

**Forest Service Handbook  
National Headquarters - Washington Office  
Washington, DC**

**Forest Service Handbook 6609.15 – Standards for Data and Data Structures Handbook  
Chapter 20 – Standard Terms and Definitions**

**Amendment:** 6609.15-1993-1

**Effective date:** April 28, 1993

**Duration:** This amendment is effective until superseded or removed.

**Approved by:** F. Dale Robertson, Chief

**Date approved:**

**Responsible Staff:**

**Last Change:**

**Superseded Document(s):**

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

**6609.15:** Establishes a new Handbook, FSH 6609.15, Standards for Data and Data Structures Handbook. Chapter 10, Database Naming Standards, is reserved. Chapter 20 covers Standard Terms and Definitions for the integrated data environment.

**Table of Contents**

<b>21.15 - Soil Theme.....</b>	<b>3</b>
<b>21.15a - Soil Feature.....</b>	<b>3</b>
<b>21.15b - Soil Attributes.....</b>	<b>3</b>
<b>21.16 - Water Theme.....</b>	<b>13</b>
<b>21.16a - Water Features .....</b>	<b>13</b>
<b>21.16b - Water Attributes.....</b>	<b>13</b>
<b>21.17 - Air/Climate Theme .....</b>	<b>24</b>
<b>21.17a - Air/Climate Features .....</b>	<b>24</b>
<b>21.17b - Air/Climate Attributes.....</b>	<b>24</b>

## 21.15 - Soil Theme

The Soil theme organizes information about soil measurements and interpretations. It includes the Soil Mapping Unit feature.

### 21.15a - Soil Feature

Soil Mapping Unit. A Soil Mapping Unit is areas of similar soil and topographic characteristics.

### 21.15b - Soil Attributes

The Soil feature has one or more of the following attributes:

Available Water Capacity (AWC). Soil water available to plants; the difference between field capacity and wilting point.

1. Valid Values. Not Applicable.
2. Units. Inches and hundredths of inches of water per inch of soil depth (in/in).
3. Example. .05 inch per inch.
4. Source for Data Standard. U.S. Department of Agriculture, Soil Conservation Service. 1983. National soils handbook. Washington, DC: U.S. Department of Agriculture, Soil Conservation Service. 1 vol.

Bare Mineral Soil Surface. That uncovered portion of the mineral soil surface, excluding surface rock, that is exposed to erosion.

1. Valid Values. 0 to 100.
2. Units. Percent to nearest whole percent.
3. Example. The plot has 10% bare mineral soil.
4. Source for Data Standard. Task team.

Base Saturation. Extent to which the adsorption complex of a soil is saturated with exchangeable cations other than aluminum and hydrogen. Expressed as a percent of total cation exchange capacity.

1. Valid Values. 0-100.
2. Units. Percent to nearest whole percent.

3. Example. 51%.
4. Source for Data Standard. Black. 1965. Agronomy monographs, No. 9. American Society of Agronomy.

Bulk Density. The mass of dry soil per unit moist bulk volume. Bulk volume is determined before drying to constant weight.

1. Valid Values. Not Applicable.
2. Units. Grams per cubic centimeter (g/cm<sup>3</sup>).
3. Example. 1.35 g/cm<sup>3</sup>.
4. Source for Data Standard. Black. 1965. Agronomy monographs, No. 9. American Society of Agronomy.

Cation Exchange Capacity. The sum of exchangeable cations that a soil, soil constituent or other material can adsorb at a specific pH.

1. Valid Values. Not Applicable.
2. Units. Milliequivalents per 100 grams of soil.
3. Example. 21.2 meq/100 g.
4. Source for Data Standard. Black. 1965. Agronomy Monographs, No. 9. American Society of Agronomy.

Coarse Fragments. Proportion of rock or mineral particles > 2.0 mm in diameter in the soil.

