Horned lark, lark sparrow, western meadowlark, and chukar were nesting in the SA.

Based on limited observations, reptiles appear not to be common in the SA. Species observed included western rattlesnake (*Crotalus oreganus*), western fence lizard (*Sceloporus occidentalis*), and possibly side-blotched lizard (*Uta stansburiana*). No amphibians were observed in the SA.

## METHODS

**Pedestrian Surveys:** The SA was visually inspected to determine if suitable burrowing owl habitat is present. The potential suitable owl habitat within project area and surrounding buffer area (collectively referred to as the SA) was surveyed using parallel pedestrian survey transects spaced no more than 100 feet apart. Spacing was reduced as needed to account for differences in terrain, vegetation density, and ground surface visibility to ensure adequate visual coverage of the ground surface. Transect routes were deviated from only to traverse difficult topography or thick vegetation or to inspect areas with unusual vegetation, or evidence of ground disturbance. Areas with slopes

that exceed 20 percent, rock outcrops, area with heavy shrub cover, and deep draws and ravines were excluded from the pedestrian survey.

A Garmin eTrex 12 channel GPS receiver was used to map transect termini and waypoints. Transects were plotted on DeLorme 3D TopoQuads™ after each days survey effort to determine coverage.

During pedestrian surveys most burrowing owls are detected visually (CDOW 2007). While traversing each transect suitable perches and loafing areas were continually scanned visually to detect any owls that may be present. Some burrowing owls may also be detected by their call. Owl vocalizations were listened for while conducting pedestrian surveys.

All potentially suitable animal borrows found were photographed, mapped, and determined if there were any signs of potential burrowing owl activity. Sign of owl activity includes, but is not limited to molted feathers, cast pellets, prey remains, eggshell fragments, excrement at or near a burrow entrance, or observation of one or more burrowing owls.

Because poor weather conditions may impact the ability to detect burrowing owls, surveys were conducted only during fair weather conditions that are considered conducive to observing owls outside their burrows. Surveys were not conducted during heavy rains, high winds (> 20 mph), temperatures over 90 °F., or dense fog.

**Call-Broadcast Surveys:** To increase the likelihood of detecting burrowing owls, if present, call-broadcast, as recommended by CDOW (2007), was conducted on May 23 and May 24. Calling stations were established (Fig. 2) to provide adequate visual coverage of the area of potential habitat being broadcasted over. Male (*coo-coo*) and alarm (*quick-quick-quick*) calls played from a portable CD and amplified through a megaphone were played from as many fixed points as necessary to provide visual coverage of the site being broadcasted over. Calls were broadcast loudly but without distortion.

Call broadcast surveys were conducted from two hours before sunset to one hour after and one hour before sunrise to two hours after sunrise. Sunrise and sunset times for the SA (Huntington, Oregon) were determined using the following website: *www.sunrisesunset.com/usa/oregon.asp*.

Although call-broadcast may increase the probability of detecting burrowing owls, most owls will still be detected visually (CDOW 2007). During the 10 minute calling, the area being broadcast over was continually visually scanned. After completion of the 10 minute calling period, an additional 10 minutes of passive monitoring was conducted from each vantage point using a spotting scope and binoculars.

## RESULTS

Surveys were conducted in all potentially suitable breeding habitat on BLM managed land within 0.5 miles of the proposed Lime Wind Project site. Approximately 24 miles (124,592 feet) of transects were traversed during site visits conducted on May 16, May 23 and May 24. These transects covered approximately 322 acres of the SA. The remaining acreage was considered unsuitable due to steep topography (> 20% slope), and/or dense woody shrub cover. No evidence of burrowing owl or their sign was noted during the course of the pedestrian surveys.

A single large abandoned, partially collapsed, mammal burrow was found approximately 800 feet southwest of Binder Spring. (UTM 11T 0477862 4915263) (Photo 5). This burrow was appropriately sized for burrowing owl use but no sign of use was evident. An area, approximately 200 feet in diameter around the abandoned burrow was thoroughly searched for additional burrow entrances, but no additional burrows were located.

Several smaller animal burrows (Photo 6) were found in the lower benches in the southwest portion of the SA. These burrows were on average 1.5 inches in diameter and where likely made by pocket burrows that occasionally immerge above ground. These small shallow burrows did not appear to be suitable as owl burrows even with extensive modification by the owls.

Photo 5. Abandoned animal burrow with collapsed roof found near Binder Spring.

Photo 6. Example of small mammal (pocket gopher) burrow found during pedestrian surveys.

Call-broadcast surveys was conducted in the evening of May 23 and May 24 and during the morning of May 24. Weather conditions were within survey parameters, but breezy conditions (sustained wind at 10 to 20 MPH) during all survey periods possibly reduced the effectiveness of the call-broadcast survey. No detection of burrowing owls occurred during call-broadcast surveys conducted on May 23 and 24.

## CONCLUSION AND RECOMMENDATIONS

The main focus of this survey was to determine if burrowing owls occupy habitat in or adjacent to the Line Wind Project area. Poor habitat suitability (topography, lack of

animal burrows and development of sagebrush across much of the site), the presence of raptors (red-tailed hawks and great horned owls) which potentially nest in the area, and ground disturbance through intense grazing may limit burrowing owl nesting opportunities in the SA. Based on the substantial effort of the habitat assessment, general unsuitability of habitat in the SA, and the lack of existing records of nesting activity or recruitment in or near the SA, the survey effort conducted to date should be considered a sufficient effort to determine that this species and its suitable nesting habitat is not present in the SA.

If nesting burrowing owls are found to be using the Lime Wind Project site prior to construction, all ground disturbing activities should cease and BLM staff notified.

**REFERENCES**

Bent, A. C. 1961. Life History of North American Birds of Prey, Part 2. Dover Publications, Inc. New York.

Bureau of Land Management (BLM). 2009. Baker Resource Management Plan Revision, Analysis of the Management Situation. Vale District Office, Baker Resource Area.

Colorado Department of Wildlife (CDOW). 2007. Recommended Survey Protocol and Actions to Protect Nesting Burrowing Owls When Conduction Prairie Dog Control, revised 03/2007. Access on line at http://wildlife.state.co.us/NR/rdonlyres/C5D61571-F1DC-4679-ADD7-F3ABB339FB1C/0/BUOWSurveyProtocol2007.pdf

Franklin, J. F. and C. T. Dryness. 1973. Natural Vegetation of Oregon and Washington, Oregon State University Press.

Haug, E. A., B. A. Millsap, and M. S. Martell. 1993. Burrowing Owl (*Speotyto cunicularia*). *In* A. Poole and F. Gill, editors. The Birds of North America, No. 61. The Academy of Natural Sciences, Philadelphia, Pennsylvania; The American Ornithologists' Union, Washington, DC.

Harrison, C. 1978. A Field Guide to the Eggs, Eggs and Nestlings of North America Birds. The Stephen Greene Press.

Klute, D. S., L. W. Ayers, M. T. Green, W. H. Howe, S. L. Jones, J. A. Shaffer, S. R. Sheffield, and T. S. Zimmerman. 2003. Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States. U.S. Department of Interior, Fish and Wildlife Service, Biological Technical Publication FWS/BTP-R6001-2003, Washington, D.C.

