Water Quality Monitoring

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Monitor – to watch or check

***Monitoring** implies a series of observations over time for the purpose of detecting change.*

Monitoring

Why, Who, What, Where,
When, and How Long?

Why Monitor?

- Most important question.
- Objectives need to be clear, meaningful and attainable.
- Vague objectives = vague results.

Who?

You should monitor your own property.

Rancher Monitoring Objectives

- Document normal conditions.
- Document abnormal (catastrophic) events.
- Confirm agency assessments.
- Investigate perceived problems.
- Document your good management.
- Document the effectiveness of new practices.

DATA IS POWER

Measurable Objectives

- Residue level meets standards.
- Canopy cover increased from 50% to 70%.
- Prevent gully from getting larger.

What, Where, When and How Often?

Depends on your objectives and pollutants of concern.

Rancher Monitoring Objectives

- Document normal conditions.
- Document abnormal (catastrophic) events.
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Basin Assessments
Document Water Quality

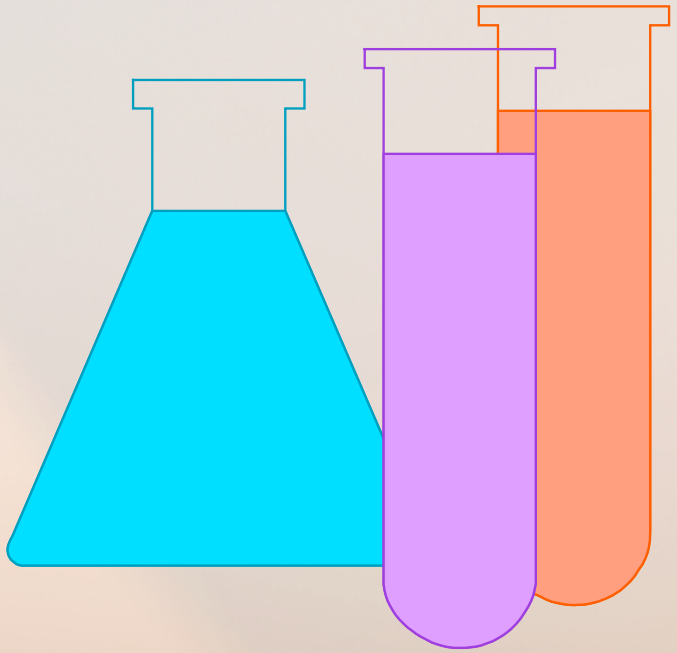
- Alerts the landowner to potential pollutants.
- Landowner assesses and monitors property to verify pollutants and/or sources.
  - Inventory potential pollution sources on property
  - Selective water sampling if necessary

