Principles of Grazing Management

University of California
Agriculture and Natural Resources

Grazing Management Principles

- Principles of grazing management
  - Season of grazing (when during the year)
  - Frequency of grazing (how often)
  - Duration of grazing (how long)
  - Intensity of grazing

You can control:

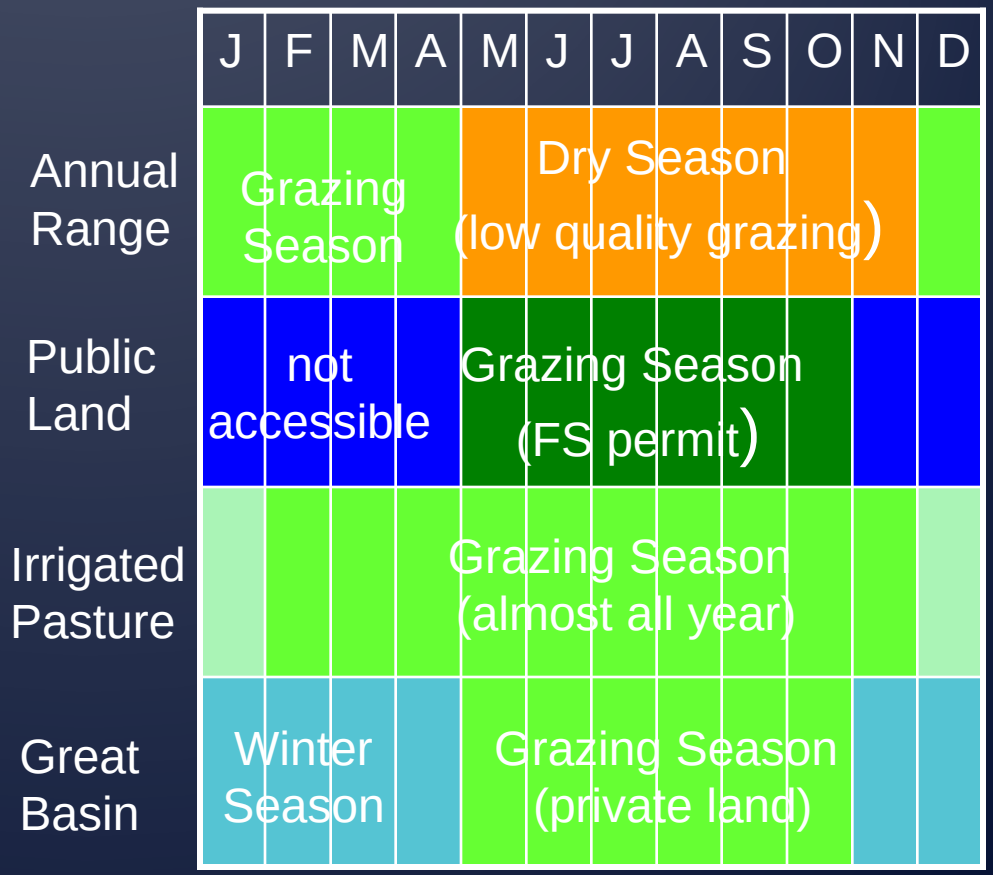
- Time
- Space
- Animal numbers
- Kind and class of animal

Time

- Season of grazing (when)
- Frequency of grazing (how often)
  - Length of rest period
- Duration of grazing (how long)
  - Length of grazing period

Season of Grazing

- Time of year grazing occurs
- Growing season
- Dry season
- Inaccessible
- Permits
- Continuous
- Rotation



Frequency of Grazing

- How often a pasture is grazed has to do with the length of the rest period
- **Rest:** non-grazing for a specified period of time ranging from a few days to a full year or more
- **Rest period**: A time period of no grazing included as part of a *grazing system*

Duration of Grazing

- Duration of grazing has to do with the length of the grazing period
- **Grazing period:** the length of time that animals are allowed to graze on a specific pasture
- Grazing systems involve alternate grazing and rest periods.