1. Valid Values. 0-100.
2. Units. Percent to nearest whole percent by volume within each soil horizon.
3. Example. Coarse fragments constitute 10 percent of the soil.
4. Source for Data Standard. U.S. Department of Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering. 1981. Soil survey manual. Rev. ed. Agric. Handb. 18. Washington, DC: U.S. Department of Agriculture, Agricultural Research Administration. 503 p.

Depth to Bedrock. Vertical distance from the soil surface to solid rock.

1. Valid Values. Not Applicable.
2. Units. Inches.
3. Example. 50 inches.
4. Source for Data Standard. U.S. Department of Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering. 1981. Soil survey manual. Rev. ed. Agric. Handb. 18. Washington, DC: U.S. Department of Agriculture, Agricultural Research Administration. 503 p.

Depth to Seasonally High Water Table. Distance from the soil surface to the zone of saturation, at the highest level of saturation during the wettest season. The zone should be at least 6 inches thick and persist in the soil for more than a few weeks.

1. Valid Values. Not Applicable.
2. Units. Feet and tenths of feet.
3. Example. 1.5 feet.
4. Source for Data Standard. U.S. Department of Agriculture, Soil Conservation Service. 1983. National soils handbook. Washington, DC: U.S. Department of Agriculture, Soil Conservation Service. 1 vol.

Detrimental Soil Disturbance. The condition where threshold values for soil properties are exceeded and result in significant change.

1. Valid Values. Not Applicable.
2. Units. See FSH 2509.18, chapter 2, sec. 2.05.
3. Example. Compaction.
4. Source for Data Standard. FSH 2509.18, chapter 2.

Drainage Class. The rapidity and extent of the removal of water from the soil, in relation to incoming water.

1. Valid Values. Seven standard classes.
2. Units. Not Applicable.

3. Example. Well drained.

4. Source for Data Standard.

U.S. Department of Agriculture, Soil Conservation Service. 1983. National soils handbook. Washington, DC: U.S. Department of Agriculture, Soil Conservation Service. 1 vol.

U.S. Department of Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering. 1981. Soil survey manual. Rev. ed. Agric. Handb. 18. Washington, DC: U.S. Department of Agriculture, Agricultural Research Administration. 503 p.

Erosion Class. The existing condition based on the degree of erosion or on characteristic patterns.

1. Valid Values. Four water and three wind classes.

2. Units. Not Applicable.

3. Example. Slightly eroded or severely eroded.

4. Source for Data Standard. U.S. Department of Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering. 1981. Soil survey manual. Rev. ed. Agric. Handb. 18. Washington, DC: U.S. Department of Agriculture, Agricultural Research Administration. 503 p.

Infiltration. Rate of entry of water into the soil at the surface.

1. Valid Values. Not Applicable.

2. Units. Inches/hour.

3. Example. 8 inches/hour.

4. Source for Data Standard. U.S. Department of Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering. 1981. Soil survey manual. Rev. ed. Agric. Handb. 18. Washington, DC: U.S. Department of Agriculture, Agricultural Research Administration. 503 p.

Organic Matter. The organic fraction of the soil; includes plant and animal residues in various stages of decomposition.

1. Valid Values. 0-100.

2. Units. Percent to nearest whole percent by weight.
3. Example. 3% of the soil sample consists of organic matter.
4. Source for Data Standard. Black. 1965. Agronomy monographs, No. 9. American Society of Agronomy.

Permeability. The ease with which gases, liquids, or plant roots penetrate or pass through a bulk mass or layer of soil.

1. Valid Values. Not Applicable.
2. Units. Inches and tenths of inches/hour.
3. Example. .1 in/hr.
4. Source for Data Standard. U.S. Department of Agriculture, Soil Conservation Service. 1983. National soils handbook. Washington, DC: U.S. Department of Agriculture, Soil Conservation Service. 1 vol.

Pore Space. Proportion of total space not occupied by soil particles in a bulk volume of soil.

