Modeling:

• **7 population models**
  - abundance
  - distribution
  - trends

• **4 threat models**
  - oil & gas
  - fire & invasives
  - cropland risk
  - conifer

• **Projects and analyses remain independent**
Integrate through spatial overlap with 4 Risk Models

Projected Relative Abundance

Projected Distribution

Projected Population Trends

Current Population Trend recent period
Talk Outline:

- Example of quantifying population exposure to risk (*Sprague's Pipit example*)
- Sage-grouse population and distribution models
- Sage-grouse Risk exposure example
- Sage-grouse Conservation Examples
An Example

Risk Modeling Framework: Agriculture Conversion

Sprague’s Pipit
Combining population models with threat models to quantify exposure to risk
Combining population models with threat models to quantify exposure to risk
- Worked with WAFWA & States on Greater Sage-grouse Lek Data:
- Analyses Structured by Management Zone
- Produce 2 Metrics:
  - Modeled Probability of Occupied Breeding Habitat
  - Relative Population Index
Greater Sage-Grouse Range-wide Modeling

- Breeding Distribution Model
- Predictive Model Linked to Habitat Metrics
- Good Model Fit and Cross-fold Validations Statistics
Greater Sage-Grouse Range-wide Modeling

Relative Population Index by Sage-grouse Management Zone

Colors Represent Relative % Populations

- Red: 10
- Orange: 20
- Dark orange: 30
- Yellow: 40
- Light yellow: 50
- Light blue: 60
- Blue: 70
- Light blue: 80
- Light blue: 90
- Dark blue: 100

Scale:
- 0
- 100 km
- 200 km
- 10 miles
Oil & Gas Example MZ I & MZ II

We Used USGS Oil & Gas Assessments to Create 3 Scenarios of Future Development:

- Min, Mean, Max
Mean Development From USGS Assessments

- **Oil & Gas Example MZ I & MZ II**
- **We Used USGS Oil & Gas Assessments to Create 3 Scenarios of Future Development:**
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Oil & Gas
Example MZ I & MZ II

We Used USGS Oil & Gas Assessments to Create 3 Scenarios of Future Development:

- Min
- Mean
- Max
Conservation: Wyoming Core Area Example

- White Areas = Wyoming Core Areas version 3. Last updated 2010.
Conservation: Wyoming Core Area Example

White Areas = Wyoming Core Areas version 3. Last updated 2010.
Conservation Example: Easements
Integrate through spatial overlap with 4 Risk Models

Projected Relative Abundance

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Current Population Trend recent period
Questions