PASTURE HEALTH AND DROUGHT PROTECTION

Barbara Bellows, NCAT Soils Specialist
Keys to Pasture Management

• Respond flexibly to changing conditions
• Protect soil and water resources
• Match livestock and forages to farm resources
• Rest and rotate animals among paddocks
• Integrate crop and livestock production

Manage conservatively in good years to maintain production in bad years
Management Flexibility

- Know your farm resources
  - Soil type and soil quality
  - Forage species and condition
  - Animal species and health
  - Financial resources and available markets
- Manage according to environmental conditions
  - Season of the year, temperature, and rainfall
  - Climate trends and changing climate conditions
Forage Species for Dry Areas

- Plants that thrive during drought
  - Can draw water from subsoil with their deep root systems
  - Grow with limited amounts of water

- Plants that survive during drought
  - Annuals that grow rapidly, then set seed before the onset of drought
  - Perennials that store food in rhizomes during periods of drought
Drought-Resistant Grasses

- **Warm season grasses**
  - Sorghum
  - Sudangrass
  - Pearl millet
  - Crested wheatgrass
  - Barnyard millet

- **Cool season grasses**
  - Smooth brome grass
  - Tall fescue
Drought-Resistant Legumes

- Alfalfa
- Birdsfoot trefoil
- Common vetch
- Cowpea
- Sanfoin
- Sweet clover
Drought-Tolerant Fodder

- Spineless cactus
- Saltbush
- Browse and shade trees
- Crop aftermath
- Drought-affected crops
Manage Grazing Land to Resist Drought

- Manage forage for drought resistance
  - In pastures, interseed drought-resistant forages
  - On ranges, manage grazing to favor forages that remain palatable and nutritious during drought

- Manage grazing to
  - Encourage effective forage use
  - Protect soil quality in paddocks
Management Intensive Grazing

- Subdivide land into paddocks
  - Move animals to another paddock when they reduce the forage height by half
  - Regraze paddock when forages regrow and pasture condition is healthy
  - Soil and forage conditions will determine the right durations of grazing and rest

- To stimulate animal movement, place water, shade, and minerals at various points in paddock
Benefits to Land and Forage

• Management intensive grazing enhances
  - Effective use and healthy regrowth of forages
  - Ability of soil to hold water and nutrients
  - Even distribution of manure

• MIG reduces
  - Selective feeding and overgrazing
  - Soil compaction and erosion
Benefits to Animal Health

- Appropriate stocking rates and effective rotations promote animal health
  - Puberty is not delayed
  - Cows produce sufficient milk for calves
  - Animals are less susceptible to parasites and diseases
  - Healthy animals are more tolerant of toxic plants
Key Management Practices

• Manage stocking rates, length of rotation, and rest time according to land and forage condition

• Time rest periods appropriately and provide rested paddocks: this is more important than the length of the grazing period
Rotation Length Affects Soil

- Rotation length should not be routine
- Base length of rest on soil fertility, quality, and moisture
  - Build up soil fertility and quality through extended rest
  - Allow soil-building plants to grow and reproduce
  - Do not graze wet paddocks
  - Do not overgraze droughty paddocks
Rotation Length Affects Plant Growth

• Base length of rest on plant characteristics and growth
  - Plant recovery from grazing varies according to variety and species
  - Temperature, light, and moisture affect plant growth and recovery from grazing

• Time rest periods so preferred forages can reproduce
Grazing and Plant Growth

- Animals rarely remove all leaf tissue the first time they graze
- Moving animals quickly through paddocks minimizes repeat grazing, decreasing stress on plants
- Plants have difficulty regrowing if animals graze most of their leaf tissue or damage the growing point
Management of Perennial Forages

• Graze perennial forages before stem elongation to stimulate tillering

• Rest and do not graze plants
  - During active tiller growth and elongation
  - When young plants or rejuvenated perennials are developing strong root systems in the spring
Management of Annual Forages

- **Time grazing of annual forages to**
  - Detach seeds from plants
  - Transport seeds within and among paddocks
  - Work seed into the ground

- **Rest paddocks with annual forages**
  - To allow for plant establishment
  - To allow plants to produce seed
Stubble Height as a Rotation Tool

- 6-8” stubble in wooded areas protects willows or other riparian trees from being used as forages.

- 4” stubble in grassy areas
  - Protects soils from compaction
  - Maintains plant vigor
  - Traps sediment
Managing Stocking Rate

• Base stocking rate on land capabilities
  - Quality and growth of forages
  - Season of the year
  - Moisture availability

• Base stocking rate on animal characteristics and management
  - Type, age, and reproductive status
  - Animal access to supplements, feed, and water
Overstocking Problems

• Overstocking in good years
  - Increases the risk of degrading land resources
  - Decreases productive capacity in drought years
  - Prolongs recovery following drought

• If you have excess forages, add animals on a short-term basis or harvest for sale or storage
Pastures Vulnerable to Grazing

- **Grazing wet areas**
  - Hoof impact compacts soil
  - Manure nutrients can contaminate streams or groundwater

- **Overgrazing droughty areas**
  - Soils become bare from loss of vegetation
  - Good forages are consumed, weedy forages survive

- **Grazing steep soils favors erosion and runoff**
Riparian Areas are Vulnerable to Grazing

