

Wind Energy Development and Wildlife: The Klondike III and IIIa Success Story

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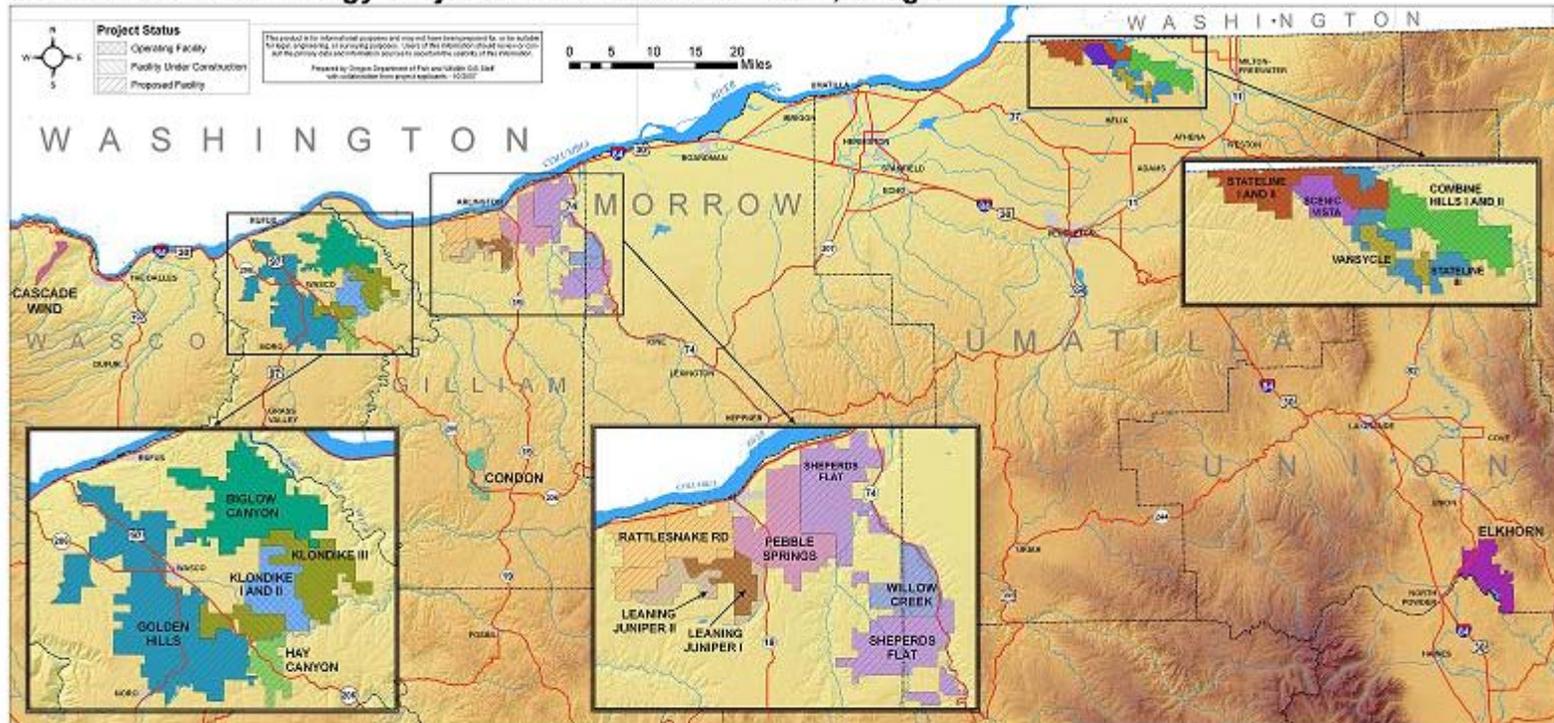
AGENDA

- Overview of Wind Projects in OR
- Klondike III and IIIa Project Description
- Macrositing
- Agency Consultation
- Pre-Project Assessment
- Micrositing
- Training and Best Management Practices
- Habitat Mitigation
- Post-Construction Mitigation and Monitoring