National Cooperative Soil Survey (NCSS). 2008. Lickskillet Series. Established Series Rev. AON/TDT/RWL. 11/2008. Accessed online at http://www2.ftw.nrcs.usda.gov/osd/dat/L/LICKSKILLET.html

NCSS. 2004. Redcliff Series. Established Series Rev. JSC/TDT/RWL 03/2004. Accessed online at http://www2.ftw.nrcs.usda.gov/osd/dat/R/REDCLIFF.html

NCSS 2003. Ukiah Series. Established Series Rev. REH/AON/TDT 04/2003. Accessed online at http://ortho.ftw.nrcs.usda.gov/osd/dat/U/UKIAH.html

Natural Resources Conservation Service (NRCS). 2009. Custom Soil Resource Report for Baker County Area, Oregon Lime Wind Project. NRCS Web Soil Survey website accessed July 9, 2009.

ODFW. 2008. Oregon Department of Fish and Wildlife Sensitive Species List. Accessed on line at http://www.dfw.state.or.us/wildlife/diversity/species/docs/SSL_by_category.pdf

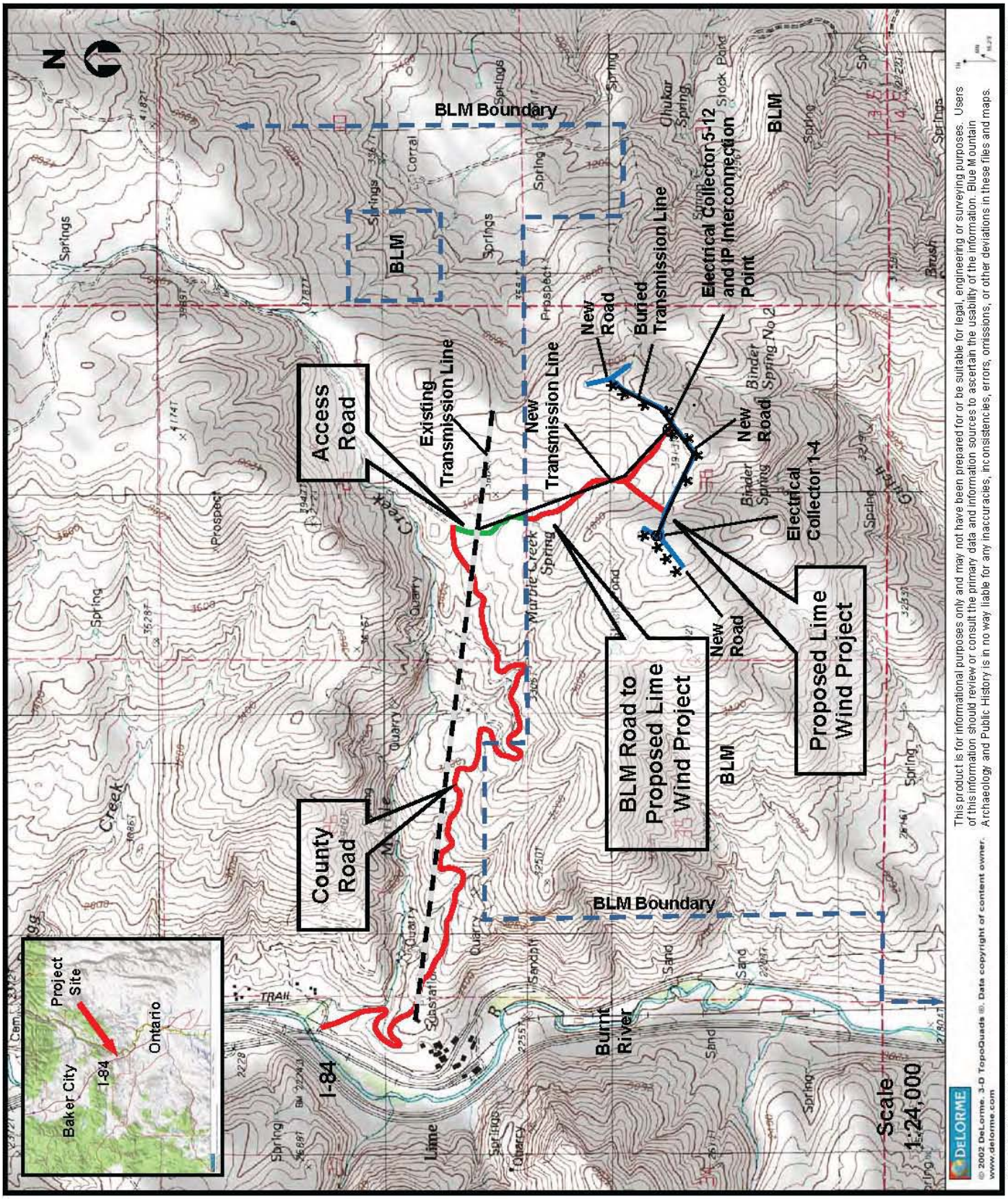
Orr, E. L. and W. N. Orr. 1996. Geology of the Pacific Northwest. McGraw Hill Companies, Incorporated, New York, NY.

Raymond, L. 1991. The Geology of Washington: Rocks and Minerals. V. 66, No. 4:262-277.

Reidel, S. 2003. Northwest Geology: Fossil Fish of the Grande Ronde Basin, www.pnl.gov.

U.S Fish and Wildlife Service (USFWS). 2008. Malheur National Wildlife Refuge. Migratory Bird Species Average Earliest Arrival Date. Accessed online at http://www.fws.gov/malheur/pdf/birdarrivaldates.pdf

