



# Eagles and Wind Energy: Understanding and Managing Risk

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**TETRA TECH**

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# Bald and Golden Eagle Protection Act

- Protected under BGEPA
- Rule allowing for take went into effect November 10, 2009
- Draft Eagle Conservation Plan Guidance released February 2011
- ECP Guidance Technical Appendices released August 2012

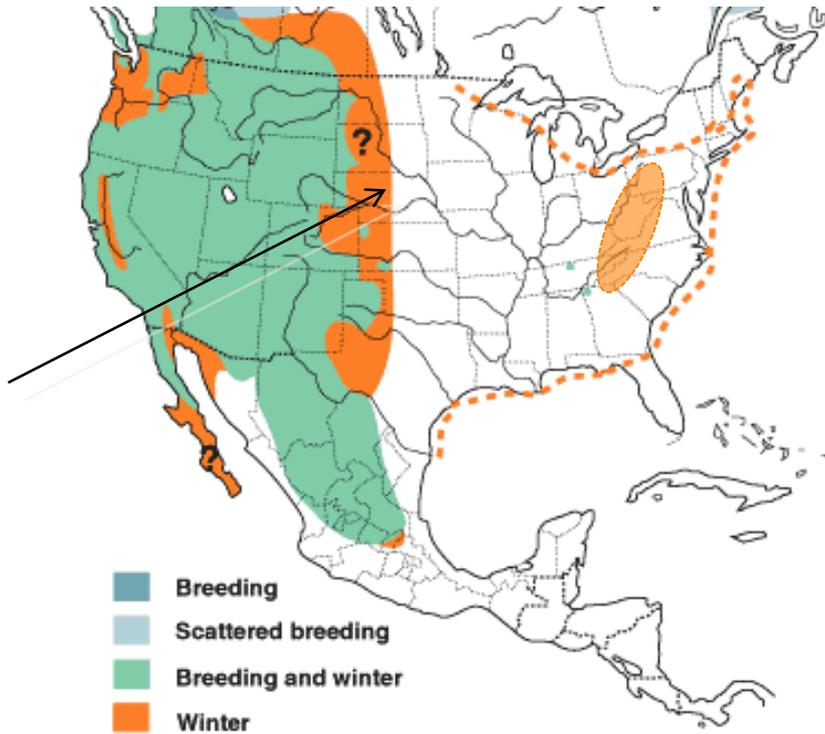


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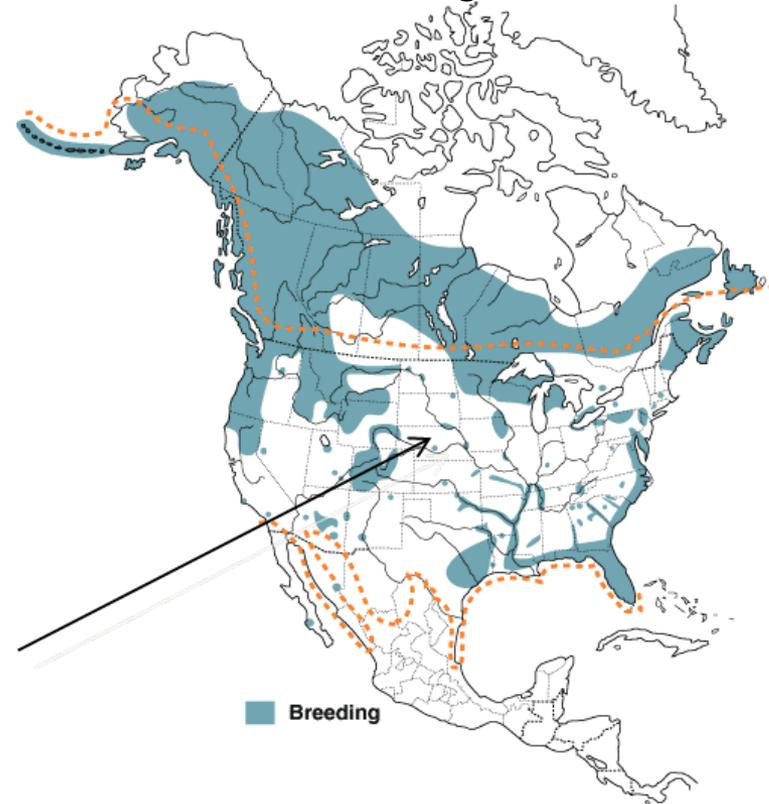


