Power Lines and Sage Grouse

Governor's Sage Grouse Habitat Conservation Advisory Council

June 11,2013

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NorthWestern Energy

Contributors

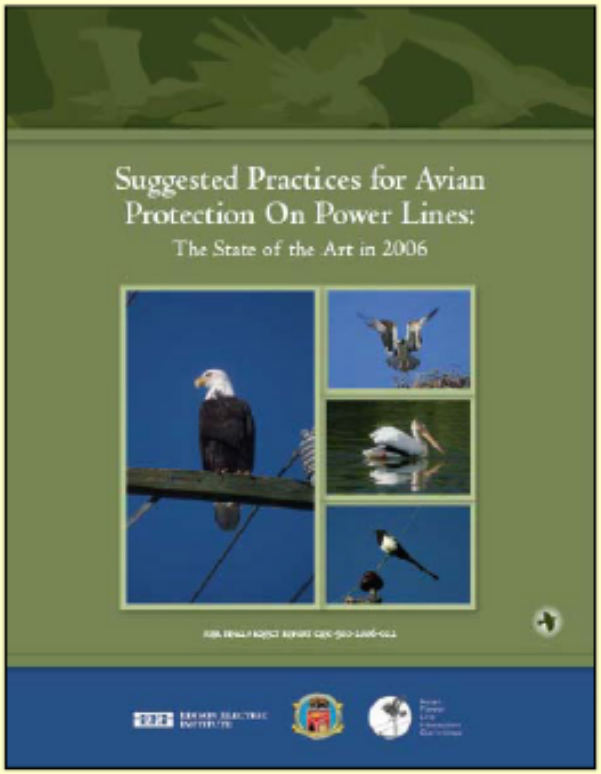
- Sherry Liguori PacifiCorp
- Natalie Turley Idaho Power
- Jim Burruss Cardno Entrix Consulting
- Abbie Krebsback Montana Dakota Utilities
- APLIC (Avian Power Line Interaction Committee)
- UWIN (Utah Wildlife in Need)
- Montana Electric Cooperative Assoc.

APLIC Mission Statement

- The Avian Power Line Interaction Committee (APLIC) leads the electric utility industry in protecting avian resources while enhancing reliable energy delivery. **We work in partnership with utilities, resources agencies and the public** to:
- Develop and provide educational resources
- Identify and fund research
- Develop and provide cost-effective management options, and
- Serve as the focal point for avian interaction utility issues

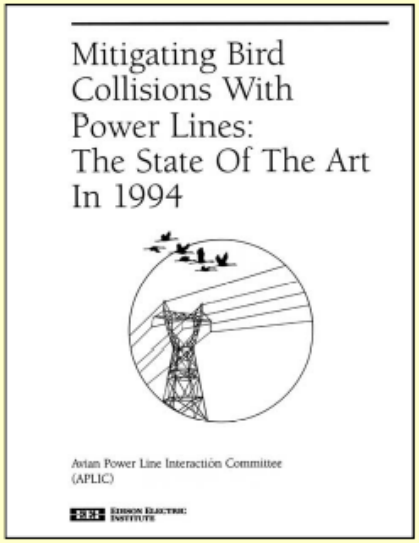
History

- *Suggested Practices for Raptor Protection on Power Lines*
  - Publications in 1975, 1981, 1996, and 2006 (title changed in 2006 from *raptor* to *avian)*
  - Used by industry and government as standard for "avian-safe" construction to minimize electrocutions

