

**Forest Service Handbook
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Forest Service Handbook 2090.11 – Ecological Classification and Inventory Handbook

Chapter 1 - Ecosystem Classification

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Approved by: F. Dale Robertson, Chief

Date approved:

Responsible Staff:

Last Change: This amendment is the first in a new numbering series corresponding to the year in which material was amended. Since this amendment replaces all text except Interim Directives (ID), do not check for the last transmittal received for this title. Replace the entire title text except ID's.

Superseded Document(s): Entire Title except ID's, 00--1 thru 2.81; Amendments Covered New, February 1986 and 1, May 1986

Digest: Following is an explanation of the changes throughout the directive by section.

This amendment changes the title of the handbook to include direction for inventory, eliminates the reserved chapter for field procedures, renames and rewrites the text for chapter 1 (formerly chapter 2) on Classification of Ecological Types, retitles chapter 2 (formerly chapter 1) Classification of Potential Natural Communities and deletes section on interrelationships and making interpretations. It also adds text for chapter 3 (Ecological Unit Inventories) and chapter 4 (Interpretations and Applications). It also incorporates direction previously issued in FSM 2060.5 through 2062.9.

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Use ecosystem classifications to establish ecological types and ecological units. Regional Foresters may establish hierarchical systems to help array and coordinate the classification of ecological types and ecological units and to make comparisons.

1.1 - Ecological Type Characterization

Characterize the ecological type by any distinguishing attributes which will differentiate it from other ecological types, or which reflect significant differences in management implications.

Use the following components as appropriate:

1. Vegetation
2. Soils
3. Topographic Features (elevation, slope gradient and aspect).
4. Water
5. Climate
6. Geology (stratigraphy, lithology and landform)

Ecosystem components may be described: (1) individually and then combined, or (2) by simultaneously evaluating a combination of components.

Combine ecosystem components to produce balanced ecologically sound classifications of ecological types.

Develop aquatic types either within the framework of the adjacent ecological types or through an independent combination of landform, vegetation, soils, stream channel, hydrologic, and aquatic characteristics.

1.2 - Naming Ecological Types

Assign a complete ecological type name using a two-part biotic and abiotic name or a multi-part name including topography, soil, climate, vegetation or other attributes. A brief descriptive name or code can be used for informal reference.

The complete name should consist of the potential natural community as described in section 2.14, and the abiotic portion of the name should be based on climate, topographic features, geology, and soils. Some examples of abiotic names are: Cold Upland, Basalt Plains, Sandhills, Steep Mountain Slope, and loamy-skeletal, mixed, Typic Cryoborolls; or Lakeland (soil series).

The complete ecological type name might be Ponderosa Pine/Bitterbrush/Idaho Fescue--Basalt Plain ecological type or a Typic Cryoboroll--Ponderosa Pine/Bitterbrush/Idaho Fescue ecological type.

1.3 - Differentiation Between Ecological Types

Differentiate one ecological type from another by describing significant differences in the following criteria:

1. The kind of vegetation, soil, topographic features, climate, water and geology.
2. Significant differences in the kind and proportions of components above, geologic materials (either singly or in combination), that indicate different potentials, constraints and hazards, or require a different set of management prescriptions.

1.4 - Description of Ecological Types

Prepare a technical description for each ecological type. Descriptions should be brief and clearly present the features that characterize the type. Include the information shown in 1.41 through 1.47f.

1.41 - Vegetation

Describe plant communities for existing vegetation and for potential natural vegetation.

Identify the taxonomic unit and the level of taxonomy and describe the vegetation characteristics associated with the ecological type. Establish the range of characteristics of all significant vegetation properties for the ecological type, based on expected response to management. Identify the vegetation according to the direction in Chapter 2 and in Regional Handbooks, FSH 2090.22, Ecosystem Classification and Inventory Handbook. Use existing vegetation in the absence of a classification of potential natural vegetation types. Different levels of soil and vegetation taxonomy may be combined to meet management needs.

1.41a - Potential Natural Community

The potential natural community provides a reference standard to which existing seral communities can be related.

Under the broad concept of potential natural community, the end point of succession may be a stable seral plant community of long-term duration or an imperceptible rate of vegetation change.

1.41b - Existing Vegetation

Existing vegetation communities are often described on the basis of significant differences in species composition, physiognomic or structural features, stand age, or numerical relationships along an ecological gradient. The forest cover types described by the Society of American Foresters are examples of a classification of existing vegetation.

1.42 - Soils

Identify the taxonomic unit and the level of taxonomy and describe the soil characteristics associated with the ecological type. Establish the range of characteristics of all significant soil properties for the ecological type, based on expected response to management. Identify the soils according to Soil Taxonomy and the standards found in FSM 2550 and FSH 2509.18 and correlate as part of the National Cooperative Soil Survey. Different levels of soil and vegetation taxonomy may be combined to meet management needs.