Overview of Projects in OR

Commercial Wind Energy Projects in the Columbia Basin, Oregon

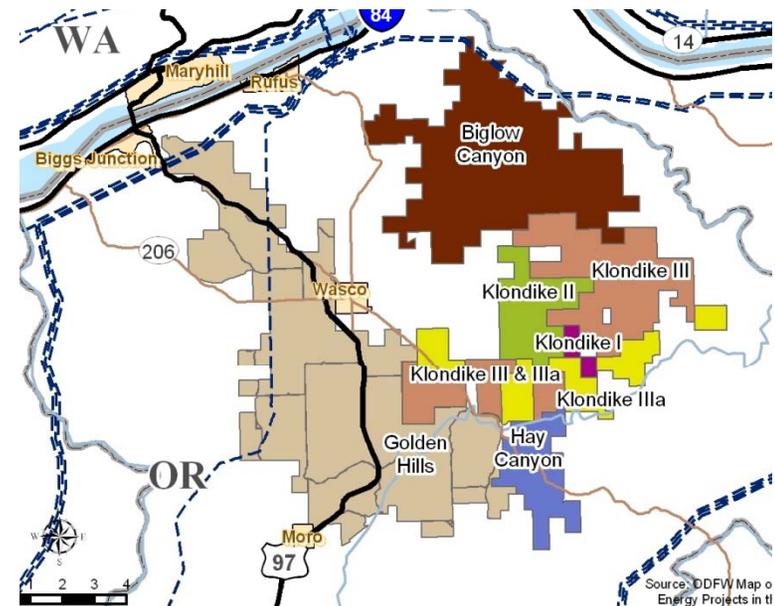


Source: ODFW 2007

Project Descriptions

Klondike III and IIIa Projects

- Located within Columbia Plateau Ecoregion, Sherman County, OR
- Located in wheat fields near other wind projects
- Both KIII and KIIIa permitted under one Site Certificate by the Oregon Energy Facility Siting Council



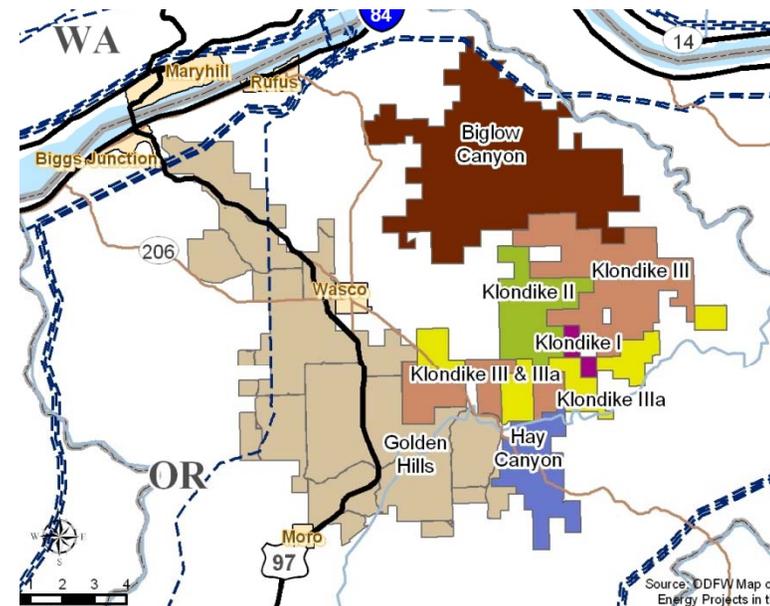
Project Descriptions

Klondike III

- 223.6 MW, 125 turbines
 - 80 General Electric 1.5 MW (397 ft)
 - 44 Siemens 2.3 MW (415 ft)
 - 1 Mitsubishi Heavy Industries 2.4 MW (418 ft)
- 12,085 acres

Klondike IIIa

- 76.5 MW, 51 turbines
 - 51 GE 1.5 MW
- 5,213 acres



Project Descriptions

- Habitat is primarily wheat fields with a few CRP fields and some native habitat in canyons
- Less than 1% of 17,298 acres within lease boundary permanently impacted
- Associated facilities: met towers, turbine access roads, underground and overhead collector lines, collector substation, overhead transmission line to BPA switching station, O&M building.



