Grazing Ecology and Management Workshop

Goal

To provide ranchers, land owners and land managers with information and tools that will help them manage grazing in ways that will promote rangeland productivity, without compromising sustainability.

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Adaptive Management for Drought

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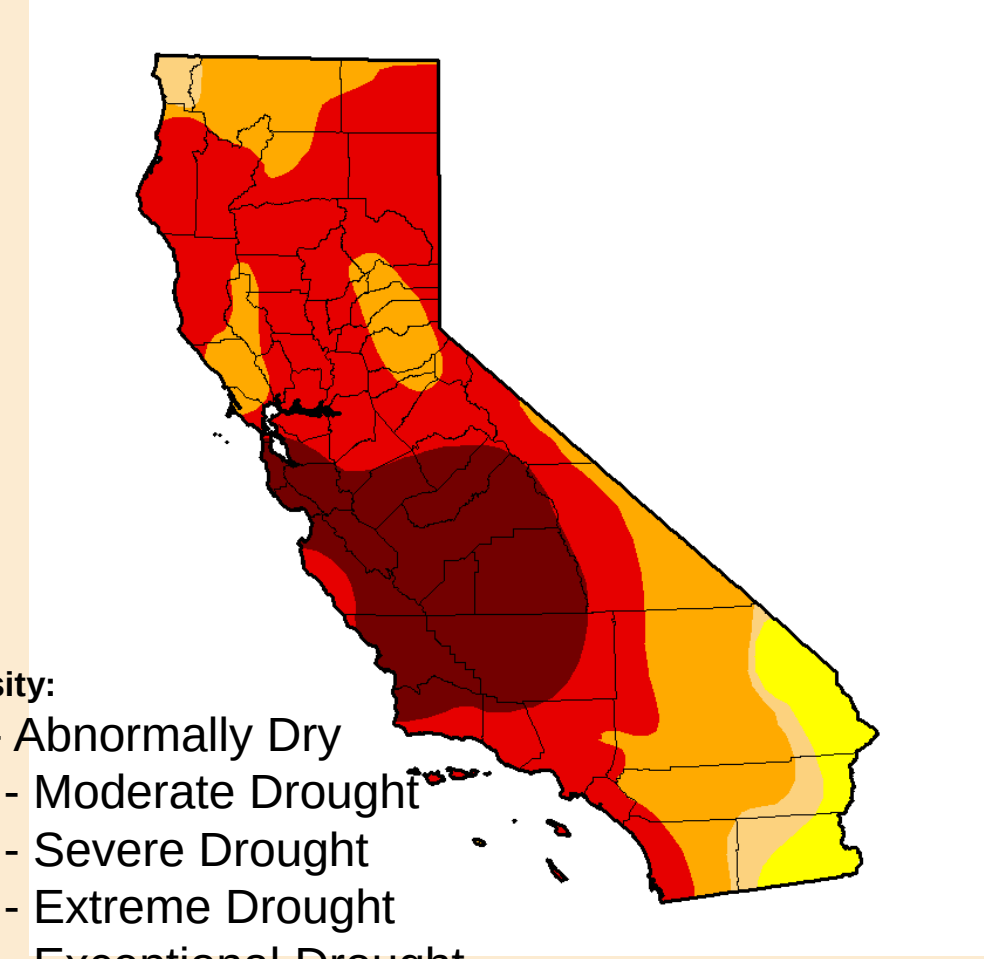
UC Cooperative Extension | University of California Agriculture and Natural Resources

Outline

- Current drought situation
- Definition of terms
- Why adaptive management is important in rangeland management
- Developing a drought management plan
- Drought Management toolbox
- Conclude

Current drought situation



Focuses on broad-scale conditions. Local conditions may vary.

http://droughtmonitor.unl.edu/Home/StateDroughtMonitor.aspx?CA

- 100% of CA is experiencing some level of drought/dry conditions
- >50% in extreme or exceptional drought
- Central part is hardest hit
- 25-50% of normal precipitation
- Worst drought in several centuries
- Followed dry years

Definition of terms:

Grazing ecology

- Studying how grazing affects species composition and productivity of rangelands.
- Factors that affect response:
  - Grazing density (distribution)
  - Season of grazing (desirable species vs weeds)
  - Grazing intensity