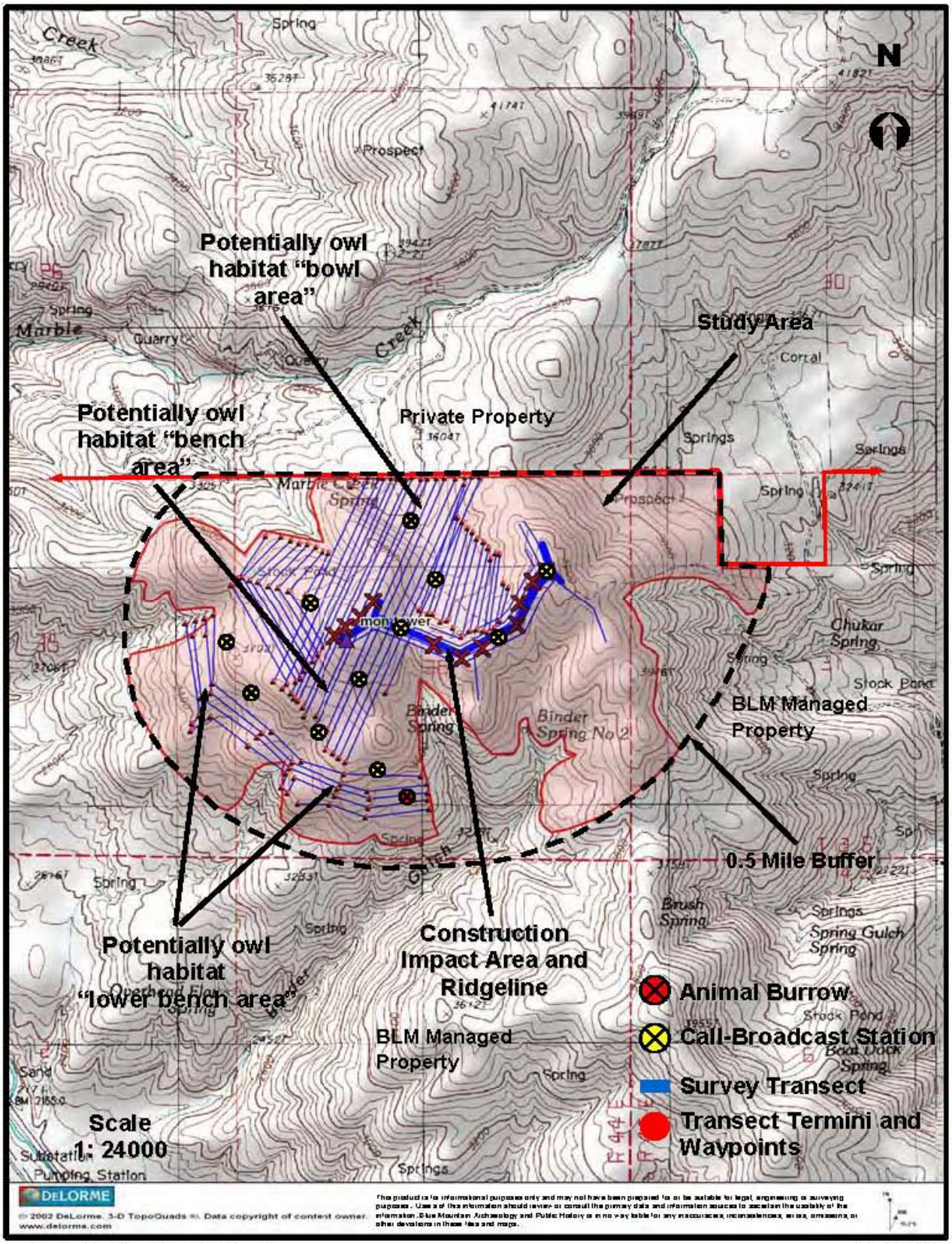
Figure 1: Lime Wind Project Site Map




Created by Blue Mountain Consulting July 8, 2009

3

**Figure 2. Lime Wind Project Study Area and Burrowing Owl Survey Map.**




Created by Blue Mountain Consulting

July 8, 2009

**Western Burrowing Owl Survey**

Observer(s): Richard Jerofke

Date: May 16, 2009

Survey Time: 0920 to 1641

Weather: clear, wind calm to light breeze (0-5 MPH), no precipitation, mid 70s to low 80s (by late afternoon)

Survey Area(s): Northern bowl, western ridge and western bench

| Transect | Start UTM | End UTM | length | Other Information |
|---|---|---|---|---|
| 1 | 11T 0477825 4916565 | 11T 0477416 4915637 | 3,347' | |
| 2 | 11T 0477401 4915643 | 11T 0477805 4916568 | 3,311' | |
| 3 | 11T 0477776 4916571 | 11T 0477389 4915665 | 3,220' | |
| 4 | 11T 0477354 4915686 | 11T 0477754 4916572 | 3,184' | |
| 5 | 11T 0477712 4916575 | 11T 0477319 4915718 | 3,088' | |
| 6 | 11T 0477438 4915607 | 11T 0477865 4916566 | 3,446' | |
| 7 | 11T 0477661 4916570 | 11T 0477640 4916532 | 135' | |
| 8 | 11T 0477889 4916571 | 11T 0477438 4915573 | 3,600' | |
| 9 | 11T 0477471 4915548 | 11T 0477926 4916568 | 3,663' | |

| | | | | |
|---|---|---|---|---|
| 10 | 11T 0477951<br>4916569 | 11T 0477494<br>4915541 | 3,698' | |
| 11 | 11T 0477540<br>4915529 | 11T 0477990<br>4916568 | 3,747' | |
| 12 | 11T 047821<br>4916571 | 11T 0477529<br>4915434 | 4,068' | |
| 13 | 11T 0477563<br>4915418 | 11T 0478063<br>4916567 | 4,115' | |

Datum: WGS 84

Total survey length: 42,622' (8.1 miles)

Other observations: wildlife sightings-brewers blackbird, lark sparrow (nesting), chukar (nesting), w. meadowlark, pronghorn (male), coyote (scat), w. kingbird, turkey vulture, hummingbird (species?), horned lark, raven, red-tailed hawk, great horned owl (rimrock north of study area), am. kestrel, only few deer pellet piles found,

**Western Burrowing Owl Survey**

Observer(s): Richard Jerofke

Date: May 23, 2009

Survey Time: 0730 to 1830

Weather: clear, breezy (5-10 MPH) in morning and evening, calm to light breeze (0-5 MPH) by mid morning , no precipitation, mid 70s to low 80s (by late afternoon)

Survey Area(s): Lower benches area transects 1-6, stock pond area transects 6-14

| Transect | UTM start | UTM end | Length | Other Information |
|---|---|---|---|---|
| 1 | 11T 0477922 4915321 | 11T 0477077 4915999 | 4,178' | waypoints @ 11T 0477608 4915331, 11T 0477430 4915385, 11T 0477309 4915508, 11T 0477070 4915711 |
| 2 | 11T 0477038 4915983 | 11T 0477945 4915290 | 4,367' | waypoints @ 11T 0477044 4915915, 11T 0477063 4915670, 11T 0477268 4915504, 11T 0477391 4915380, 11T 0477593 4915289, 11T 0477702 4915259 |
| 3 | 11T 0477948 4915252 | 11T 0477004 4915974 | 4,539' | waypoints @ 11T 0477712 4915228, 11T 0477582 4915271, 11T 0477381 4915356, 11T 0477250 4915486, 11T 0477022 4915650, 11T 0476992 4915912<br><br>**animal burrow @ 11T 0477862 4915263 (lower bench area 780' SW of Binder Spring** |
| 4 | 11T 0476960 4915964 | 11T 0477948 4915223 | 5,544' | waypoints @ 11T 0477016 4915578, 11T 0476986 4915544, 11T 0476981 4915513, 11T 0477061 4915573, 11T 0477214 4915450, 11T 0477368 4915335, 11T 0477348 4915276, 11T 0477374 4915254, 11T 0477399 4915316, 11T 0477570 4915241, 11T 0477707 4915189 |
| 5 | 11T 0477954 4915184 | 11T 0477415 4915208 | 1,804' | waypoints @ 11T 0477695 4915150, 11T 0477549 4915204 |

| | | | | |
|---|---|---|---|---|
| 6 | 11T 0477147 4916126 | 11T 0477373 4915708 | 1,558' | |
| 7 | 11T 0477409 4915718 | 11T 0477288 4916330 | 2,311' | waypoints @ 11T 0477175 4916155 |
| 8 | 11T 0477352 4916328 | 11T 0477430 4915730 | 2,377' | waypoints @ 11T 0477191 4916160 |
| 9 | 11T 0477443 4915761 | 11T 0477391 4916312 | 2,235' | waypoints @ 11T 0477222 4916147 |
| 10 | 11T 0477425 4916299 | 11T 0477459 4915788 | 2,096' | waypoints @ 11T 0477256 4916139 |
| 11 | 11T 0477459 4916296 | 11T 0477478 4915803 | 1,970' | waypoints @ 11T 0477299 4916122 |
| 12 | 11T 0477500 4915830 | 11T 0477493 4916284 | 1,832' | waypoints @ 11T 0477337 4916115 |
| 13 | 11T 0477522 4916285 | 11T 0477523 4915864 | 1,620' | waypoints @ 11T 0477380 4916099 |
| 14 | 11T 0477449 4916086 | 11T 0477549 4916259 | 655' | |

