Rangeland Site Description

Duration: 1 hour (depending on travel to site)

Group Size: up to 30 in groups of 3-4

Setting: Classroom and Field

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The purpose of this activity is to provide students with an opportunity conduct a rangeland site description in the field.

Goals:

Students will:

- Use a variety of methods to locate, describe, and document a study site, its physical characteristic, and land use history

Materials:

- Handout: "Site Description Data Sheet"
- USGS Quadrangle map of the study site
- Computer with internet access
- Camera, either digital or film
- Clinometer/Photo card and erasable marker
- Compass
- Global Positioning System (GPS) unit (optional)

Background Information:

Rangeland scientists cannot measure the attributes of all the plants on rangelands; monitoring every plant would take forever! Instead, scientists study smaller samples of the rangeland that represent the whole area. One common method to collect scientific rangeland vegetation data uses a transect line and study plots. A transect line is a straight line through the study area on which the study plots will be located. The study plots are relatively small areas, but by monitoring vegetation in several small study plots, the results can be averaged and used to represent conditions over the whole study area.

Collecting field data is pointless unless the site can be relocated and adequately described! Scientists must be able to describe the location and physical characteristics of their study site to collect meaningful, repeatable data. A good location description (by road directions, watershed, township-range grids, or by latitude-longitude coordinates) is critical if further monitoring, vegetation mapping, or land use discussions are to take place on that site. A good description of the physical site characteristics (precipitation, potential natural vegetation, topography, soil texture) can be very important to study microclimates, current vegetation types, weed invasions, and soil erosion. Understanding the ownership and current and historical land uses are very important for characterizing the current and potential characteristics of the rangeland vegetation and habitat.

Selecting an appropriate study site is one of the most important steps in collecting valid and repeatable rangeland date. Sites that are too small, intersected by distinct boundaries (e.g., fences, roads, etc.), or that are lacking in diversity may result in less meaningful data. In addition, data from poorly chosen study sites may be skewed by factors that do not reflect the management of the specific rangeland site. Other important considerations include the long-term availability of the site for future monitoring and the landowner's ability to assist with land-use history and current management practices. Following are some tips to help evaluate potential study sties.

1. The study site should be at least two acres in size (one acre is about the size of a football field), so that there is room for all three transect lines.

2. The site should be relatively uniform in terms of plant species and slope. Some minor differences like rocky outcrops or weed patches are acceptable, but in general, the area should look similar from one side to the other.

3. The site should be at least 30 meters from roads, fences, houses (including yards), or water developments like troughs or ditches. This will help eliminate variation in the data resulting from human disturbances and that do not represent the majority of the rangeland.

4. The site should not be densely forested. These protocols are designed for rangelands, which do not have significant tree cover. Under a canopy of trees, these methods are less valid, meaningful, and repeatable. There are other methods used in forested systems.

5. The site should be at least 30 meters from natural water sources like springs, creeks, ponds, etc. The land area associated with nearby water is called the riparian zone, and these methods were not designed for riparian systems. There are other methods used to perform riparian vegetation inventory and monitoring.

6. If the site is located on private land, make sure the owner has given his or her permission for the class to use the area, and is able to provide a basic land-use history and current practices on the site. This history will be useful in subsequent data interpretation. If the site is located on public land, it is a good idea to speak with the area land manager, who can provide similar information. Many land owners and managers will be happy to accommodate this type of field study, but some will not.

7. The site could be located in an irrigated or fertilized pasture, or one that has all been seeded to the same plant species. However, for a more interesting field experience, the site should have 3 to 5 different recognizable plant species, and preferably a variety of plant classes (grasses, forbs, or woody plants).

8. The study site should be accessible by bus or van, and should be fairly close to the school to minimize travel time. The students can therefore have as much time as possible to complete the field protocols.

Procedures:

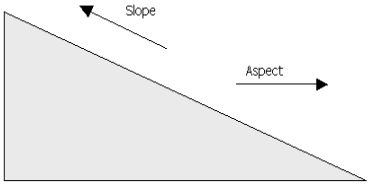
- Select an appropriate site based on the information above.
- Put students in groups of 3-4.
- Give each student a site description data sheet.
- Complete the following activities while in the field:

GPS Location: If your class has a GPS unit, record the **latitude and longitude** of the study site. This information can also be obtained on www.earthtools.org (go to tools → location). Remember to make sure that your GPS unit is set to measure in latitude and longitude. For example, your GPS can be set to display locations in UTM coordinates instead of latitude and longitude. The **UTM** (Universal Transverse Mercator) coordinates differ from latitude and longitude because they display the easting and a northing coordinates in meters. The easting is the projected distance from the earth's central meridian, while the northing is the projected distance from the equator. You should also record what **datum** your GPS unit is set to. The datum references what projection model you are basing your location measurements from. Common datums are NAD27 and NAD83.