Grazing management

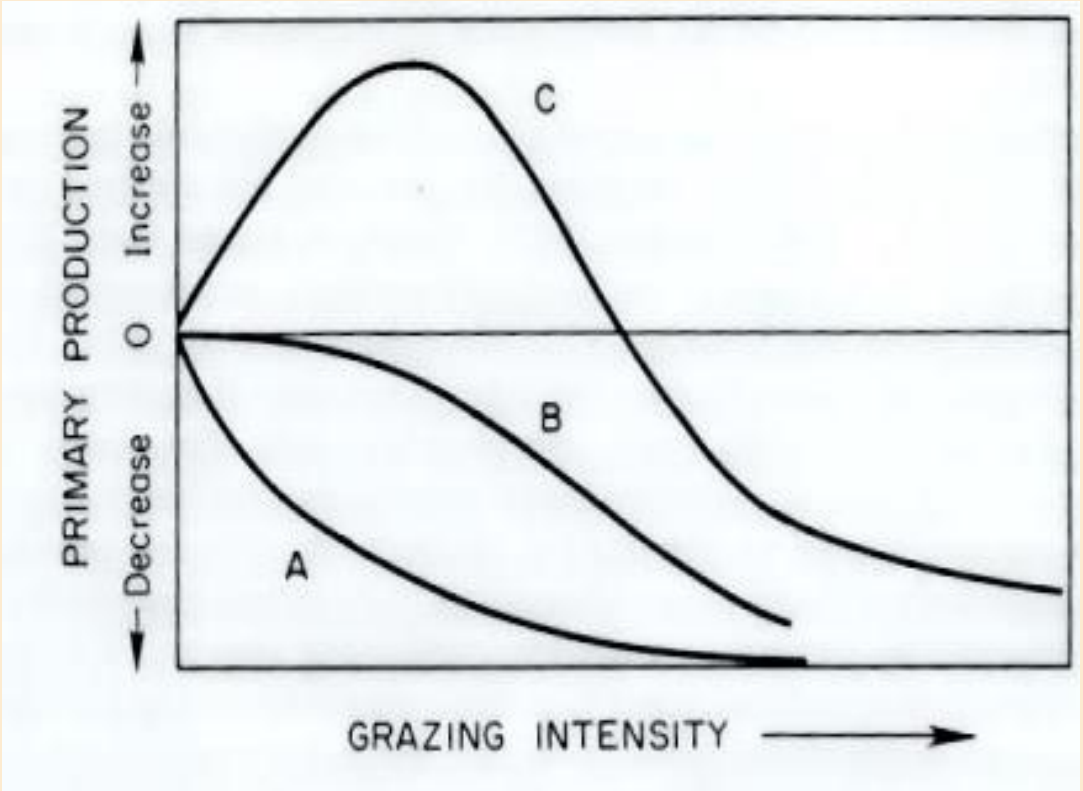
- Manipulating
  - grazing intensity,
  - season of grazing
  - duration of grazing
    - ➢optimize and sustain vegetation production, environmental and economic objectives.

- Influence the seed bank, root mass, residual leaf area and sprouting potential
  - ➢plant recruitment, growth and persistence.

Grazing intensity

- Main factor affecting vegetation response to grazing, which depends on stocking rate and grazing period.

