CORE CONCEPTS:
Attributes and Indicators
Objectives

By the end of this lesson each student should be able to:

• Explain the purpose/important of assessment, inventory, and monitoring.
• Identify/Describe the key features of assessment, inventory, and monitoring.
• Explain the purpose/important of attributes, indicators, and methods of/for determining rangeland health.
• Identify/Describe attributes, indicators, and methods of/for determining rangeland health.
• Give examples of attributes, indicators, and methods of/for determining rangeland health.
• Describe the characteristics/give examples of a core indicator(s).
• Describe how qualitative and quantitative data collection work together
Route

• Assessment, inventory, and monitoring
• Attributes, indicators, and methods
• Qualitative and quantitative data collection
• Additional Resources
Assessment, Inventory, and Monitoring
Monitoring, Assessment, and Inventory

• How is the resource changing over time?
• What is the condition of the resource compared to a threshold or reference condition?
• Where is the resource and how much of it do I have?
Monitoring

How is the resource changing over time?

- Consistent data collection
- Quantitative
- Indicator change over time

![Graph showing the percentage of bare ground over time from 1990 to 2015. The percentage increases from 1990 to 2000, reaching its peak around 2005, and then decreases to around 2015.]
Assessment

What is the condition of the resource compared to a threshold?

- One point in time
- Quantitative or qualitative
- Compare an indicator or attribute to a threshold or reference condition

Departure from Reference

Stream Canopy Cover

- None to Slight
- Moderate
- Extreme

Percentage of Stream KM

44.8%
27.6%
27.6%
Inventory

*How much of the resource do I have? Where is the resource located?*

- Systematic
- Quantitative or qualitative
- Can include monitoring and assessment data
- Describe the amount, location, and condition of a resource
Attributes, Indicators, and Methods
Attributes

Component that provides information about the functional status of the ecological processes
**Attribute: Soil/Site Stability**

The capacity of an area to limit redistribution and loss of soil resources (including nutrients and organic matter) by wind and water.

Desert grassland - good stability

Desert grassland - loss of stability
Attribute: Hydrologic Function

The capacity of an area to capture, store, and safely release water from rainfall, run-on, and snowmelt (where relevant), to resist a reduction in this capacity and to recover this capacity when a reduction does occur.

Sagebrush “captures” snow

Grasses have reduced ability (structure) to “capture” snow
Attribute: Biotic Integrity

The capacity of a site to support characteristic functional communities (above and below ground) in the context of normal variability, to resist loss of this function and structure, due to disturbance, and to recover following such disturbances.

Joshua tree/blackbrush site

Integrity diminished by exotic grasses and increased fire
How can we easily and economically determine if ecological processes are functioning?

Sensors attached to a yoke enable Ahmed Fashi, of Alabama A&M University, to gather data on vegetation and soil properties at the ARS Grazinglands Research Laboratory at El Reno, Oklahoma.
Indicators

- **What** you are measuring
- Index of an ecosystem attribute that is too difficult or expensive to measure directly.
- May be more than one indicator for an attribute
Core Indicators...

...are the minimum set of data to describe the attributes of rangeland health for many resource needs.
Core Indicators...

...are based on land health concepts
Core Indicators...

....are based on land health concepts
....can be measured consistently in all rangeland ecosystems
Core Indicators...

....are based on land health concepts
....can be measured consistently in all many ecosystems
....are scalable
Supplemental Indicators

• Additional indicators to evaluate when needed

EXAMPLE:

In the Colorado Plateau, biological crusts may be a useful supplemental indicator to help evaluate soil and site stability and biotic integrity.
Choosing Supplemental Indicators

- Bare Ground
- Vegetation Composition
- Plants of Mgmt. Concern
- Nonnative Invasive Sp.

Vegetation Height

Canopy Gaps
Choosing Supplemental Indicators

- Vegetation Height
- Canopy Gaps
- Bare Ground
- Vegetation Composition
- Plants of Mgmt. Concern
- Nonnative Invasive Sp.
- Plant Density
Methods

- How to measure an indicator
- Technique for measuring an indicator
- May be more than one method for an indicator
- Qualitative or quantitative
Quantitative and Qualitative Data
Quantitative and Qualitative Data Collection

• Quantitative methods are more *precise*

• *Either qualitative OR quantitative methods can be more accurate*
Compaction layer

Soil surface

*Even though it has a high (quantitative) bulk density

NOT a compaction layer*
How much bare ground?

19%
Additional Resources
Indicators and Attributes Resources

• Monitoring Manual for Grassland, Shrubland, and Savannah Ecosystems, 2nd Edition
  http://www.landscapetoolbox.org/manuals/monitoring-manual/

• Interpreting Indicators of Rangeland Health, version 4
  http://www.landscapetoolbox.org/manuals

• BLM Core Terrestrial Indicators and Methods, Technical Note 440
Conclusion
Objectives

Each students should now be able to:

• Explain the purpose/\textit{importance} of assessment, inventory, and monitoring.
• Identify/Describe the key features of assessment, inventory, and monitoring.
• Explain the purpose/\textit{importance} of attributes, indicators, and methods of/for determining rangeland health.
• Identify/Describe attributes, indicators, and methods of/for determining rangeland health.
• Give examples of attributes, indicators, and methods of/for determining rangeland health.
• Describe the characteristics/give examples of a core indicator(s).
• Describe how qualitative and quantitative data collection work together
Summary

• Assessment, inventory, and monitoring
• Attributes, indicators, and methods
• Qualitative and quantitative data collection
• Additional Resources
Next Learning Steps

• Watch the IIRH Indicators and Attributes videos:

• Watch the core quantitative methods videos on the Landscape Toolbox:
  http://www.landscapetoolbox.org/training/resources/