What to Monitor

- Water Monitoring
- Pollution Source Monitoring

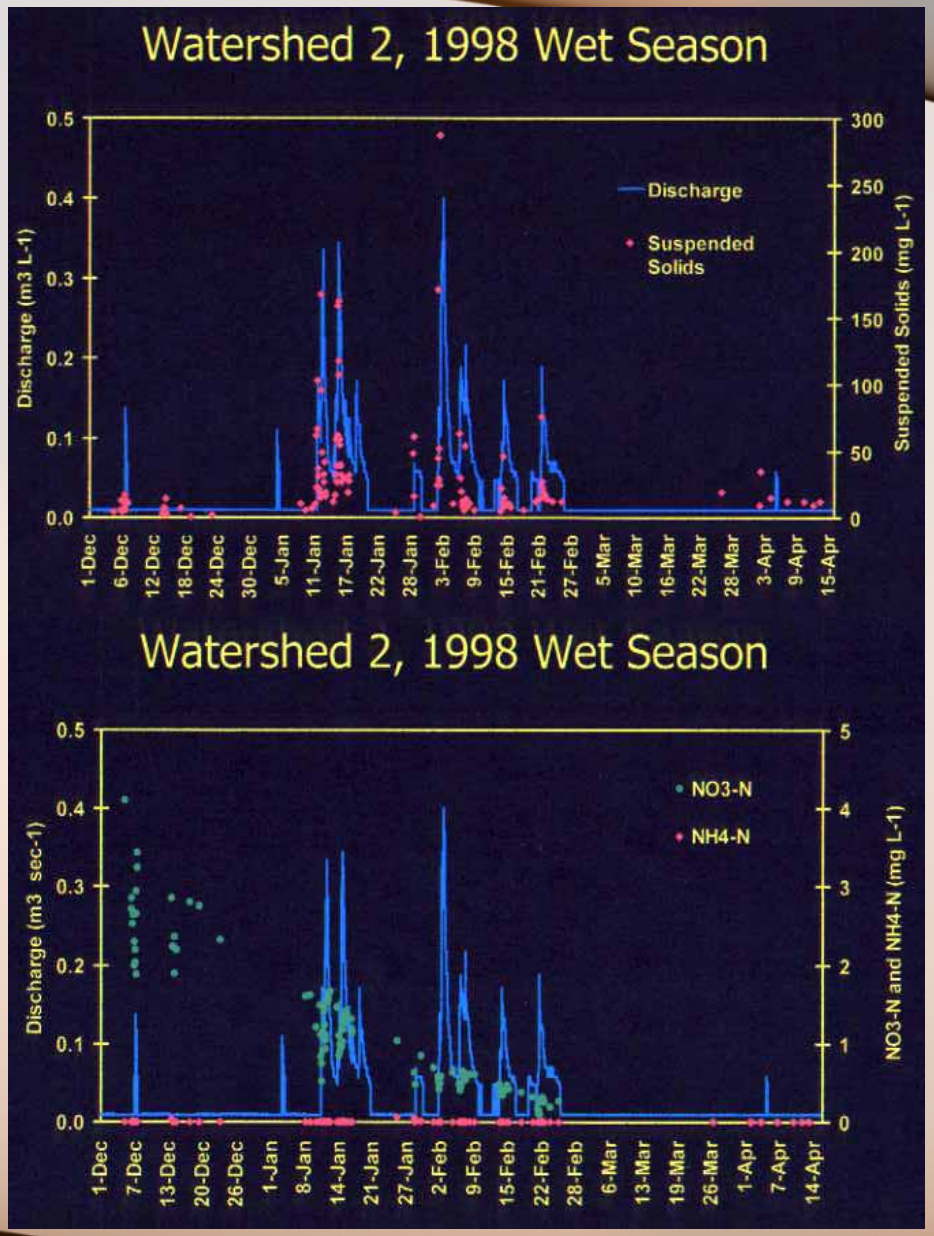
Water Monitoring

- Water sampling
- Laboratory analysis
- Calculate concentration
- Calculate load
- Sediment, nutrients, pathogens, temperature.



Pollutant Load Varies

- Within storm events
- Between storm events
- Seasonally
- Annually
- Need frequent sampling for several years to figure out what is normal vs. abnormal…this is research!



Take Home

Could spend a lot of time and money collecting lots of data that isn’t helpful.

What to Monitor

- Water (Stream, etc)Monitoring
- Pollution Source Monitoring

Source Monitoring

- Documenting pollution sources in the watershed.
  - Baseline inventory & assessment
- Documenting the removal or mitigation of pollution sources in the watershed.
  - Annual reports
- Records and photographs

Records

- Fertilizer application.
- Pesticide application
- Herd health practices
- Pasture use

Photo-Monitoring Rancher Objectives

- Document normal conditions.
- Document abnormal (catastrophic) events.
- Confirm agency assessments.
- Counteract inaccurate perceptions.
- Document your good management.
- Document the effectiveness of new practices.

Document Normal Conditions

- General appearance of the ranch
- Selected sites

Document Abnormal Conditions

- Fire
- Flood
- Wind Erosion
- Vandalism

Confirm Agency Assessments

- Potential sediment sources
- Potential heavy metal sources
- Potential nutrient and pathogen sources
- Potential elevated stream temperature

Counteract Inaccurate Perceptions

- Stream banks extensively trampled by cattle
- Stream temperature exceeds standard for salmonid species
- Erosion caused by off-road recreation but blamed on cattle grazing.