Intensity of Grazing

4 cow/1 acre

- **Stocking density :** The relationship between number of animals and area of land at any instant of time. It is usually expressed as animal-units per acre
- **Stocking rate:** is defined as the number of animals grazing on an area of land for a specified period of time

Intensity of Grazing

4 cow/1 acre/3 months

- **Stocking density :** The relationship between number of animals and area of land at any instant of time. It is usually expressed as animal-units per acre
- **Stocking rate:** is defined as the number of animals grazing on an area of land for a specified period of time

Intensity of Grazing

- **Carrying Capacity –** (A.K.A Grazing Capacity) the maximum stocking rate that can be sustained year after year
  - Expressed in AUMs
  - Reported as acres/per AUM
- **Example**
  - **4 AU x 3 months x 1 acre = 12 AUMs**

1 AU = 1000 lb cow

Calculating Carrying Capacity

- Take Half, Leave Half
- Allowable Use Method
- RDM Method

Carrying Capacity (Take Half, Leave Half)

Forage Production (lb/a)	X	50 (%)	=	Available Forage (lb/a)	÷	800 lb DM/AUM	=	AUMs
2800 lbs/a	X	50 %	=	1400 lbs/a	÷	800 lb DM/AUM	=	1.75 AUMs

1000 acres X 1.75 AUMs/acre = 1750AUMs

1750 AUMs/12=145.83 AUY

Carrying Capacity (Allowable Use Method)

Forage Production (lb/a) X Allowable Use (%) = Available Forage (lb/a) ÷ 800 lb DM/AUM = AUMs

Allowable Use = 45 % (see Allowable Use Table)

2800 lbs/a X 45 % = 1260 lbs/a ÷ 800 lb DM/AUM = 1.575 AUMs

1000 acres X 1.575 AUMs/acre = 1575 AUMs

1575 AUMs/12=131.25 AUY

Carrying Capacity (RDM Method)

Forage Production (lb/a) -- RDM	X	Grazing Allocation (%)	=	Available Forage (lb/a)	÷	800 lb DM/AUM	=	AUMs

RDM Target = 700 lbs, Grazing Allocation = 45 %

2800 lbs/a - 700	X	45 %	=	945 lbs/a	÷	800 lb DM/AUM	=	1.18 AUMs

1000 acres X 1.18 AUMs/acre = 1180 AUMs

1180 AUMs/12=98 AUY

AUM Dry Matter Equivalent

- 1 animal unit = 1000 lb cow
- Daily intake = 1.5 to 3 % of body weight
- 2 % of 1000 = 20 lbs per day
- 3 % of 1000 = 30 lbs per day
- 20 lbs per day * 30 days/mo = 600 lb/ month
- 30 lbs per day * 30 days/mo = 900 lb/ month
- 1 AUM = 600 to 900 lb of dry matter

Understanding Stocking Rate

- Calculating Stocking Rate - Terminology
  - Animal unit (AU) - A 1000 lb cow is one animal unit
  - Animal unit equivalent (AUE)
  - Animal unit day (AUD)
  - Animal unit month (AUM)
  - Animal unit year (AUY)
  - Utilization - Proportion of production that is consumed or destroyed