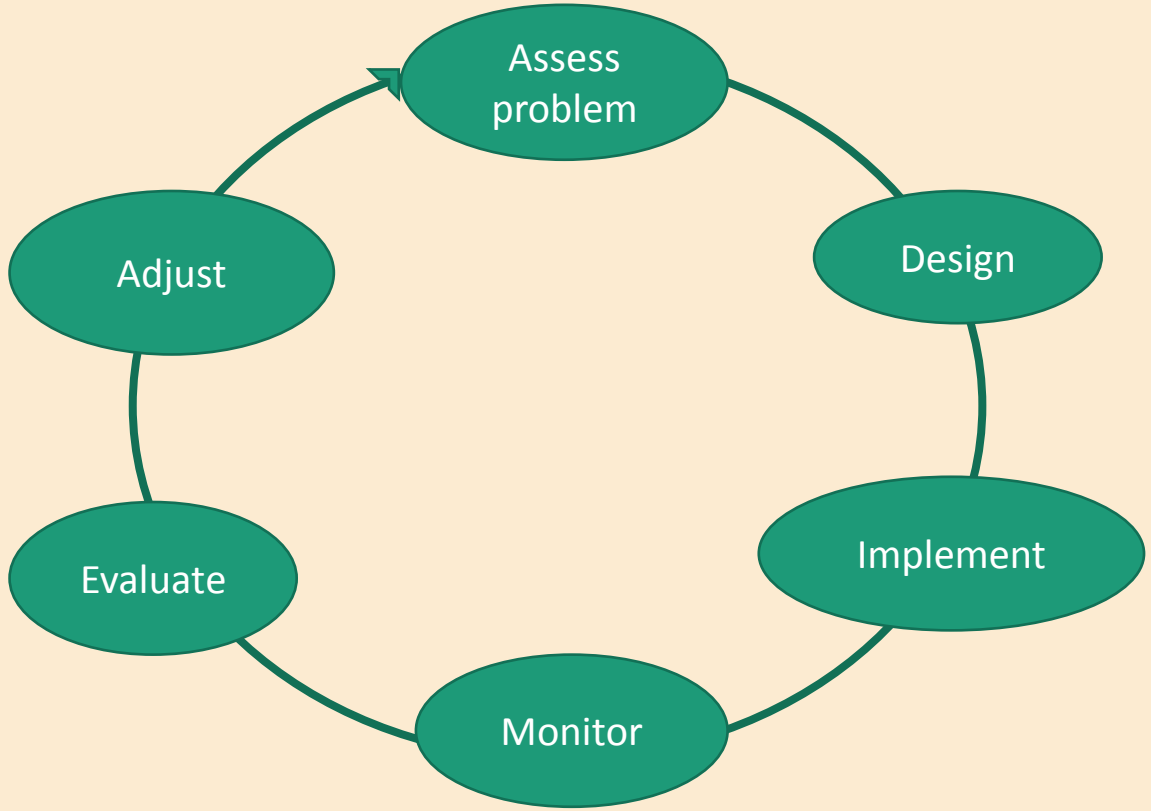
- Effects of grazing on plant production can range from positive to negative depending on grazing intensity, grazing season and growing conditions.



From Detling 1988

Adaptive Management (AM)

- AM is a planned process that involves collecting data, monitoring and making adjustment, aimed at reducing uncertainty by generating critical information useful in making informed decision in future (Holling 1978).



Adaptive Management Cycle