# Eagle Ranges

*Golden eagle*



*Bald eagle*

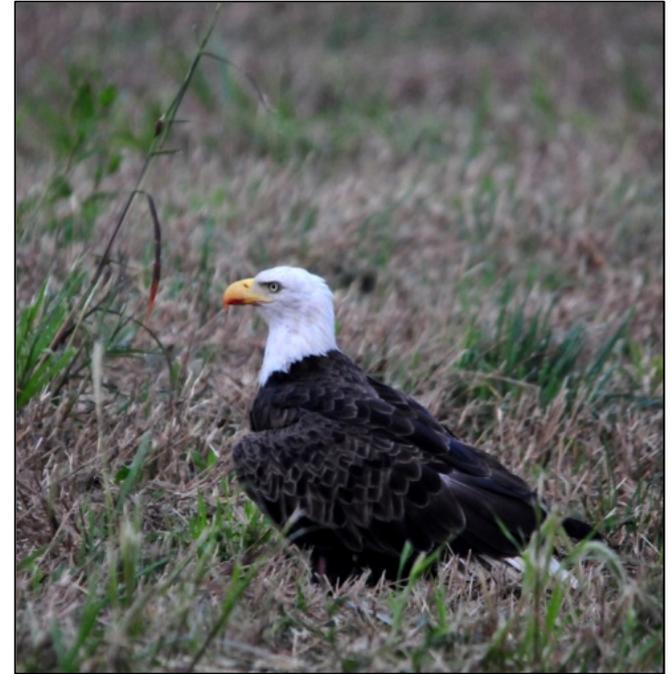


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# Bald Eagle Biology

- Opportunistic feeding
  - Fish, waterfowl, small mammals
  - Carrion
  - Piracy
- Aquatic habitats
- 5 fatalities
  - 3 in U.S.
  - 2 in Canada
- Lower risk profile

