

## **FOREST LAND INTERPRETATIONS**

### **NASIS**

Forest land interpretations are produced in NASIS (1). Tables may be produced from NASIS using the old National Forestry Manual guidelines (2) and the new Forestry Manual guidelines (3). A National Forestry Handbook is currently under development which will explain in detail the technical criteria used to carry out the policy in the National Forestry Manual.

To produce the various woodland tables in NASIS:

- In the select manager, load the area, correlation, and data mapunit tables for the county
- Go to view, then standard tables
- Select NATIONAL tables
- Select the table of interest

### **NATIONAL FORESTRY MANUAL (September 1980 Edition)**

In the list of NATIONAL reports, select the report named "MAN - Table E2. Forestland Mgmt obs and Productivity". This report generates a Woodland Management and Productivity table under the old National Forestry Manual guidelines. Ordination symbols and productivity classes are generated. Ordination symbols have been used extensively in soil survey reports in

West Virginia. A discussion on their use follows.

### **WOODLAND ORDINATION SYMBOL**

The ordination symbol has two parts: The class and subclass. An example is 9A. The class = 9 and the subclass = A.

### **ORDINATION CLASS SYMBOL**

**Productivity Class:** The first element in ordination is a number that denotes potential productivity in terms of cubic meters of wood per hectare per year for an indicator tree species. Generally, the larger the number, the greater the potential productivity. However, in some earlier surveys this is not the case. Some earlier surveys indicate that the lower the number the greater the productivity. Most woodland productivity values have been obtained from conversion of site index data. A mean annual increment of one cubic meter per hectare equals 14.3 cubic feet per acre (For quick conversion, a factor of 15 may be used).

**Indicator Species:** The indicator species is the species that is common in the area and is generally, but not necessarily the most productive on the soil. It is the species that determines the ordination class. To make comparisons of productivity consult the "Woodland Productivity Table" which

lists productivity for all species where data have been collected.

**Site Index** Site index is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. Site indexes shown in the woodland productivity table are averages based on measurements made at sites that are representative of the soil series and where the site has been free of past fire and disturbances. When comparing site index and woodland productivity of different soils, the values for the same tree species should be compared.

**Ordination Subclass Symbol** The second element or subclass is indicated by a capital letter, which indicates certain soil or physiographic characteristics that contribute to important hazards or limitations in management. These are listed and defined as follows:

### **Ordination Subclass Definitions and Implications**

#### **Subclass R (relief or slope steepness)**

Soils that have restrictions or limitations for forest land use or management because of steepness of slope.

#### **Subclass X (stoniness or rockiness)**

Soils that have restrictions or limitations for forest land use or management because of stones or rocks.

#### **Subclass W (excessive wetness)**

Soils in which excessive water, either seasonally or year round, causes significant limitations for forestland use and management. These soils may have restricted drainage, a high water table, or flooding hazard that adversely affects either stand development or management.

#### **Subclass T (toxic substances)**

Soils that have within the root zone excessive alkalinity, acidity, salt, or other toxic substances that limit or impede development of desirable species.

#### **Subclass D (restricted rooting depth)**

Soils that have restrictions or limitations for forest land use and management because of the rooting depth. For example, soils that are underlain by hard rock, hardpan, or other layers in the soil that restrict roots.

#### **Subclass C (clayey soils)**

Soils that have restrictions or limitations for forest land use or management because of the kind or amount of clay in the upper part of the soil profile.

#### **Subclass S (sandy soils)**

Dry, sandy soils that impose equipment limitations, have low moisture holding capacity, and normally are low in available plant nutrients.

#### **Subclass F (fragmental or skeletal soils)**

Soils that have restrictions or limitations for forest land use or management because they contain large amounts of rock fragments that are larger than 2mm and smaller than 10 inches. This subclass includes flaggy soils.

### **Subclass A (no limitations or slight limitations)**

Soils that have no significant restrictions or limitations for forest land use or management.

### **Multiple Limitations**

Some soils may have more than one limiting characteristic, but only one symbol will be used. Priority in placing each kind of soil into a subclass must be in the order in which the subclass characteristics are listed above. Plant competition and special considerations are not to be used to determine subclass.