Animal Type	AUE
Cattle	
Calves	
300 lbs	0.3
400 lbs	0.4
500 lbs	0.5
600 lbs	0.6

Animal Type	AUE
Cows	1.0
Bulls	1.25
Horses	1.25
Sheep	0.2
Goats	0.17
Deer	0.17

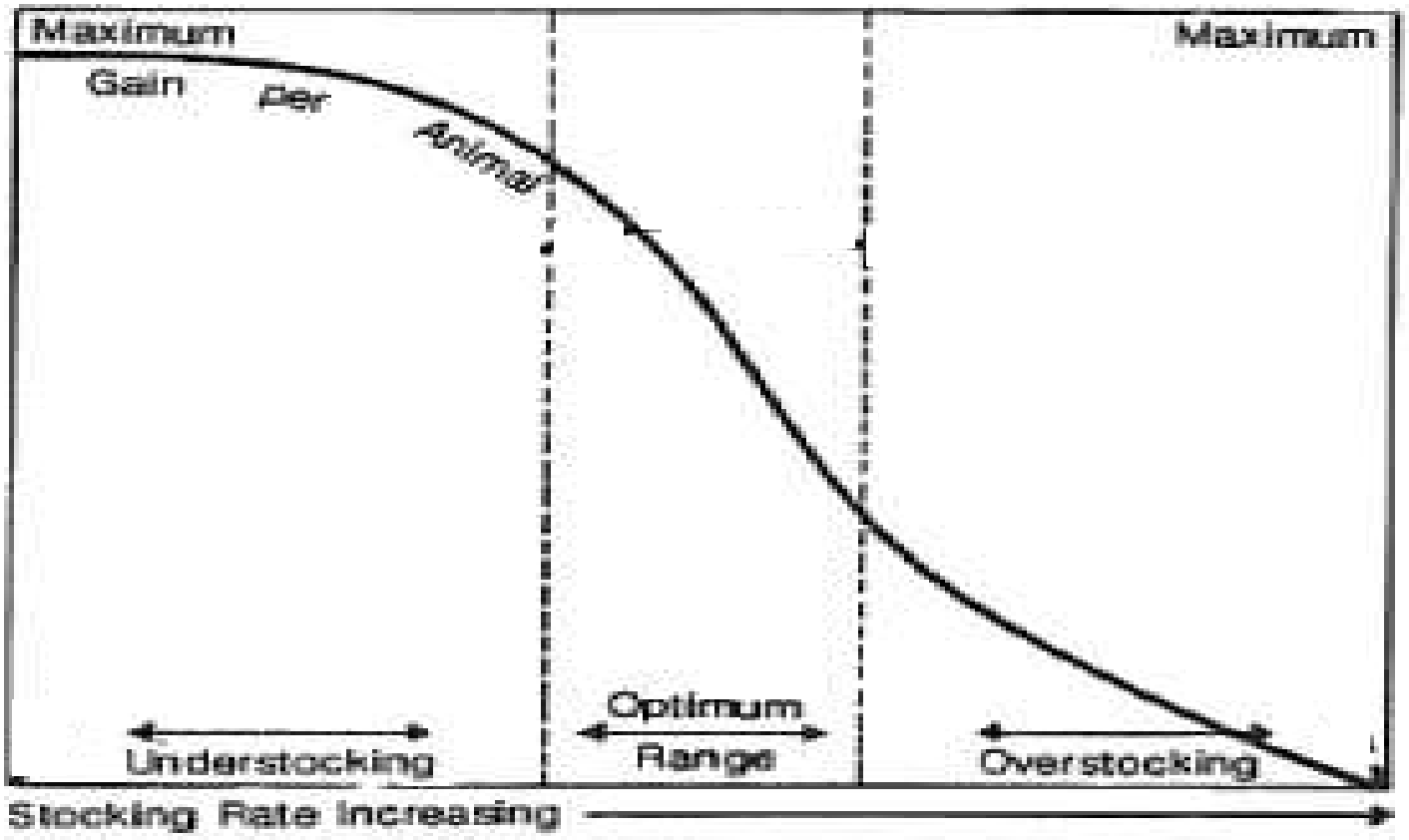
Stocking Rate

- Most important of all grazing and range management decisions
- There is no substitute for experience in setting stocking rates
- Stocking rate, not grazing system, is the primary factor controlling vegetation, animal and financial outcomes of range livestock grazing