1. Valid Values. 0-99.
2. Units. Percent to nearest whole percent.
3. Example. 30% pore space.
4. Source for Data Standard. U.S. Department of Agriculture, Soil Conservation Service. 1975. Soil taxonomy: a basic system of soil classification for making and interpreting soil surveys. Agric. Handb. 436. Washington, DC: U.S. Department of Agriculture, Soil Conservation Service. 754 p.

Restrictive Layer. A dense, hard soil layer that can impede plant growth and/or water permeability.

1. Valid Values. Present or absent.
2. Units. Not applicable.
3. Example. Fragipan, duripan present.
4. Source for Data Standard.

U.S. Department of Agriculture, Soil Conservation Service. 1983. National soils handbook. Washington, DC: U.S. Department of Agriculture, Soil Conservation Service. 1 vol.

U.S. Department of Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering. 1981. Soil survey manual. Rev. ed. Agric. Handb. 18. Washington, DC: U.S. Department of Agriculture, Agricultural Research Administration. 503 p.

Soil Color. The basic soil properly identified in terms of hue, value, and chroma by comparison to a set of standard color charts. Hue: the dominant spectral (rainbow) color; it is related to the dominant wavelength of the light. Value: the relative lightness of color and is a function (approximately the square root) of the total amount of light. Chroma: (sometimes called saturation) the relative purity or strength of the spectral color and increases with decreasing grayness.

1. Valid Values. Munsell Soil Colors.
2. Units. Not Applicable.
3. Example. 10 YR 5/4.
4. Source for Data Standard. Munsell Soil Color Book; Munsell Color Co.

Soil Depth. The thickness of unconsolidated mineral material on the immediate surface of the earth that serves as a natural medium for the growth of land plants.

1. Valid Values. Not Applicable.
2. Units. Inches.
3. Example. 38 inches.
4. Source for Data Standard. U.S. Department of Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering. 1981. Soil survey manual. Rev. ed. Agric. Handb. 18. Washington, DC: U.S. Department of Agriculture, Agricultural Research Administration. 503 p.

Soil Erosion Type. Form of soil erosion dominant on a specific area. Erosion is the process of removal of soil material by running water, wind or gravitational creep.

1. Valid Values. See Soil Survey Manual.
2. Units. Not Applicable.



3. Example. Water - sheet.
4. Source for Data Standard. U.S. Department of Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering. 1981. Soil survey manual. Rev. ed. Agric. Handb. 18. Washington, DC: U.S. Department of Agriculture, Agricultural Research Administration. 503 p.

Soil Litter Cover. Dead plant material in contact with the soil surface that provides protection from erosion.

1. Valid Values. 0-100.
2. Units. Percent to nearest whole percent.
3. Example. 35%.
4. Source for Data Standard. Not Applicable.

Soil Live Vegetative Cover. Living plant material, in contact with the soil surface, that provides protective soil cover. This includes basal area of stems.

1. Valid Values. 0-100.
2. Units. Percent to nearest whole percent of area.
3. Example. 50%.
4. Source for Data Standard. Resource Inventory Coordination Task Group.

Soil Moisture Regime. A class that reflects the presence or absence either of ground water or water held at a tension <15 bars in the soil in specific horizons by periods of the year.

1. Valid Values. Five classes, see source.
2. Units. Not Applicable.
3. Example. Aquic; udic.
4. Source for Data Standard. U.S. Department of Agriculture, Soil Conservation Service. 1975. Soil taxonomy: a basic system of soil classification for making and interpreting soil surveys. Agric. Handb. 436. Washington, DC: U.S. Department of Agriculture, Soil Conservation Service. 754 p.

Soil Parent Material. The unconsolidated and more or less physically and chemically weathered mineral or organic matter from which the solum of soils is developed by pedogenic processes.