Macrositing

5 Elements of Successful Wind Project

- Best Wind Resources
 - Transmission Access
 - Landowner Interest
 - **Sites with Minimal Environmental Impacts**
 - Market/Customer
- Klondike III and IIIa Projects are ideally located in wheat fields



Klondike I project, 2002





Macrositing

Project is a Win-Win Situation

“From ODFW’s perspective, siting these wind facilities on cultivated land is a win/win proposition. The farmers win by getting paid, under lease agreements, for the areas where wind facilities are located, and yet the farmers are still able to farm around the wind turbines. Wildlife win as well, since a minimum amount of native wildlife habitat is lost to development.”

– Chip Dale, High Desert Region Manager, ODFW





Agency Consultation

- KIII and KIIIa permitted under one Site Certificate by the Oregon Energy Facility Siting Council
- Continual Agency Consultation with ODFW and ODFW throughout EFSC process
- Milestones:
 - Request for Expedited Review submitted on February 17, 2005
 - Application for Site Certificate submitted May 13, 2005
 - Final Order and Site Certificate issued June 30, 2006
 - Final Order and Site Certificate issued for Amendment #1 on November 3, 2006
 - Final Order and Site Certificate issued for Amendment #2 on June 27, 2007
 - Final Order and Site Certificate issued for Amendment #3 on November 16, 2007



ODFW Tour of Klondike I & II and Leaning Juniper Wind Projects, 12/13/06

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Pre-Project Assessment: Overview of Pre-Construction Surveys



Independent biological consultants surveyed project area

- Mapped and Rated habitat per ODFW Categories 1-6
- Surveyed for avian use, raptor nests, rare plants and T/E and other special status species
- Surveys from 2004 through 2007 for KIII and KIIIa



Klondike I and II Projects, 2006 prior to construction of Klondike III and IIIa



Pre-Project Assessment: Pre-Construction Surveys at Klondike III



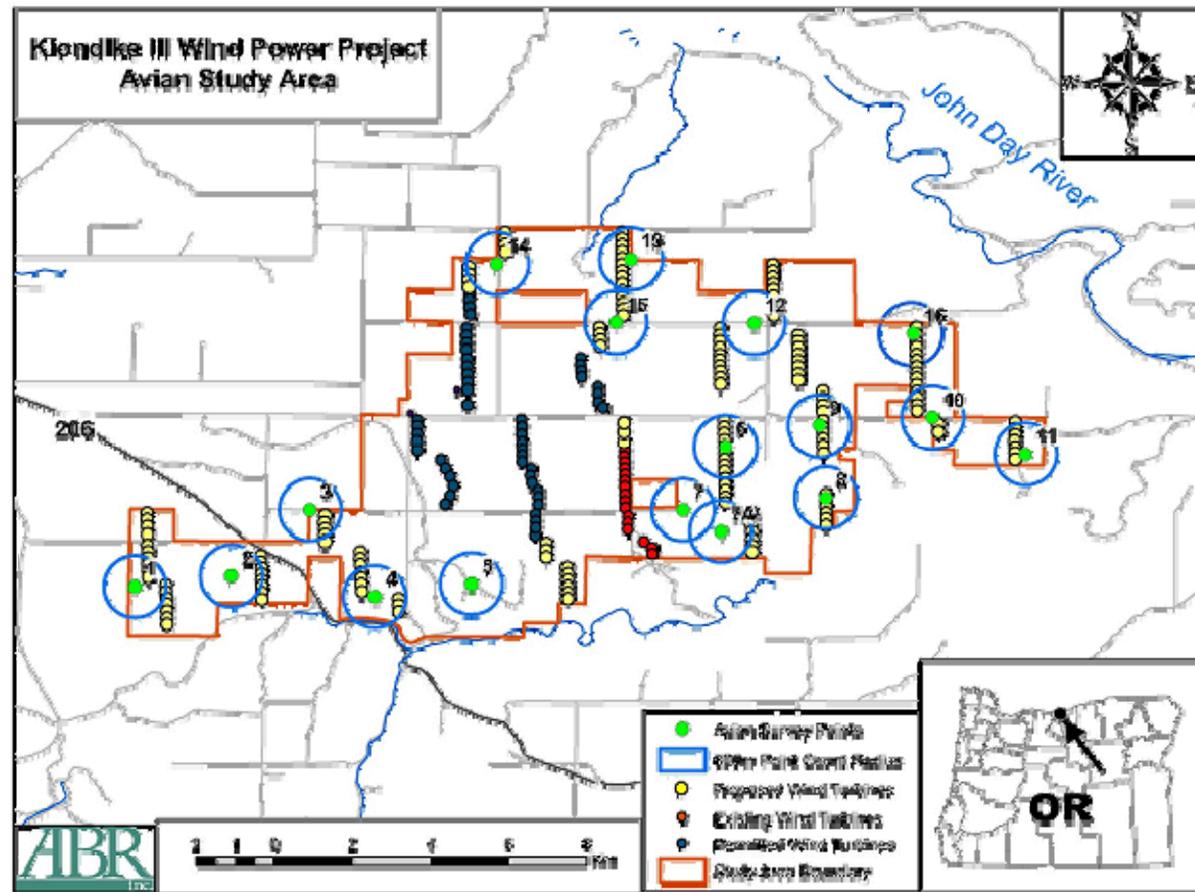
Avian Use Surveys:

