

Principles of Managed Grazing

Dan Macon

UC Cooperative Extension

September 14, 2018

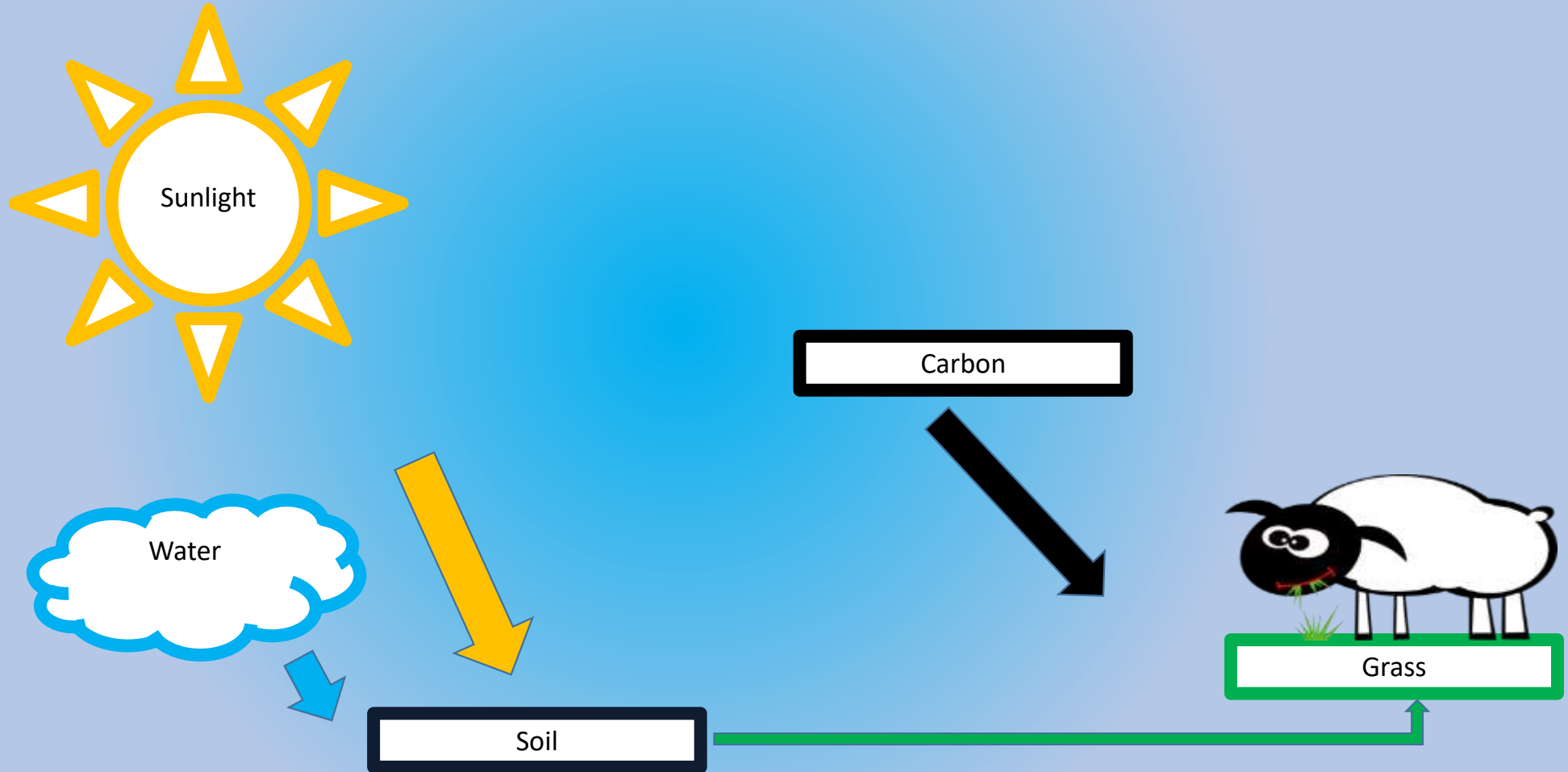


Ranchers are Grass Farmers



Livestock are
the Harvesters

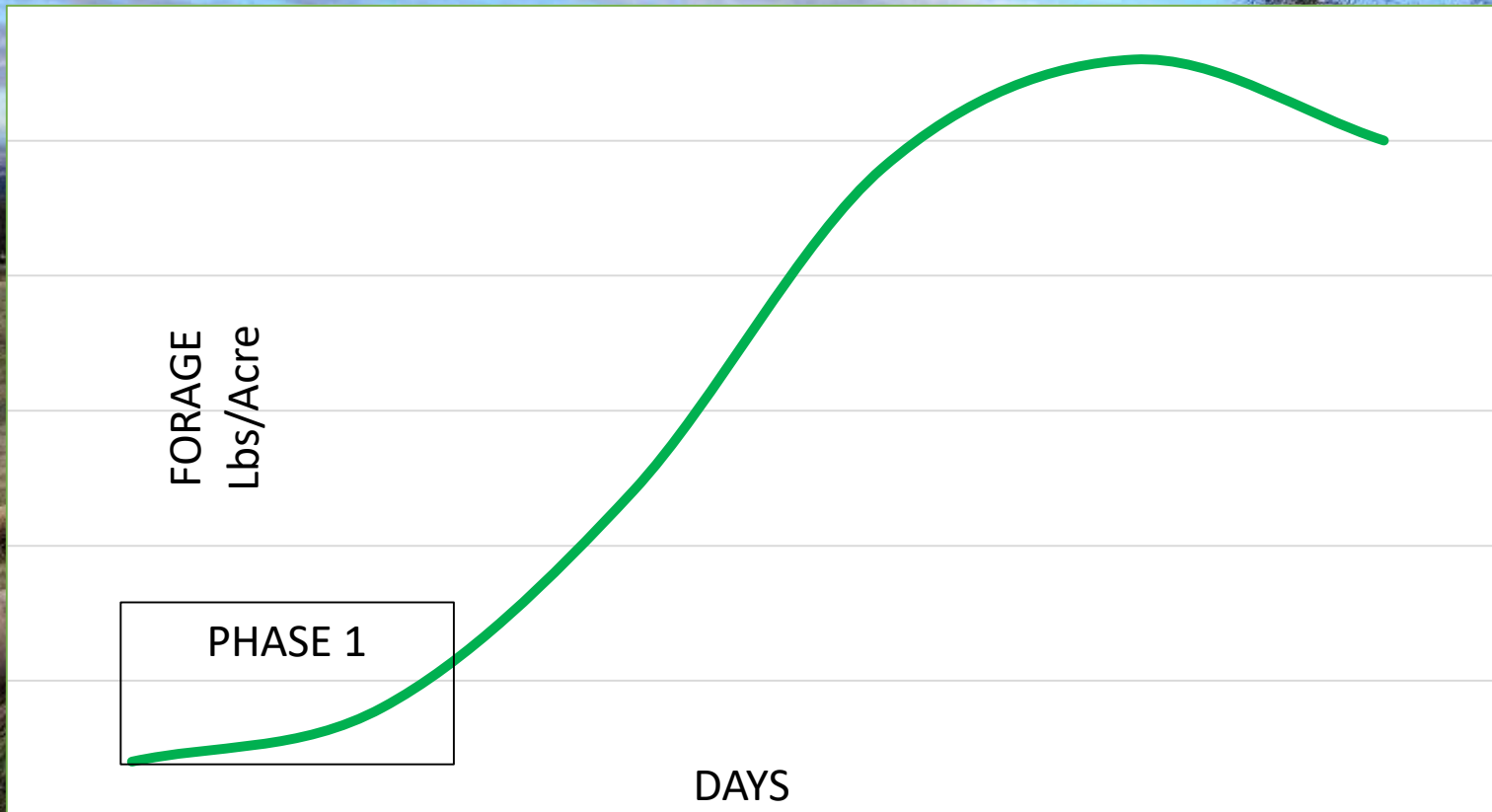
Our Basic Equation



**How does
grass grow?**



Forage Growth



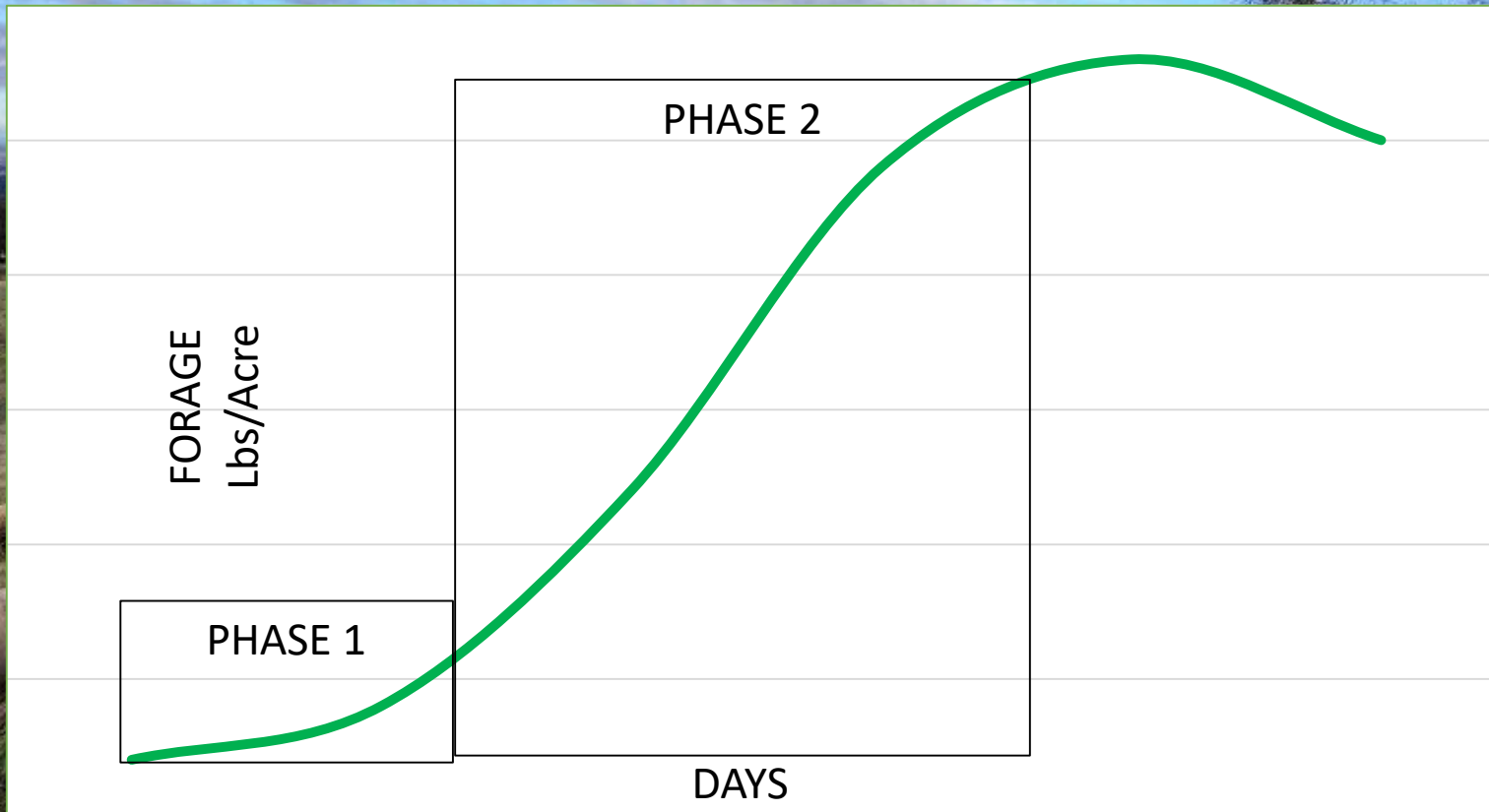
Phase 1

- Fewer leaves to capture sunlight
- Slower recovery
- Fewer (and less vigorous) roots
- Plant must draw energy from roots and/or seed to support growth