Elevation: Use the GPS unit to detect the elevation. If you do not have a GPS, this information can be found on a topographic map (maps are available through the Idaho Geological Survey or at http://maps.insideidaho.org/WebMapping/DRG) or use www.earthtools.org and click tools → height.

Photos: Record the photo numbers of pictures you've taken (on the camera), so you can easily separate and label your pictures later. Holding the camera about 1 meter high, take at least one picture from the beginning looking toward the end of the transect, and from the end looking toward the beginning of the transect. Use the photo label on the back of the clinometer to record the site information; Ask someone to hold this card in the lower corner of your transect pictures. Make sure the card is close enough to the camera to be legible!

Slope: Locate the area that is at the highest point to determine the slope of the site. Get down close to the ground and put the 90° side of the clinometer towards your face. Look through the straw towards whichever direction is uphill. Through the straw, find the highest uphill point on the site. Trap the dangling washer against the clinometer, read the slope (in degrees), and circle the appropriate slope category on the survey sheet. If you are using a clinometer other than the one provided, it may read the slope in degrees and percent. Percent slope measures the rise over run, or tangent, of the slope angle in degrees. The conversion equation for this is: % Slope = Tan (°Slope) x 100.



Aspect: Aspect is *opposite* from the direction the slope is pointing (which is the direction you faced when you measured the slope). For example, if you look straight North when you measure the slope, by turning 180 degrees, you should now face straight South, which is the aspect of that slope.

Soil Texture: Use the "Feel Method to Determine Soil Texture" handout (included) to determine the texture of the soil on the site.

Location Description: Describe the study site as if you were telling someone how to get there. If you need to make reference to distances (i.e. follow Sand Hollow road __ miles and walk __ feet northwest), find your location on www.earthtools.org and click tools → distance.

Evidence of Use:

Belt transect: A belt transect is a 1 meter wide swath and a specified length, in this case 30 meters. Belt transects are used to inspect relatively small areas for various characteristics. You are inspecting the belt transect for evidence of use by animals or humans.

Evidence of Animal Use: **Animal use** includes tracks, droppings, hair, bone, skin, trails, or plants that have been grazed or bitten. You should also record any animals seen or heard at the site.

Evidence of Human Use: **Human use** includes things like roads, fences, houses, trails, areas where soil or vegetation has been moved by heavy equipment, campfire rings, water developments, agricultural fields, etc. Human uses can be hard to see if they occurred a long time ago (like old logging landings or homestead sites). Remember that nature almost never makes perfectly straight lines, angles, or curves.

- Return to the classroom and complete the following activities:

Team/Investigators/Study Site/Date: Record the team name or number, students on the team, the name of the study site (ie. Sandra Jones' west pasture), and the date the data are collected.

Watershed: Locate the study site on the "Surf Your Watershed" site at http://cfpub.epa.gov/surf/locate/index.cfm. Record the name and the number of the watershed your site was located.

Soils: Locate your study site on the "Web Soil Survey" website at http://websoilsurvey.nrcs.usda.gov. Instructions for locating the soil information on the web soil survey website can be found at www.cnr.uidaho.edu/what-is-range/curriculum.

Precipitation: The **long-term average** precipitation is useful to determine vegetation zones and limitations of plant productivity. The **current year's precipitation** is the amount of precipitation received since Jan. 1 of this year. It is an important factor in site productivity, especially current year forage availability and wildfire risks. Both long term averages and current year's precipitation can be found at http://www.wrcc.dri.edu/summary/climsmid.html for various locations around Idaho.

Land Ownership: If you are on someone's private property, record their name (or the person who takes care of the property). For land ownership information (i.e. private, state, tribal, Bureau of Land Management, Forest Service, etc), visit the Idaho Fish and Game website at http://fishandgame.idaho.gov/ifwis/huntplanner/mapcenter.aspx. On the **LAYERS** tab, SELECT "town & places", "highways & roads", "rivers & streams", "land ownership", and "USGS topography" by checking the boxes next to the layer names. Then use the interactive map tools to navigate to your site location. Once you have closely pinpointed the site location, click on the **LEGEND** tab to display the land ownership information and record the information on your worksheet.

Possible Assessments:

- Have students turn in one Site Description Data Sheet per group or individual.