- Focus: All birds, including raptors, passerines, waterfowl, game birds, doves
- Special status species: bald eagle, golden eagle, peregrine falcon, burrowing owl, all raptor species, long-billed curlew, loggerhead shrike, grasshopper sparrow
- Duration: Fall 2004 to spring 2005
- Results:
 - 26 species (7,739 individuals) in winter; 27 species (952 individuals) in spring
 - Raptor mean use: 0.14 bird observed/20-minute survey in winter to 0.33 bird observed/20-minute survey in spring
 - Songbird mean use ranged from 26.88 birds/20-minute survey in winter to 6.00 birds/20-minute survey in spring.
 - Most abundant avian group was songbirds, which accounted for 87% and 91% of all birds observed during winter and spring, respectively.
 - Special status species observed: golden eagle, Swainson's hawk, loggerhead shrike, and grasshopper sparrow.

Pre-Project Assessment: Pre-Construction Surveys at Klondike III



Avian Use Surveys



Pre-Project Assessment: Pre-Construction Surveys at Klondike III



Special Status Species Surveys

- Key Species: white-tailed jackrabbit, bald eagle, peregrine falcon, golden eagle, Swainson's hawk, burrowing owl, loggerhead shrike, long-billed curlew, 18 rare plant species.
- Duration: Spring 2005 and Spring 2006
- Results in 2005 for KIII:
 - No threatened or endangered species.
 - Non-listed special status species observed: white-tailed jackrabbit (1 confirmed); loggerhead shrike, northern harrier, rough-legged hawk, red-tailed hawk, prairie falcon, and American kestrel; no rare plants observed.
- Results in 2006 for wider corridors:
 - No rare wildlife or plant species were documented.



Location of white-tailed jackrabbit sighting in CRP outside analysis area
Source: Appendix P-2 to KIII ASC

Pre-Project Assessment: Pre-Construction Surveys at Klondike III



Raptor Nest Surveys

- Key Species: Raptors (eagles, hawks, falcons, vultures, owls) and corvids (crows and ravens)
- Duration: Spring 2005
- Results:
 - 20 active nests within 2 miles of lease boundary (including red-tailed hawk, Swainson's hawk, great horned owl, and common raven), 10 inactive nests, and 4 unknown status nests