- Highly nutritious
- Not enough quantity

Tastes great, less filling!



Forage Growth



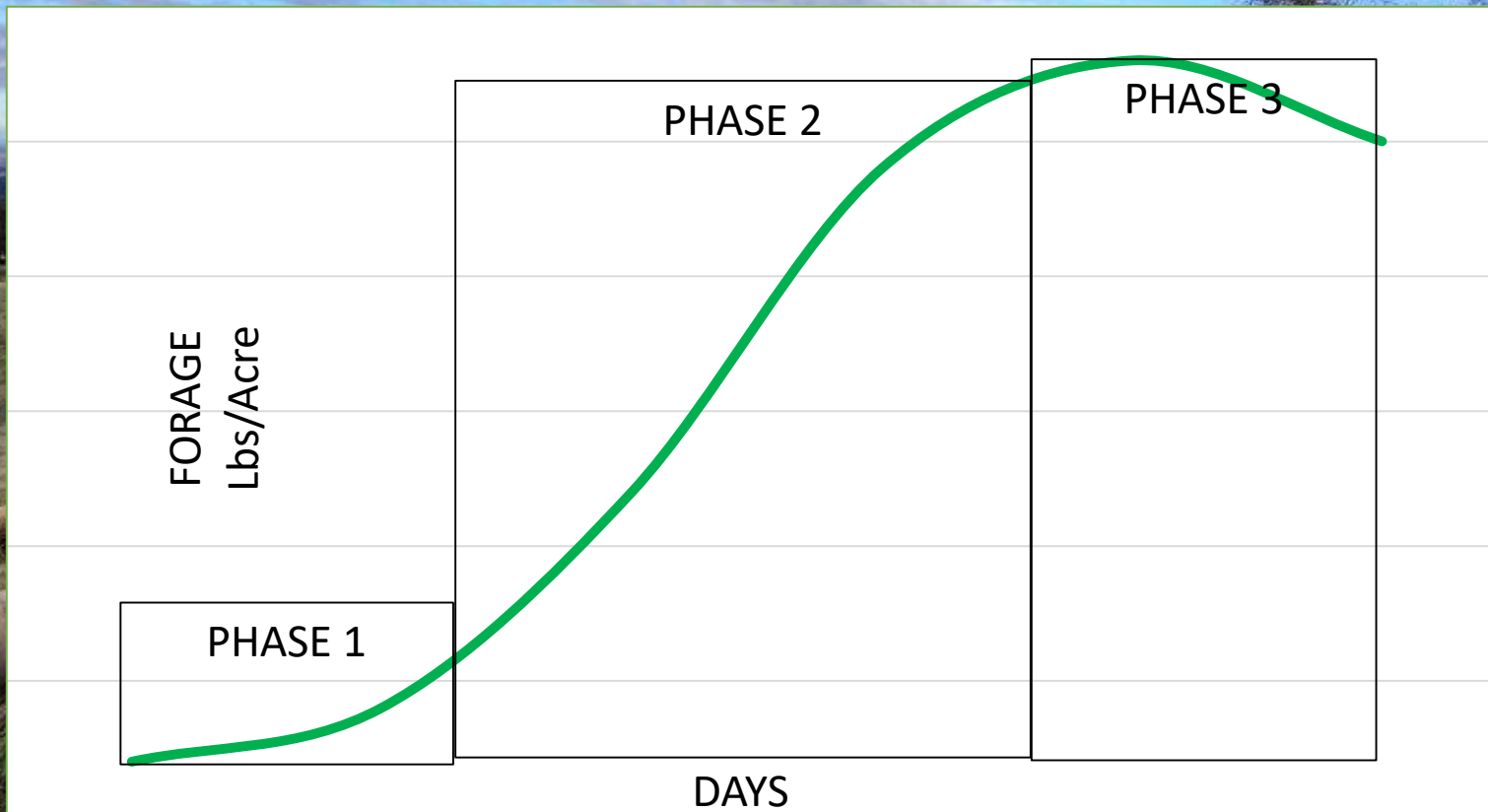
Phase 2

- Lots of leaves to capture sunlight
- Rapid recovery (for the time of year)
- Happy (and vigorous) root system
- Nutritious, and plenty of it!

Like a kid in a candy store!



Forage Growth



Phase 3

- The plant is too big to capture enough energy during the day to replace energy lost at night
- Higher leaves may shade middle/lower leaves
- Increased lignification as plant enters reproductive phase
- Plenty of leaf material, but low nutritional quality

Belly-deep in grass and starving to death!



Photosynthesis is maximized in Phase 2



Phase 1: Not enough leaf surface to meet the energy needs of the plant.



Phase 2: Ideal solar collectors!



Phase 3: Lignification and shading. Lower nutrition and palatability.

Which growth phase is most desirable?!



