

## INTRODUCTION

### **What Are They?**

An ecological site is a basic unit of ecological land classification and represents a type of land with a distinctive combination of potential natural plant communities, soils, landforms, hydrology, climate, and ecological properties and processes. These processes are included in the ecological site description.

### **What is the relationship between soils and ecological sites?**

Soils are the building blocks of ecological sites. Usually, soils have a more narrowly defined range of morphological, physical, and chemical properties than an ecological site. One or more soils that have similar vegetative and ecological potentials and processes are grouped together to define an ecological site.

To effectively build an ecological site classification from the soil classification, a high degree of correlation between soils, vegetation, and ecological potential is necessary. To establish the relationships and maintain correlation, vegetative characteristics and ecological patterns and processes observed in the field are used in conjunction with soil characteristics and other criteria specified in “Soil Taxonomy” and “Keys to Soil Taxonomy” (*Soil Survey Staff 1975; 1996b*). Soils are classified to the series, subgroup, and great group levels (see “Classification of the Soils”) depending on the scale of mapping. Soil phases (*Soil Survey Staff 1996c*) are defined if the range in properties for a soil is too broad to maintain the correlation with the vegetative and other ecological properties. Phases are applied at any level of the soil classification. When a soil is split into multiple soil phases, phase name modifiers are added to the soil name to identify the phases. Some rules for establishing ecological sites are:

- Ecological sites are unique to an MLRA.
- A soil component-phase combination is assigned a single ecological site.
- An ecological site has one historic potential natural plant community (HPNC) that is unique to the MLRA.

### **What is the relationship between vegetation and ecological sites?**

Traditionally an ecological site is defined as a *rangeland ecological site* or *forest land ecological site*. Rangeland is a distinctive kind of land on which the historic climax vegetation was predominantly grasses, grass-like plants, forbs, or shrubs. Rangeland includes natural grasslands, savannas, most deserts, tundra, alpine plant communities, coastal and freshwater marshes, and wet meadows. Forest land typically provides a diverse range of commodity and non-commodity products and values, including wood products, grazing for wildlife and livestock, high quality water, wildlife and fish habitat, recreational opportunities, and aesthetic and spiritual values.

Ecological site classification in Alaska is not oriented to any type of land or land use. The relationship between climate, landforms, soils, and vegetation, and the ability to discern differences in the cumulative effect of these factors from one site to another is the basis for ecological site classification. Vegetation is considered to be an indicator of the integrated factors of the environment.

In Alaska, the most efficient and accurate measure in describing and comparing plant communities is percent canopy cover by species. By definition, an ecological site is characterized by a single historic potential natural plant community (HPNC). The HPNC is the assemblage of plant species that most nearly achieves a long-term steady state of productivity, structure, and composition on a site. The occurrence of a single potential plant community is based on the notion, that over time, and in the absence of disturbances to the vegetation and changes in the site, succession (the gradual and successive replacement of one plant community by another) eventually leads to a single plant community which best reflects the integrated

factors of the environment. The HCPNC provides a benchmark from which long and short term responses of the vegetation to disturbances, and pathways and processes of succession, can be related.

### **What is a State and Transition Model?**

A 'state and transition' model describes the gradual and progressive changes over time to the physical and environmental conditions of the site that result in a different HCPNC. A 'state' is a stable and resilient complex of both the physical environment and the biotic communities. A state is capable of absorbing disturbance or stress, defined by the model as 'community pathways.' The pathways and the communities they shape are dynamic. The boundary of a state is defined as a 'threshold.' If a particular disturbance or stress crosses this threshold, a change in state occurs. This process represents a 'transition.' A return to the previous state is not dynamic on a practical time scale without significant inputs or accelerating practices.

Primary succession is the formation process that begins on substrates having never previously supported any vegetation (e.g., lava flows, flood plains). Secondary succession occurs on previously formed soil from which the vegetation has been partially or completely removed.

### **What Purposes Do They Serve?**

Landscapes are divided into ecological sites for the purposes of inventory, evaluation, and management. Ecological sites are used in conservation planning for evaluating ecosystem health. They are also a critical interpretation for the soil survey program, and are necessary for program planning. For rangeland, they are necessary for the application of the grazing management software. They can assist in wetland, riparian and fire mitigation; provide insight on management for rare and endangered species; and provide benchmarks in monitoring programs for effects of climate change.