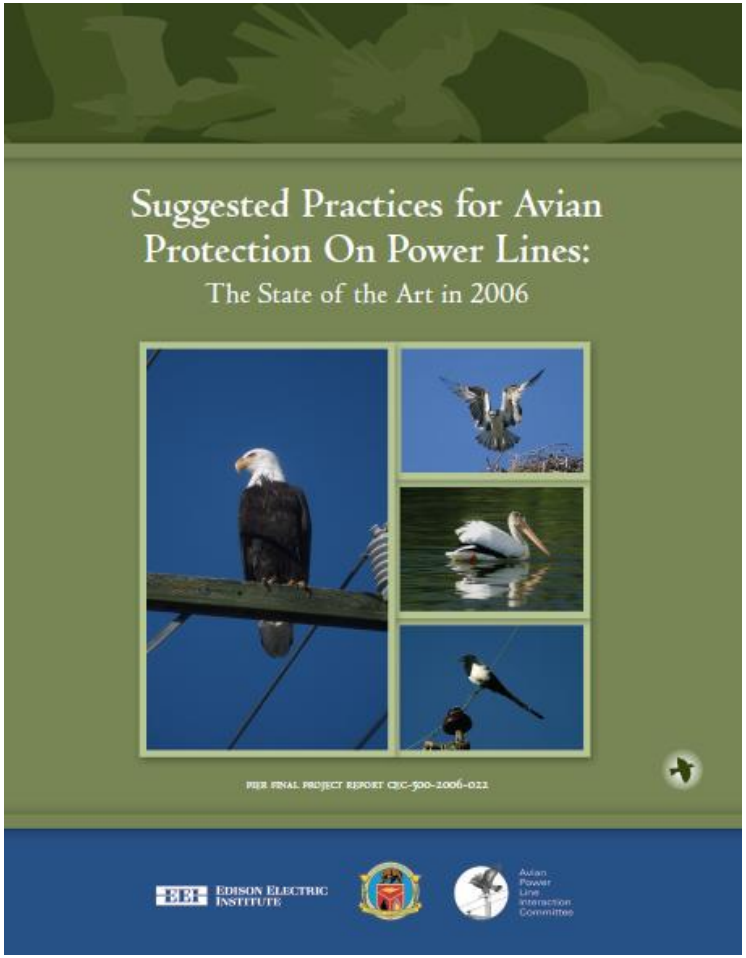


History

- 1994 – APLIC/EEI published *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994*
  - Identified factors influencing collision risk
  - Protocols for collision research studies
  - Methods to reduce collisions



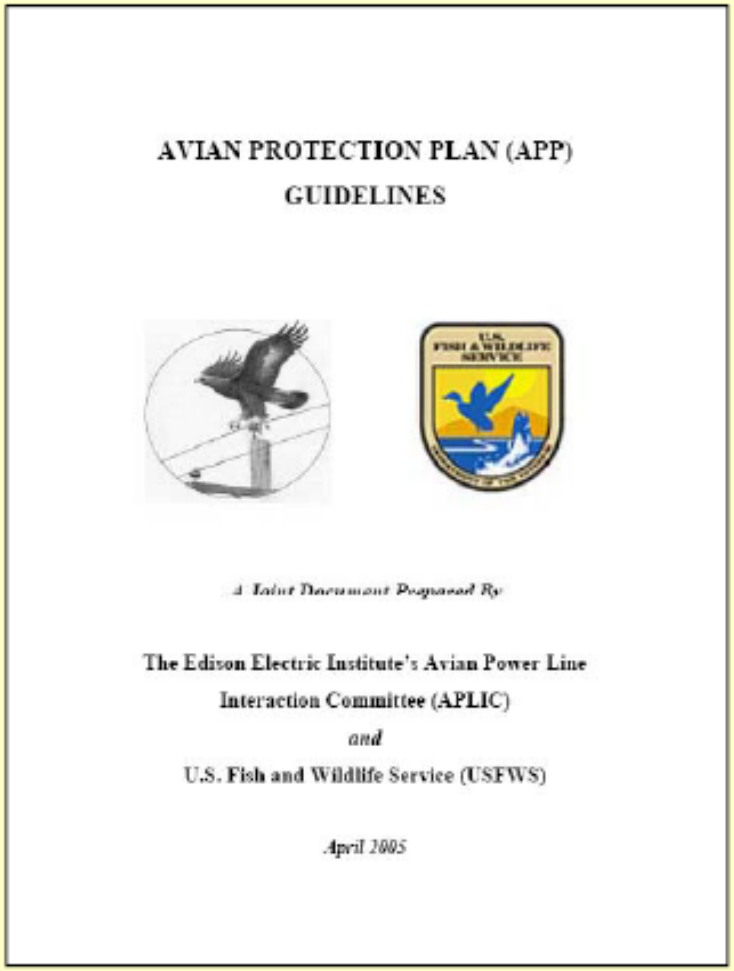
History



- APLIC/EEI *published Reducing Collisions with Power Lines: Suggested Practices* 1994 & 2012.
  - Identified factors causing collisions
  - Protocols for collision research studies
  - Methods to reduce collisions