**When will plants
recover most rapidly
after grazing?**

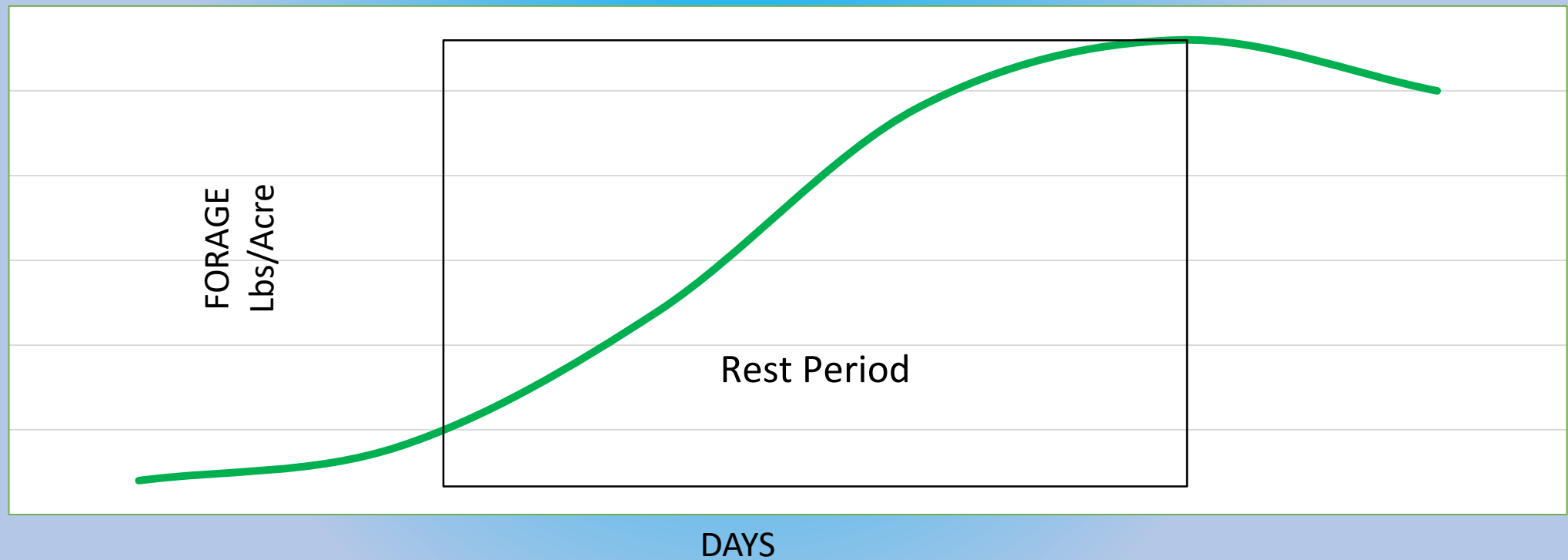
**When is the
recovery rate the
slowest?**

What about overgrazing?

- Definition
 - Grazing a plant before it has recovered from the previous grazing.
- Overgrazing is a function of time, not animal numbers.
- Overgrazing can occur in 2 ways:
 - Animal(s) stay too long and get a second bite before the plant has recovered.
 - Animal(s) come back too soon (e.g., the rest period is too short for the plant to recover).

Grazing Principle: Adjust rest periods to match the growth rate of the plant(s).

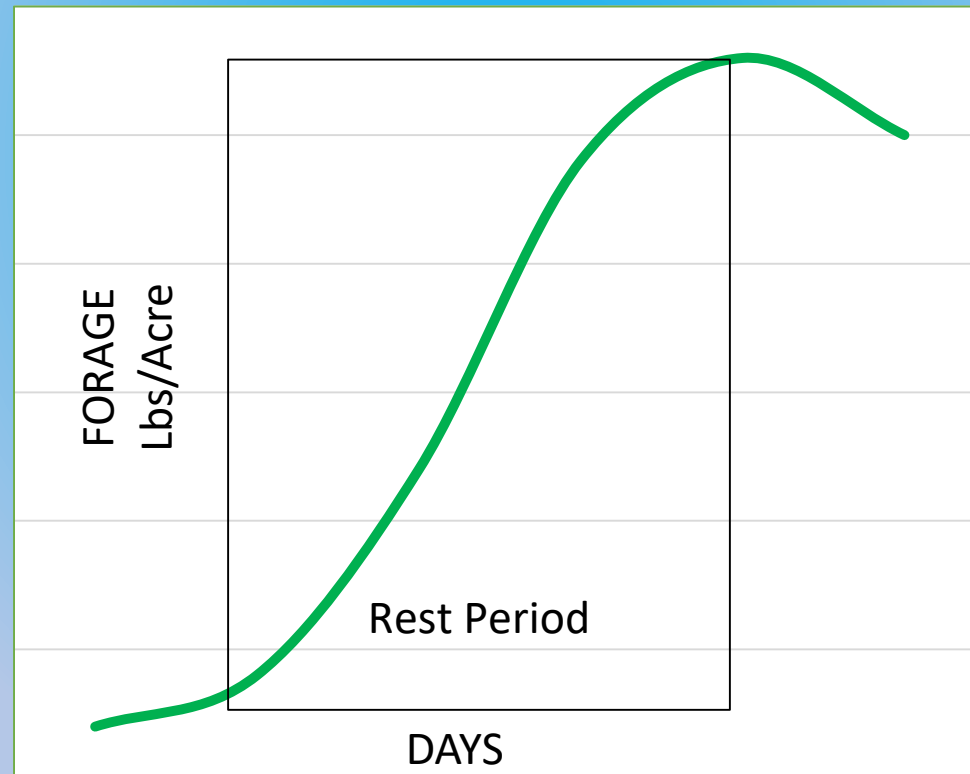
Forage Growth



When are we most likely to see slow recovery or growth?