Heavy Stocking Rates

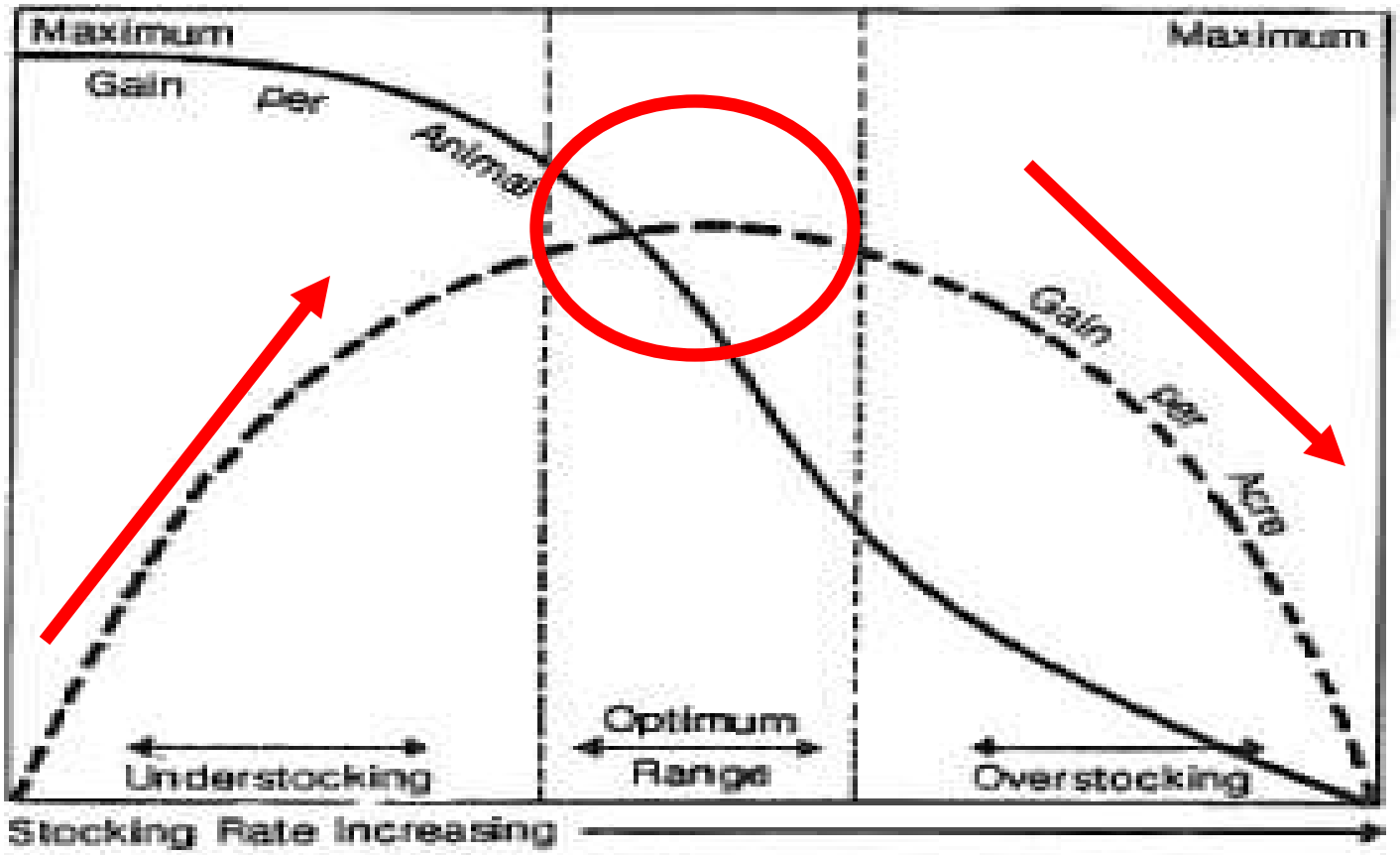
- Generally result in lower forage productivity
- Lower animal productivity
- Lower financial returns per acre
- Increases risk
- Forage and animal productivity improve substantially as move from heavy to moderate stocking rates
- Smaller improvements as move from moderate to light stocking rates
- Loss of palatable or preferred species with repeated use.
- Increased bare ground

