

# The Cerulean Warbler (*Setophaga cerulea*) and the role of fire on the breeding grounds.

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# Cerulean Warbler

**Male**

**8-10 g, wing 65, pp 25%**

**Female**

**Wing 60mm, pp 16%**



# Why are we concerned about the Cerulean Warbler?

- ▶ Population Decline (Link and Sauer 2002) of 3% per year.
- ▶ Difficult to study and determine why.
  - Small – only recently were tags small enough available!
  - Stay high in canopy, difficult to see or catch
  - Females relatively silent
- ▶ Resources are utilized by many species, fierce competition with other forest species (Jones et al 2007)
  - **Blue-gray Gnatcatcher**
  - **American Redstart**
  - Red-eyed Vireo
  - Black-throated Green Warbler
- ▶ Morphological changes within temperate mature forest species group, thought to result from habitat changes (Desrochers 2010), could be problems (Winker 1996).
  - Primary projection decreasing over past 100 years (not significant for species, but significant for mature forest species, -2.73mm/100 years) 32.5%
  - Our two specimens (1938, 1943) 30%
  - Our field samples 2011 (25%), female 16%

# Wing Shape, 2011



# What could be the problem?

- ▶ Breeding Habitat
  - Fragmentation
  - Changing Forest composition toward shade tolerant maple mix
  - Changing forest structure
  - Mining – mountain top removal
- ▶ Parasitism/Predation – unquantifiable at this point.
  - Brown-headed Cowbird (57% for Hooded Warbler)
  - Predation (30-50% for Hooded Warbler)
- ▶ Toxins in the environment.
  - Heart of species range is in Coal mining territory (Hamel 2010), also Sulfur dioxide emissions are greatest.
  - Elm treatments were vast (Wyman 1947)
  - Many other sources

# What did we learn?

- ▶ Slippery Elm – early leaf
  - Source of geometrids early in season
  - Nesting material, saprophytic fungus particular to Elm - *Poronidulus conchifer* (*Trametes conchifer*)
- ▶ Black Cherry utilized by female and male
  - Food source for female throughout breeding season
  - Eastern Tent Caterpillar nest utilized for silk, likely for food, though we can not support that with observations
  - 1 of 9 nests were built in Black Cherry
  - Many with multiple trunks, likely grew quickly from existing root, with quality of being tall for diameter (characteristic)
- ▶ Oak
  - Almost exclusive food resource for male until catkins fell
  - Male territories always included sizeable oaks which were actively defended
  - Groves of oaks which were not in territory were visited when they had catkins
  - One nest, unsuccessful, but built very high in oak, covered with Oak catkins, in contention with Blue-gray Gnatcatcher







# What did we learn?

- ▶ Black Walnut used throughout season
  - Used heavily for feeding nestlings, green caterpillars from tips of branches
  - 3 of 9 nests located in Black Walnut
- ▶ Black Locust – leafing very late (Bitternut Hickory, COSEWIC)
  - utilized as singing perch for male (not eating while singing)
  - Many in nest territory were densely covered in vines, serving as cover, perhaps foraging area, one nest.
  - Could serve the function of a snag
  - Present in areas with fledglings, possibly late season food source
- ▶ **Variety** of trees available at nest sites
  - Unidentified needs?
  - With concern over Oak wilt, separation of the dominant canopy trees could be important
- ▶ Summer Grape
  - Thick vines often present on or near nest tree. Bulk of nest material was not transported very far.