Grazing Principle: Adjust rest periods to match the growth rate of the plant(s).

Forage Growth



When are we most likely to observe rapid recovery (or growth)?

What about annual rangelands?!

- ❖ Annual rangelands typically have 2 dormant (slow or no growth periods):
 - Winter (cold, short days; insufficient photo period)
 - Summer (after maturity; until germination)
- ❖ Rapid growth phase may last 30-60 days (depending on weather conditions)
- ❖ Residual forage (RDM) provides soil protection and microclimate for germination
 - Appropriate RDM depends on slope, other vegetation, climate, etc.
- ❖ Annual forage can be budgeted after peak stand crop – think of it as lower quality, standing hay!

Grazing Behavior and Animal Impacts

- What are the 3 impacts that grazing animals can have on a plant?

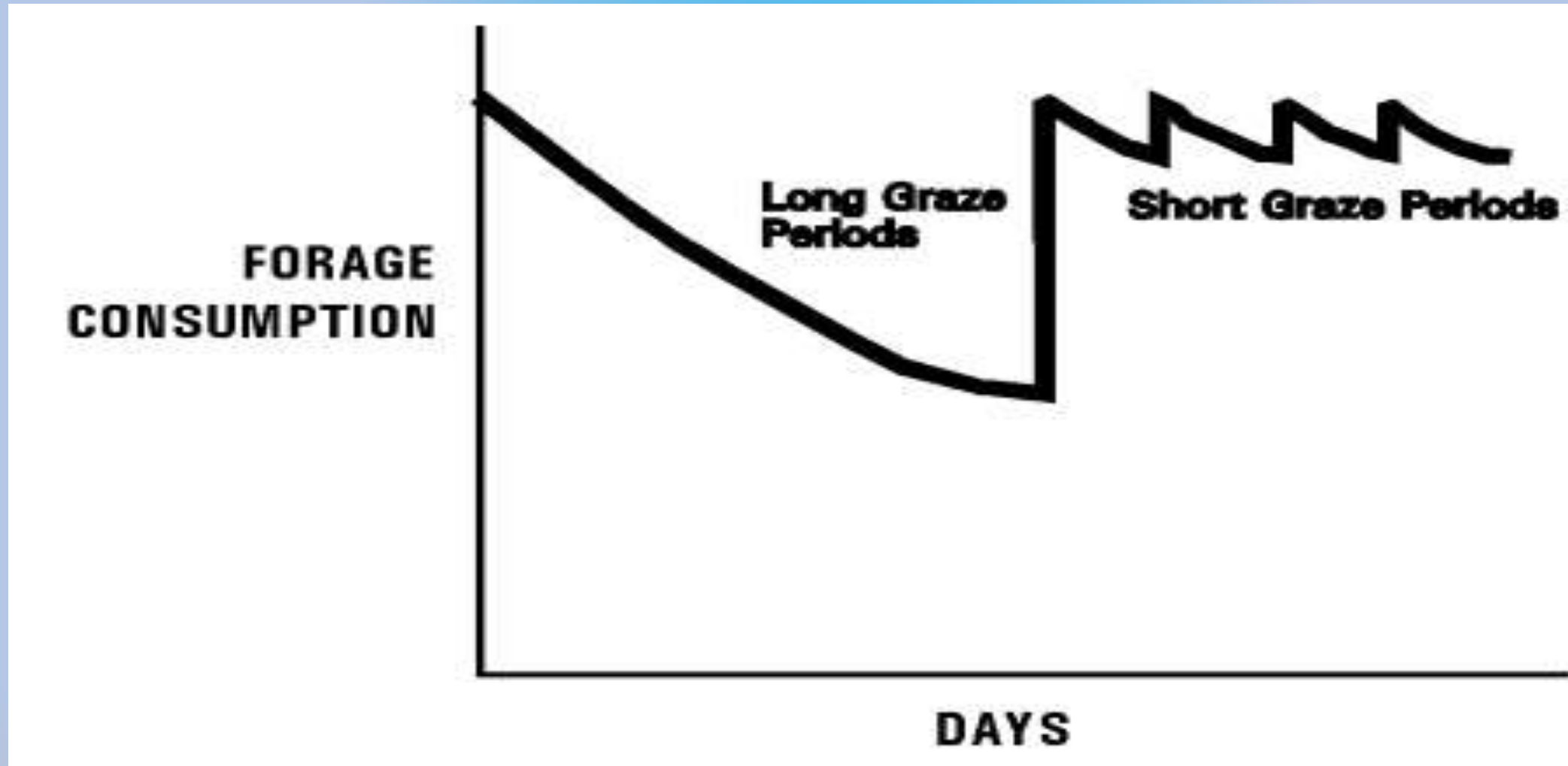


Maintaining Forage Intake is Critical!

- Increased consumption = increased weight gain
- Voluntary forage intake is controlled by 3 factors:
 - Grazing time
 - Biting rate
 - Bite size
- Maximum intake occurs when pasture is 6-15 inches in height
 - What about brush?
- Let's walk through an example!



Grazing Principle: Use the shortest graze period possible while maintaining adequate rest.



Uniformity of Consumption



Which scenario is more likely to result in uniform consumption of all (most) forage plants?

Grazing Principle: Use the highest stock density possible.

1 Animal For 100 Days

○

100 Animals For 1 Day

○ ○ ○ ○ ○ ○ ○ ○
○ ○ ○ ○ ○ ○ ○ ○
○ ○ ○ ○ ○ ○ ○ ○
○ ○ ○ ○ ○ ○ ○ ○
○ ○ ○ ○ ○ ○ ○ ○
○ ○ ○ ○ ○ ○ ○ ○
○ ○ ○ ○ ○ ○ ○ ○
○ ○ ○ ○ ○ ○ ○ ○



How many stock days are we harvesting in these pastures?