Datum: WGS 84

Total survey length: 37,086 (7.2 miles)

Other observations: wildlife sightings-am. crow, western kingbird, northern oriole, lark sparrow (nesting), chukar (nesting), western meadowlark (nesting), pronghorn (male) on ridge top near wind monitoring tower, rattlesnake, coyote (scat), horned lark, raven, red-tailed hawk, deer pellet piles fairly common on lower benches, active and old pocket gopher mounds.

**Western Burrowing Owl Survey**

Observer: Richard Jerofke

Date: May 24, 2009

Survey Time: 0700 to 1900

Weather: clear, breezy (10± MPH) in morning and evening, calm to light breeze (0-5 MPH) by mid morning , no precipitation, mid 70s to mid 80s (by late afternoon)

Survey Area(s): Rigeline area transects 1-5, northern bowl area transects 6-21

| Transect | UTM start | UTM end | Length | Other information |
|---|---|---|---|---|
| 1 | 11T 0477638 4915878 | 11T 0478671 4915880 | 5,141' | waypoints @ 11T 0477732 4915935, 11T 0478080 4915788, 11T 0478137 4915815, 11T 0478152 4915636, 11T 0478339 4915917, 11T 0478463 4916146, 11T 0478620 4916019 |
| 2 | 11T 0478455 4916165 | 11T 0477630 4915895 | 3,393' | waypoints @ 11T 0478396 4916098, 11T 0478321 4915937, 11T 0478083 4915812, 11T 0477727 4915957 |
| 3 | 11T 0477730 4915986 | 11T 0478339 4916390 | 3,639' | waypoints @ 11T 0478075 4915844, 11T 0478267 4915948, 11T 0478298 4915977, 11T 0478374 4916124, 11T 0478433 4916189, 11T 0478391 4916306 |
| 4 | 11T 0478319 4916377 | 11T 0477738 4915998 | 3'449' | waypoints @ 11T 0478409 4916198, 11T 0478258 4915962, 11T 0478077, 4915862 |
| 5 | 11T 0477931 4915953 | 11T 0478341 4916271 | 2,228' | waypoints @ 11T 0478074 4915898, 11T 0478276 4916017, 11T 0478380 4916200 |
| 6 | 11T 0478105 4916574 | 11T 0477587 4915399 | 4,219' | |
| 7 | 11T 0477613 4915382 | 11T 0478131 4916577 | 4,276' | |
| 8 | 11T 0478165 4916574 | 11T 0477777 4915670 | 3,231' | |
| 9 | 11T 0478241 4915969 | 11T 0478277 4916112 | 485' | |

| | | | | |
|---|---|---|---|---|
| 10 | 11T 0478258<br>4916130 | 11T 0478220<br>4915939 | 640' | |
| 11 | 11T 0478195<br>4915921 | 11T 0478242<br>4916252 | 1,098' | |
| 12 | 11T 0478225<br>4916256 | 11T 0478177<br>4915928 | 1,089' | |
| 13 | 11T 0478147<br>4915932 | 11T 0478206<br>4916230 | 998' | |
| 14 | 11T 0478196<br>4916278 | 11T 0478118<br>4915927 | 1,181' | |
| 15 | 11T 0478087<br>4915903 | 11T 0478177<br>4916303 | 1,347' | |
| 16 | 11T 0478150<br>4916316 | 11T 0478052<br>4915940 | 1,276' | |
| 17 | 11T 0478027<br>4915970 | 11T 0478132<br>4916344 | 1,278' | |
| 18 | 11T 0478114<br>4916361 | 11T 0478003<br>4915965 | 1,351' | |
| 19 | 11T 0477971<br>4915997 | 11T 0478092<br>4916387 | 1,341' | |
| 20 | 11T 0478072<br>4916404 | 11T 0477950<br>4916000 | 1,386' | |
| 21 | 11T 0477917<br>4916016 | 11T 0478100<br>4916545 | 1,838' | |

Datum: WGS 84

Total survey length: 44,884 (8.5 miles)

Other observations: wildlife sightings-barn swallow, California quail, mourning dove, am. crow, western kingbird, lark sparrow (nesting), chukar, western meadowlark (nesting), coyote (scat), horned lark, raven, limited deer sign in lower elevations, active and old pocket gopher mounds in lower elevations..

# LIME WIND PROJECT

## Results of a Survey for Resident Bats

Burr J. Betts, PhD
Betts Enterprises, LLC
Cove, OR 97824

## INTRODUCTION

About 1.5 bat fatalities per megawatt per year is the average for the four wind projects in Oregon and Washington for which there are data (calculated from data summarized in Barclay et al. 2007). Most bat fatalities involve species that migrate significant distances between summer feeding/reproductive sites and winter hibernation sites (Curry 2009). Although baseline surveys have demonstrated significant resident bat populations in the areas of wind projects, only about 3% of all bat fatalities in the United States have occurred in early and mid-summer suggesting that few residents are being killed (Johnson 2004). However, documenting the resident species in the area of a proposed wind project is still important for differentiating the potential impact of the project on migratory vs. resident species.

Based on habitat, behavior, and museum records, eight species of bats are potential residents in the Lime Wind Energy Project Area (EA Table 4; Csuti et al. 1997, Verts and Carraway 1998). Of these, 7 are considered _species of concern‘ by the BLM (EA Table 4). The potential resident species include: Pallid Bat (*Antrozous pallidus*), California Myotis (*Myotis californicus*), Western Small-footed Myotis (*M. ciliolabrum*), Western Long-eared Myotis (*M. evotis*), Little Brown Bat (*M. lucifugus*), Yuma Myotis (*M. yumanensis*), Big Brown Bat (*Eptesicus fuscus*), and Canyon Bat (*Parastrellus hesperus*). Although unlikely to reside in the area, the Silver-haired Bat (*Lasionycteris noctivagans*), another BLM species of concern, and the Hoary Bat (*Lasiurus cinereus*), are possible migrants through the project area. Hoary Bats and Silver-haired Bats comprise 96% of the bat fatalities at wind energy project areas in the Pacific Northwest (Johnson 2004).

