Habitat Selection of Greater Prairie-Chicken Broods in a Heterogeneous Grassland

David Londe†, R.D. Elmore, S.D. Fuhlendorf, and C.A. Davis

Oklahoma State University

†david.londe@okstate.edu
Habitat Selection

Habitat-use influenced by scale and time

Hierarchal process: Subunits within larger habitat units

Trade-offs between multiple resource needs

- Food
- Predator Avoidance
- Thermal Conditions (Both Hot and Cold)

FIGURE 5. Hierarchical decision-making process of habitat selection by migratory birds (from Hutto, 1985).
Greater Prairie-Chicken Broods
(*Tympanuchus cupido*, GRPC)

- High energy demands due to rapid growth
- Sensitive to weather
- Low mobility
Grassland Heterogeneity

Fire and grazing drives vegetation structure

Management that emphasizes heterogeneity becoming more common

Different patches used by GRPC through life-cycle
Objectives

Evaluate GRPC brood habitat selection and response to heterogeneity

What factors are important for determining habitat use?
- Vegetation Structure
- Thermal Environment
- Food resources (Invertebrate Biomass and Abundance)

Do broods use different patches for different parts of daily cycle?
Study Site: Osage County, Oklahoma

Study Site:
Private Cattle Ranches
The Nature Conservancy's Tallgrass Prairie Preserve
Methods: Capture and Transmitters

Female GRPC captured using walk in funnel traps on leks

22 gram Argos/PPT GPS transmitters (Microwave Telemetry Inc, Columbia, MD, USA)

15 locations per day

Transmitter error ± 18-20 meters
Nest and Brood Monitoring

Monitor nests remotely via Satellite GPS

Conducted weekly brood flushes to monitor survival
Sampling Design

Randomly select 4 GPS Locations

- 2 Morning feeding locations (7:00-10:00)
- 2 Afternoon loafing locations (13:00-16:00)

Thermal (Black Spheres Tbs with Hobo Data Loggers)

Vegetation
- Percent Cover
- Vegetation Height
- Visual Obstruction (VOR)
- Litter Depth

Sweep net Transects
Sampling Design

Hobo Data Logger and Black Sphere
Sweep Net Transect
Sampling Design

Locations Randomly Assigned Sample Period

Sample Times
- Afternoon (12:30-17:00)
- Morning (6:30-10:30)
Patch Level Selection

![Diagram showing the distribution of Time Since Fire within Brood and Landscape contexts. The bars represent the percentage of patches within each time category: 0-12 Months, 13-24 Months, 25-36 Months, and >36 Months. The map illustrates the spatial distribution of nests and broods with varying times since fire, marked by different colors.](image)
Patch Level Vegetation Characteristics

### Vegetation Cover

<table>
<thead>
<tr>
<th>Location Type</th>
<th>Grass</th>
<th>Forb</th>
<th>Litter</th>
<th>Shrub</th>
<th>Sericea</th>
<th>Bare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random 0-12 Months Post Fire</td>
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<tr>
<td>Random 13-24 Months Post Fire</td>
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<td>Random &gt; 24 Months Post Fire</td>
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### Vegetation Structure

<table>
<thead>
<tr>
<th>Location Type</th>
<th>Litter Depth</th>
<th>Veg Height</th>
<th>VOR</th>
</tr>
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<td>Random &gt; 24 Months Post Fire</td>
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</tbody>
</table>
Patch Level Thermal

Sample Period = Morning (6:30 - 10:30)

Sample Period = Afternoon (12:30 - 16:30)

Average Tbs (Celsius)

Time of Day

Location Type
- Random 0-12 Months Post Fire
- Random 13-24 Months Post Fire
- Random >24 Months Post Fire
Brood Locations Vegetation Characteristics

### Vegetation Cover

- **Grasses**: Percent Cover
- **Forb**: Percent Cover
- **Litter**: Percent Cover
- **Shrub**: Percent Cover
- **Sereca**: Percent Cover
- **Bare**: Percent Cover

### Vegetation Structure

- **Litter Depth**: Centimeters
- **Veg Height**: Centimeters
- **VOR**: Centimeters

**Location Type**
- **Brood Morning**
- **Brood Afternoon**
- **Random 0-12 Months Post Fire**
Brood Location Invertebrates

- **All Invertebrates Abundance**
  - Mean Abundance
  - Brood Morning, Brood Afternoon, 0-12 Months Post Fire

- **All Invertebrates Biomass**
  - Mean Biomass (g)
  - Brood Morning, Brood Afternoon, 0-12 Months Post Fire

- **Orthoptera Abundance**
  - Mean Abundance
  - Brood Morning, Brood Afternoon, 0-12 Months Post Fire

- **Orthoptera Biomass**
  - Mean Biomass (g)
  - Brood Morning, Brood Afternoon, 0-12 Months Post Fire
Conclusions

Grassland heterogeneity important for GRPC broods at multiple scales

Hierarchal Patterns of Habitat Selection

Habitat selection varied through the day
Acknowledgements

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- Oklahoma Department of Wildlife Conservation

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Questions?

Contact Information:
david.londe@okstate.edu