History

- 2005 – APLIC and USFWS released Avian Protection Plan (APP) Guidelines



AVIAN PROTECTION PLAN (APP)
GUIDELINES

A Joint Document Prepared By

The Edison Electric Institute's Avian Power Line
Interaction Committee (APLIC)
and
U.S. Fish and Wildlife Service (USFWS)

April 2005

UWIN

- **Utah Wildlife in Need** is a nonprofit wildlife foundation focusing primarily on Utah's at-risk, native species by supporting:
  - Research
  - Conservation
  - Education
- To ensure the future of native Utah wildlife

Western Association of Fish and Wildlife Agencies

GREATER SAGE-GROUSE COMPREHENSIVE CONSERVATION STRATEGY

National Sage-grouse Conservation Planning Framework Team
December 2006

Utah Wildlife in Need

"Strategy" Problem Statement - Tall Structure Definition and Desired Condition

Problem Statement: tall structures and associated activities in Greater sage-grouse habitat may lead to negative impacts on Greater sage-grouse. (Perceived impacts – avoidance behavior, increased predation and habitat fragmentation)

Tall structures: including power lines, communication towers, wind turbines, and other installations.

Desired Condition: Existing and new tall structures will have no or minimal impacts on Greater sage-grouse and their key habitat.

"Strategy" Goals for Assessing and Minimizing Tall Structure Impacts

Goal 1: Compile and evaluate existing published research on effects to greater sage-grouse due to direct impacts of existing tall structures.

Goal 2: Develop research protocols for conducting new studies to assess direct impacts of tall structures.

Goal 3: Develop scientific and consistent siting and Operation & Maintenance (O&M) criteria for "tall structures" in greater sage-grouse habitat that will minimize negative impacts on greater sage-grouse.

Goal 4: Develop best management practices (BMPs) and appropriate mitigation measures that can be implemented for siting and O&M activities associated with tall structures.

Funding

- Little new Electric Transmission
- New generation is not near load
- Renewable Portfolio Requirements
- Several large transmission lines proposed
- Large capitol projects will require research
- Electric utilities propose to fund the research

"Strategy" – Goal 1 - Compile and evaluate existing published research on effects to Greater sage-grouse due to direct impacts of existing tall structures.

Project Partners – Phase I

- Rocky Mountain Power/PacifiCorp
- Utah Division of Wildlife Resources
- Utah State University

Phase I Study Process

1. Identified Key Stakeholders,
2. Had stakeholders identify shared concerns,
3. Conducted a synthesis of existing knowledge ,
4. Identified gaps between concerns and existing knowledge,
5. Identified "must have" research,
6. Compiled existing siting and O&M criteria,
7. Published *"Contemporary Knowledge and Research Needs Regarding the Effects of Tall Structures on Sage-grouse (Centrocercus urophasianus and C. minimus)"*, and
8. Received EOC endorsement and encouragement in Grand Rapids, Michigan in September , 2010.

Key Stakeholders

Anschutz
Bureau of Land Management
EDM International, Inc
Hawkwatch International
Horizon Wind Energy
Iberdrola, S. A.
Idaho Power Company
LS Power Development LLC.
Natural Resources Conservation Service
PacifiCorp
Parsons, Bele and Latimer
Ridgeline Energy
The Nature Conservancy
US Fish and Wildlife Service
US Forest Service
Utah Division of Wildlife Resources
Utah Governor's Office-Energy Advisor
Utah State University
Wasatch Wind
Wyoming Association of Conservation Districts
Wyoming Audubon
Wyoming Game and Fish Department
Wyoming Outdoor Council

Key Points We Learned in Phase I

- Project Participant's most pervasive and broadly held concern was **"the science upon which to base many tall structure decisions is lacking"**.
- **Before** Goals 3 and 4 of the "Strategy's" tall structure impact assessment can be addressed, **additional science based knowledge must be acquired**.
- Stakeholders are willing to **work proactively and collaboratively to acquire this knowledge and to address shared concerns.**
- There are **three primary knowledge gaps.**

Three Knowledge Gaps Identified in Phase I that Must Be Answered through Additional Research

1. **Do sage-grouse avoid tall structures** and if so why?