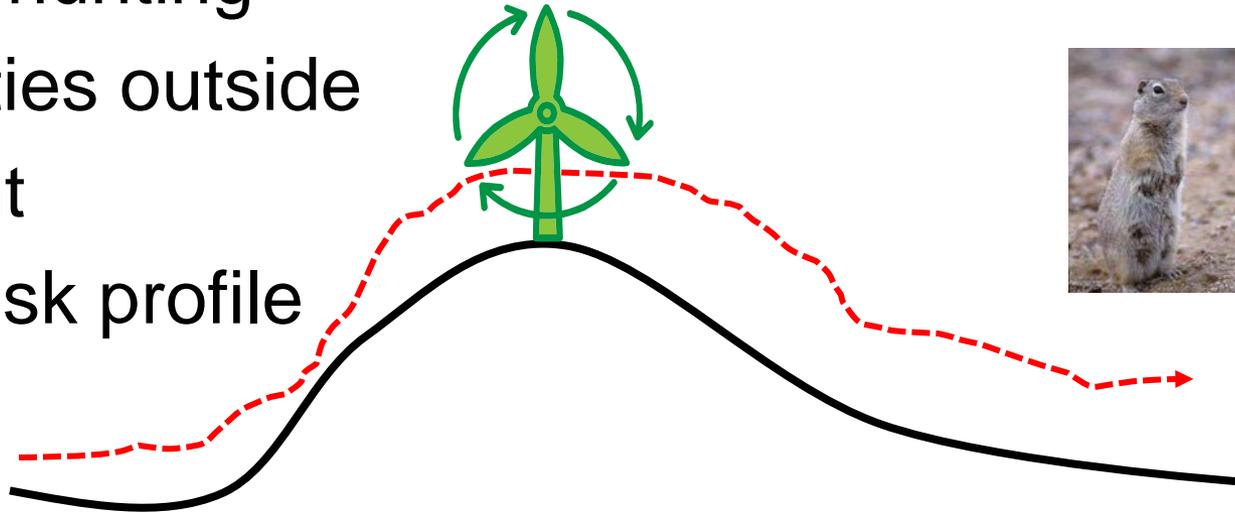


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# Golden Eagle Biology

- Active hunters
  - Small mammals
  - Carrion
- Contour hunting
- 54 fatalities outside Altamont
- Higher risk profile



# Assessing and Documenting Risk

- Bird and Bat Conservation Strategy (BBCS)
- Eagle Conservation Plan (ECP)
- Eagle Take Permit



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# Eagle Conservation Plan

- Project-specific plan to address risk to eagles from wind developments
- Step-wise approach
  - Identify if eagles are an issue early
- Understand ECP contents
  - Data requirements
  - Consider long-term impacts to project
    - Cost
    - Schedule



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# Stage 1 – Initial Site Assessment

- Gather existing, available information
  - Balance suitability for development with potential risk to eagles
  - Refine potential project sites
  - Risk category
- Important use areas within 10 miles of the project
  - Nests
  - Prey concentrations
  - Communal roost site
  - Migration corridor
  - Migration stopover
- USFWS coordination



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# Risk Categories

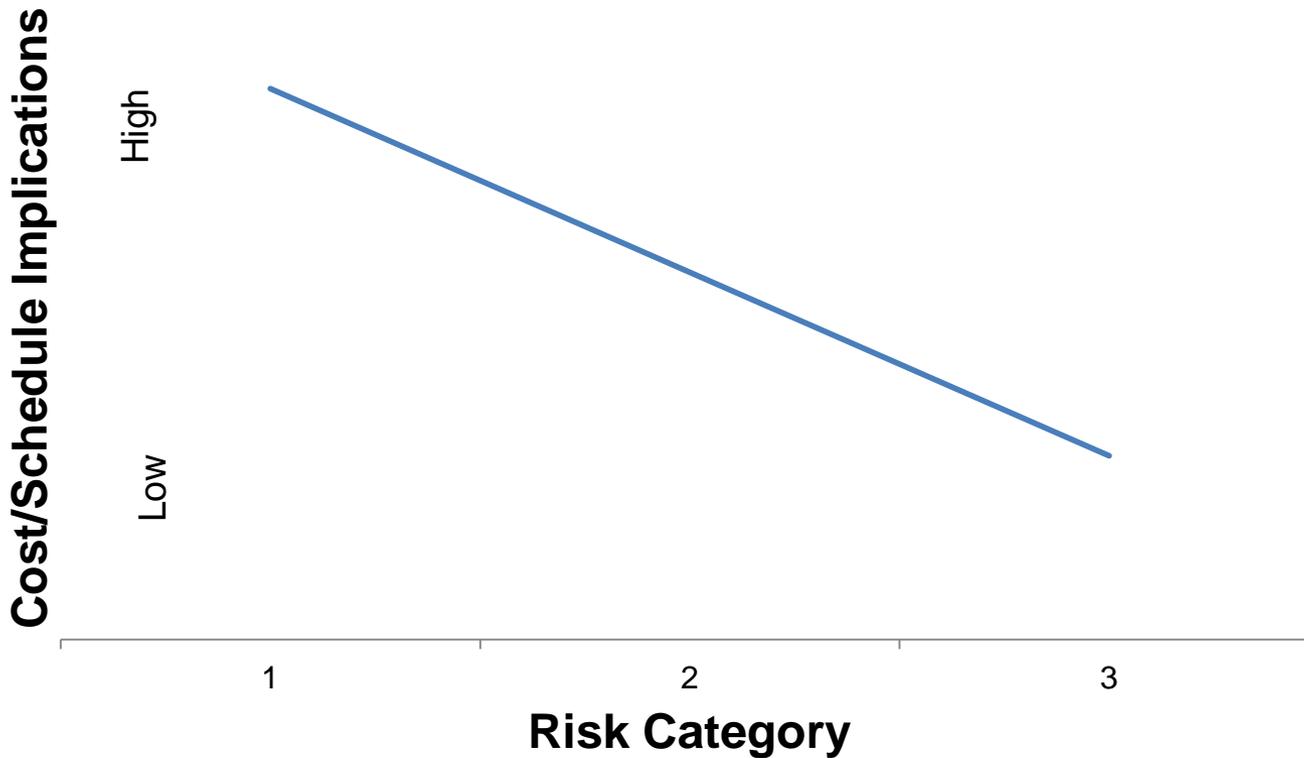
1. High risk to eagles – little opportunity to minimize effects
  - Should be moved, significantly redesigned, or abandoned
2. High to moderate risk to eagles, opportunity to minimize/mitigate effects
  - ECP should be prepared
3. Minimal risk to eagles
  - ECP may be prepared to document low risk
4. Uncertain risk to eagles
  - Need site-specific surveys to place in a category