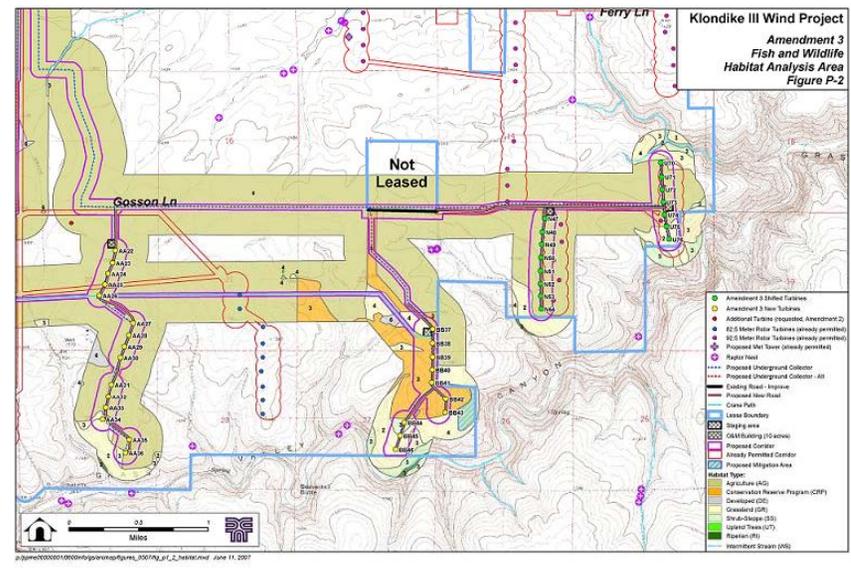
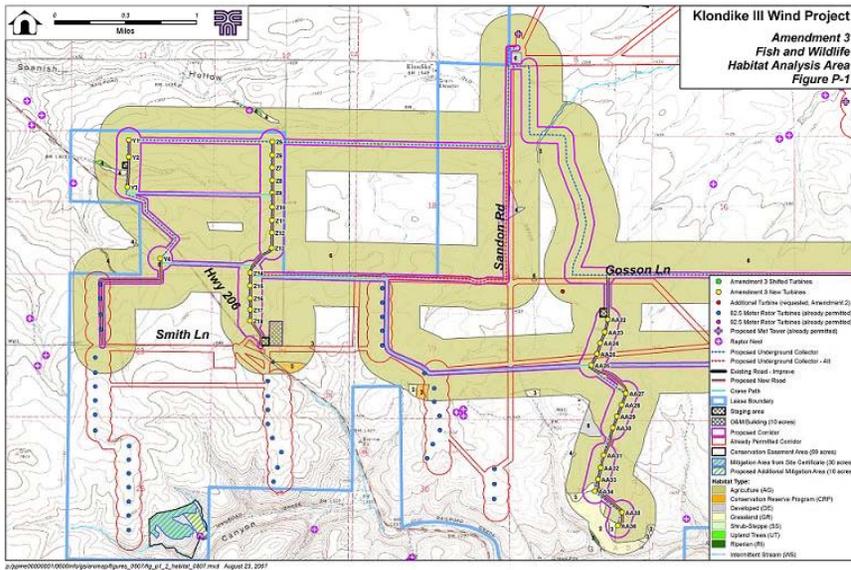


Swainson's hawk nest adjacent to abandoned house just outside the Analysis Area. Female on the nest in black locust tree to right; male perched in tree to left.
Source: Appendix P-2 to KIII ASC

Pre-Project Assessment: Pre-Construction Surveys at Klondike IIIa



Habitat Mapping
Dominant Habitats: wheat fields, CRP, native habitat along riparian area, some shrub-steppe