Stocking Rate



Low Moderate High

Stocking Rate



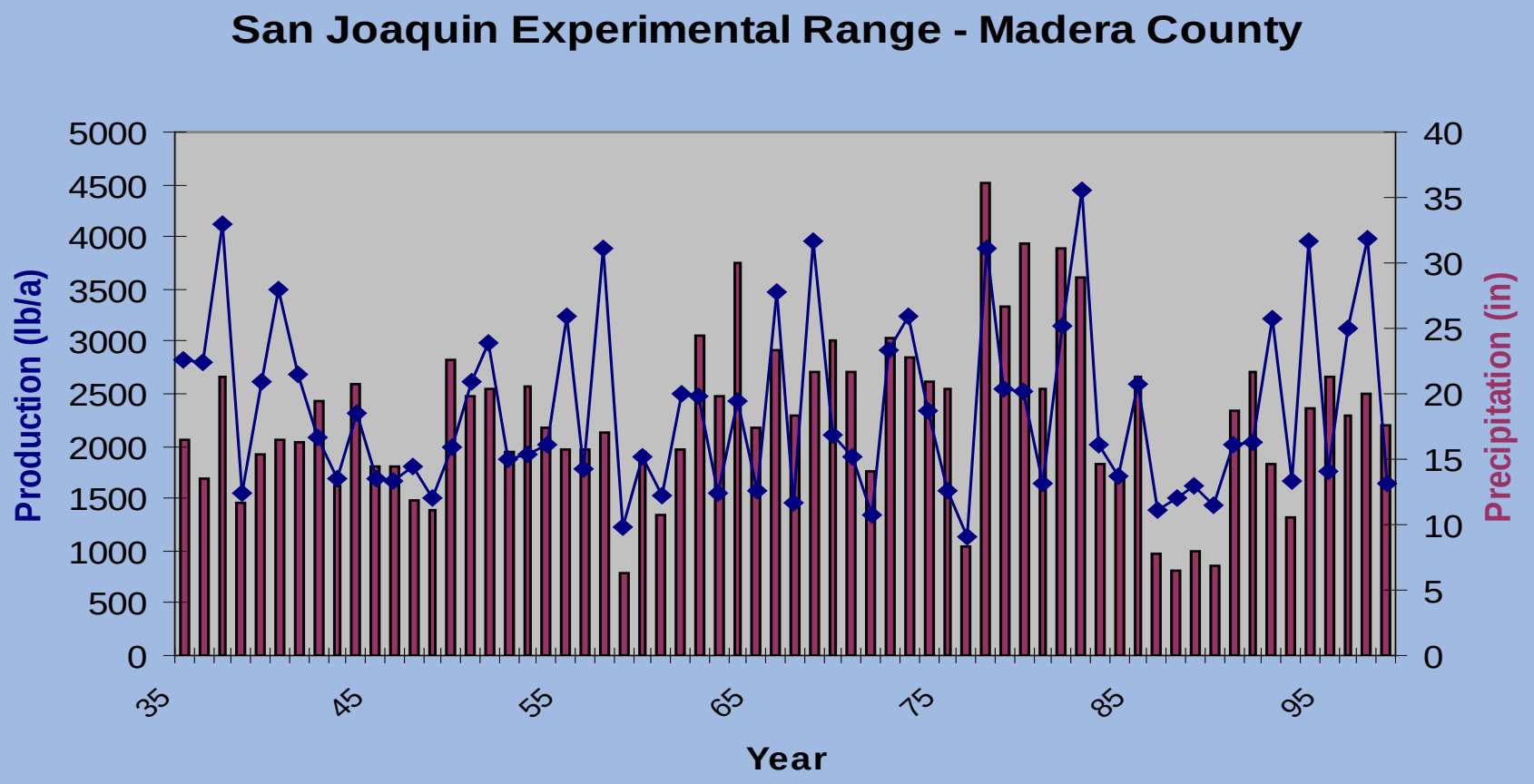
Low Moderate High

Carrying Capacity

- Reported carrying capacities are usually based on long-term average forage production
- Carrying capacity varies seasonally and annually
- Flexible stocking rates require annual changes in culling rates, animal retention and animal purchases. It is difficult to manage
- Ranchers often attempt to reduce risk by stocking at a rate somewhat below the average