Additional woodland management and productivity information presented in report "MAN - Table E2. Forestland Mgmt obs and Productivity" includes information on the hazard of erosion, equipment use, seedling mortality, and windthrow hazard. Ratings of SLIGHT, MODERATE, or SEVERE are used to indicate the degree of major soil limitations. Information on potential productivity includes plant competition, common trees, site index, productivity class, and trees to plant.

### **Management Concerns**

#### **Erosion Hazard**

The risk of erosion is slight if the expected soil loss is small; moderate if some measures are needed to control erosion during logging; and severe if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

#### **Equipment Limitation**

A rating of slight indicates use of equipment is not limited to a particular kind of equipment or time

of year; moderate indicates a short seasonal limitation, or a need for some modification in management of equipment; and severe indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

#### **Seedling Mortality**

The ratings are for seedlings from a good planting stock that are properly planted during a period of sufficient rainfall. A rating of slight indicates that the expected mortality of the planted seedlings is less than 25 percent; moderate - 25 to 50 percent; and severe - more than 50 percent.

#### **Windthrow Hazard**

A rating of slight indicates that trees in wooded areas are not expected to be blown down by commonly occurring winds; moderate - that some trees are blown down during periods of excessive soil wetness and strong winds; and severe - that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

### **Potential Productivity**

**Plant Competition** - A rating of slight indicates little or no competition from other plants; moderate indicates that plant competition is expected to hinder the development of the fully stocked stand of desirable trees; and severe means that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed for the control of undesirable plants.

**Common Trees** - Trees that woodland managers generally favor in intermediate or improvement cuttings.

**Site Index and Productivity Class** - These are discussed under ordination symbol.

**Trees to Plant** - Trees that are suitable for commercial wood production and that are adapted to the soil.

### **FOREST LAND INTERPRETATIONS NATIONAL FORESTRY MANUAL (August 2000 Edition)**

Woodland productivity and management tables are produced from NASIS. To produce woodland tables in NASIS:

- In the select manager, load the area, correlation, and data mapunit tables for the county
- Go to view, then standard tables
- Select NATIONAL tables
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Woodland productivity for each mapping unit in the county is found in "Table E1. -- Forest Productivity". Populated data elements are: Map symbol and soil name, common trees, site index, and volume of wood fiber.

**Map Symbol and Soil Name** - Each soil map unit symbol and the soil name in the survey is listed. An example is: Allegheny AgB = map unit symbol where Ag is the symbol for the soil Allegheny and B represents the slope (3 to 8 percent).

**Common trees** - lists the most common trees growing on the map

unit for the selected survey area. All map units have an indicator species which is the species that is common in the area and is generally, but not necessarily the most productive on the soil. In West Virginia, the indicator species is generally northern red oak.

**Site Index** - Site index (as determined from the identified site index curve) is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands.

**Volume of wood fiber** - the annual production of each identified species is expressed in terms of cubic feet per acre.

### **FOREST LAND MANAGEMENT (INTERPRETATIONS) NATIONAL FORESTRY MANUAL (August 2000 Edition)**

Criteria-based interpretations are derived from rating guides that are used to assess a soil component's features and properties. Interpretative ratings are automatically assigned to each soil component based on an evaluation of the rating criteria through the interpretations generator module in NASIS. In addition to the standard rating classes of slight, moderate, and severe, "fuzzy" ratings are given for each limitation. Fuzzy ratings (sometimes called approximate reasoning) range from 0.01 to 1.00. The larger the value, the greater the potential limitation (4).

The following interpretative tables are produced from NASIS under NATIONAL reports:

**MAN - Table FOR 1. Forest Land Management w/fuzzy rating**

Table - FOR 1 gives the map unit symbol and name and limitation ratings of slight, moderate, and severe or suited, moderately suited, and poorly suited (along with fuzzy ratings) for construction of haul roads and log landings, suitability for log landings, and soil rutting hazard.

Construction of haul roads and log landings ratings:

Ratings reflect limitations for constructing haul roads and log landings

**Suited** - little or no restrictions to road or log landing suitability

**Moderately suited** - one or more restrictions reduce site suitability

**Poorly suited** - one or more restrictions generally make the use of the site for a landing very difficult or unsafe.

Soil Rutting Hazard Ratings:

Ratings indicate the hazard or risk of ruts in the uppermost soil surface layers by operation of forest equipment. Soil displacement and puddling may occur simultaneously with rutting.