Document Good Management

- Erosion control.
- Protection of stream banks.
- Placement of feed and water away from stream channels.
- Grass buffer between creek and corral.
- Road maintenance.

Document Effectiveness of Management

- Erosion control – stable soil
- Protection of stream banks – stable stream banks
- Placement of feed and water away from stream channels – reduce stream channel impacts
- Grass buffer between creek and corral – improved ground cover
- Road maintenance – improved surface drainage

Photo-Monitoring

- Landscape
- Plot or close-up
- Riparian/Stream
- Event
- Practice


Landscape Photo

Plot or close-up

Riparian or Stream

Landscape Event

Practice

Erosion control
Before and after

Monitoring Frequency

- Depends on rate of change
  - Seasonal changes
  - Annual change
  - Multi-year change
  - Major event change
  - Management action change

Monitoring Equipment

- Pocket sized 35 mm camera
- Color film
- Notebook
- Compass
- Steel Post or other marker

Photo-point

- Permanent Marker
- Compass Heading
- GPS (optional)

Residual Dry Matter (RDM)

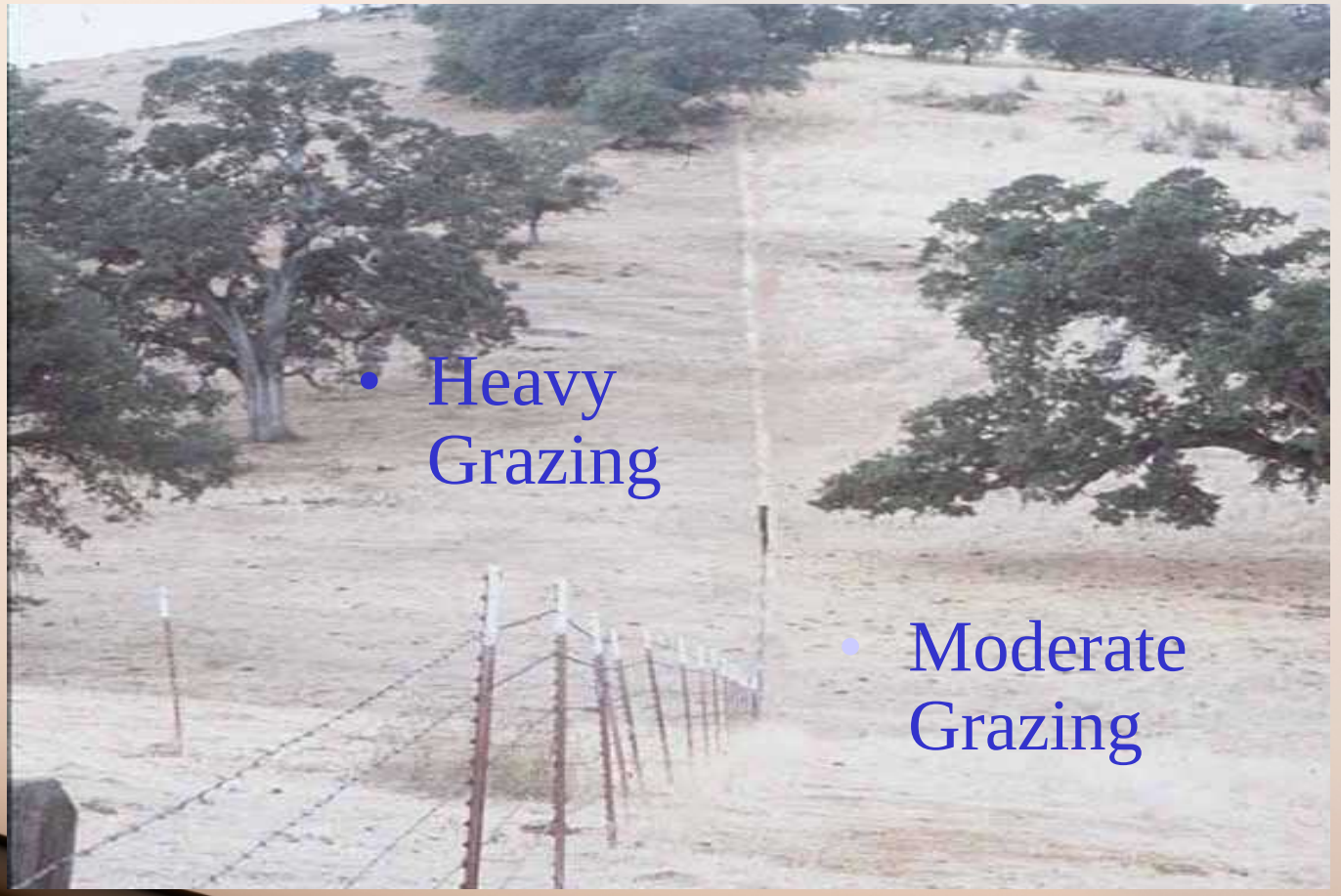
- Amount of old plant material left on the ground at the beginning of a new growing season
- Previous season's use
- Health or condition of annual rangelands