Carrying Capacity

Annual Precipitation and Production Variation



Overgrazing

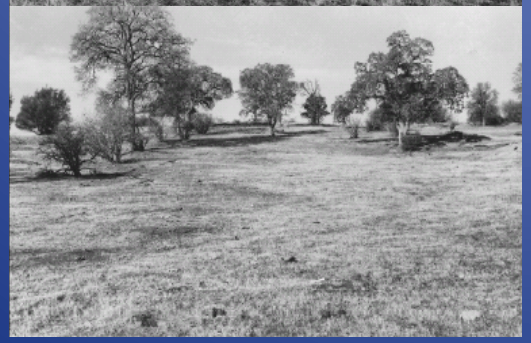
- **Overgrazing** is continued heavy grazing which exceeds the recovery capacity of the community and creates a deteriorated range

Annual Rangeland Grazing Intensity

Light

Moderate

Heavy



- Light grazing leaves fall residue levels that exceed the minimum RDM levels
- Moderate grazing leaves fall residue that equals or exceeds the RDM levels
- For annual range heavy grazing results in fall RDM levels that are below the minimum standards

Moderate Grazing

Moderate grazing results in a patchy appearance with an average residue about 2 inches tall which equals or exceeds the recommended RDM level

Light Grazing

Light grazing results in a less patchy appearance than moderately grazed areas and unused forage averages 3 or more inches in height, exceeding the recommended RDM level

Heavy Grazing

Heavy grazing results in a closely grazed appearance with fall residue averaging less than 2 inches which is below the minimum recommended RDM levels. Small rocks, sticks, and manure are clearly visible

Residual Dry Matter

RDM – Dry Annual Grassland Precipitation (12 in and less)

Table 1. Minimum residual dry matter (RDM) guidelines for dry annual grassland.

Percent	Percent slope			
woody cover	0–10%	10–20%	20–40%	>40%
	(lb RDM per acre)			
0–25	300	400	500	600
25–50	300	400	500	600
50–75	NA	NA	NA	NA
75–100	NA	NA	NA	NA

Residual Dry Matter

RDM – Annual Grassland/Oak-Woodland (Precipitation 12-40 in)

Table 2. Minimum residual dry matter (RDM) guidelines for annual grassland/hardwood range.

Percent	Percent slope			
woody cover	0–10%	10–20%	20–40%	>40%
	(lb RDM per acre)			
0–25	500	600	700	800
25–50	400	500	600	700
50–75	200	300	400	500
75–100	100	200	250	300

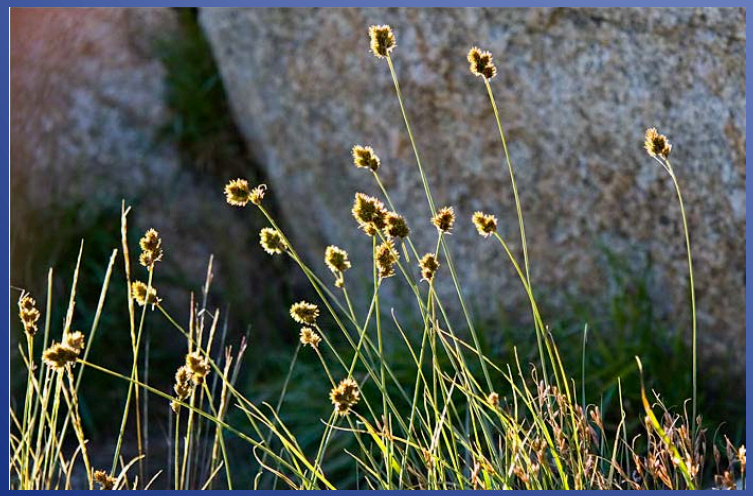
Residual Dry Matter

RDM – Coastal Prairie (Precipitation variable)

Table 3. Minimum residual dry matter (RDM) guidelines for the costal prairie.