- Animals congregate on streambanks
  - Breakdown streambank structure
  - Compact moist soil
  - Deposit manure in or near streams

- Animals overgraze riparian vegetation
  - Located where animals congregate
  - Riparian vegetation is more lush than upland vegetation
Vulnerable Area Protection

• Use sacrifice areas when paddocks are in vulnerable condition

• If vulnerable areas are grazed
  - Limit time animals are kept in paddocks
  - Provide sufficient time for paddocks to recover before regrazing
Match Livestock with Land

- Beef breeds more drought tolerant than dairy animals
- Mix grazing species to use forage resources more effectively
  - Sheep and goats eat plants that cattle do not like
  - Small ruminants use less feed and water than cattle
  - Mixing species allows precise balancing of stocking rates with land and water resources
Breed for Drought Resistance

- Breeding practices can provide a farm with long-term protection against drought
- Use breeding stock that perform well under drought conditions
  - Select slow-growing breeds rather than livestock bred for fast weight gain
  - These breeds can provide dependable growth on poor-quality, dry forages
Breeding and Water Needs

- British sheep breeds need about 20% more water than do Merino sheep in hot weather.

- *Bos indicus* cattle need less water under hot conditions than do *Bos taurus* breeds
Cattle Cross-Breeding

- *Bos indicus* and *Bos taurus* cross-breeds produce well under drought conditions

- Best crosses for growth on poor pastures
  - Cross *Bos taurus* bull with *Bos indicus* cow
  - Pure-bred bull (either breed) with cross-bred cow
Integrating Crops and Livestock

- Provides economic and management flexibility during drought
  - When droughts are predicted or water stores are low, can transition fields from crop to livestock production
  - When drought-affected crops cannot be harvested profitably, they can provide value through grazing
Summary

• Protect your land resources in good years to maintain productivity in drought years

• Manage according to the capabilities of your land

• Use flexible, integrated crop and livestock practices to enhance your management options and your potential for farm profits
### Illustration Credits

<table>
<thead>
<tr>
<th>Slide Title</th>
<th>Photo courtesy of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover</td>
<td>USDA Natural Resources Conservation Service</td>
</tr>
<tr>
<td>Management Flexibility</td>
<td>USDA Natural Resources Conservation Service</td>
</tr>
<tr>
<td>Forage Species for Dry Areas</td>
<td>The Samuel Roberts Noble Foundation, Ardmore, Oklahoma</td>
</tr>
<tr>
<td>Drought-Resistant Grasses</td>
<td>USDA Photography Center</td>
</tr>
<tr>
<td>Drought-Resistant Legumes</td>
<td>The Samuel Roberts Noble Foundation, Ardmore, Oklahoma</td>
</tr>
<tr>
<td>Drought-Tolerant Fodder</td>
<td>The Samuel Roberts Noble Foundation, Ardmore, Oklahoma</td>
</tr>
</tbody>
</table>
### Illustration Credits (Cont.)

<table>
<thead>
<tr>
<th>Key Management Practices</th>
<th>USDA Natural Resources Conservation Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manage Grazing Land to Resist Drought</td>
<td></td>
</tr>
<tr>
<td>Management Intensive Grazing</td>
<td></td>
</tr>
<tr>
<td>Benefits to Land and Forage</td>
<td></td>
</tr>
<tr>
<td>Benefits to Animal Health</td>
<td></td>
</tr>
<tr>
<td>Rotation Length Affects Soil</td>
<td></td>
</tr>
<tr>
<td>Rotation Length Affects Plant Growth</td>
<td></td>
</tr>
<tr>
<td>Illustration Credits (Cont.)</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Management of Perennial Forages</strong></td>
<td>USDA Natural Resources Conservation Service</td>
</tr>
<tr>
<td><strong>Management of Annual Forages</strong></td>
<td>USDA Natural Resources Conservation Service</td>
</tr>
<tr>
<td><strong>Stubble Height as Rotation Tool</strong></td>
<td>USDA Natural Resources Conservation Service</td>
</tr>
<tr>
<td><strong>Managing Stocking Rate</strong></td>
<td>USDA Natural Resources Conservation Service</td>
</tr>
<tr>
<td><strong>Overstocking Problems</strong></td>
<td>USDA Natural Resources Conservation Service</td>
</tr>
<tr>
<td><strong>Pastures Vulnerable to Grazing</strong></td>
<td>University of Missouri Extension and Outreach</td>
</tr>
<tr>
<td><strong>Riparian Areas are Vulnerable to Grazing</strong></td>
<td>USDA Natural Resources Conservation Service</td>
</tr>
<tr>
<td>Illustration Credits (Cont.)</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td>Vulnerable Area Protection</td>
<td>USDA Photography Center</td>
</tr>
<tr>
<td>Match Livestock with Land</td>
<td>USDA Natural Resources Conservation Service</td>
</tr>
<tr>
<td>Breed for Drought Resistance</td>
<td>USDA Natural Resources Conservation Service</td>
</tr>
<tr>
<td>Breeding Affects Water Needs</td>
<td>USDA Photography Center</td>
</tr>
<tr>
<td>Integrating Crops and Livestock</td>
<td>USDA Agriculture Research Service Image Gallery</td>
</tr>
<tr>
<td>Summary</td>
<td>NRCS Image Library</td>
</tr>
</tbody>
</table>