Density = Animals ÷ Acres

What are the 2 ways we can increase stock density?

How can we impact the carbon cycle?

Grazing



Trampling



Grazing Principle: Use the largest herd size possible consistent with sound animal husbandry practices.



Stocking Rate and Carrying Capacity

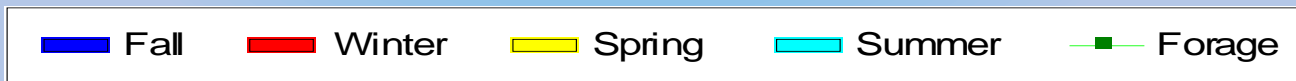
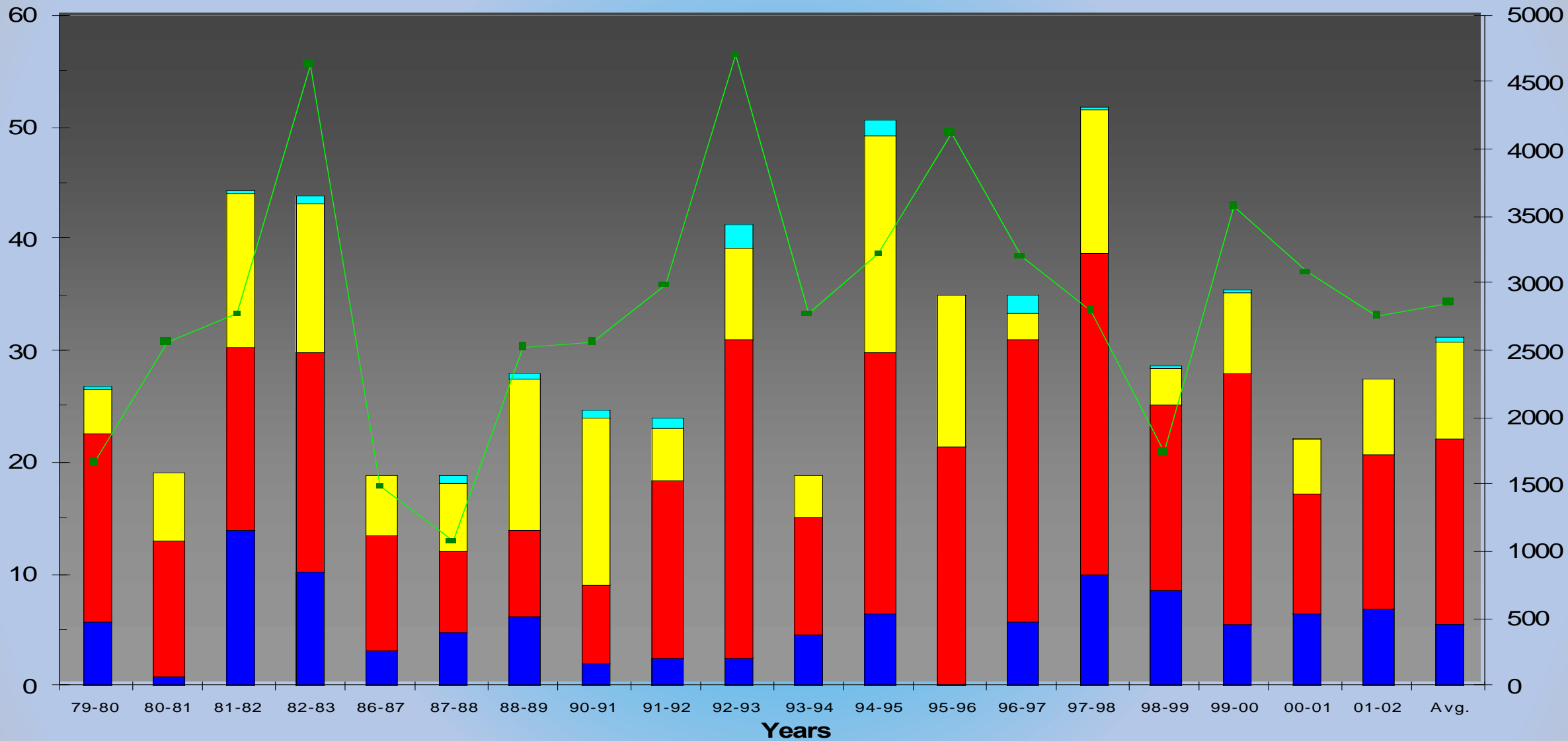