**Slight** - little or no rutting

**Moderate** - ruts are likely

**Severe** - ruts readily

**MAN - Table FOR 2. Forest Land Management w/fuzzy rating**

Table FOR 2 gives the map unit symbol and name and limitation ratings of slight, moderate, severe, very severe or suited, moderately suited, and poorly suited (along with fuzzy ratings) for hazard of off-road/off-trail erosion, hazard of

erosion on roads and trails, and suitability for roads (natural surface).

Hazard of Off-Road or Off-Trail Erosion ratings

Ratings indicate the hazard or risk of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface.

**Slight** - erosion is unlikely under ordinary climatic conditions.

**Moderate** - some erosion is likely; control measures may be needed.

**Severe** - erosion is very likely; control measures for vegetation re-establishment on areas and structural measures are advised.

**Very Severe** - Significant erosion is expected; loss of soil productivity and off-site damages are likely; control measures are costly and generally impractical.

Hazard of Erosion On Roads and Trails

The risk of soil loss from unsurfaced roads/trails.

**Slight** - little or no erosion is likely.

**Moderate** - some erosion is likely; occasional maintenance may be needed; simple erosion control measures needed.

**Severe** - significant erosion can be expected; roads require frequent maintenance; costly erosion control measures are needed.

Suitability for roads (natural surface)  
Suitability for using the natural surface of the soil component for roads by trucks for the transport of logs and other wood products from the site.

**Suited** - little or no restrictions to natural road suitability.

**Moderately suited** - one or more restrictions reduce site suitability.

**Poorly Suited** - one or more restrictions generally make the use of the site for a natural road very difficult or unsafe.

**MAN - Table FOR 3. Forest Land Management w/fuzzy rating**

Table FOR 3 gives the map unit symbol and name and limitation ratings of well suited, moderately suited, poorly suited (along with fuzzy ratings) for suitability for hand planting, suitability for mechanical planting, and suitability for use of harvesting equipment.

Suitability for Hand Planting

Ratings indicate the expected difficulty of hand planting

**Well Suited** - little or no restrictions to hand planting; planting rates are not affected

**Moderately Suited** - one or more restrictions that impede planting and reduce planting rates

**Poorly Suited** - one or more restrictions that severely impede planting and reduce planting rates

**Unsuited** - site factors and features prevent the proper planting of seedlings

Suitability for Mechanical Planting

Ratings indicate the expected difficulty of planting tree or shrub seedlings using a mechanical planter

**Well Suited** - little or no restrictions to mechanical planting; planting rates are not affected

**Moderately Suited** - one or more restrictions that impede planting and reduce planting rates

**Poorly Suited** - one or more restrictions that severely impede planting and reduce planting rates

**Unsuited** - site factors and features prevent mechanical planting of seedlings

Suitability for Use of Harvesting Equipment

Ratings indicate the suitability for operating harvesting equipment

**Well Suited** - little or no restrictions to equipment operability

**Moderately Suited** - one or more restrictions reduce the effective and safe use of equipment

**Poorly Suited** - one or more restrictions make the use of equipment impractical unsafe

**MAN - Table FOR 4. Forest Land Management w/fuzzy rating**

Table FOR 4 gives the map unit symbol and name and limitation ratings of suited, poorly suited, and unsuited (along with fuzzy ratings) for suitability for mechanical site preparation (surface) and suitability for mechanical site preparation (deep).

Suitability for Mechanical Site Preparation (surface)

Ratings indicate the suitability of using surface-altering soil tillage equipment

**Suited** - little or no restrictions to surface mechanical site preparation

**Poorly Suited** - one or more restrictions reduce the effective and safe use of equipment

**Unsuited** - one or more restrictions generally prevent the effective and safe use of equipment.

Suitability for Mechanical Site Preparation (deep)

Ratings indicate the suitability of using deep soil tillage equipment

**Suited** - little or no restrictions to deep mechanical site preparation

**Poorly Suited** - one or more restrictions reduce the effective and safe use of equipment

**Unsuited** - one or more restrictions generally prevent a sufficient level of deep mechanical site preparation

**REFERENCES**

- (1) National Soil Information System  
- Version 4.1 NRCS
- (2) National Forestry Manual, Title 190, September 1980  
(Amendments 1-4)
- (3) <http://nssent.nssc.hrcs.usda.gov/nfm/preface.htm>  
(Amendments 1-3)
- (4) NASIS Interpretations Handbook, 1997