2. **Do tall structures increase predation**, especially avian predation by providing increased nesting and perching opportunities? If there is an increase in predation, **is it significant on a population level?**

3. **Do linear transmission and distribution lines fragment habitat**, limiting use or movement of sage-grouse?

"Strategy" - Goal 2 - Develop research protocols for conducting new studies to assess direct impacts of tall structures.

Project Partners – Phase II

- Rocky Mountain Power/PacifiCorp
- Avian Power Line Interaction Committee
- Northwestern Energy
- Idaho Power

Phase II – Research Protocol
Workshop Participants and Peer Reviewers

San Stiver, WAFWA, EOC
Pat Deibert, USFWS
Jim Sedinger, University of Nevada, Reno
Michael Schroeder, WDFW
Jack Connelly, IDFG
Tom Christiansen, WDGF
Joe Bohne, WDGF
Shawn Espinosa, NDW
Jason Robinson, UDWR
Chris Keefe, BLM
Steve Madsen, BLM

Steve Hanser, USGS
Brad Fedy- USGS, CSU
Rick Danver, Deseret Land and Livestock
Toni Holthuijzen, Idaho Power
Jim Burruss, PacifiCorp
Joe Hallman, PacifiCorp
Sam Milodragovich, Northwestern Energy
Rick Northrop, MFW&P
Pete Coates, USGS
Jon Kehmeier, SWCA Environmental Consultants

Phase II Study Process

1. Representatives from EOC, USFWS, BLM, PacifiCorp and UWIN identified Subject Matter Experts.
2. Hosted a two day, facilitated workshop to enhance and develop consensus on research protocol.
3. Based on the workshop input, developed a revised draft of the protocol which was sent to our workshop participants and independent experts for peer review and approval.
4. Published "*Protocol for Investigating the Effects of Tall Structures on Sage-grouse (Centrocercus spp.) within Designated and Proposed Energy Corridors.*"

Protocol Components Overview

- ✓ Before-and-After-Control-Impact (BACI), paired treatment approach with gradient analysis
- ✓ 2-3 years of pre-development research
- ✓ 5 years of post construction research
- ✓ Specific metrics:
  1. Lek attendance trends
  2. Female and male survival
  3. Population productivity (vital rates)
  4. Spatial and temporal patterns of seasonal habitat use, and
  5. Migration and habitat connectivity

Phase III Conduct research to gain the science based knowledge to support attainment of "Strategy" Goals 3 & Goal 4

Goal 3 - Develop scientific and consistent siting and Operation & Maintenance (O&M) criteria for "tall structures" in greater sage-grouse habitat that will minimize negative impacts on greater sage-grouse.

Goal 4: Develop best management practices (BMPs) and appropriate mitigation measures that can be implemented for siting and O&M activities associated with tall structures.

