Relationships between Cerulean Warblers and Forest Management on the Breeding Grounds

David A. Buehler, University of Tennessee
Petra Bohall Wood, USGS WV Coop. Fish & Wildlife Research Unit
Paul B. Hamel, Center for Bottomland Hardwoods, USFS Southern Research Station
Today……

- Update on cerulean relationships with forest management.
- Talk a little about the forest management experiment we are conducting in the core of the range.
Forest Management and Ceruleans

- **Landscape scale relationships**
  - How does forest management affect patch size, edge, and other components important to cerulean....
    - Occurrence
    - Productivity
    - Survival

- **Stand scale relationships**
  - How does forest management affect stand structure and composition important to cerulean......
    - Occurrence
    - Productivity
    - Survival
Studies on Ceruleans and Forest Management

- Anecdotal observations
- Point counts
- Reproductive success
- Return rates
- Experimental treatments
  - Before and after with controls
West Virginia: Wood et al.

two-age harvests

Photo by Gary Miller

Photo by Tim Dellinger
Cerulean occurrence and abundance

- Unharvested
- Clearcut periphery
- Two-age periphery
- Clearcut harvest
- Two-age harvest

Occurrence and Abundance graphs show differences in occurrence and abundance between unharvested, clearcut periphery, two-age periphery, clearcut harvest, and two-age harvest areas.
Pennsylvania- Rodewald

- Ceruleans more likely to occur in forested landscapes disturbed by silviculture than landscapes disturbed by agriculture.
- Ceruleans used even-aged regeneration areas <5 yrs old with 100 trees/ha residual.
- Ceruleans most common in unharvested stands with natural tree-fall gaps.
Pennsylvania: Stoleston et al.

- Shelterwood cuts with prescribed burning had greater cerulean occurrence than uncut controls.

- Population densities fluctuated widely but generally were declining in stands with group selection for one rotation and also in controls.
- Return rates were greater in stands with groups although sample sizes were very small.
- Felt that thinning between groups had negative effects on ceruleans.
Ontario: Jones et al.

- Canoe Lake, ON
  - Study site had annual single-tree selection harvest during last 10 years.
  - No change in density from 1994-2000
  - Breeding success was high when monitored.
  - No pre-treatment density estimates.
Wayne National Forest, OH: Flegel

- 1992
  - Group selection harvest
    - 2 ac groups, up to 25% of stand area harvested
  - Single-tree selection harvest
- No ceruleans found in group selection stand
- More ceruleans found in single-tree selection stand than in adjacent uncut areas.
Wisconsin: Hoffman

• Kettle Moraine State Forest
  – Thinning treatment on mature hardwood forest reduced canopy cover to 70%.
  – No change in pre-harvest cerulean densities.
Ceruleans continued to use forest stands that had been commercially “clearcut” with ~10 ft²/ac (2.5 m²/ha) residual basal area. Densities were lower in the harvested area than in adjacent uncut stands.

- Ice storm significantly opened canopy of study site.
- Territory size in the year of disturbance was similar to previous years but nest success was much lower.
- Territory size and nest success increased in the second year post-disturbance although nest success did not reach pre-disturbance levels.
- Cerulean showed some flexibility in territory size and habitat selection in response to changing habitat conditions.
Silvicultural Prescriptions

- Do we manage the species by applying standard silvicultural prescriptions and measuring response by Cerulean Warblers
  
or
  - Do we manage the species by designing a specific Cerulean Warbler prescription?
Experimental Forest Management For Priority Songbirds (Cerulean Warblers) in the Central Hardwoods Region

David Buehler and Benny Thatcher
Robert Wheat and Patrick Martin
Experimental Silvicultural Prescription for Ceruleans

Goal: Increase forest structural diversity to improve breeding habitat quality for regional priority songbirds (Cerulean Warbler among others).

- Timber harvest to create canopy gaps
- Increase light, moisture, nutrients
- Accelerate crown and diameter growth
- Promote development of understory & mid-story vegetation
Management Prescription

- Canopy closure: 40% in patches, 70% in matrix
- Retain: large trees, cavity trees, mast species
CWTG Forestry Experiment

- Funded by NFWF, forest industry, NFs, state wildlife agencies, TNC, and others.
  - 7 sites (KY, OH, TN-2, WV-3)
- 4 Treatments
  - Heavy: harvest to 20 ft²/ac BA, remove all other woody stems > 5 cm
  - Moderate: harvest to 55 ft²/ac BA, remove all other woody stems > 5 cm
  - Light: harvest to 75-80 ft²/ac BA
  - Control: unharvested
- Pretreatment 2005-2006
- Treatments summer-fall 2006
- Monitoring through 2009 at least.
Experimental Design
Sundquist Forest, TN

- Heavy Treatment: 10 ha, 300 m buffer
- Medium Treatment: 5 ha buffer
- Light Treatment: 5 ha buffer
- Control: 10 ha buffer
Heavy Treatment
Sundquist Forest, TN
Timing of Cerulean Habitat Recovery

• Human development => probably never

• Mining => unknown
  – Key is the success of reforestation reclamation option

• Forest Management
  – Dependent on management regime
    • Clearcutting => 40+ years?
    • Alternative methods => may maintain habitat suitability throughout rotation although habitat quality may go down and then recover over time with harvest