Landscape-scale Rapid Assessment of Risks to Wildlife from Wind Power

Collins Fund Wind/Biodiversity Project
Wind Power Biodiversity Concerns

- Large footprint
- Habitat fragmentation
- Displacement & direct impact
- Little known of local endemics
- Industry interested in more predictability
Collins Wind/Biodiversity Project

- Regional assessment of wind country
- GIS informs survey for species in gaps
- Convey biodiversity values in wind country
Eastern Washington and Montana

- Model wind development areas
- Inventory target species data and identify data gaps in windy areas
- Collect new field data in gap areas
- Create a wind energy siting blueprint
Wind suitability

- Transmission
- Willing landowners
- Power market
- Wind
Wind Class 2?
Wind Development Area Criteria

- Wind class 3 and up
- Transmission lines
  - Within 30 miles
  - 115kv and greater
  - Unconstrained

- Excluded:
  - Urban/exurban areas
  - Areas in protective management status
Biodiversity data inventory - Birds

- Sage Grouse
- Columbia Sharp-tailed Grouse
- Ferruginous Hawk
- Golden Eagle
- Grasshopper Sparrow
- Sage Sparrow
- Sage Thrasher
- Loggerhead Shrike
- Burrowing Owl
- Long-billed Curlew
Biodiversity data inventory - Mammals

- Merriam’s Shrew
- Townsend’s Ground Squirrel
- Washington Ground Squirrel
- American Badger
- Pygmy Rabbit
- White-tailed Jackrabbit
- Black-tailed Jackrabbit
Biodiversity data inventory - Herps

- Striped Whipsnake
- Night Snake
- Short-horned Lizard
- Sagebrush Lizard
Biodiversity data inventory - 14 Bat Species

Big brown bat
- California Myotis
- Fringed Myotis
- Hoary Bat
- Little Brown Myotis
- Long-legged Myotis
- Pallid Bat
- Silver-haired Bat
- Spotted Bat
- Townsend’s Big-eared
- W. Long-eared Myotis
- W. Pipistrelle
- W. Small-footed Myotis
- Yuma Myotis

Photo by John Musser 2003. Spotted Bat
Mapping species

Predicted distribution of grasshopper sparrow in Eastern Washington (WDFW GAP 1997) and Element Occurrences

Legend
- MESA BC's
- MESA predict
- Tribal Land
- Counties

Grasshopper Sparrow photo by permission of Bill Schmoker
http://schmoker.org
Narrowing the search field for quality habitat

- Shrubmap used to exclude
  - Developed areas
  - Agriculture
  - Invasive annuals
  - Recently burned

- Fragmentation model excludes
  - Areas >50% fragmented
Integrate habitat, species and wind data for gaps

- Qualitative review of relationships between occurrences, ranges, and windy areas
Field Assessment

- Random quad selection in target areas
- Point counts along 4.5mi routes
- Bats- sound recordings, some mist netting
- Collaborate with Wa Natural Heritage

Sample field area from Montana
Blueprint for Biodiversity and Wind Power

- Mapped wind country
- Mapped target species
- How integrate these within regional context to understand cumulative impacts?
Blue Printing Elements

- Fragmentation
- Irreplaceability
- Direct Mortality

Golden Eagle photo by permission of Bill Schmoker
http://schmoker.org
Blueprinting: Fragmentation

- Leu et al. 2008
- Regional picture of human influence
- Cumulative measure of habitat fragmentation

Human Footprint on Eastern Washington

Legend
- major road
- Counties
- Human Footprint
  - Low
  - Moderate
  - High
  - Very High

Fragmentation of what for what?
Blueprinting: Irreplaceability

Sage sparrow photos by permission of Bill Schmoker http://schmoker.org
Blue Printing: Irreplaceability

- Informs selection of TNC priorities
- MARXAN systematic planning tool
- Selects least sites, least area, least cost
Blueprinting: Direct Mortality

- Use improved EO data to inform estimates
- How many individuals to be effected?
- Is cumulative population effect likely?

### Direct Mortality Estimates (West Inc.)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Total Megawatts (all phases)</td>
<td>2,809</td>
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<tr>
<td>Raptor Fatalities</td>
<td>197</td>
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<td>General Bird Fatalities</td>
<td>6,181</td>
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<tr>
<td>Bats Fatalities</td>
<td>1,910</td>
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Ferruginous Hawk photo by permission of Bill Schmoker http://schmoker.org
Blueprinting

- Contextual Data
  - Fragmentation
  - Irreplaceability
  - Direct mortality estimates
- Actual species data
  - Prior occurrences
  - Current occurrences
  - Expert knowledge
- Science on impacts to species

High Risk to Wildlife
Mod Risk to Wildlife
Low Risk to Wildlife
Energy By Design: Science and Planning

- Employ best available science
- Work collaboratively and non-confrontationally
- Examples of this approach in Wyoming

In Wyoming local ranchers, agency staff and conservation groups work collaboratively on projects that are guided by the Conservancy’s science. © Joe Kiesecker

Avoid → Minimize/Restore → Offset
Female Greater Sage Grouse photo by permission of Bill Schmoker http://schmoker.org

Questions?
Energy By Design: Science and Planning

Avoid ➔ Minimize/Restore ➔ Offset

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Sage Thrasher photo by permission of Bill Schmoker http://schmoker.org