

What is an Ecological Site Description?

By Tracey Jean Wolfe

SRM Certified Professional in Rangeland Management

During the first part of the century farms and ranches in America experienced major soil erosion and crop failures due to lack of understanding of the capabilities of their land. One such period in our history is known as the Dust Bowl. During this time, in 1935, the Soil Conservation Service (SCS) was established. One of the conservation efforts that SCS and the local soil conservation districts were involved in was livestock grazing on rangelands. The key to conservation of rangelands was to know the current condition of the range and to understand its potential, so as to know when and how much the land might be grazed without causing deterioration. In order to determine the condition of the land, SCS developed a system of range condition classification, based on scientific principles, which anyone could use and understand.

A system was developed that applied ecological concepts to range classification and management. SCS used the concept of "range site". The concept of a "site" as an ecological or management unit based on climax plant communities was developed in forestlands and then borrowed and applied to rangeland during the 1930-40s.

What land managers still need to know today as they did 80 years ago is what the plant community is today and what the potential plant community will be tomorrow? If a land manager can answer these questions, then management strategies can be developed and implemented to achieve attainable goals for the land.

What is an ecological site? The original term for the site concept on rangelands was "range site". This term has been widely used over the years, but is typically referred to now as an "ecological site". An ecological site, as defined for rangeland, is a "**...distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.**" (NRCS, National Range and Pasture Handbook, December 2003)

The definition is a bit of a mouthful, so let's break it down. A site has characteristic soils that have developed over time by the soil development process incorporating parent material, climate, living organisms, topography, and time. Soils are one of the most important components to a site. Also, a site has characteristic hydrology, particularly infiltration and runoff. Hydrology is influenced by the soil and plant community. A site has a characteristic plant community, both kinds of plants and amount of production. The development of the vegetation, the soil and the hydrology are all interrelated. Each is influenced by the others and influences the development of the others.

Another key concept for an ecological site is that a "potential plant community" is described, which may not necessarily be the existing plant community today. For example, the ecological site description might describe a mountain big sagebrush/bluebunch wheatgrass plant community, but the existing plant community might be pinyon and juniper trees that have invaded the site. This

potential plant community is based on the “historic climax plant community” that existed at the time of European immigration and settlement in North America.

The historic climax plant community was in dynamic equilibrium with its environment. It is the plant community that was able to avoid displacement by the suite of disturbances and disturbance patterns that naturally occurred within the area occupied by the site. Natural disturbances, such as drought, fire, grazing by native fauna, and insects, were inherent in the development and maintenance of these plant communities. The example of the mountain big sagebrush/bluebunch wheatgrass site being a historic plant community is that prior to European settlement, fire may have occurred periodically enough to keep pinyon and juniper trees out of the plant community. When settlement began, the occurrence of fire may have been reduced through domestic livestock grazing (reduction of fine fuels) and other fire suppression activities. This reduction in burning allowed pinyon and juniper trees to become established and over time dominated the site.

The historic climax plant community of an ecological site is not a precise assemblage of species. In all plant communities, variability is apparent in productivity and occurrence of individual species. Boundaries of plant communities, however, can be recognized by characteristic patterns of species or groups of species that dominate a site. This pattern is repeated from place to place (spatially) and from year to year (temporally.) Because of their stability in the plant community, the dominant species can be used to identify the site and to differentiate one site from another

Plant communities change along environmental gradients. Where changes in soil, topography, or moisture conditions are abrupt, plant community boundaries are distinct. The example being mountain big sagebrush/bluebunch wheatgrass site on a deep soil and adjacent to this site are shallow soils over bedrock and the dominant plants change to a low sagebrush/bluebunch wheatgrass site. Where boundaries are broader and less distinct, plant communities change gradually along wide environmental gradients of relatively uniform soils and topography.

There are several ways to go about determining the ecological site of a particular location, such as the back 40 acres of your ranch or a place on a grazing allotment where there are pinyon and juniper trees. The first step to this process starts with the soils. Ecological sites are tied to soils. For each soil series mapped and described, there will be an ecological site associated with that soil. To determine the soil you need to start with a soil survey. Most of the private lands and public lands (BLM) in Nevada have a soil survey. Soil surveys are typically done by counties or portions of counties, such as Soil Survey of Lyon County, Nevada or Soil Survey of Humboldt County, Nevada East Part. Soil surveys can be found at local USDA Natural Resource Conservation Service (NRCS) offices, libraries and on the web. A web based soil map with ecological site can be produced with the Web Soil Survey program at <http://websoilsurvey.nrcs.usda.gov>. This site is easy to use and you can produce your own custom soil report.

A description of a soil series will include an ecological site if it is not farmland. Ecological sites have a number and a name such as 028BY015NV, Loamy Slope 12-16" Precipitation Zone (P.Z.). The soil survey may include plants found on and production for the site.

For a detailed description of an ecological site you need a site description. These can be obtained from local NRCS offices or can be found on the web at the NRCS Ecological Site Information System site at <http://esis.sc.egov.usda.gov>. At this time only a few sites for Nevada have been put into the system, but more are being added as time goes by.

A site description contains interpretations on the physical, climatic, soil and vegetation conditions. Interpretation of vegetation includes major plant species, production by species, composition, cover and plant community dynamics. The site description for Loamy Slope 12-16" P.Z. indicates that the site occurs on back slopes of hills and mountains, slopes range from 15 to 50 percent, elevations are 6500 to 8200 feet. Average annual precipitation is 12 to 14 inches. Soils are usually moderately deep to deep and well drained. Potential native vegetation is dominated by mountain big sagebrush and bluebunch wheatgrass. Bluebunch wheatgrass produces 330-440 pounds of annual production per year; mountain big sagebrush produces 110-220 pounds of annual production per year. Other species found on this site include needlegrasses, basin wildrye, balsamroot, lupine, snowberry, and bitterbrush. Approximate ground cover is 25 to 35 percent. Total annual air-dry production (all species) on a normal year is 1100 pounds per acre. A site that commonly occurs in associated with this site is 028BY034NV Mountain Ridge 12-14" PZ. Plant community dynamics show single leaf pinyon and Utah juniper readily invade this site. Plant dynamics descriptions are very helpful for determining management. Many ecological site descriptions are being updated to include information on ecological dynamics (state and transition models), water features, vegetation structure, growth curves, wildlife, livestock, and recreation interpretations, a reference worksheet for range health and photographs.

Consider the area that has pinyon and juniper trees. You looked at the soil map, determined the soil for that location, looked up the ecological site and found that it is a Loamy Slope 12-16" P.Z. site, read the site description and saw that pinyon and juniper invade this site. Now what do you do with this knowledge? You would know that if you can remove the trees mountain sagebrush and bluebunch wheatgrass could potentially occupy the site again. You would also know that the site could be planted to introduced grass species such as crested wheatgrass that have the same moisture requirements as bluebunch wheatgrass. If the area burned and you wanted to reseed the site back to native vegetation the site description would basically give you a seed list.

With this knowledge management strategies can be developed and implemented to achieve attainable goals. Ecological site descriptions are a great tool for making decisions and determining management actions for any land manager.