Habitat Maps of Project Area
Source: KIII Amendment #3

Pre-Project Assessment: Pre-Construction Surveys at Klondike IIIa



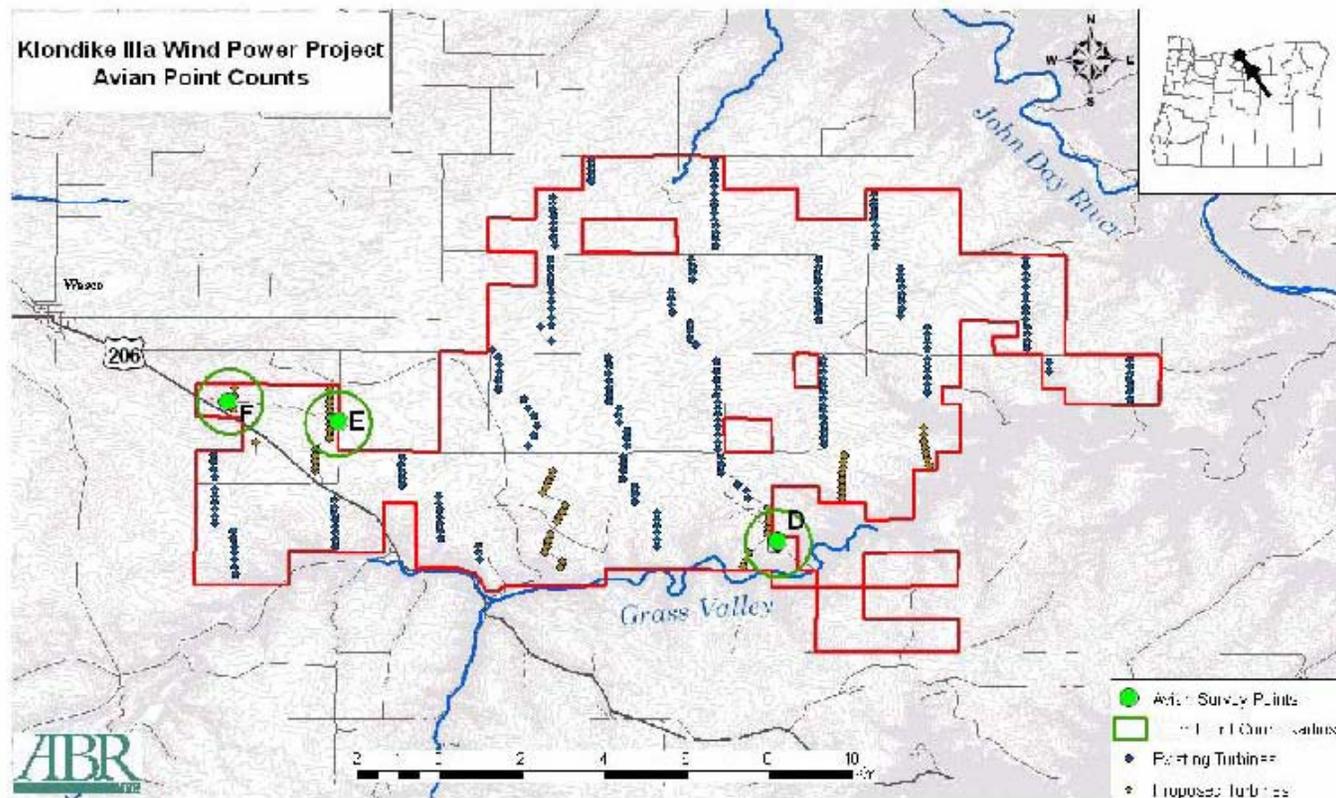
Avian Use Surveys (focus and special status species same as KIII):

- Focus: All birds, including raptors, passerines, waterfowl, game birds, doves
- Special status species: bald eagle, golden eagle, peregrine falcon, burrowing owl, all raptor species, long-billed curlew, loggerhead shrike, grasshopper sparrow
- Duration: Spring 2007
- Results:
 - 16 species (197 individuals) in spring.
 - Raptor mean use: 0.92 bird observed/20-minute survey
 - Songbird mean use 6.71 birds/20-minute survey.
 - Most abundant avian group was songbirds, which accounted for 82 % of all birds observed during the study.
 - Special status species observed: golden eagle, long-billed curlew, and grasshopper sparrow.