PRECIPITATION & FORAGE YIELD

SFREC; Selected years, 1979 through 2002

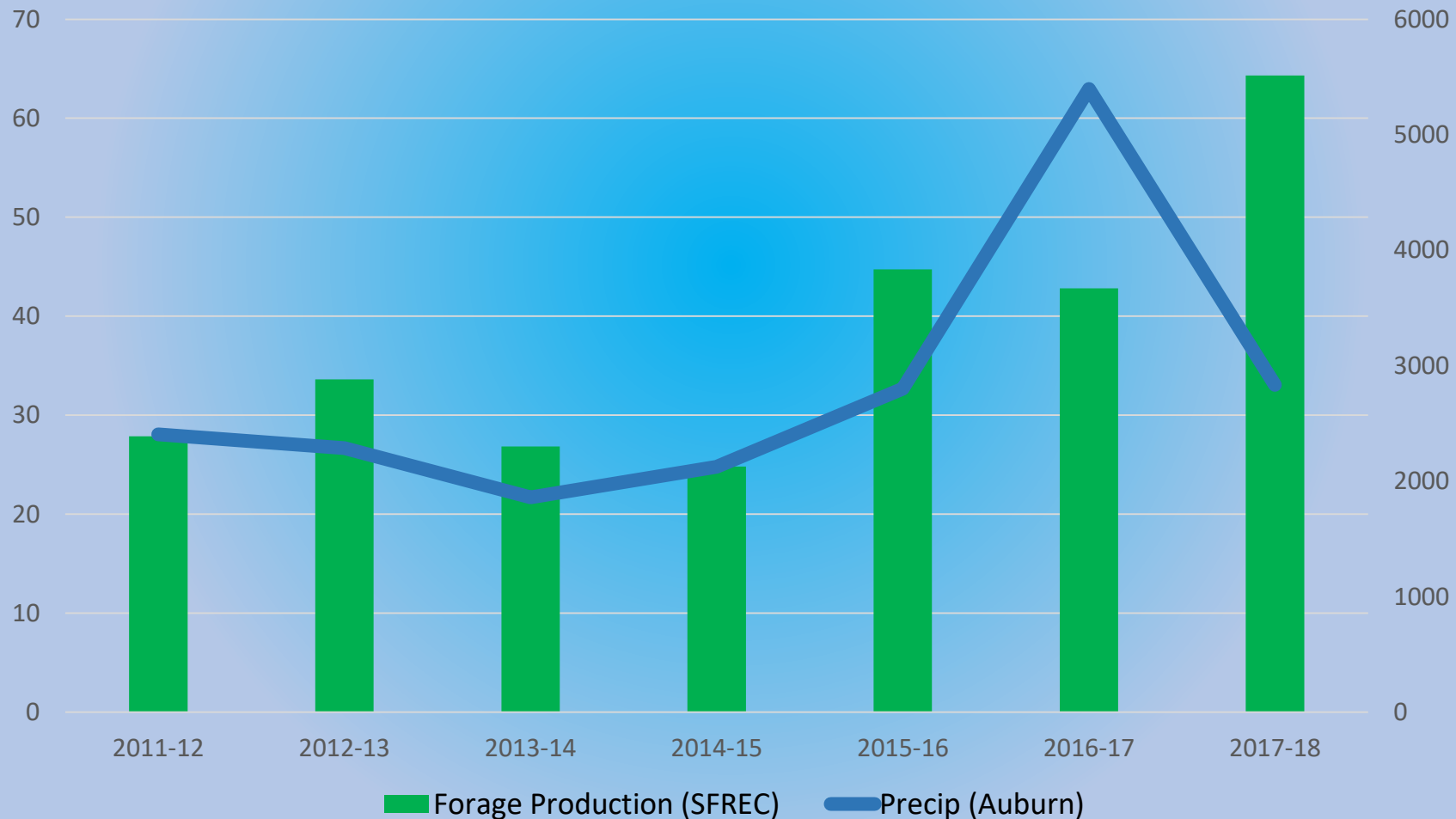
Precip., inches

Forage, #/ac.



But what about now?!

Foothill Precipitation and Forage Production
2011 - 2018



What about seasonality?

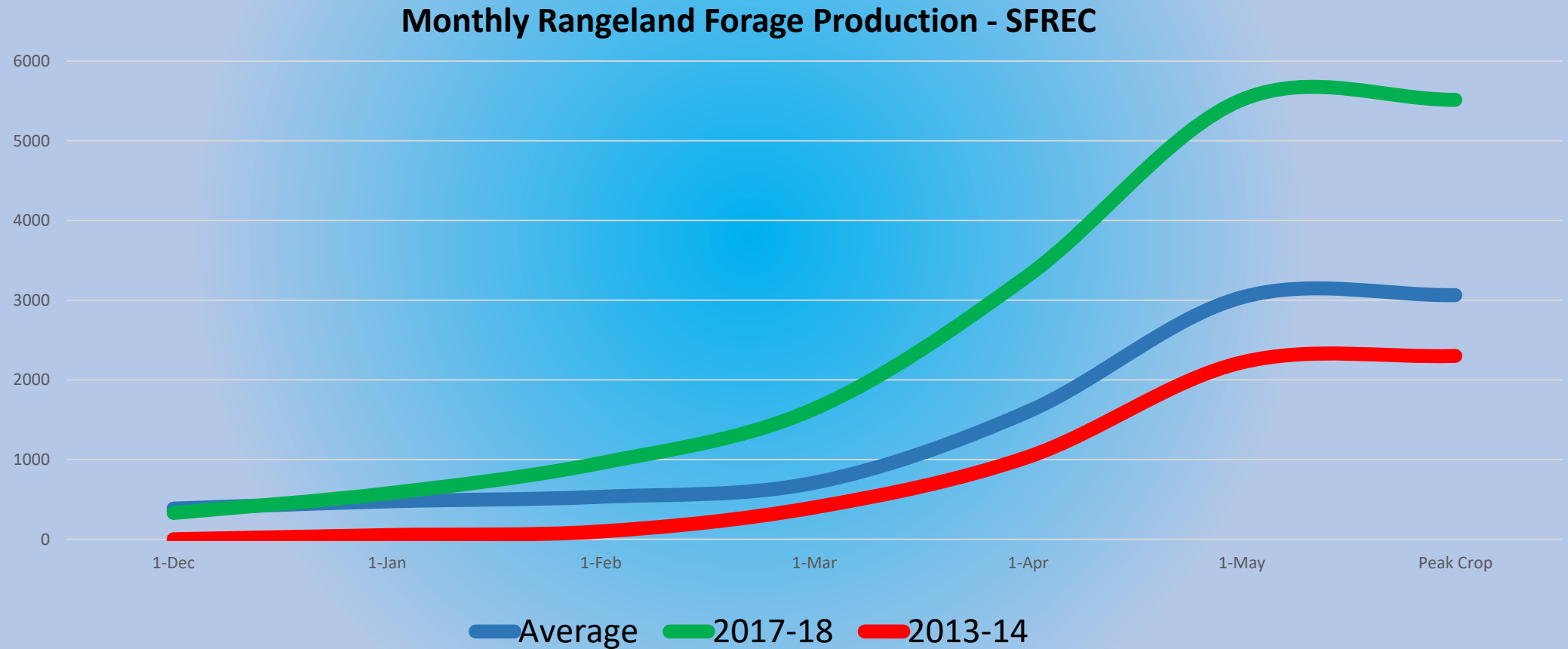
Will this forage...