RDM Monitoring

	Slope		
	Flat	Gentle	Steep
Precipitation	lbs/acre		
Southern California (<10”)	200	250	350
Valley Foothills (10-40”)	400	600	800
North Coast (>40”)	750	1000	1250

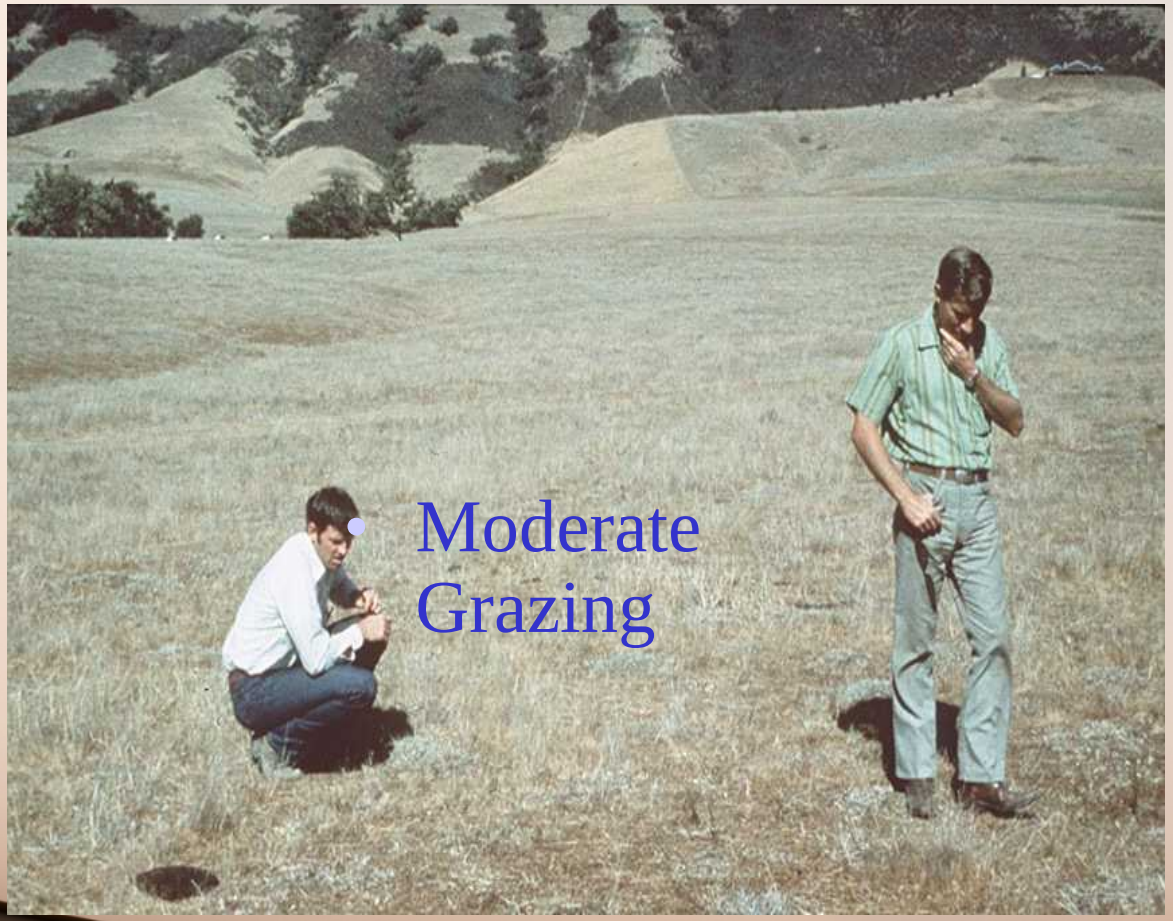
Residual Dry Matter

