

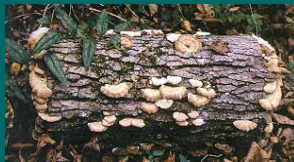
## Biomass Utilization and Wildlife

Chris Moorman, PhD  
North Carolina State University

## What I'll Say

- ◆ Importance of downed wood (includes logging slash) to wildlife
- ◆ Dynamics of downed wood
  - Used to predict the following
- ◆ Effects of biomass utilization on downed wood and wildlife
  - Speculative

## Downed Wood and Wildlife



## Downed Wood and Herps

- ◆ Used by salamanders, frogs, toads, lizards, snakes
  - Avoid desiccation
  - Thermoregulation
  - Nesting (e.g., snakes and lizards)
  - Feeding
  - Predator avoidance



Northern red salamander

## Downed Wood and Birds

- ◆ Used by >20 bird species in South
  - Nesting cover (e.g., Black-and-white warbler)
  - Foraging (e.g., Pileated woodpecker)
  - Drumming by Ruffed Grouse
  - Perching



Black-and-white Warbler

## Downed Wood and Mammals

- ◆ Used by >55 species in South
  - Roosting (e.g., bobcat)
  - Nesting (e.g., skunks)
  - Predator avoidance (most small mammals)
  - Thermoregulation (e.g., bears)
  - Feeding (e.g., shrews)
  - Travel (e.g., mice)



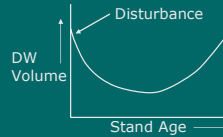
Short-tailed Shrew

## Downed Wood Dynamics



## Downed Wood Volume

- ◆ Follows U-shaped chrono-sequence
  - Varies by type, aspect, elevation, etc.
- ◆ Hardwoods higher than pines
- ◆ Lower in frequently burned stands
- ◆ Lower in short-rotation plantations



## Downed Wood Characters

- ◆ Decays rapidly in South
  - Volume decreased by 1/2 within 6 years after clearcut (Mattson et al. 1987)
- ◆ Larger diameter, more decayed logs generally better for wildlife

## “Forest Gleanings” and Wildlife



More

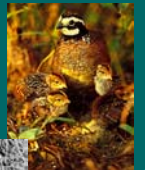
Less

“...more woody debris is almost always better than less.” (Hess & Zimmerman 2001)



## Cleaner Clearcuts

- ◆ Affects early-succession species
  - E.g., Mice, rabbit, and quail
- ◆ Short-term effect?
  - Rapid decay without removal
- ◆ What are thresholds?
  - How clean is too clean?



## Pertinent Studies

- ◆ Salvaged tornado-disturbed pine stands
  - Fewer mice in salvaged stands
  - Lower survival and reproduction
- ◆ Salvaged Mt. hurricane gaps
  - Herps not affected
  - Mice not affected
  - ◆ Sufficient residual



Cotton Mouse

## Moorman's Assessment

- ◆ Logging debris often burned
- ◆ Debris still left after biomass harvest
- ◆ But:
  - Quail ↓
  - Rabbit ↓
  - Mice ↓↓
  - Reptiles ↓



## Cleaner Thinnings

- ◆ What would have happened to non-commercial stems?
- ◆ Is pre-existing CWD affected?
- ◆ SRS Experiments – No harvest
  - ↓ Neotropical migrant birds
  - ↓ weak excavating birds
  - ↓ 2° cavity nesters
  - ↓ least shrews



## Moorman's Assessment

- ◆ Low downed wood "naturally"
  - Frequently burned pine stands
- ◆ Low residual may maintain pops.
- ◆ Allows immediate use of fire
  - Quail →↑
  - Amphibians →↓
  - Reptiles →↓
  - Songbirds →↓
  - Sm. Mammals →↓



## TSI and Wildlife



## Overstocked Stands

- ◆ Stands choked with midstory stems
  - Past high-grading
  - Dense natural pine regeneration
  - Fire suppression
  - Relatively poor wildlife habitat
- ◆ PCT becomes CT
- ◆ Reintroduction of fire
  - Improved habitat



## Fuels Reduction

- ◆ Restore historical stand conditions
  - Laurel and rhododendron in Mts.
  - Ericaceous shrubs in CP pocosins
  - Midstory hardwoods in Piedmont
- ◆ Allow reintroduction of fire
  - Improved habitat



## Invasive Removal

- ◆ Clean sites invaded by:
  - Chinese privet
  - Autumn olive
  - Tree-of-heaven
- ◆ Follow with herbicides
- ◆ Increases plant diversity
  - Improved habitat



## Final Harvest of “Junk” Stands



## What’s a “Junk” Stand

- ◆ “Poor” species composition
  - Few oaks so low acorn production
  - But poor timber species maybe excellent for wildlife (e.g., blackgum)
- ◆ Poorly formed trees
  - Wildlife don’t care – maybe more den trees
  - But smaller crowns may yield lower mast production

## Shift of Seral Stages

- ◆ New markets allow “junk” harvests
  - Occur in areas (Piedmont & Mts.) with declining early-succession habitat
- ◆ Early-succession species benefit
  - Generally declining
- ◆ Cleaner clearcuts again
- ◆ What comes back?
  - Short-rotation pine stands?
  - More “junk” stands?



Ruffed Grouse

## Summary

- ◆ Patterns are complex and vary by:
  - Wildlife Species
  - Forest type
  - Scale
  - Timing and purpose of harvest
  - Post-harvest management (e.g., fire)
- ◆ More research needed on:
  - Downed wood thresholds
  - Effects of *Biomass Utilization* on residual downed wood and wildlife