1. Valid Values. Refer to "Lithologic Unit" for appropriate codes.
2. Units. Not Applicable.
3. Example. Sandstone, alluvial.
4. Source for Data Standard. U.S. Department of Agriculture, Forest Service, Resource Inventory Coordination Task Group. 1989. Interim resource inventory glossary. Washington, DC: U.S. Department of Agriculture, Forest Service. 96 p.

Soil Particle Size. Proportion of each of the various soil separates (sand, silt, and clay).

1. Valid Values. Not Applicable.
2. Units. Percent by weight.
3. Example. 33% clay.
4. Source for Data Standard. U.S. Department of Agriculture, Soil Conservation Service. 1983. National soils handbook. Washington, DC: U.S. Department of Agriculture, Soil Conservation Service. 1 vol.

Soil pH. The degree of acidity or alkalinity of a soil.

1. Valid Values. 0-14.
2. Units. pH units.
3. Example. 6.2.
4. Source for Data Standard. Black. 1965. Agronomy monographs, No. 9. American Society of Agronomy.

Soil Structure. The combination or arrangement of primary soil particles into secondary particles, units or peds. Described by grade, class, and type.

1. Valid Values. Standard in Soil Survey Manual.
2. Units. Not Applicable.
3. Example. 1 FSBK (weak, fine, subangular blocky).

4. Source for Data Standard.

U.S. Department of Agriculture, Soil Conservation Service. 1983. National soils handbook. Washington, DC: U.S. Department of Agriculture, Soil Conservation Service. 1 vol.

U.S. Department of Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering. 1981. Soil survey manual. Rev. ed. Agric. Handb. 18. Washington, DC: U.S. Department of Agriculture, Agricultural Research Administration. 503 p.

U.S. Department of Agriculture, Soil Conservation Service. 1975. Soil taxonomy: a basic system of soil classification for making and interpreting soil surveys. Agric. Handb. 436. Washington, DC: U.S. Department of Agriculture, Soil Conservation Service. 754 p.

Soil Taxonomic Unit. A soil class at any categorical level in the USDA system of soil classification.

1. Valid Values. Soil classes from Source.
2. Units. Not Applicable.
3. Example. Typic Cryoboroll or Cecil Series.
4. Source for Data Standard. U.S. Department of Agriculture, Soil Conservation Service. 1975. Soil taxonomy: a basic system of soil classification for making and interpreting soil surveys. Agric. Handb. 436. Washington, DC: U.S. Department of Agriculture, Soil Conservation Service. 754 p.

Soil Temperature Regime. A class used in Soil Taxonomy that reflects mean annual soil temperature, average seasonal fluctuations from that mean, and the mean warm or cold seasonal soil-temperature gradient.

1. Valid Values. 10 classes.
2. Units. Not Applicable.
3. Example. Frigid or cryic or xeric.
4. Source for Data Standard. U.S. Department of Agriculture, Soil Conservation Service. 1975. Soil taxonomy: a basic system of soil classification for making and interpreting soil surveys. Agric. Handb. 436. Washington, DC: U.S. Department of Agriculture, Soil Conservation Service. 754 p.

Soil Texture Class. Classification based on relative proportions of sand, silt, and clay in soil described by U.S. Department of Agriculture classes of soil texture.

1. Valid Values. CL, SIL, L (see source, para. 4, National Soils Handbook).
2. Units. Not Applicable.
3. Example. Clay Loam.
4. Source for Data Standard.

U.S. Department of Agriculture, Soil Conservation Service. 1983. National soils Handbook. Washington DC: U.S. Department of Agriculture, Soil Conservation Service. 1 vol.

U.S. Department of Agriculture, Bureau of Plant Industry, Soils, and Agricultural Engineering. 1981. Soil survey manual. Rev. ed. Agric. Handb. 18. Washington, DC: U.S. Department of Agriculture, Agricultural Research Administration. 503 p.

Soil Water. Water contained in the soil, measured by volume.

