



United States Department of Agriculture  
Natural Resources Conservation Service

# NRCS Conservation Planning and Use of Monitoring and Business Planning Information

NRCS-West National Technology Support Center

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# Preparing For Change

Objectives change; terms change; problems change; management changes; partners change; emphasis changes; key areas change; protocols change; death, divorce, disability change; ecosystem goods and services change; location where goods and services are produced change.

## **Inventory answers**

- What is it?
- Where is it?
- How much is there?

## **Monitoring answers**

- What changed?
- Where did it change?
- How much did it change?



# To find answers about change one needs a plan

- PLAN - Refers to any method of thinking out acts and purposes before hand. Acts are the practices or combination of practices. Purposes are the goals and objectives.
- (528) Prescribed Grazing Plans and Specification will include:
  - Monitoring plan with appropriate records to assess whether the grazing strategy is resulting in a positive or upward trend and is meeting objectives. Identify the key areas and key plants that the manager should evaluate in making grazing management decisions.

# Setting GOALS leads to OBJECTIVES and then ACTION tasks lead to OUTCOMES.

- Goals
  - Develop a more desirable scenario
  - A goal is an end while an action strategy is a means for achieving a goal.
- Objectives
  - Attributes, Responsibilities, Timelines, and Quantities
- Action Items
  - Brainstorm some action strategies
    - Action to start an activity
    - Action to continue an activity
    - Action to increase an activity
    - Action to stop an activity

# Possible Goals

- Identify problems and opportunities to determine if management purpose and objectives are realistic. Confirm good management.
- Understand what others think is the problem
  - “I am interested in learning more”
  - Become the ‘friendly’ expert on all aspects
- Profit
  - Better reproduction , market weights, or herd health
  - Increased productivity of land or animals
  - Lower cost (reduce winter feeding costs)
  - Better use of resources , extend grazing season
- Plant health, resiliency, and reduced risk
- Better land and soil management (long- or short-term)
- Reveal potential problems early
- Evaluate alternatives for management

# Monitor Objectives

- The **attributes** of the objectives(s) monitored must:
  - Be present on the area selected. Be achievable within a useful time frame. Be measurable. Be worthy of the management needed to meet them and the monitoring needed to assess them.
- **Component** – should be the ecological process that needs maintenance or improvement. (PFC, IIRH, PCS)
- **Accomplishment** – increase willows, decrease bare ground, decrease thatch build-up, eliminate invasive weeds
- **Change** – Benchmark to go from. Quality to go toward.
- **Location** – Change will occur on the whole ranch? On a particular pasture? Or a critical area in a pasture?
- **Timeframe** –
  - Short-term is 7 days to 1 year
  - Mid-term is 3-5 years
  - Long-term is dependent on the capacity of the site

# Monitoring Objectives should be SMART

- ***Specific*** – Describe what will be accomplished, focusing on limiting factors, and identifying the range of acceptable change from the present to the proposed condition.
- ***Measurable*** – The change between present and proposed condition must be quantifiable and measurable.
- ***Achievable*** – Can be achieved within a designated time period and in accord with resource capability.
- ***Related/Relevant*** – Related to the land use plan goals and relevant to current management practices. They must be worthy of the cost of the management needed to achieve them and the monitoring needed to track them.
- ***Trackable*** – They must be trackable over time and include a definite timeframe and location for achievement.

# Monitoring

The Romans used the word thousands of years ago to mean reminder of the past and teacher of the future.

Latin word = English meaning

- Admonitor = reminder, teacher
- Ad = compared with
- Monita = warning, prophecy

**Present Definition** - Monitoring is the orderly collection, analysis, and interpretation of resource information and data that is used to make short-term and long-term management decisions



# Sustainable Ecosystem Indicators

- Effectively monitoring a System requires one to think in multiple scales and to consider effects of scale in the analysis of composition, structure, and function.
- Ecosystems are functionally and geographically interacting and nested. They are multi-scale systems. The SRR indicators simplify, quantify, standardize, and communicate changes in the rangeland system of goods and services.
- Productive capacity is a function most commonly monitored. However, the sustaining ecological drivers for productivity are Ecological Integrity (Indicator # 1,2,4 -10,14 -16,18, 23) and Biodiversity (Indicator # 3,11- 15, 17- 20, 24, 25).

