



United States Department of Agriculture Natural Resources Conservation Service



The Ecological Site Information System (ESIS) is the repository for the data associated with the collection of forestland and rangeland plot data and the development of ecological site descriptions. ESIS is organized into two applications and associated databases:

### **Ecological Site Description (ESD)**

**Overview --** The Ecological Site Description (ESD) application provides the capability to produce automated ecological site descriptions from the data stored in its database. ESD is the official repository for all data associated with the development of forestland and rangeland ecological site descriptions by the Natural Resources Conservation Service.

Looking across any landscape it is not difficult to recognize that some parts are different from other parts in regard to the kinds and amounts of vegetation. To understand this variation across the landscape, we classify these different parts into units called ecological sites. Ecological site is defined as “a distinctive kind of land with specific characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation”. Any land inventory, analysis, and resulting management decisions require the knowledge of these individual sites and their interrelationships to one another on the landscape. The ecological site description is the document that will contain information about the individual ecological sites.

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The data comprising a ecological site description is presented in four major categories:

- Site Characteristics -- Identifies the site and describes the physiographic, climate, soil, and water features associated with the site.

- Plant Communities -- Describes the ecological dynamics and the common plant communities comprising the various vegetation states of the site. The disturbances that cause a shift from one state to another are also described.
- Site Interpretations -- Interpretive information pertinent to the use and management of the site and its related resources.
- Supporting Information – Provides information on sources of information and data utilized in developing the site description and the relationship of the site to other ecological sites.

**Differentiating Ecological Sites** -- The following criteria are used to differentiate one ecological site from another:

- Significant differences in the species or species groups that are in the characteristic plant community.
- Significant differences in the relative proportion of species or species groups in the characteristic plant community.
- Soil factors that determine plant production and composition, the hydrology of the site, and the functioning of the ecological processes of the water cycle, mineral cycles, and energy flow.
- Differences in the kind, proportion, and production of the overstory and understory plants due to differences in soil, topography, climate, and environment factors, or the response of vegetation to management.

**Ecological Site Types** -- Forestland ecological sites and rangeland ecological sites are separated based on the historic climax plant community.

A site type of "forestland" is assigned and described where a 25% overstory canopy of trees, as determined by crown perimeter-vertical projection, dominated this historic vegetation. A tree is defined as a woody-stemmed plant that can grow to 4 meters in height at maturity on the site being described.

A site type of "rangeland" is assigned where overstory tree production was not significant in the climax vegetation.

**Historic Climax Plant Communities** -- The historic climax plant community for a site in North America is the plant community that existed at the time of European immigration and settlement. It is the plant community that was best adapted to the unique combination of environmental factors associated with the site. 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 of native fauna, and insects, were inherent in the development and maintenance of these plant communities. The effects of these disturbances are part of the range of characteristics of the site that contribute to that dynamic equilibrium. Fluctuations in plant community structure and function caused by the effects of these natural disturbances establish the boundaries of dynamic equilibrium. They are accounted for as part of the range of characteristics for an ecological site. Plant communities that are subjected to abnormal disturbances and

physical site deterioration or that are protected from natural influences, such as fire, for long periods seldom typify the historic climax vegetation and may exist in a steady state that is different from the historic climax plant community.

The historic climax plant community of an ecological site is not a precise assemblage of species for which the proportions are the same from place to place or from year to year. In all plant communities, variability is apparent in productivity and occurrence of individual species. Spatial boundaries of the communities; however, can be recognized by characteristic patterns of species composition, association, and community structure.

At times, normally less frequently occurring plants may increase on a site, or plants not formerly found in the climax community may invade the site. The presence or abundance of these plants may fluctuate greatly because of differences in microenvironment, weather conditions, or human actions. Consequently, using them for site identification can be misleading, so they should not be used to differentiate sites. Site differentiation, characterization, and determinations are based on the plant community that developed along with the soils. A study of several locations over several years is needed to differentiate and characterize a site.

Where changes in soils, aspect, topography, or moisture conditions are abrupt, ecological site boundaries are distinct. Boundaries are broader and less distinct where plant communities change gradually along broad environmental gradients of relatively uniform soils and topography. Although some plant communities may appear to be along a continuum, distinctive plant communities can be identified and described. These communities occur with predictable regularity and are associated with concurrent differences in soil, topography, hydrology, or climate that can also be recognized.

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## **Ecological Site Inventory (ESI)**

**Overview --** The Ecological Site Inventory (ESI) application provides the capability to enter, edit, and retrieve rangeland, forestry, and agroforestry plot data. ESI is the official repository for all plot data collected via the Soil-Woodland Correlation Field Data Sheet (ECS-005), the Windbreak-Soil-Species Evaluation Data Sheet (ECS-004) and the Production and Composition Record For Native Grazing Lands (RANGE-417).

**Data Use --** The collection of plot data is an important activity conducted by the Natural Resources Conservation Service. The data are used to develop inventories for planning, to monitor ecological change, to provide data to make management decisions, for the development of ecological site descriptions, for obtaining data for hydrologic models, for studies of treatment effects, and for many other purposes.

**Available Data --** ESI contains inventory data collected on thousands of plots over the past 40 years. All of this data is made available to the public through the ESI application. The data may be viewed in a variety

of standard report formats or through the use of custom queries tailored to an individual needs. The data may also be downloaded for use in other applications. Inventory data collected on rangeland plots includes the total annual production of all plant species of a plant community, as well as the production (by weight measurement) and composition of individual plant species comprising the plant community.

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In addition to plant community data, inventories on both rangeland and forestland plots includes data relative to the physiographic features of the site (soil, slope, aspect, landform, etc.).

**Updated 7/28/2003**