## METHODS

### *Acoustic Detection of Bats*

Anabat II Bat Detectors were used to detect echolocation calls of bats moving through the project area. The detectors were attached to CF-ZCAIMS which recorded calls on compact flash memory cards. Each –pass" (a burst of individual calls) was recorded in a separate data file and automatically labeled with the date and time of recording. Detector set-ups were located along the ridge where the turbines will be (**Fig. 1**). Detectors C1, C2, and C3 were pointed straight up; the others were raised to about 45° above horizontal and aimed toward the sides of the ridge (see arrows in Fig. 1). These positions were

chosen to give broad coverage of the area through which bats were expected to fly. The detectors were set to record from 1900 hours to 0700 hours for the nights of August 26-29, 2009.

*Data Analysis and Reporting*

For each memory card the files will be downloaded, non-bat noises will be deleted, and the number of passes recorded by each detector will be counted. "Calls" are individual, discrete pulses of sound and "passes" are defined as a sequence of ≥2 individual calls separated by ≤1 second (Thomas 1988).

The ability to identify the species emitting a particular pass is dependent on a number of factors including: 1) the number of calls in the pass; 2) the behavior of the bat—calls may change within and between passes as bats move in relation to the microphone, as they get closer to a target insect or background clutter, and in the presence of other bats; 3) the proximity of the bat to the microphone and hence the completeness of the calls—higher frequencies of a call are often lost during recording due to greater attenuation than lower frequencies; 4) variation between individuals of the same species within a geographic area; 5) variation between populations of a species in different geographic areas; and 6) whether there are multiple species with similar call characteristics within the community of bats being sampled (Betts 1998, O'Farrell et al 1999, Barclay 1999). The percentage of identifiable passes is maximized when monitoring is done in person and passes are fed directly to a laptop computer where identification can be restricted to high-quality (many calls of high intensity) passes (O'Farrell et al 1999).

However, direct monitoring is not feasible for the several-night, multiple-site type of study needed for the Lime Wind Project. Rather it is necessary to use automated recording that often produces files containing passes with few calls of low quality produced by bats moving quickly in-and-out of the detector range. O'Farrell et al (1999) noted that within a good, identifiable pass there are still about 22% of the calls that are not diagnostic, which in itself suggests that at least a significant proportion of automated recordings containing just a few calls will not be identifiable. Additionally, Barclay (1999) presented data from other researchers that indicated 25% to 55% of all passes were not identifiable to species. Finally, two of the authors of O'Farrell et al (1999) tested their own ability to identify high quality passes from known species with success rates of only 62.5% and 89.6%, and Betts (1998) tested four experienced individuals on their ability to discriminate between Big Brown and Silver-haired Bats with resulting accuracies of only 34.0% to 70.2%. These results suggest that attempts at identifying all passes to species is risky and likely to be inaccurate.

A conservative approach to the problem of species identification is to group bats on the basis of the constant frequency (CF) component at the end of the call and then suggest further species identity on the basis of habitat affinity and details of call structure when calls are of sufficient quality. Following is the grouping for the 10 species likely to be encountered at the Lime Wind Project:

50 kHz group – California Myotis, Yuma Myotis, Canyon Bat
40 kHz group – Western Small-footed Myotis, Little Brown Bat
30 kHz group –Long-eared Myotis
25 kHz group – Pallid Bat, Silver-haired Bat, Big Brown Bat
<20 kHz group – Hoary Bat

Hoary Bats and Long-eared Myotis have distinctive call structures and can be identified to species. Although Silver-haired Bats, Big Brown Bats, and Pallid Bats have similar call structures, it is expected that detections of the 25 kHz group during the migration study will mostly likely be the migratory Silver-haired Bat. Detections of the 40 kHz group will most likely be Western Small-footed Myotis because of this species' greater affinity for the habitat than the Little Brown Bat. Detections of the 50 kHz group are more likely to be the California Myotis and the Canyon Bat rather than the Yuma Myotis, which has less affinity for the habitat that the other two species.

*File Analysis and Species Identification*

At the end of the recording period, the memory cards were removed from the CF-ZCAIMS and downloaded into a computer. The Anabat software converts the sounds recorded in each file into a graphic display of frequency (y-axis) vs. time (x-axis); the graphic display of each call in a pass typically has a reverse J-shape. Each file was examined by using the Analook software program. Files containing extraneous noise (mostly wind) were deleted and the files containing bat calls were assigned to a species group on the basis of call structure (primarily lowest frequency and shape) as follows:

50 kHz group – California Myotis, Yuma Myotis, Canyon Bat
40 kHz group – Western Small-footed Myotis, Little Brown Bat
30 kHz group –Long-eared Myotis
25 kHz group – Pallid Bat, Silver-haired Bat, Big Brown Bat
<20 kHz group – Hoary Bat

RESULTS

Four of the detector set-ups were disturbed, probably by wind near the end of the second night, but only one set-up failed to record any bat passes. A total of 133 identifiable passes were recorded (Table 1). The largest number of detections was recorded at C2, which might indicate that the saddle area between turbines 3 and 5 is in a flight path between the higher rock roosting crevices and the lower Burnt River Valley foraging area.

It is not possible to tell how many bats were represented by the 133 detections because the methodology cannot discriminate between one bat flying through the detection area several times vs. different individuals each flying through once. Also, some individuals may have been detected by more than one of the nine detector set-ups. In addition, even if similar data from other wind projects were available, it is not possible to compare the

Lime Project capture rates with such data because of the inherent night-to-night and location-to-location variability in bat activity.

Almost 80% of the recorded passes were from members of the 40 kHz group. Because of the greater affinity for the habitat near the turbine locations by the Western Small-footed Myotis compared to the Little Brown Bat, it appears that the Western Small-footed Myotis is the most common resident in the Lime Wind Project Area (Table 1). The next most common species are probably the California Myotis and the Canyon Bat, based on details of call structure that indicate most of the 50 kHz passes were from these two species rather than from Yuma Myotis. Likewise, details of call structure suggest that none of the 8 detections of the 25 kHz group were Pallid Bats. One Long-eared Myotis was detected.

TABLE 1. The number of passes of 5 bat species groups recorded at 9 Anabat detector set-ups from 1900 h to 0700 h on the nights of August 26-29, 2009 in the Lime Wind Energy Project Area.

| Detector | California Myotis, Yuma Myotis, Canyon Bat | Western Small-footed Myotis, Little Brown Bat | Long-eared Myotis | Pallid Bat, Silver-haired Bat, Big Brown Bat | Hoary Bat | Total |
|---|---|---|---|---|---|---|
| C1 | 4 | 22 | 0 | 1 | 0 | 27 |
| P1 | 0 | 2 | 0 | 0 | 0 | 2 |
| S1 | 0 | 26 | 0 | 1 | 0 | 27 |
| C2 | 14 | 31 | 0 | 0 | 0 | 45 |
| P2 (failed) | | | | | | |
| S2 | 1 | 2 | 0 | 1 | 1 | 5 |
| C3 | 0 | 4 | 1 | 3 | 0 | 8 |
| P3 | 0 | 2 | 0 | 1 | 0 | 3 |
| S3 | 1 | 14 | 0 | 1 | 0 | 16 |
| Total | 20 | 103 | 1 | 8 | 1 | 133 |

The one Hoary Bat that was detected was most likely a migrant as the migration period for the Pacific Northwest begins in late August (Johnson 2004). Although Big Brown Bats are possible residents in this area, it is not the most common habitat for this species (Verts and Carraway 1998). This species may also be a short-distance migrator through the area and accounts for about 2% of wind project fatalities in the Pacific Northwest (Johnson 2004). That observation, the detection of the Hoary Bat, and the likelihood that no Pallid Bats were detected, suggest that the 8 detections of the 25 kHz group were migrating Silver-haired and perhaps Big Brown Bats.