# Ecosystem Integrity and Biodiversity

- Non-linear dynamics of management and disturbance events and processes listed in the State and Transition Model of an Ecological Site Description are useful for determining present ecosystem integrity and to set goals for future scenario.
- Biological diversity has three aspects: Compositional diversity; Structural diversity; Functional diversity. (key species and key area).
- Productivity has four aspects: Capacity to sustain a supply of goods or services in the long run; Capacity to produce organic material; Rate at which organic material is produced per unit of area; Ability to recruit new members by reproduction.

# Site Information Recorded For All Monitoring Activities.

- **Pasture Name.** Need an map of entire property with all names or numbers clearly listed.
- **Study Site.** specific site where monitoring data or photographs are collected. Be as specific as possible so that others can easily relocate the site in later years.
- **Date.**
- **Observer.**
- **Objectives.** (More specific than the goals)
- **Monitoring Method(s).** List the method(s) by which monitoring information is collected.
- **Date Study Established.** Record the date the first information was collected for this site. This facilitates tracking trend information across several years.
- **Access.** Optional. Describe the easiest way to drive or ride to the study site vicinity.

# Key Areas

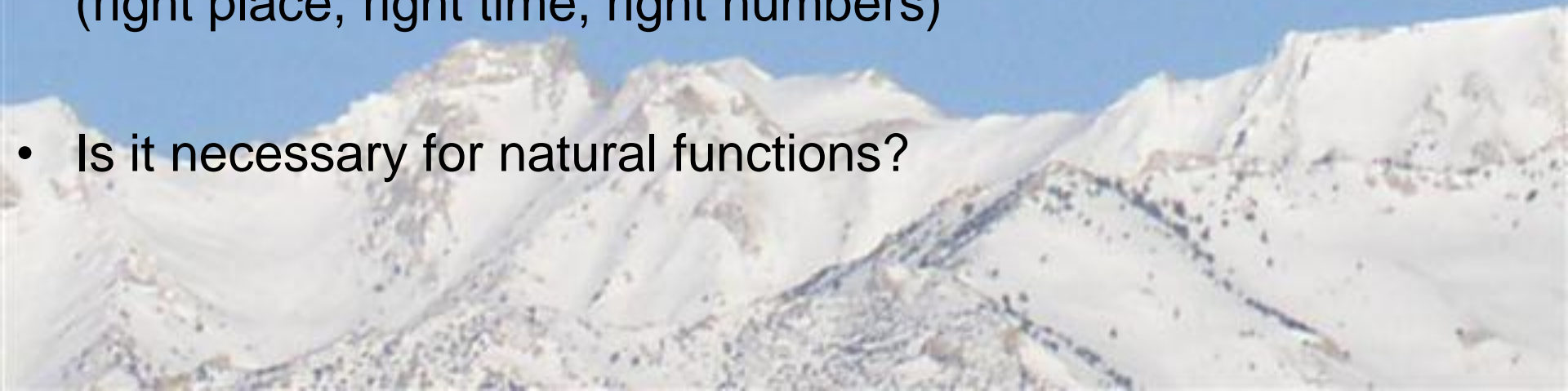
- **Represent** specific concerns and mutual resources
- **Possess** specifics relative to management objectives
- **Is located** where the ecological situation is well understood and you have baseline information with analysis
- **It may** be a Critical Area because it may be more sensitive to disturbance and processes than typical
- **Area** that provides a significant amount, but not necessarily the greatest amount, of available forage in the pasture
- **Have** the potential to respond quickly to changes in management (that can be measured)
- **Be able** to help answer key monitoring questions
- **Best** if selected by a team
- **Should** not be compounded with other activities
- **Must** not be too static.

# Key Area Homogeneity

- **No site is absolutely homogenous**
- **Homogeneity is dependant on the size of monitoring plots (use aerial photos)**
- **Have clearly defined rejection criteria**
  - Should not include any obvious change in the expression of the life forms of the dominate plants and vegetation
  - Dominate plant species in each vegetation layer should be consistently distributed across the plot
  - Should not encompass any abrupt changes or obvious gradients in slope, aspect, parent materials, soil depth, soil moisture, or texture
  - Avoid water sources, trails, corrals, historic salt grounds and other concentration areas, shade, and stay away from roadsides or other disturbances.
  - Consider the season of use and class of animal because diet preferences change by season, kind, and class of animal.

# Key Plant Species

- Where is it in the Ecological Site Description's State and Transition Model?
- Is it sufficiently abundant to respond to management?
- Are the physiological and ecological requirements understood as it differs from site to site?
- Is it directly related to vegetation management objectives?  
(right place, right time, right numbers)
- Is it necessary for natural functions?