...support as many animals as this forage?



Seasonal Variation in Forage Production



Grazing Principle: Adjust stocking rate to seasonal and annual changes in carrying capacity.



How can we adjust stocking rate?

Seasonally

- Matching reproductive cycle with forage cycle
- Weaning lambs/kids
- Buying/selling Feeders
- Custom grazing for other producers
- Others?

Annually

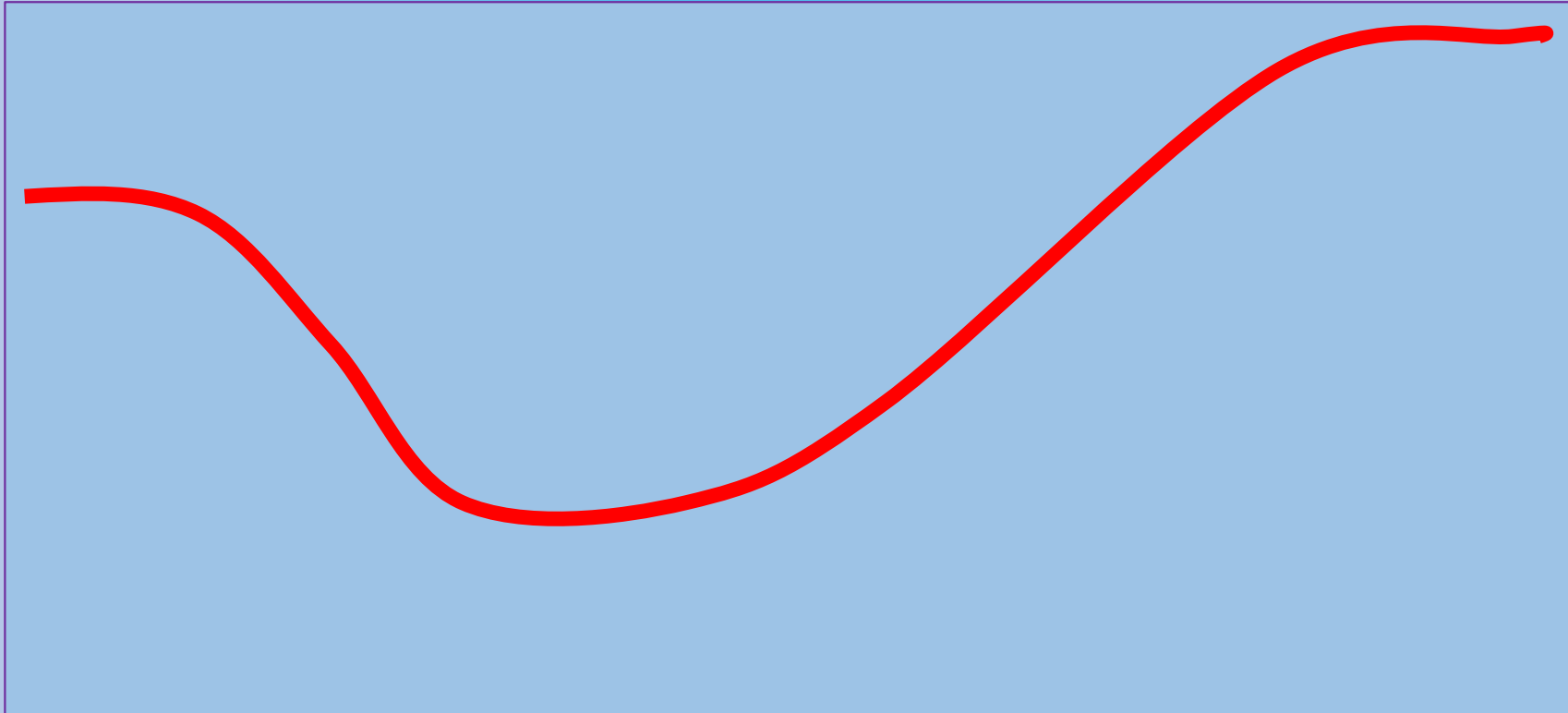
- Buying/selling feeders
- Custom grazing for other producers
- Retaining/selling replacements
- Others?

A flock of sheep is grazing in a lush green field. In the background, there are several trees and a clear blue sky with some light clouds. The text is overlaid on the image in a bright yellow, bold font.

**Is this approach
A CHANGE
from
Business as Usual!?**

Why are changes in management difficult?

System Performance



Time

Barriers to Change



- Availability of capital
- Inertia
- Labor availability
- Biology
- Cash flow impacts
- Aversion to risk
- Life-work balance
- Others?

Recap – Grazing Principles

1. Adjust rest periods to match the growth rate of the plant(s).
2. Use the shortest graze period possible while maintaining adequate rest.
3. Use the highest stock density possible.
4. Use the largest herd size possible consistent with sound animal husbandry practices.
5. Adjust stocking rate to seasonal and annual changes in carrying capacity.

Questions?