Why is adaptive management important

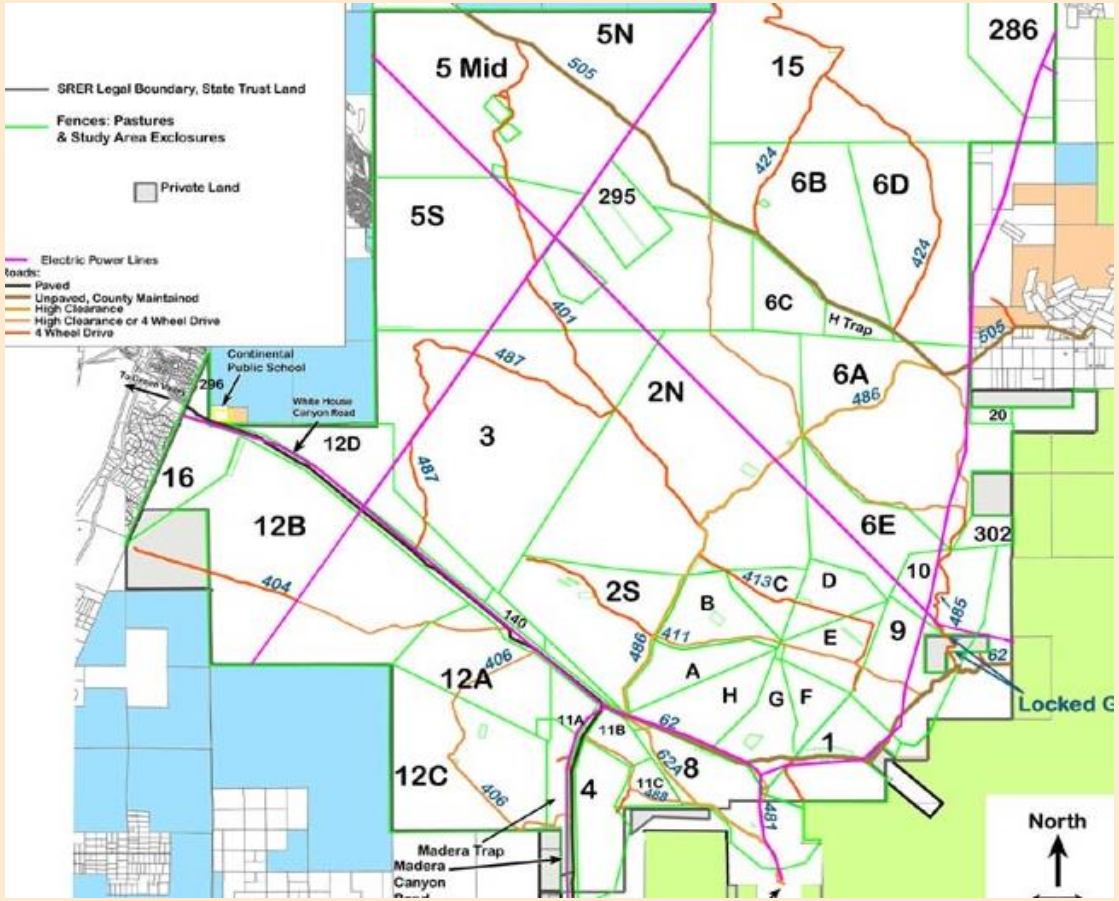
- Production depends on complex ecosystems
  - Environmental and climatic conditions change across the landscape
  - Climatic fluctuations over time
  - Many interacting factors affect production and response to grazing
    - *Soil depth, moisture retention capacity, nutrients, slope, aspect, rainfall amount and distribution, plant species, fire frequency, intensity etc*
  - Low predictability