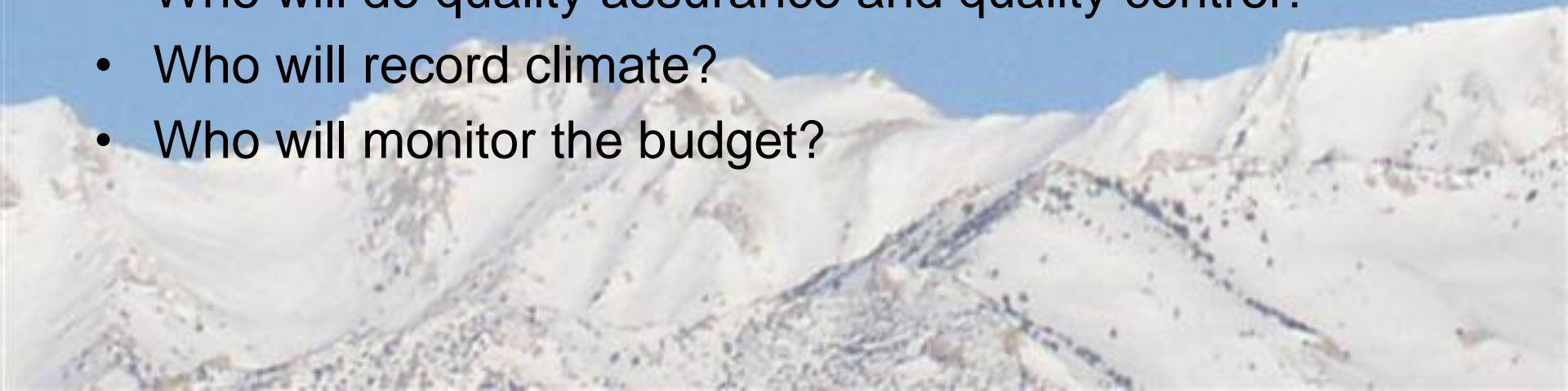
# Key Plant Species data analysis (multi-scale)

- Utilization of key forage species, unlike overall utilization levels in a pasture, is an indication only of livestock grazing pressure, and is not necessarily related to other resource uses or values.
- Attainment of specific use levels is nearly impossible on a year-to-year basis due to variation in climate. Instead, utilization should be a target across 5 to 10-year time periods.
- Management changes may be needed if utilization guidelines are exceeded on over 30% of the pasture for two consecutive years or in any two years out of five.



# Monitoring Responsibilities

- Who set up the monitoring site and when?
- Who will monitor the short term triggers and when?
- Who will monitor the end of season indicators and when?
- Who will use and interpret the data and observations?
- Who will make the observations of wildlife use?
- Who will take photos?
- Who will be contacted if monitoring data indicates problems?
- Who will do quality assurance and quality control?
- Who will record climate?
- Who will monitor the budget?





# Setting Timelines (temporal scale)

- Monitor when the soil, water, plant or animal indicators are likely to change due to ecological drivers. Monitoring for sustainability is always long-term. However, the frequency of monitoring may range from continuous, frequently during one season, once seasonally, annually, or once every 5-10 years. Some monitoring is based on annual plant phenology:

<b>GRASSES</b>	<b>FORBS</b>	<b>SHRUBS</b>
Start Growth	Start Growth	Initiate Leaf Growth
Boot Stage	Pre-flower	Fully-formed Leaf
Start Flower	Start Flower	Start Flower
Peak Flower	Peak Flower	Peak Flower
Seed Ripe	Seed Ripe	Seed Ripe
Seed Dissemination	Seed Dissemination	Seed Dissemination
Cured	Cured	Leaf Fall
Regrowth	Regrowth	Dormant

# Monitoring Protocols and Methods

- Condition
- Cover
- Frequency/Density
- Invasive/Rare Species
- Plant Production
- Species Composition
- Species Richness
- Soils
- Vertical Structure/Obstruction
- Utilization/Residual
- Stream Channel Attributes
- [www.Landscapetoolbox.org](http://www.Landscapetoolbox.org)

# Knowing When You Get There

- "If you plan for one year, plant rice; if you plan for 10 years, plant trees; but if you plan for 100 years, educate the people." Chinese proverb
- How to display your monitoring data?
- Nothing is permanent including the location and source of ecosystem services.
- Reference Condition specifics.
- Indicators are only useful in the context of a fundamental understanding of how the system works. Indicators cannot substitute for this understanding.



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