ESTIMATING FATALITIES

Although the Lime Wind Energy Project is expected to have no significant impact on resident bat populations (see below), it may impact migrant species more. Carcass searches should be done to document any fatalities of either residents or migrants. Orloff and Flannery (1992) and Johnson et al. (2002) reported that most bats and birds killed by turbines remained within 63 m of the turbine. Searches should be conducted at least every other week during the period of highest fatality rates (mid-August to mid-October for the Pacific Northwest). Because the Lime Wind Energy Project only has 12 turbines, a plot could be established around each turbine and sampled every-other week or around every-other turbine and sampled weekly. The procedure below was taken from Young et al. (2003).

1. Searchers walk parallel transects spaced 6-8 m apart at a pace of 45-55 m/min until the entire plot is covered
2. For each casualty, searchers should record species, sex and age when possible, date and time collected, location, and whether the carcass was intact or showed signs of scavenging.
3. Carcasses can be labeled with a unique number, bagged, and frozen for future reference or determination of species, sex, and age, if questionable.

Searches should be made both pre-construction and post-construction. The pre-construction searches provide a baseline of natural deaths that may occur in the area. Numbers of carcasses found in pre-construction searches can be subtracted from those found in post-construction searches to give an estimate of fatalities due to the turbines. When possible, two corrections should be made to both the pre-construction and post-construction data: one based on an estimate of searcher efficiency (the percentage of carcasses present that are found) and one based on an estimate of scavenger loss (the percentage of carcasses present that are removed by scavengers before they are found by searchers). However, determination of both searcher-efficiency and scavenger-removal requires trials using carcasses that are not available at the Lime Wind Energy Project. Thus, the data will have to be reported as uncorrected deaths/turbine/year or uncorrected deaths/MW/year.

EXPECTED IMPACT ON RESIDENT BATS

There is little reason to expect any significant impact on resident bat populations in the Lime Wind Energy Project area. First, as noted earlier, about 1.5 bat fatalities per megawatt per year is the average for the four wind projects in Oregon and Washington (Johnson 2004). That would suggest that the 3.6-megawatt Lime Project could experience 4-5 bat fatalities per year. However, only 4% of fatalities in the Pacific Northwest are potentially resident species in the Lime Project area (Johnson 2004), which suggests that <0.2 fatalities of resident bats could be expected per year. Second, through a review of published data, Barclay et al. (2007) found that tower height had a significant effect on the rate of bat fatalities with fewer fatalities at short towers such as those in the

Lime Project, which would reduce the estimate of resident fatalities even further. Third, it is likely that any individuals roosting in the rock crevices near the project area are flying down into the Burnt River or Snake River canyons to drink and forage and should easily learn to avoid the turbines; it appears that bats may already be using a flight path through a saddle where no turbines will be located (where detector C2 was).

LITERATURE CITED

BARCLAY RMR, BAERWALD EF, GRUVER JC. 2007. Variation in bat and bird fatalities at wind energy facilities: assessing the effects of rotor size and tower height. Canadian Journal of Zoology 85:381-387.

CSUTI B, KIMMERLING AJ, O'NEIL TA, SHAUGHNESSY MM, GAINES EP, HUSO MMP. 1997. Atlas of Oregon wildlife: distribution, habitat, and natural history. Oregon State University Press, Corvallis, OR.

CURRY A. 2009. Deadly flights. Science 325:386-387.

JOHNSON GD, ERICKSON WP, STRICKLAND MD, SHEPHERD MF, SHEPHERD DA, SARAPPO SA. 2002. Collision mortality of local and migrant birds at a large-scale wind-power development on Buffalo Ridge, Minnesota. Wildlife Society Bulletin 30:879-887.

JOHNSON G. 2004. A review of bat impacts at wind farms in the U.S. Presentation at wind energy and birds/bats workshop: understanding and resolving bird and bat impacts, 17-19 May 2004, Washington, DC.

ORLOFF S, FLANNERY A. 1992. Wind turbine effects on avian activity, habitat use, and mortality in Altamont Pass and Solano County wind resource areas. 1989-1991. BioSystems Analysis, Inc., Tiburon, CA.

VERTS BJ, CARRAWAY 1998. Land Mammals of Oregon. University of California Press, Berkeley, CA.

YOUNG DP JR, ERICKSON WP, GOOD RE, STRICKLAND MD, JOHNSON GD. 2003. Final report: avian and bat mortality associated with the initial phase of the Foote Creek Rim windpower project, Carbon County, Wyoming. Western Ecosystems Technology Inc., Cheyenne, WY.

Betts BJ. 1998. Effects of interindividual variation in echolocation calls on identification of big brown and silver-haired bats. Journal of Wildlife Management 62:1003-1010.

Barclay RMR. 1999. Bats are not birds—a cautionary note on using echolocation calls to identify bats: a comment. Journal of Mammalogy 80:290-296.

O'Farrell MJ, Miller BW, Gannon WL. 1999. Qualitative identification of free-flying bats using the Anabat detector. Journal of Mammalogy 80:11-23.

Thomas DW. 1988. The distribution of bats in different ages of Douglas-fir forests. Journal of Wildlife Management 52:619-626.

# LIME WIND PROJECT

## Results of a Survey for Migrating Bats

Burr J. Betts, PhD
Betts Enterprises, LLC
Cove, OR 97824

## INTRODUCTION

About 1.5 bat fatalities per megawatt per year is the average for the four wind projects in Oregon and Washington for which there are data (calculated from data summarized in Barclay et al. 2007). Most bat fatalities involve species that migrate significant distances between summer feeding/reproductive sites and winter hibernation sites (Curry 2009). Based on habitat, behavior, and museum records, eight species of bats are potential residents in the Lime Wind Energy Project Area (EA Table 4; Csuti et al. 1997, Verts and Carraway 1998). Although unlikely to reside in the area, the Silver-haired Bat (*Lasionycteris noctivagans*) and the Hoary Bat (*Lasiurus cinereus*) are potential long-distance migrants through the project area. These two species constitute 96% of the bat fatalities at wind energy project areas in the Pacific Northwest (Johnson 2004).

