Golden Eagle Research and Management

Douglas A. Bell et al.
East Bay Regional Park District
Outline

• East Bay Regional Park District
• Altamont Pass Wind Resource Area
• Risk Mapping & GPS
• Take Permits and Mitigation
• Volunteers
Pre-Repowered APWRA

5,000 Turbines

50-70 Annual GOEA Mortalities
Repowering and Risk Mapping

Flight Behavior

GSM/GPS Telemetry
DEM - Grid Cells

5,460,000 grid cells
Fuzzy Logic Model

Ridge orientation + Subwatershed orientation + $2 \times \text{Percent up slope} + 0.75 \times \text{Hill size}$

Flight Behavior Mapping
GSM/GPS (2012-2018)

Golden Eagles: 32
Local/Juv 14
Sub-Adults 13
Adults 5
### Fuzzy Logic Model

<table>
<thead>
<tr>
<th>Component</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance to major valley</td>
<td>distance to major valley + 2 × Percent up slope + 2 × Percent up major terrain slope + Gross slope + 2 × Subwatershed orientation + 3 × Ridge orientation + 10 × Hazard site</td>
</tr>
</tbody>
</table>
Not-Colliders vs Colliders

- No. of DEM grid cells
- No. of telemetry positions

Percent up slope

- DEM grid cells
- Not colliders
- Colliders

0 100 0 100 0 100

Not colliders

Colliders

[Image of a dead bird with a sensor attached]
Flight Behavior Risk Map
GPS Telemetry Risk Map
Repowering and Risk Mapping

<table>
<thead>
<tr>
<th>Project</th>
<th>Status</th>
<th>MW</th>
<th>Turbines</th>
<th>Pre-</th>
<th>Post-</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tres Vaqueros</td>
<td>Hold</td>
<td>28.8</td>
<td></td>
<td>86</td>
<td>21</td>
<td>U</td>
</tr>
<tr>
<td>Vasco Winds</td>
<td>Built</td>
<td>78.1</td>
<td></td>
<td>800</td>
<td>34</td>
<td>U</td>
</tr>
<tr>
<td>Golden Hills</td>
<td>Built</td>
<td>87.4</td>
<td></td>
<td>817</td>
<td>48</td>
<td>U, B, F</td>
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<tr>
<td>Golden Hills N</td>
<td>Built</td>
<td>39.2</td>
<td></td>
<td>305</td>
<td>24</td>
<td>B, F</td>
</tr>
<tr>
<td>Patterson Pass</td>
<td>Permitted</td>
<td>21.9</td>
<td></td>
<td>337</td>
<td>13</td>
<td>B, F</td>
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<tr>
<td>Sand Hill</td>
<td>Plan</td>
<td>24.1</td>
<td></td>
<td>426</td>
<td>12</td>
<td>B, F, T</td>
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<tr>
<td>Sand Hill</td>
<td>Revised</td>
<td>144.5</td>
<td></td>
<td>671</td>
<td>40</td>
<td>----</td>
</tr>
</tbody>
</table>
Movements & Miscellany
Take Permits and Mitigation

U.S. Fish and Wildlife Service final rule:
On December 9, 2013, the U.S. Fish and Wildlife Service (USFWS) announced a new, final rule for eagle take permits and wind turbines. District staff believes this new rule presents an opportunity for mitigation funding to be directed in a more constructive manner. While the new rule extends the take permit term limit from five to 30 years, it does appear to provide review opportunities every five years. These reviews should include specific criteria for mitigation measures; including funding for research, maintenance, and acquisition of eagle habitat. In addition, many of the wind turbines in the Altamont Pass Wind Resource Area (APWRA) are 30 years old and need to be replaced. Repowering (the process to replace numerous, smaller old wind turbines with fewer, larger new turbines) provides an opportunity to further reduce fatalities by carefully siting the new wind turbines.

District Research:
Current research by District biologists and collaborators is producing risk maps for the APWRA landscape to show locations where eagles demonstrate consistent flight patterns based on topography – areas which should be avoided to the extent practical when siting new wind turbines during repowering. Research-directed mitigation funding needs to be a priority to further develop modelling and mapping to reduce risks to eagles and other species.

Next Steps:
The District stands ready to work with USFWS to develop meaningful mitigation criteria for this take permit program. With decades of experience in researching, monitoring and adapting to the ever-changing conditions of the APWRA, the District possesses a unique understanding of this important interface between migratory birds and wind energy generation.

The District is asking elected officials to support meaningful mitigation measures – research, maintenance and acquisition of habitat – when reviewing wind turbine take permits.

Contact:
Erich Pfuehler
Government Relations Manager
(510) 544-2006
epfuehler@ebparks.org
East Bay Regional Park District
2950 Peralta Oaks Court
Oakland, CA 94605
www.ebparks.org / 1-888-
EBPARKS

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