Sage-Grouse

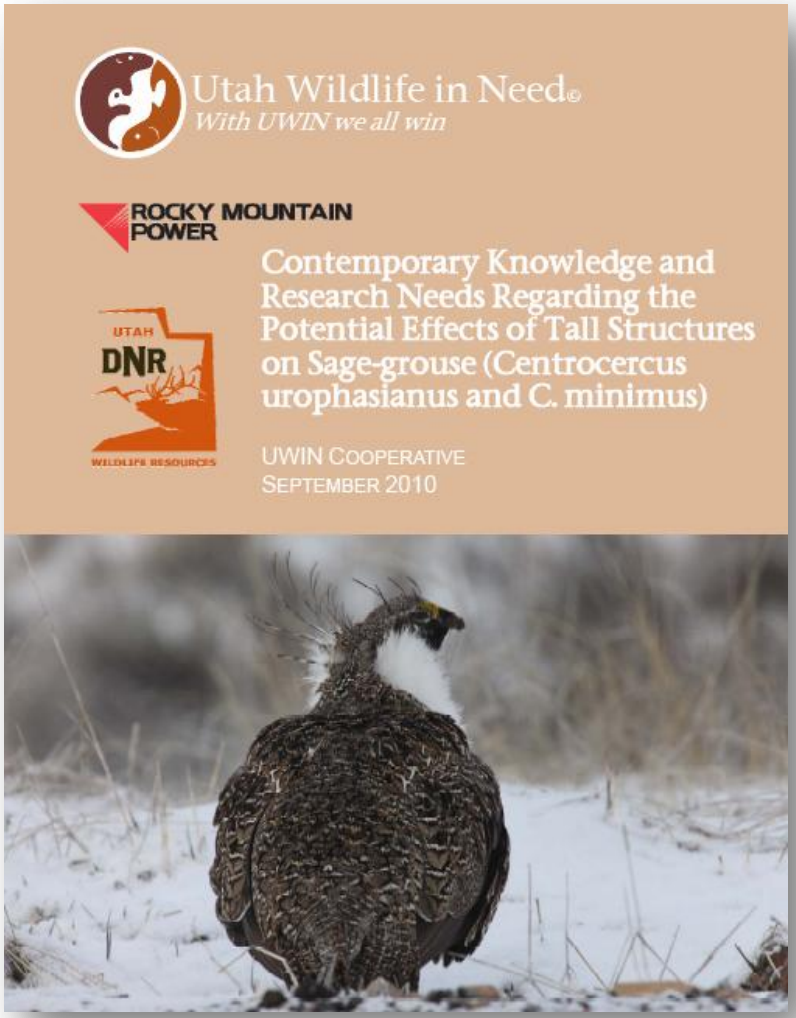
- ✓ Compile existing research/literature
  - Addressed by Utah Wildlife in Need, Utah State University, Utah Div. of Wildlife Resources, and Rocky Mountain Power in 2010
  - Conducted stakeholder workshops in UT and WY
  - Conducted review of all currently available literature
  - Evaluated literature to see if commonly cited concerns are supported in the literature (e.g., avoidance of tall structures, eagle predation, habitat fragmentation, etc.)
  - Update proposed

Sage-Grouse

- SAGR/tall structures literature review and workshop report can be found at:

  http://utahcbcp.org/htm/tall-structure-info

  or link at www.aplic.org



Sage-Grouse

- Literature review identified that:
  - No peer-reviewed experimental studies that have evaluated impacts of tall structures on SAGR
    - No data to support SAGR avoidance of tall structures, increased eagle predation
    - Mis-citations common in the literature, e.g., citations from forest grouse in Europe used to support habitat fragmentation impact for SAGR
    - Anecdotal incidents or individual opinions cited as if actual studies
  - Inconsistency among temporal and seasonal buffers and siting policies due to lack of knowledge of impacts
    - No monitoring of policy effectiveness

Sage-Grouse

- Stakeholder workshops identified concerns and needs:
  - Science is lacking
  - Rigorous, replicable research is needed (BACI)
  - Need to work proactively & collaboratively
  - Best current technology should be used
  - Research should be encouraged as a mitigation option
  - BMPs are needed

Phase II – Research Protocol
Workshop Participants and Peer Reviewers

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Sage-Grouse

- Development of research protocols
  - Completed in 2011
  - Workshop held with sage-grouse researchers, agencies, academia, utilities, and others
  - Goal: consistent methods for replicable, valid studies to assess sage-grouse response to transmission lines
  - Collaboration among UWIN, USU, UDWR, APLIC, and individual APLIC-member utilities
  - WAFWA endorsement

Governance Committee Membership

- BLM Branch Chief, Lands & ROWs
- Montana FW&P Asst. Director
- Idaho F&G Asst. Director
- Wyoming G&F Asst. Director
- USFWS Sage grouse Coordinator
- Idaho Power
- APLIC Rep.
- SOC Chair
- FRPMF Chair

Sage-Grouse

WAFWA (2006) goals:

1. Compile existing research/literature - COMPLETED
2. Develop research protocols - COMPLETED
3. Develop scientific and consistent siting criteria
4. Develop Best Management Practices

NEXT STEPS?

