Mule and Black-tailed Deer

"Because mule deer are closely tied to the history, development, and future of the West, this species has become one of the true barometers of environmental trends in western North America. As goes the West, so does mule deer."

– J. Heffelfinger and T. Messmer

Mule and Black-tailed Deer:
Western U.S., Canada, and northern Mexico

Mule Deer

- Popular and challenging game animal
- USFWS survey 2001:
  - More than 4 million hunters in 18 states
    - Includes hunting for other species
    - Mule deer most important
  - Spent over $7 billion
  - Average hunter spent $1,581 in local towns
    - Lodging, gas, equipment

Mule Deer

- Life history similar to WTD
  - Few fawns ever breed
- Larger body size (but variable)
  - Varies with region
- Differ from WTD in:
  - Antler branching pattern
  - Tail
  - Metatarsal gland size, location

Mule Deer

- Behavior
  - Breeding: tending bonds
  - Predator avoidance: stotting
    - Bounding gait with all 4 feet
    - Agility on rough surfaces
  - Habitat use
    - Home range, movements over larger scale
  - Migration common
    - Different summer, winter ranges
    - Meet nutritional and energy requirements

Mule Deer

- History
  - Not very abundant, sparse in early records
    - 1800’s populations below or equal today’s
  - Declined after settlement
    - Hunting
    - Overgrazing of livestock
    - Scarce by 1900
Mule Deer

• History
  – Populations rebounded
    • 1920’s to 1940’s and through 1960’s
    • Harvest regulated
    • Change in habitat through logging, grazing and plant succession
  – Population declines in 1970’s
    • No single reason could be identified
    • Increased in 1980’s
    • Late 1980’s early 1990’s = drought, decline

Mule Deer

• Management Issues
  – Fire suppression, livestock grazing
    • Change plant community
    • Non-native grasses (cheatgrass)
  – Oil-gas-mineral exploration
    • Disturbance, roads
  – Development
    • Critical for winter ranges
    • Disrupt migration corridors
  – Forest management

Predators:
  Fawns: coyote, bobcat, black bear, etc.
  Adults: Lions, wolves, grizzly

Mule Deer

• Variety of habitats
  – Alaska to southern Mexico
  – Forest, plains, desert

• Wide diet
  – Prefer succulent forbs, emergent grasses
  – Browse important in winter

Mule Deer

• Habitat requirements (limiting factors)
  – Cover (snow)
  – Cover (fawns)
  – Browse (winter range)
  – Migration corridors
Migration

Wyoming mule deer migrated 20-158 km
Crossed 1.6 km Trapper’s Pt
Development has reduced the width of the gap to <0.8 km
Heavily used 2x year (spring and fall)
2,500-3,500 mule deer
1,500-2,000 pronghorn

Natural Succession

Figure 31-6. Generalized pattern of deer forage supplies during early successional stages in western coastal Oregon. Succession of stages represents average for western temperate/subalpine forests of the northern Pacific Coast. (Grau, 1975.)
Mule Deer Decline in 1990s

- Investigated demographic processes to understand factors causing decline. JWM 63:315-325
- Fawn survival overwinter and annual doe survival in CO, Montana, and Idaho

Survival Rates

- Fawn rates varied widely, depending on winter severity. Average was 0.44
- Doe rates relatively constant, averaging 0.85

Fawn:Doe ratios for stable population

- Given observed fawn and doe survival rates, a fawn:doe ratio of 66 necessary for λ = 1.0
- CO 42-48:100
- ID 49-77:100
- MT 25-51:100

Density Dependence

- Annual adult survival averaged 0.87
- Fawn survival ranged from 0.07 to 0.54
- Removed deer from one area of study site and not from another

Density Dependence

- Test whether birth or death rates density-dependent (Wildl. Monograph 121)
  - Little evidence that reproduction varied
  - 1.38-1.51 fetus/doe 64-78 fawns:100 does over 5 to 6 years
- Concentrated on death rates, especially overwinter mortality
- What age class most likely to see response?

Density Dependence

- Annual adult survival averaged 0.87
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- Removed deer from one area of study site and not from another

Density Dependence

- Placed removed animals in a series of enclosures about 1 km² in size
- Estimated fawn survival using radio collars
Predator Removal

- Removed coyotes from 1 area and not another

<table>
<thead>
<tr>
<th></th>
<th>Predation</th>
<th>Starvation</th>
<th>Survival</th>
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</thead>
<tbody>
<tr>
<td>Coyotes</td>
<td>0.596</td>
<td>0.187</td>
<td>0.173*</td>
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<tr>
<td>Coyote control</td>
<td>0.424</td>
<td>0.232</td>
<td>0.246*</td>
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</tbody>
</table>

*Not Significant

- Predation was compensatory mortality
- Coyotes mainly ate fawns that would have starved
- 54 to 96 trapdays/coyote, 0.5 to 0.9 helicopter hr/coyote, $49 to $139/coyote over the study

Lessons

- Fawn survival varies dramatically among years
  - Fawn survival dependent on winter survival
  - Some proportion destine to die of starvation or predation

- Fawn survival related to deer density. Harvesting more deer in fall should increase overwinter fawn survival

- Mule deer can attain very high densities on winter range (deer/4 ac). How can this be sustained??