Percent	Percent slope			
woody cover	0–10%	10–20%	20–40%	>40%
	(lb RDM per acre)			
0–25	1,200	1,500	1,800	2,100
25–50	800	1,000	1,200	1,400
50–75	400	500	600	700
75–100	200	250	300	350

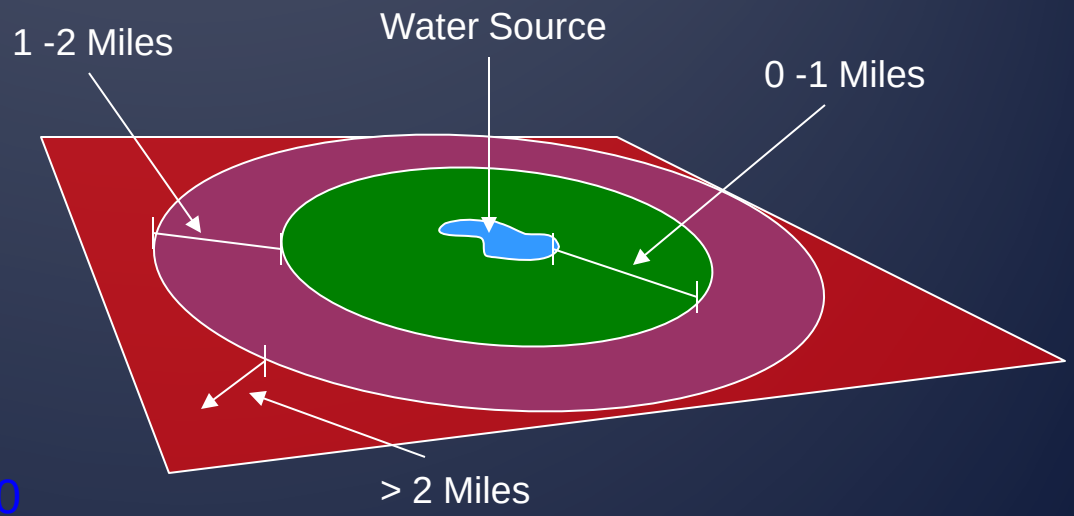
Monitoring Stocking Rate



- Stocking rate and carrying capacity calculations are just estimates
- Following grazing check to see if you overused or underused the pasture
- Monitor
  - Utilization estimates
  - Residual dry matter
- Make adjustments before next grazing season

Step 3: Distance to Water Adjustment

Distance to Water Class (Miles)	Carrying Capacity Reduction (%)
0-1	0
1-2	50
>2	100



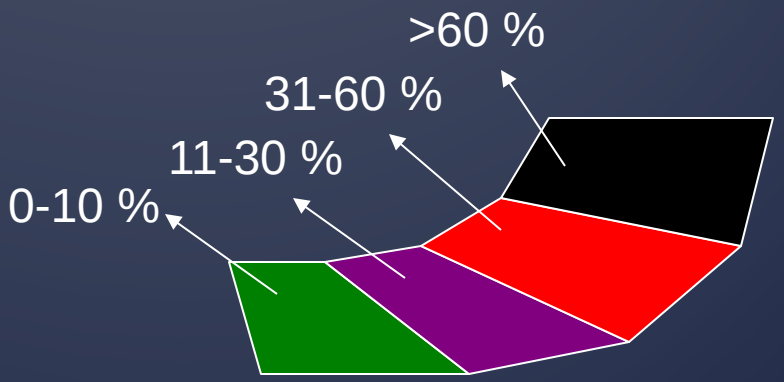
AUMs available before = 200

Distance to Water Class (Miles)	Area in Class (%)	AUM in each class	Carrying Capacity Reduction (%)	Adjusted Carrying Capacity (AUM)
0-1	50	100	0	100
1-2	30	60	50	30
>2	20	40	100	0

AUMs after adjusting for water distribution=130

Step 4: Slope Adjustment

Slope Class (%)	Reduction in Capacity (%)
0-10	0
11-30	30
31-60	60
>60	100



AUMs available before = 185

Slope Class (%)	Area in Class (%)	AUM in each class	Carrying Capacity Reduction (%)	Adjusted Carrying Capacity (AUM)
0-10	50	100	0	100
11-30	30	50	30	15
31-60	20	25	60	15
> 60	10	10	100	0

AUMs after adjusting for slope=130

Questions