1.43 - Topographic Features

Identify and describe slope, relief, and elevation as directed in FSH 2509.18 or according to standards established by the Regional Forester. Slope has gradient, length, shape, aspect, and other components.

1.44 - Water

Field units may issue direction at FSH 2090.22 to provide Regional direction related to water.

1.45 - Climate

Field units may issue direction at FSH 2090.22 to provide Regional direction related to climate.

1.46 - Geology

Identify and describe the stratigraphy, lithology and landform according to the Interim Resource Inventory Glossary or according to standards established by the Regional Forester.

1.46a - Landform

Landform is any physical, recognizable form or feature of the earth's surface, having a characteristic shape, and produced by natural causes. Use the Regional list and description of landforms and/or a taxonomic key to landforms in each Region based on the service-wide GIS data standards for Geology and National Cooperative Soil Survey Glossary (1984) and include it in FSH 2090.22. Correlate the list, descriptions and keys with adjacent Regions.

1.47 - Description of Ecological Type Interpretations

Develop appropriate interpretations for activities such as vegetation manipulation, silviculture, wildlife and fisheries habitat capability, engineering properties, geologic hazards, livestock grazing, visuals, watershed, fire and insect disease management, and other uses as needed.

1.47a - Ecological Status

Determine ecological Status for existing vegetation and current soil conditions.

Base ecological status ratings on the similarity of the current vegetation to the potential natural community. Include the degree of similarity between existing soil conditions and soil conditions at potential as measured by the degree of achievement of desired soil quality standards (FSH 2509.18). Express this similarity on a relative scale ranging from 0 to 100, with adjective ratings assigned as low, moderate, or high similarity.

1.47b - Assessment of Existing Conditions

Develop minimum criteria for estimating resource values based on vegetation and environmental characteristics important for evaluating a particular use or benefit. Use FSM 2550 and FSH 2509.18, Soil Management Handbook, to guide development of soil protection, management standards, and assessment methods. Develop for each ecological type.

1.47c - Estimation of Production Potential

Assess both long-term and short-term production potential of the ecological type using appropriate parameters to provide the needed information for determining the capability of the site to produce vegetation and respond to management.

1.47d - Prediction of Response to Change

As needed to meet management objectives, classify seral community types and the described successional pathways or seral stages for each ecological type. Describe the ecological status, resource values, and ecological relationships of each seral community type and/or stage. Correlate the type of treatment and rate of change with the appropriate pathways of vegetation succession or retrogression in the ecological type.

1.47e - Assessment of Ecological and Resource Conditions Across Mosaics of Communities

As needed to meet management objectives, evaluate the relationships of different ecological types within a biogeographic area that includes typical groups of communities.

1.47f - Use of Ecosystem Classification in Coordination, Correlation, and Linkage of Resource Data Bases

Include the ecological type in resource inventory data bases.

1.5 - Correlation of Ecological Types

Correlation is a process for ensuring consistency in naming, classifying and interpreting ecological types. The correlation process also provides quality control for consistent description and documentation of the ecosystem components.

1.51 - Criteria

Use the components in section 1.1, along with the defined range of characteristics for each property used, to classify the ecological type.

1.52 - Correlation

Make and document correlations of type descriptions between forests and regions. Conduct correlation of soils as described in FSM 2550, FSH 2509.18 and the National Soils Handbook, USDA, SCS. Correlate the potential natural communities according to direction in 2.12. Use the process and procedures for Inter- and Intra-Regional correlation as developed by the appropriate Regional Foresters.

1.6 - Reference Sites

Establish reference sites for all ecological types in order to maintain a base of reference.

1.61 - Descriptions

Reference site descriptions must be based on measurement and observation only, not on inferences from other sites. Methods used to measure attributes must be repeatable and verifiable. Include all factors that will later be needed for resource value and other ratings. Reference sites can include benchmark soils as described in FSM 2550.

1.62 - Minimum Standards

To adequately characterize an ecological type, use reference sites to sample the spatial and temporal variation. At least 3 sites are recommended for the major ecological types. Existing benchmark sites, exclosures, Research Natural Areas, Botanical Areas, and reference sites of other agencies should be used when available. Once established, identify reference sites on Forest Land and Resource Management Plan maps and protect them as appropriate. Reference site data must include at least the following: a detailed soil pedon description, topographic and stratigraphic characteristics, and a complete floristic (flora and vegetation) description. Regions may further define these requirements.

1.7 - Identification of Ecological Units

Identify ecological units according to local forest planning and project evaluation needs for inventory and evaluation. In the absence of a developed ecological type classification, ecological units can be developed from existing resource inventories or created from components listed in section 1.1. Refer to chapter 3. Also see FSH 2509.18, Soil Management Handbook, section 1.22, for direction on soil map unit design and development (a process applicable to designing ecological units).