## METHODS

### *Acoustic Detection of Bats*

Anabat II Bat Detectors were used to detect echolocation calls of bats moving through the project area. The detectors were attached to CF-ZCAIMS which recorded calls on compact flash memory cards. Each ―pass" (a burst of individual calls) was recorded in a separate data file and automatically labeled with the date and time of recording. Detector set-ups were located along the ridge where the turbines will be. Detectors C1, C2, and C3 were pointed straight up; the others were raised to about 45° above horizontal and aimed toward the sides of the ridge. These positions were chosen to give broad coverage of the area through which bats were expected to fly. The detectors were set to record from 1900 hours to 0700 hours for the nights of September 9-13 (Week 1), September 23-27 (Week 2), and October 7-11, 2009 (Week 3).

### *Data Analysis and Reporting*

For each memory card the files will be downloaded, non-bat noises will be deleted, and the number of passes recorded by each detector will be counted. ―Calls" are individual, discrete pulses of sound and ―passes" are defined as a sequence of ≥2 individual calls separated by ≤1 second (Thomas 1988).

The ability to identify the species emitting a particular pass is dependent on a number of factors including: 1) the number of calls in the pass; 2) the behavior of the bat—calls may change within and between passes as bats move in relation to the microphone, as they get closer to a target insect or background clutter, and in the presence of other bats; 3) the proximity of the bat to the microphone and hence the completeness of the calls—higher frequencies of a call are often lost during recording due to greater attenuation than lower frequencies; 4) variation between individuals of the same species within a geographic area; 5) variation between populations of a species in different geographic areas; and 6) whether there are multiple species with similar call characteristics within the community of bats being sampled (Betts 1998, O'Farrell et al 1999, Barclay 1999). The percentage of identifiable passes is maximized when monitoring is done in person and passes are fed directly to a laptop computer where identification can be restricted to high-quality (many calls of high intensity) passes (O'Farrell et al 1999).

However, direct monitoring is not feasible for the several-night, multiple-site type of study needed for the Lime Wind Project. Rather it is necessary to use automated recording that often produces files containing passes with few calls of low quality produced by bats moving quickly in-and-out of the detector range. O'Farrell et al (1999) noted that within a good, identifiable pass there are still about 22% of the calls that are not diagnostic, which in itself suggests that at least a significant proportion of automated recordings containing just a few calls will not be identifiable. Additionally, Barclay (1999) presented data from other researchers that indicated 25% to 55% of all passes were not identifiable to species. Finally, two of the authors of O'Farrell et al (1999) tested their own ability to identify high quality passes from known species with success rates of only 62.5% and 89.6%, and Betts (1998) tested four experienced individuals on their ability to discriminate between Big Brown and Silver-haired Bats with resulting accuracies of only 34.0% to 70.2%. These results suggest that attempts at identifying all passes to species is risky and likely to be inaccurate.

A conservative approach to the problem of species identification is to group bats on the basis of the constant frequency (CF) component at the end of the call and then suggest further species identity on the basis of habitat affinity and details of call structure when calls are of sufficient quality. Following is the grouping for the 10 species likely to be encountered at the Lime Wind Project:

50 kHz group – California Myotis, Yuma Myotis, Canyon Bat
40 kHz group – Western Small-footed Myotis, Little Brown Bat
30 kHz group –Long-eared Myotis
25 kHz group – Pallid Bat, Silver-haired Bat, Big Brown Bat
<20 kHz group – Hoary Bat

Hoary Bats and Long-eared Myotis have distinctive call structures and can be identified to species. Although Silver-haired Bats, Big Brown Bats, and Pallid Bats have similar call structures, it is expected that detections of the 25 kHz group during the migration study will mostly likely be the migratory Silver-haired Bat. Detections of the 40 kHz group will most likely be Western Small-footed Myotis because of this species' greater

affinity for the habitat than the Little Brown Bat. Detections of the 50 kHz group are more likely to be the California Myotis and the Canyon Bat rather than the Yuma Myotis, which has less affinity for the habitat that the other two species.

*File Analysis and Species Identification*

At the end of each recording period, the memory cards were removed from the CF-ZCAIMS and downloaded into a computer. The Anabat software converts the sounds recorded in each file into a graphic display of frequency (y-axis) vs. time (x-axis); the graphic display of each call in a pass typically has a reverse J-shape. Each file was examined by using the Analook software program. Files containing extraneous noise (mostly wind) were deleted and the files containing bat calls were assigned to a species group on the basis of call structure (primarily lowest frequency and shape) as follows:

50 kHz group – California Myotis, Yuma Myotis, Canyon Bat
40 kHz group – Western Small-footed Myotis, Little Brown Bat
30 kHz group –Long-eared Myotis
25 kHz group – Pallid Bat, Silver-haired Bat, Big Brown Bat
<20 kHz group – Hoary Bat

RESULTS

A total of 99, 42, and 8 identifiable passes were recorded during Weeks 1, 2, and 3, respectively (Table 1). As with the study of resident bats (Betts 2009), the largest number of detections was recorded at C2, which reinforces the suggestion that the saddle area between turbines 3 and 5 is in a flight path through the area.

It is not possible to tell how many bats were represented by the 149 detections because the methodology cannot discriminate between one bat flying through the detection area several times vs. different individuals each flying through once. Also, some individuals may have been detected by more than one of the nine detector set-ups. In addition, even if similar data from other wind projects were available, it is not possible to compare the Lime Project capture rates with such data because of the inherent night-to-night and location-to-location variability in bat activity.

The number of detections of all species declined from 133 during the resident study (Betts 2009) to 99 during the first week of the migratory study, and then continued to decline to 42 and 8 detections during the last two weeks of the migratory study (Table 1). These data suggest that the timing of the resident and migratory studies was appropriate.

The 25 kHz Species Group was by far the most commonly detected group during the first two weeks of the migratory study and the only group detected during the third week of the migratory study (Table 1). Based on details of call structure most of these individuals appeared to be Silver-haired Bats, which is one of the two species expected to migrate through the area. The other long-distance migratory species, the Hoary Bat, was detected

once during the resident study, but has not been detected in this migratory study. There are several possible, non-mutually exclusive reasons for the paucity of Hoary Bat detections. First, the detection of one Hoary Bat and a few probable Silver-haired Bats during the resident study suggests that some migrants and perhaps all the Hoary Bats had already moved through the area by the start of this migration study. Second, most Hoary Bats may follow a migratory flyway that does not pass through the Lime Project Area. Third, Hoary Bats may fly higher that can be detected by ground-based Anabat detectors.

There has been a large shift in the proportion of detections for two of the species groups between the resident and migratory studies (Table 2). Proportionally, detections of the 25 kHz Group increased greatly while detections of the 40 kHz Group decreased greatly. This result is expected if most of the 25 kHz Group detections are of Silver-haired Bats and if the resident species of the 40 kHz Group have begun their own short-distance migrations to wherever they will hibernate. The continued detection of some 30, 40, and 50 kHz species during the first two weeks of the migratory study also may have several explanations. First, some resident individuals may have remained in the area because of the continued summer-like weather during the first part of the migratory study. Second, some detections may be of individuals of these species moving through the area from some other residence area to their hibernation site. Third, some residents may be able to hibernate deep in the rock crevices in the Lime Project area. That might be particularly true for the Canyon Bat, which would explain the fairly constant detection of the 50 kHz Group for the first two weeks of the migratory study.