Conduct research, address goals 3 & 4

- Current research opportunities with upcoming transmission projects (including research as part of mitigation for unknown impacts would facilitate funding)

APLIC Sage Grouse Working Group

- APLIC members and state/federal agencies developing **BMPs for electric utilities in sage-grouse areas**.
- **APLIC model** of collaborative, voluntary efforts developed in **partnership with the FWS** – is serving as a framework for the sage-grouse BMPs.
- **BMPs will be a living document** updated and refined as new research becomes available.
- BMPs - **practical, effective, science-based, and justifiable to customers and Public Service Commission**.
- Organizational meeting at APLIC workshop in Gr. Falls October 2012 Hosts NorthWestern Energy and Montana Electric Cooperative Association

Common Mitigation Recommendations

- Undergrounding lines
- Use of perch discouragers

Undergrounding Lines

- Concerns
  - Feasibility
  - Cost
  - Environmental impacts

Undergrounding Lines

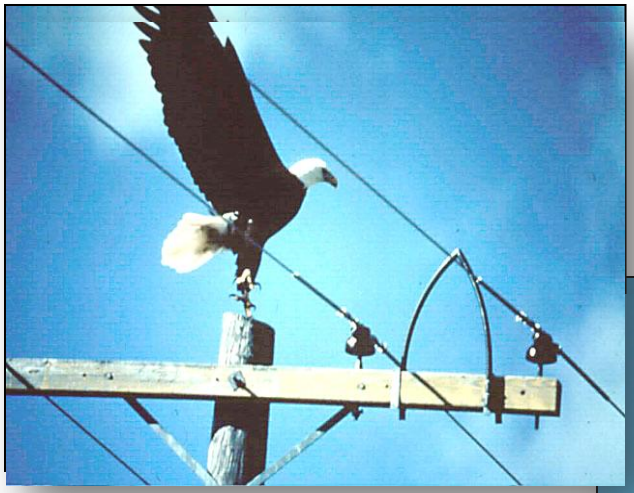
- Distribution voltages (<69kV)
  - Costs approx. 30% more to underground
- Transmission voltages (>69kV)
  - Technologically not feasible for high voltage lines
  - Very costly (ex: $14 million additional cost per mile to put 345kV underground)

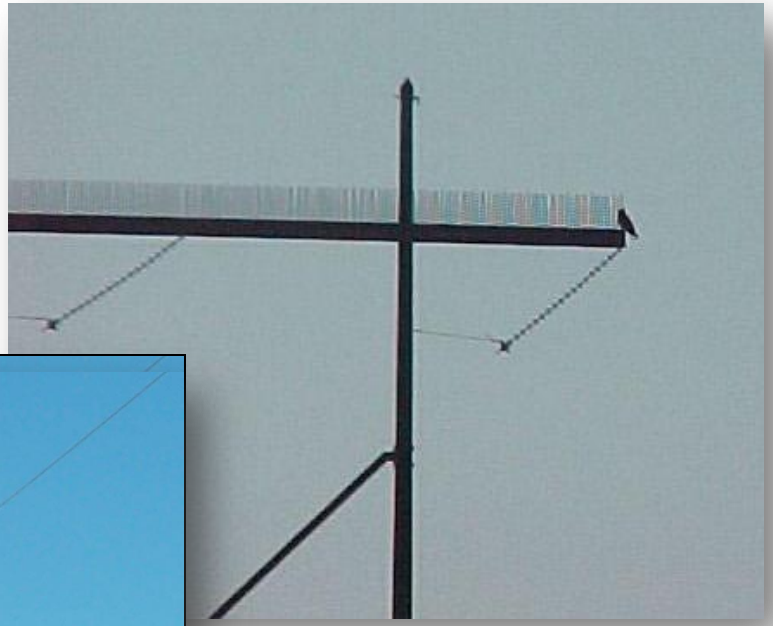
Undergrounding Lines

- By law, utility is required to provide lowest cost service (overhead cost)
  - Cost of undergrounding must be paid by customer/agency requesting underground line
- Greater ground disturbance, longer construction duration, landowner objections (weeds)
- Maintenance of underground lines
- Ground disturbance from unearthing sections of line for maintenance, repairs, outage response
- Higher maintenance costs than overhead