Ecological Site Descriptions include a section on the interpretations for the use and management for the site. The type of interpretations can be site and/or area dependent, and updated as more information is gathered. Interpretations include:

*Grazing*-the information necessary to develop the initial stocking rates along with forage preferences for both livestock and wildlife. It also includes a description of wildlife-livestock interactions and competition. Uses of vegetation by the kind and class of livestock is listed as well as potential management problems that may exist such as poisonous plants, topographical limitations, physical barriers, etc. In areas where grazing is an important land use, annual plant production is included in the ecological site description. This information is usually collected after ecological sites have been correlated but in some surveys, it may be collected during the soil survey. Information on annual production is used primarily in the interpretation section of an ecological site rather than a measure to differentiate plant communities within an ecological site.

*Plant Preference by Animal Kind (forestland/woodland)* – a listing of plant preferences by various animals. For each animal of importance, the preference rating is listed for various plant species. Additionally preference ratings may be listed for the different plant parts (leaf, flower, bud, etc.) of each of the identified species.

*Forest Site Productivity* – the minimum and maximum, and representative annual productivity and site index of the major tree species. The annual productivity per acre in cubic feet at the culmination of the mean annual increment (CMAI) is listed for each species when available.

*Animal Community/Wildlife* – a list and/or description of the animal communities associated with the site. It may also include information about the type of forage and cover the site affords specific animals, management implications, impacts, etc.

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*Hydrology Functions* – a narrative description that includes such information as storm events, rainfall distribution, landscape position, flooding potential and/or ponding susceptibility, erosion potentials, concentrated flow characteristics, etc.

*Recreational Uses* – a narrative description of the potential recreational uses that the site can support or which may influence the management of the site. This can include plant species that have special aesthetic values, landscape values, view sheds etc.

*Wood Products* – a narrative description of the kinds of wood products the site is capable of producing and any potential impact that may influence the management of the site as the result of producing these wood products.

*Other Products* – a narrative description of potential uses of other products produced on the site. Examples include such things as biomass, subsistence, landscape plants, mushrooms, berries, ferns, nuts, etc.

*Other Information* – a narrative description of other pertinent, interpretative, and descriptive information that may be relative other information change; and as a tool to identify potential risks and mitigation of wildfire.

### **Where are ecological site descriptions kept?**

Ecological Site Descriptions are normally referenced in Section II of the electronic Field Office Technical Guide (eFOTG) and located in a separate location. For some areas of the state they are contained in the soil survey. They can also be located in the Ecological Site Information System (ESIS). ESIS is the official repository for all vegetation data collected on forestland and rangeland. ESIS is organized into two applications: The Ecological Site Description (ESD) application, and the Ecological Site Inventory (ESI) application. ESD stores the ecological site descriptions while ESI stores the plot and point vegetation data.

As ecological sites are developed as part of the ongoing soil surveys in Alaska, descriptions will be available in eFOTG and/or in ESIS.

### **How is an ecological site named?**

Ecological sites are unique to a Major Land Resource Area (MLRA). Alaska is stratified into 27 MLRA's which are intended to represent areas of sub regional physiographic and geomorphic patterns and processes and general vegetation potentials. Ecological sites are numbered for use in ESIS. The site number is 10-characters and consists of five parts:

1. The letter R (rangeland) is used to identify an ecological site when the HNPC is dominated by vegetation with less than 25% tree cover. The letter F (forest land) is to identify an ecological site when the HNPC is dominated by vegetation with 25% or greater tree cover.
2. A three-digit number and a one-digit letter MLRA. In Alaska we only have three-digit numbers for MLRA's so an "X" is used after the MLRA number.
3. A single letter "Y" which is used when no Land Resource Unit is applicable such as in Alaska.
4. A three-digit site number, assigned by the state.
5. A two-digit letter state postal code, AK.

An example of an ecological site number for an ecological site with a HNPC of Balsam poplar-white spruce/bluejoint in the MLRA 227 – Copper River Basin is: F227XY101AK