## ESTIMATING FATALITIES

Although the Lime Wind Energy Project is expected to have no significant impact on resident bat populations (Betts 2009), it may impact migrant species more. Carcass searches should be done to document any fatalities of migrants. Orloff and Flannery (1992) and Johnson et al. (2002) reported that most bats and birds killed by turbines remained within 63 m of the turbine. Searches should be conducted at least every other week during the period of highest fatality rates (mid-August to mid-October for the Pacific Northwest). Because the Lime Wind Energy Project only has 7-12 turbines, a plot could be established around each turbine and sampled every-other week or around every-other turbine and sampled weekly. The procedure below was taken from Young et al. (2003).

1. Searchers walk parallel transects spaced 6-8 m apart at a pace of 45-55 m/min until the entire plot is covered
2. For each casualty, searchers should record species, sex and age when possible, date and time collected, location, and whether the carcass was intact or showed signs of scavenging.
3. Carcasses can be labeled with a unique number, bagged, and frozen for future reference or determination of species, sex, and age, if questionable.

Searches should be made both pre-construction and post-construction. The pre-construction searches provide a baseline of natural deaths that may occur in the area. Numbers of carcasses found in pre-construction searches can be subtracted from those found in post-construction searches to give an estimate of fatalities due to the turbines. When possible, two corrections should be made to both the pre-construction and post-construction data: one based on an estimate of searcher efficiency (the percentage of carcasses present that are found) and one based on an estimate of scavenger loss (the percentage of carcasses present that are removed by scavengers before they are found by searchers). However, determination of both searcher-efficiency and scavenger-removal requires trials using carcasses that are not available at the Lime Wind Energy Project. Thus, the data will have to be reported as uncorrected deaths/turbine/year or uncorrected deaths/MW/year.

EXPECTED IMPACT ON MIGRATORY BATS

As noted earlier, about 1.5 bat fatalities per megawatt per year is the average for the four wind projects in Oregon and Washington (Johnson 2004) and the two long-distance migratory species (Hoary and Silver-haired Bats) constitute 96% of fatalities. That would suggest that the 3.6-megawatt Lime Project could experience about 5.4 fatalities of migrating bats per year. However, through a review of published data, Barclay et al. (2007) found that tower height had a significant effect on the rate of bat fatalities with fewer fatalities at short towers such as those in the Lime Project, which would reduce the estimate of resident fatalities even further.

Barclay et al (2007) present data for four wind project areas with turbine heights <40 m (a fifth area, Tehachapi, CA, is clearly an outlier); the average fatality rate of these 4 areas was used to estimate fatality rates for the 30-m towers proposed for the Lime Wind Energy Project. Barclay et al (2007) also present data for five wind projects with turbine heights between 35 m and 45 m; the average fatality rate for these 5 areas was used to estimate fatality rates for the 40-m towers proposed at the Lime Wind Energy Project.

**Table 8. Bat Fatalities Based on Tower Height**

| Tower Height | Fatalities per MW per year (from Barclay) | Estimated Total Annual Bat Fatalities at Lime | Estimated Annual Resident Bat Fatalities at Lime (4%) | Estimated Annual Migratory Bat Fatalities at Lime (96%) |
|---|---|---|---|---|
| 30 m | 0.067 | 0.2412 | 0.0096 | 0.2316 |
| 40 m | 0.178 | 0.6408 | 0.0256 | 0.6152 |

Although the increase in tower height from 30 m to 40 m roughly triples the expected bat fatality rates, the latter are still very low at 0.64 bats/year for the entire project. Thus, there is little reason to expect any significant impact on either resident or migratory bat populations in the Lime Wind Energy Project area regardless of turbine height.

MITIGATION MEASURES

Should the number of bat fatalities turn out to be significantly higher than expected, there are two mitigation measures that could be put into effect. The first involves altering when the turbine rotors begin turning (Baerwald et al. 2008). Bat fatality rates are affected by wind speed, with more bats killed on low wind nights (see references in Baerwald et al. 2008). Baerwald et al. (2008) found that changing the wind-speed trigger at which rotors begin turning and altering blade angles to reduce rotor speed reduced bat fatalities by 60.0% and 57.5%, respectively. A second, but more costly and thus last-resort mitigation measure, would be to immobilize the rotors during the time period in which the excessive number of dead bats are found.

LITERATURE CITED

BAERWALD EF, EDWORTHY J, HOLDER M, BARCLAY RMR. 2008. A large-scale mitigation experiment to reduce bat fatalities at wind energy facilities. The Journal of Wildlife Management 73:1077-1081.

BARCLAY RMR, BAERWALD EF, GRUVER JC. 2007. Variation in bat and bird fatalities at wind energy facilities: assessing the effects of rotor size and tower height. Canadian Journal of Zoology 85:381-387.

BETTS BJ. 2009. Lime wind project: results of a survey for resident bats. Report submitted to Randy Johnson, Lime Wind Energy Project, September 24, 2009.

CSUTI B, KIMMERLING AJ, O'NEIL TA, SHAUGHNESSY MM, GAINES EP, HUSO MMP. 1997. Atlas of Oregon wildlife: distribution, habitat, and natural history. Oregon State University Press, Corvallis, OR.

CURRY A. 2009. Deadly flights. Science 325:386-387.

JOHNSON GD, ERICKSON WP, STRICKLAND MD, SHEPHERD MF, SHEPHERD DA, SARAPPO SA. 2002. Collision mortality of local and migrant birds at a large-scale wind-power development on Buffalo Ridge, Minnesota. Wildlife Society Bulletin 30:879-887.

JOHNSON G. 2004. A review of bat impacts at wind farms in the U.S. Presentation at wind energy and birds/bats workshop: understanding and resolving bird and bat impacts, 17-19 May 2004, Washington, DC.

ORLOFF S, FLANNERY A. 1992. Wind turbine effects on avian activity, habitat use, and mortality in Altamont Pass and Solano County wind resource areas. 1989-1991. BioSystems Analysis, Inc., Tiburon, CA.

VERTS BJ, CARRAWAY 1998. Land Mammals of Oregon. University of California Press, Berkeley, CA.

YOUNG DP JR, ERICKSON WP, GOOD RE, STRICKLAND MD, JOHNSON GD. 2003. Final report: avian and bat mortality associated with the initial phase of the Foote Creek Rim windpower project, Carbon County, Wyoming. Western Ecosystems Technology Inc., Cheyenne, WY.

Betts BJ. 1998. Effects of interindividual variation in echolocation calls on identification of big brown and silver-haired bats. Journal of Wildlife Management 62:1003-1010.

Barclay RMR. 1999. Bats are not birds—a cautionary note on using echolocation calls to identify bats: a comment. Journal of Mammalogy 80:290-296.

O'Farrell MJ, Miller BW, Gannon WL. 1999. Qualitative identification of free-flying bats using the Anabat detector. Journal of Mammalogy 80:11-23.

Thomas DW. 1988. The distribution of bats in different ages of Douglas-fir forests. Journal of Wildlife Management 52:619-626.