Perch Discouragers

- Perch discouragers are designed to move the location a bird perches to a safer location
- Not effective at completely excluding birds from perching





Perch Deterrents Continued

- NESC clearances
- May aid in the accumulation of nest material

Other Concerns

- Longevity
- Impalement
- Maintenance

  Nests on deterrents
- Crews working around deterrents
- Impossible to prevent perching on lattice transmission
- Birds can perch on static; can perch on very thin substrates (e.g., tree branches)

Perch Discourager Effectiveness

- Utah State University (Prather and Messmer)
- Falcon to Gondor 345kV (Lammers and Collopy)
- HawkWatch International
- PacifiCorp (*in prep.*)

Utah State University *(Prather and Messmer)*

- Tested 5 types of discouragers in Gunnison sage-grouse range

Fig. 2a: 1 Fire Fly

Fig 2b: 2 Fire Flies

Fig. 2c: Cones (Kaddas)

Fig. 2d: Triangles

Fig. 2e: Spikes (Mini-Zena)

Fig. 2f: Control

Utah State University *(Prather and Messmer)*

- None of the perch discouragers were effective in preventing raptors or corvids from perching on poles
  - No significant difference in bird use of control and each treatment category
  - 68% (2007) and 67% (2008) of all perching events were on poles with discouragers
  - 74% (2007) and 84% (2008) of golden eagle perching events were on poles with discouragers
- Mechanical failure of some products
- No evidence of raptor predation on sage-grouse documented near power line
  - Majority of pellets and prey remains collected were rabbits

Falcon to Gondor 345kV *(Lammers and Collopy)*

- Perch discouragers reduced amount of time birds perched on poles, but did not prevent perching
- Raptors and corvids were able to overcome perch discouragers and perch on structures
- Did not have the desired effect