Pre-Project Assessment: Pre-Construction Surveys at Klondike IIIa



Avian Use Surveys



Pre-Project Assessment: Pre-Construction Surveys at Klondike IIIa



Special Status Species Surveys

- Key Species: Washington ground squirrel, white-tailed jackrabbit, all raptors (including Swainson's hawk, ferruginous hawk), burrowing owl, loggerhead shrike, grasshopper sparrow.
- Duration: Spring 2007
- Results:
 - No threatened or endangered species.
 - Non-listed special status species observed: few grasshopper sparrows in native grasslands or CRP; Few black locust trees or other trees suitable for loggerhead shrike were present; no individuals were found.



Plowed wheat fields and patch of black locust trees within Analysis Area. Potential loggerhead shrike nest tree in center of locust patch.

Source: Appendix P-2 to KIII ASC

Pre-Project Assessment: Pre-Construction Surveys at Klondike IIIa



Special Status Species

Results (cont.)

- A few common raptor species were noted, including northern harrier, American kestrel, and red-tailed hawk.
- Very few burrows were found, with little, if any, habitat for ground squirrels or burrowing owl.

Raptor Nest Surveys

- Key Species: Raptors (eagles, hawks, falcons, vultures, owls) and corvids (crows and ravens)
- Duration: April 2007
- Results:
 - One great-horned owl nest



Pre-Project Assessment: Calculating Habitat Impacts



Habitat Impacts:

- Impacts were calculated based on “worst-case” impacts
- Permanent Impacts: 85.17 acres in wheat fields (88% of impacts), 9.35 acres in CRP (10 % of impacts)
- Less than 1% of land within lease boundary permanently impacted



Pre-Project Assessment: Habitat Impacts

Worst-case habitat Impacts for KIII and KIIII combined

Habitat type	Area of temporary impact (acres)	Area of permanent impact (acres)
Category 2		
Grassland	8.98	1.32
Shrub-steppe	0.00	0.03
Category 3		
CRP	32.98	9.35
Grassland	4.81	0.59
Shrub-steppe	3.77	0.26
Upland trees	0.00	0.03
Category 4		
Grassland	5.95	0.39
Category 6		
Developed	3.16	0.00
Agricultural	374.26	85.17
TOTAL	433.91	97.14

Source: EFSC Final Order, Amendment 3

Micrositing

- Interdisciplinary team conducted micrositing, based on:
 - Wind characteristics
 - Topography
 - Geotechnical conditions
 - Biological resources
 - Land use constraints (setbacks, etc).
 - Land owner input
- Klondike III and IIIa layouts were microsited to minimize habitat and wildlife impacts
- Moved turbines away from canyon edges and native habitat
- Avoided wetlands and other sensitive resources

Training and Best Management Practices

During Construction

- Identification of key compliance staff
- Environmental training
- Flagging and micro-siting to avoid sensitive resources
- Implementation of construction BMPs

During Operation

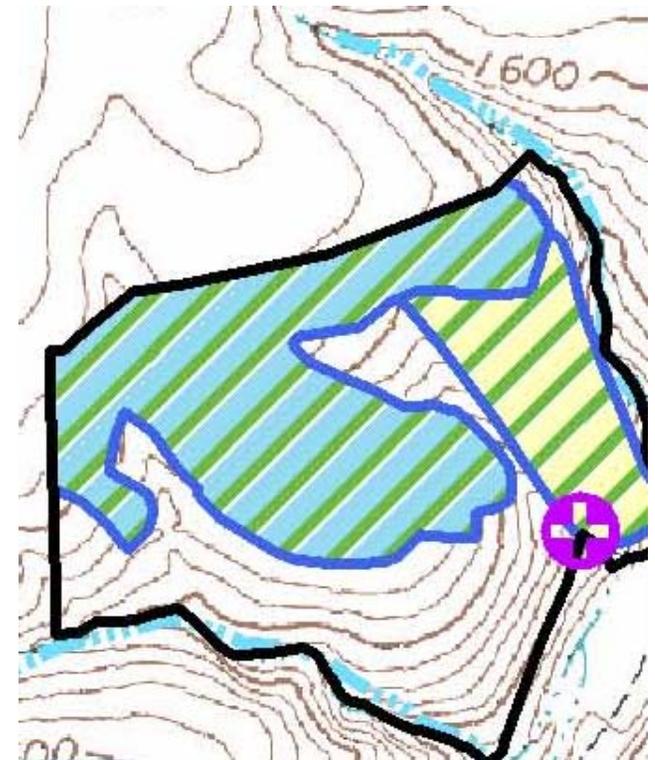
- Environmental compliance and training continues throughout project life