Case study: Adaptive grazing management SRER, AZ

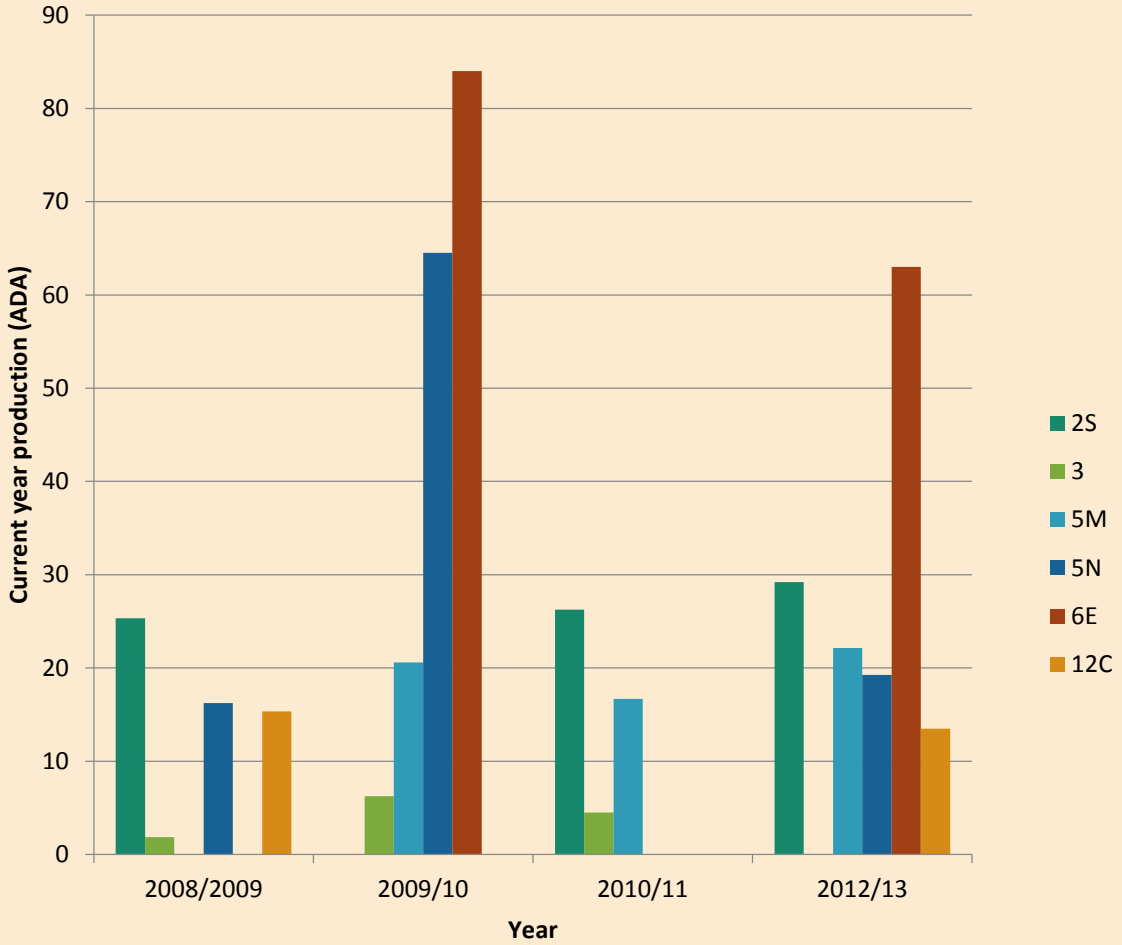
- Rotational grazing system study did not result in improved production in a 32year experiment
  - Stocking rate was maintained throughout the experiment,
  - Limited adjustments made during extreme drought years.
  - Stocking rate based on average long-term plant production
  - In 2007, management system was changed to adaptive grazing management, where annual stocking rates were based on production data.
  - Production data showed high variability across pastures and time.