HawkWatch International

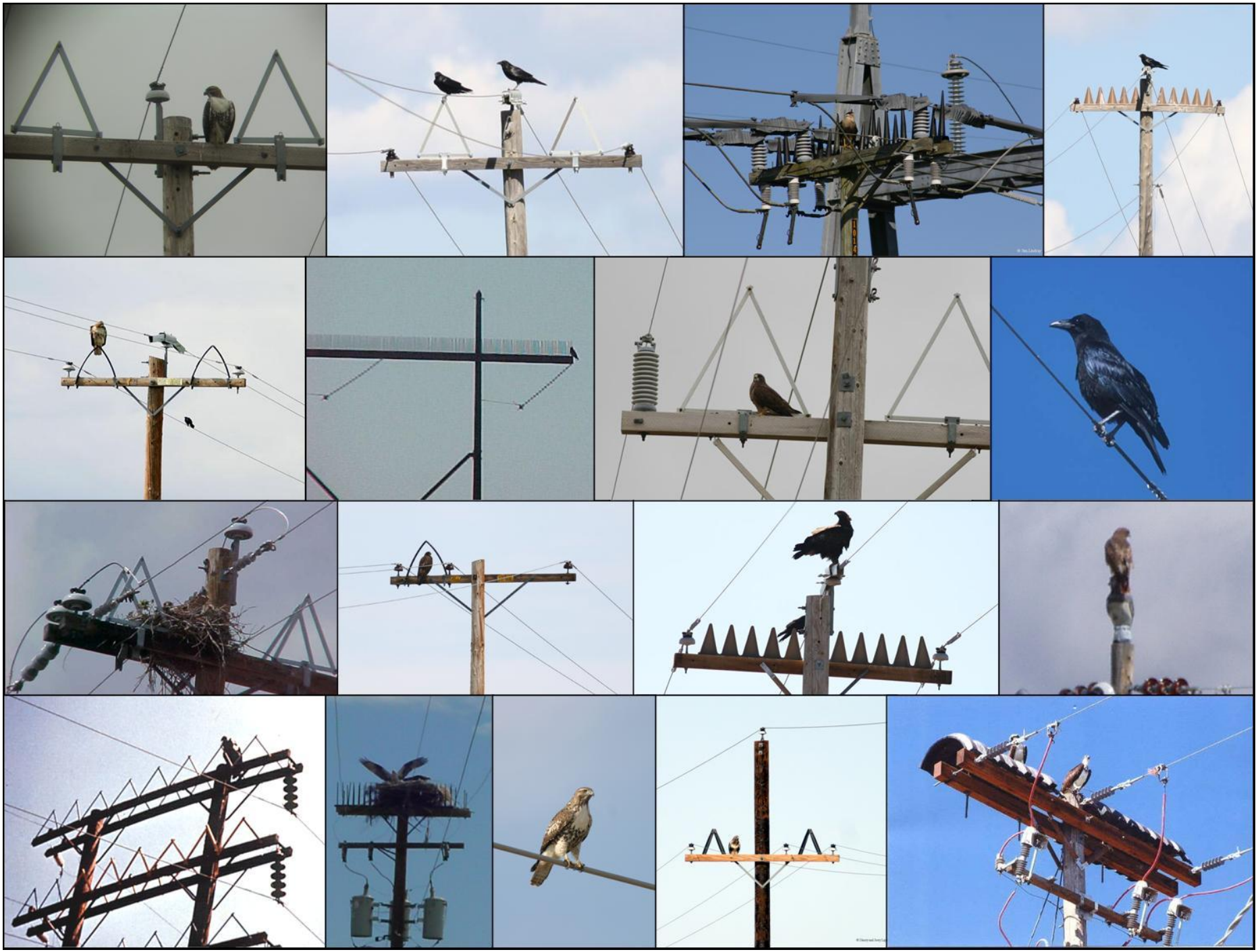
- Assessed perching on line with spike discouragers
- Adjacent line with no discouragers
- Higher perching rates on adjacent line with no spikes
- Golden eagle and common raven more likely to overcome deterrents
- Raven nesting documented on deterrents
- Availability of other perches may impact effectiveness

Photo: Roy Brown, USFWS

Photo: HWI

PacifiCorp

- Assessed effectiveness of various bird protection products (2001-present)
  - Distribution voltages to 69kV, various discourager styles assessed, *n*>100,000 poles evaluated in similar habitats with similar prey abundance
- Greater raptor/raven perching use on poles with discouragers
- 3.6 times more likely to have nests on poles with discouragers
- 4 times more likely to have electrocutions on poles with discouragers
- 94% of prey remains documented mammalian



Other Regulatory Bodies

- Electric utilities are governed by several agencies with regulations which may conflict with some well intended stipulations.
  - WECC Western Electricity Coordinating Council
  - FERC Federal Energy Regulatory Committee
  - NERC North American Electric Reliability Corporation
  - NESC National Electrical Safety Code

Redundancy

(not just for the birds)

- Some Critical transmission lines may not legally be sited close together (common corridor) because a single event like a fire etc. may take out both lines causing unacceptable impacts to the rest of the system.
- Decisions not made by utility
- Must comply

Additional Research

- **Lek persistence after power line construction**
- APLIC /University of Idaho pilot study using LandSat imagery to look at landscape scale, impacts like agricultural changes, industrial activites etc. in the vicinity of leks since 1973.
- Idaho Power will provide power line data.
- Idaho F&G will provide Lek data.
- If feasible a larger scale project is proposed.

Considerations

- Electric Utility Industry is Proactive (BMPs)
- Support Science and informed decisions
- Safety, reliability also regulated by agencies
- Consider offsite mitigation
- Perch preventers don’t work
- Underground has problems
- Flexibility to adjust to new science
- Consider Power Line Corridors w/min impact

Thank You

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