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# Category and Cost/Schedule Effects

*The lower the category, the higher the project risk*



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## Stage 2 – Site-specific Field Surveys

### ■ Eagle point counts

- 1-2 hours or more
- Distributed over entire project
- At least 30% coverage
- All daylight hours
- Year-round preferable
- At least 2 years

**Coordinate with USFWS**

### ■ Nest surveys

- Aerial
- 10 miles
- February - May
- 2 breeding seasons



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# Stage 3 – Risk Assessment

- Electrocution
  
- Displacement/disturbance
  - Nests
  
- Habitat Fragmentation
  
- Collision
  - Use data from Stage 2
  - Initial fatality prediction



# Stage 4a – Avoidance and Minimization Measures

- Determine measures to avoid and/or minimize the predicted risks to eagles
  - Follow APLIC guidance
  - Avoid guy wires
  - Carcass removal
  - Speed limits
- Re-run fatality model after consideration of measures
  - Standard: has proponent avoided and minimized risks to the maximum extent achievable?



# Stage 4a - Mitigation

- Mitigation for predicted eagle fatalities
- No-net-loss
  - For each take, need to 'save' one eagle
  - 2 fatalities predicted, 2 eagles saved
- Translate mitigation action into eagles
  - Resource Equivalency Analysis
  - Power pole retrofits
  - Others could be considered
  - Project-specific



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# Stage 4b – Adaptive Management

- Develop strategy if fatalities exceed predicted
- Curtailment
  - Prescribed
    - Based on risk factors
    - Turbines might be curtailed when eagles are not present
  - Controlled
    - Based on risk to eagles
    - Monitors or technology
    - Turbines curtailed when eagles are present



# Stage 5 – Risk Validation Post-construction

- **Post-construction Mortality Monitoring Studies**
  - Objective: generate data for comparison with baseline
  
- **Turbine searches**
  - Year-round
  - Searcher efficiency trials
  - Carcass persistence trials
  - At least 3 years
  
- **Other studies**
  - May be other studies to validate baseline data
    - Occupancy/productivity of nests
    - Behavioral observations



# Summary

- Eagles becoming a potential fatal flaw
- Begin thinking about data collection early in the process
- Recognize that eagle guidance is changing
- Consult USFWS early and often
- Keep a formal record of all avoidance and minimization efforts during project siting
- Keep a record of consultation with federal and state agencies
- Consider cost of post-construction monitoring and adaptive management as early as possible



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