Case study: Adaptive grazing cont…

Map of the Santa Rita Experimental Range, AZ



Production in different pastures over time



- Collected biomass data → used to set stocking rates
- With monitoring data residual dry matter/utilization ~ 50%

Adaptive management for drought

- Integrate your drought management plan in your management plan
- Adaptive management for drought:
  - Starts with defining specific goal for your operation:
    - E.g. increase/maintain livestock production to 100AU/year without compromising species diversity and grass production in the next 20 years
  - Management strategies – how do you achieve that goal?
  - **What steps to take to prepare for a future drought, and**
  - **actions to take during drought (toolbox)**
  - Monitoring to see if you are meeting your goal
  - **Make adjustment to management approach/toolbox**

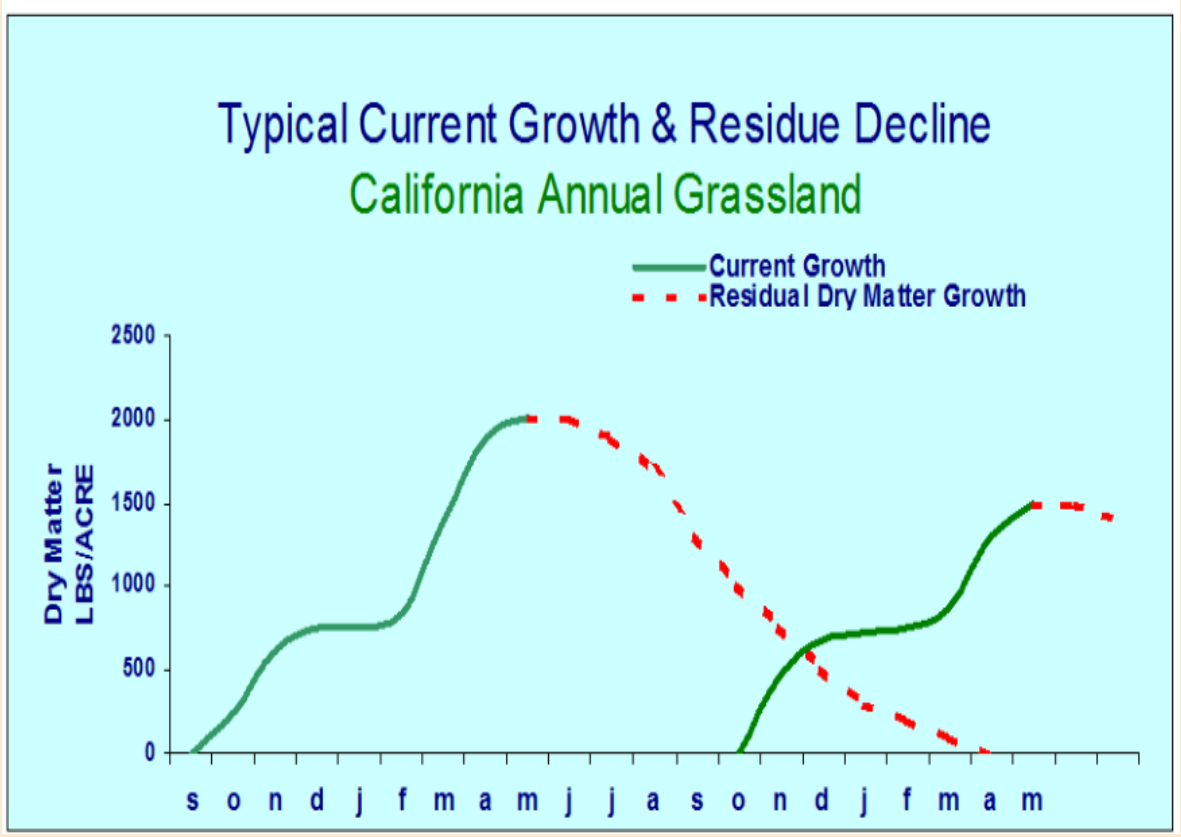
Drought management toolbox

*Adopted from Drought workshop held at SFREC (1/29/14)

- Integrate into management system: *Written plan is better*

Vegetation Management:

- Manage residual dry matter(RDM)
  - Flexible stocking/grazing period
  - Leave enough for early season deficient period in quality and quantity
  - Protect soil, manage composition, promote production
  - Be mindful of other goal e.g. weed control



Drought toolbox cont…

- ***Develop water sources for drought period***
  - Deepen wells
  - Develop spring
  - Put in pipes and water troughs in drought prone pastures

- ***Establish relationships:***
  - Forage sources
    - ➢Shipping livestock to during drought (future breeding herd)
    - ➢Other neighboring ranches available for lease?
    - ➢Summer grazing in the foothills (private or public)
  - Alternative feed sources (tomatoes, sweet potatoes, almond hulls, etc)

Drought toolbox cont…

Collect ranch data to base future management decisions on:

- Forage production to estimate stocking rates and grazing period for annual grasslands
- Rain gauges (estimating production → stocking rates?)
- Weight gain
- Calving rates

Animal management:

- Livestock Marketing Service Information sale price (http://www.lmic.info/priprod/pandp.html)
- Culling plan (older cows, weaners, open cows)
- Manage nutrient deficiency (quality, Vitamin A, D, E)
- Poisoning: Toxic plants and moldy alternate feed sources

Use Federal drought programs

- NRCS
- Farm Services Agency (FSA)
- Tax deferment option

Rancher Survey: Drought Adaptation

	Strategies to manage for drought impacts	%
Proactive	Employ conservative stocking rates	37
	Incorporate pasture rest into grazing system	25
	Incorporate both cow-calf and stockers for flexibility	23
	Grass bank/Stockpile forage	14
	Use 1-3 month weather predictions to adjust stocking	12
	Add other livestock types for flexibility	3
Reactive	Reduce herd size	76
	Purchase feed	75
	Apply for government assistance programs	43
	Wean early	43
	Rent additional pasture	28
	Move livestock to another location	26
	Earn off-ranch income	25
	Sell retained yearlings	24
	Place livestock in a feedlot	9
	Allow livestock condition to decline; maintain herd size	7
	Add alternative on-ranch enterprise	5

Roche and Tate

Social aspects of adaptive management

- Local knowledge generated over generations very important
- Importance of rancher-to-rancher extension – sharing of ideas
  - What has worked or not in the past
- Work as groups to
  - Negotiate for certain policies (e.g. Mariposa Williamson Act moratorium)
  - Achieve certain goals (environmental outcome, relationships with organizations)→ conflict to collaboration
- Collaboration between ranchers and farm advisors → more locally relevant solutions.

Conclusion

- Well planned drought management plans (Adaptive management) which are part of your management system will are more effective
- "*Write it down make it happen*"
- Have your own toolbox that works for you
- Flexible stocking
- There is power in numbers (ranchers, UCCE farm advisors, specialists, NRCS etc.)

More information on drought

- http://cemariposa.ucanr.edu/Livestock_and_Natural_Resource_Management/Drought_Information_126/

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Questions?

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