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Post Construction: Restoration and Habitat Mitigation

- Impacts to native habitat were minimized
- Revegetation Plan: areas temporarily impacted were reseeded and restored after construction (road shoulders, underground collector lines, etc)
- Habitat Mitigation Plan was developed for potential displacement impacts to grassland nesting birds and for footprint of the project facilities (turbines, new access roads, O&M) in native habitat



-  Mitigation Area from Site Certificate (30 acres)
-  Proposed Additional Mitigation Area (10 acres)
-  Raptor Nest

Post Construction: Restoration and Habitat Mitigation



- Habitat Mitigation Plan components:
 - Enhancement of a previously farmed old field and long term protection of enhanced area
 - Mitigation area protected through a Conservation Easement (CE) for the life of facility
- Current Status: CE established in 2007; subsequent fire burned area later in '07; tilled in 2008; seeding in tilled area planned winter 2008
- Monitoring for success of enhancements and reporting to the DOE/ODFW will occur. After meeting specified success criteria, the site will be monitored every 5 years for the life of the projects.



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See EFSC Final Order on Amendment 3,
Attachments B and C

Post Construction: Restoration and Habitat Mitigation



Worst-case habitat impacts and mitigation acres for Kill and Killa combined

- Category 2
 - Footprint impacts: 1.35 acres
 - Displacement impacts: 5.15 acres
 - Mitigation area: 6.5 acres x 2 = 13 acres
- Category 3 (grassland, shrub-steppe and upland tree habitat)
 - Footprint impacts: 0.88 acres
 - Displacement impacts: 4.5 acres
 - Mitigation area: 5.38 acres

Source: EFSC Final Order on
Amendment 3, Attachment C





Post Construction: Restoration and Habitat Mitigation

Worst-case habitat impacts and mitigation acres for KIII and KIIIIa combined

- Category 3 (CRP)
 - Footprint impacts: 9.35 acres
 - Displacement impacts: 15.35 acres
 - Mitigation area: 24.7 acres
- Category 4
 - Footprint impacts: 0.39 acres
 - Displacement impacts: 0.7 acres
 - Mitigation area: 1.09 acres

Total mitigation area (rounded): 44 acres

Source: EFSC Final Order on
Amendment 3, Attachment C





Post-Construction: Monitoring and Mitigation

Wildlife Monitoring and Mitigation Plan developed for KIII and KIIIIa Projects

- Fatality monitoring program
 - Carcass Removal Trials (CRT) and Searcher Efficiency Trials (SEEF)
 - Fatality Search Protocol
 - Statistical Analysis
 - Correct observed carcass #s based on CRT and SEEF to estimate actual fatalities
 - Comparison of fatality rates between GE 1.5 MW turbines (389 ft) and Siemens 2.3 MW turbines (415 ft)
- Raptor nesting surveys (2008 and 2012)
- Avian use surveys (during fatality monitoring)
- Wildlife Reporting and Handling System throughout project life
- Wildlife Mitigation
 - Upfront financial mitigation: \$10,000/year for 3 years to fund research
 - Additional mitigation may be necessary if fatality “thresholds of concern” are exceeded (i.e. habitat conservation, raptor nest platforms, research) or raptors abandon nearby nests

Post-Construction: Monitoring and Mitigation

- NWC currently conducting wildlife monitoring
- Operations staff are trained to monitor site and record avian and bat fatalities and respond to injured wildlife
- IBR provides semi-annual reports to DOE and will discuss monitoring results with DOE and ODFW
- One year of wildlife monitoring complete. Summary of findings to be provided to the agencies.



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Thank You



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