Residual Dry Matter



Residual Dry Matter

- Visual Assessment
- Photo Guides
- Clipping
- Mapping



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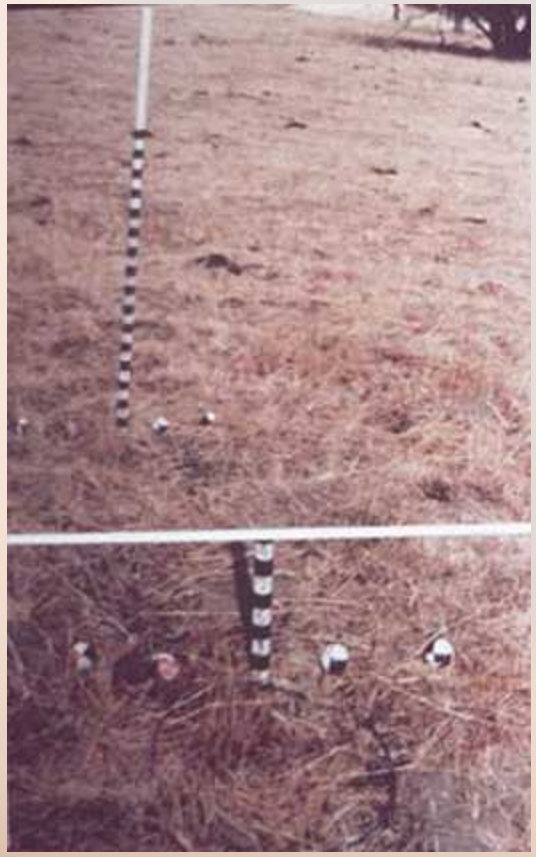
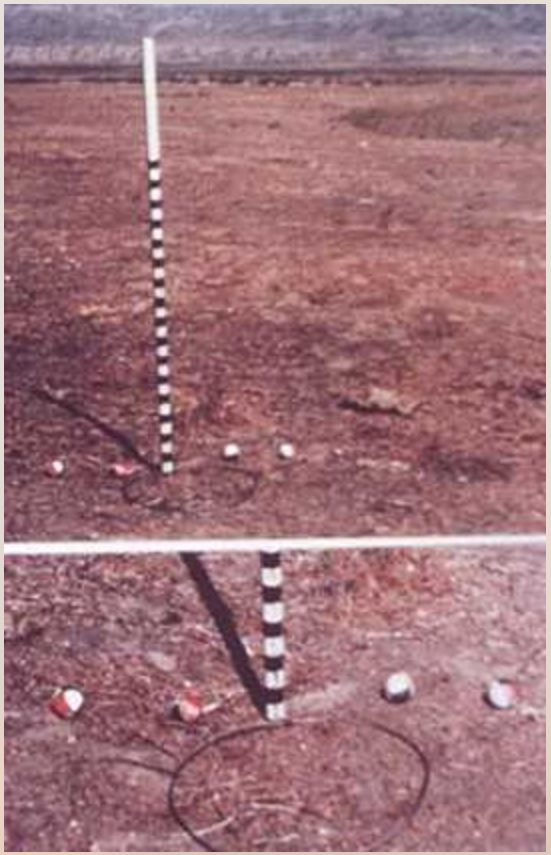