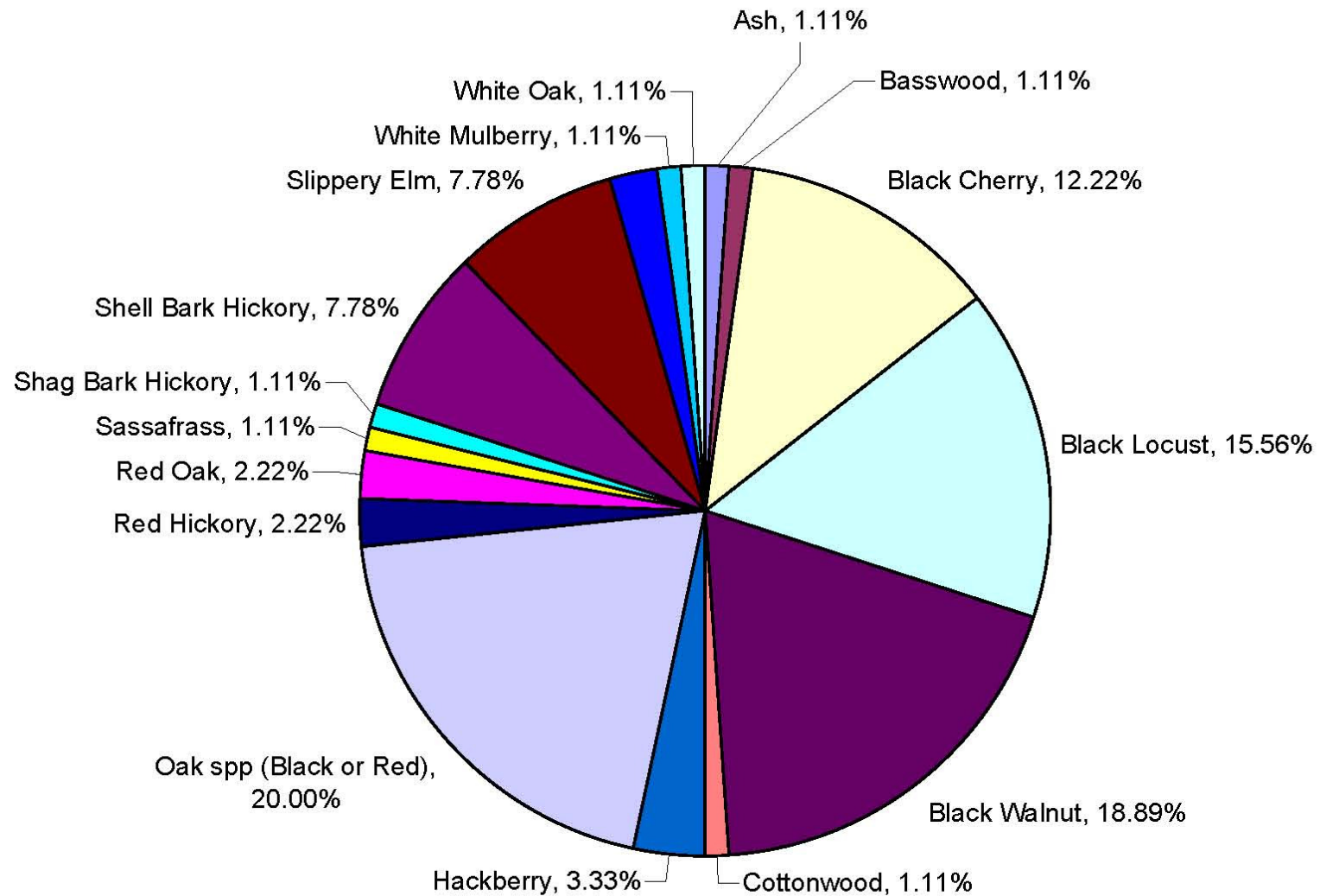


Curculio beetle

Caterpillar on Black Walnut bud



# Surveyed trees from 2011 nest site locations.



# How can fire help?

- ▶ Maintain Oak systems.
  - Oak is a primary food source for a period of time during the breeding cycle. This item is held in common across the breeding range.
- ▶ Create ecotones.
  - Burned/unburned areas in close proximity to one another provide a larger variety of resources in a smaller space. Male territory tended to be burned, female nest sites tended not to be.
- ▶ Create snags
- ▶ Create small openings/disturbance
  - Suited to pointy wings
  - Disturbance areas, let in light for sun loving trees to have lateral development.
- ▶ Create complex structure of the forest canopy, determined a desired forest characteristic in some regions (Hamel 2005)
- ▶ Promote Summer Grape (Carey 1994), which was found at most nest sites.
- ▶ Change community composition: fewer shrub species, which respond negatively to fire., greater species richness. (Bowles et al 2007)

# Summary

- ▶ The Cerulean Warbler evolved under fire regimes which co-existed with human occupancy.
- ▶ While many of the benefits are known and quantifiable, others are probably present.
- ▶ Providing for the most sensitive species of the temperate mature forest group, we are benefitting others in the group who perhaps have higher tolerance, but many similar requirements.

# Thank You!

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