500-750 lb/a



<200 lbs/a

Residual Dry Matter

- Visual Assessment
- Photo Guides
- Clipping
  - Comparative yield
- Mapping

Clipping for RDM

- 0.96 square ft circle (13.25 inside diameter)
- Include stems, seed stalks & litter
- Weigh the RDM collected with gram scale
- Multiply by 100 to obtain pounds per acre
- Example: 9.3 grams X 100 = 930 lbs/acre RDM

Comparative Yield

- 1 square foot rectangle
- Rank 1-5 visually
- Clip & weigh to validate
  - 1 = low yield
  - 5 = high yield

Residual Dry Matter

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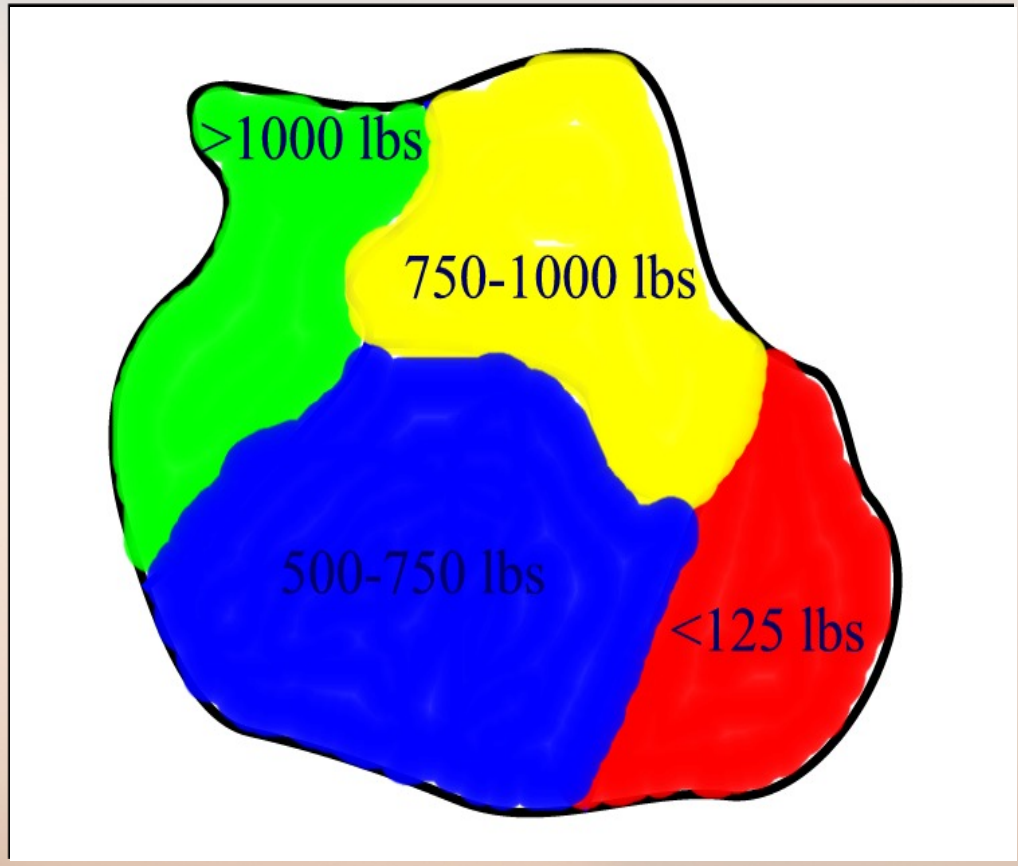

Mapping

- Utilization mapping
  - Rangeland use pattern mapping
  - Consolidate RDM classes into 3 or 4
  - Identify areas that meet management objectives and those that don’t

Monitoring Summary

- Commitment
- Consistency
- Keep records with plans
- Don’t forget to identify monitoring sites on map or arial photo