1. Valid Values. 0-100.
2. Units. Percent to nearest whole percent.
3. Example. 10%.
4. Source for Data Standard. 1987, SSSA Glossary.

Surface Rock. Rock fragments on the soil surface, including those that lie on the surface and those that are partly within the soil but protrude above ground.

1. Valid Values. 0-100.
2. Units. Percent of area.
3. Example. 5% of activity area, map area or plot.
4. Source for Data Standard. Not Applicable.

Thickness of "A" Horizon. Thickness of the upper horizon of mineral soils characterized by loss of clay, iron or aluminum and accumulation of organic matter.

1. Valid Values. Not Applicable.
2. Units. Inches.
3. Example. 5 inches.
4. Source for Data Standard. U.S. Department of Agriculture, Soil Conservation Service. 1975. Soil taxonomy: a basic system of soil classification for making and interpreting soil surveys. Agric. Handb. 436. Washington, DC: U.S. Department of Agriculture, Soil Conservation Service. 754 p.

## **21.16 - Water Theme**

The Water theme organizes information about water measurements and interpretations. It includes the Spring/Seep, Water Body, Water Course, Watershed, and Wetland features.

### **21.16a - Water Features**

Spring/Seep. A Spring/Seep is a place where ground water is discharged to the surface.

Water Body. A Water Body is standing water (for example, lakes, reservoirs, ponds, oceans).

Water Course. A Water Course is flowing water (for example, rivers, streams, creeks, brooks).

Watershed. A Watershed is an identifiable area which drain to particular water courses or water bodies.

Wetland. A Wetland is an area of land characterized by the interface between aquatic and terrestrial ecosystems (for example, marshes, swamps, bogs, estuaries).

### **21.16b - Water Attributes**

Water features have one or more of the following attributes:

Alkalinity. A measure of the power of a solution to neutralize hydrogen ions.

1. Valid Values. Refer to STORET. (STORage and RETrieval system and national water quality database devised and operated by the U.S. Environmental Protection Agency).
2. Units. Milligrams per liter (mg/l) as calcium carbonate (CaCO<sub>3</sub>) equivalent.
3. Example. Alkalinity of the water sample is 14 mg/l.

4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Aquatic Habitat Type. A reach of stream with distinct gradient, shape, and flow patterns that define aquatic habitat features and response.

1. Valid Values. See Source.
2. Units. Square feet per unit length (usually sq. ft. per mile).
3. Example. Pool, glide, run, riffle are all distinct aquatic habitat units.
4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Average Depth. Arithmetic average of two or more vertical measurements from the water surface to the bottom of a water body or water course.

1. Valid Values. Not Applicable.
2. Units. Feet.
3. Example. The average depth of Portage Lake is 178 feet.
4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol. p.43

Bedload Sediment. Sediment moving on or near the stream bed and frequently in contact with it.

1. Valid Values. Not Applicable.
2. Units. Weight (pounds, kilograms, tons, and so forth) per unit time.
3. Example. Bedload movement on the Entiat River was estimated to be 650 pounds for the month of July 1977.
4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard

methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Clarity. The transparency of water expressed in depth of light penetration.

1. Valid Values. Not Applicable.
2. Units. Feet.
3. Example. A secci disk measurement of Lake Tahoe on June 16th indicated a clarity of 22 feet.
4. Source for Data Standard. Veatch, Jethro Otto; Humphrys, Clifford R. 1966. water and water use terminology. Kaukauna, WI: Thomas Printing. 375 p.

Dissolved Oxygen. The concentration of oxygen dissolved in water.

1. Valid Values. Not Applicable.
2. Units. Milligrams per liter (mg/l).
3. Example. 8 mg/l.
4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Embeddedness. Degree to which larger particles (boulders, cobbles, gravels) are surrounded or covered by fine sediment (sand, silt, clay) in a stream.

1. Valid Values. 0-100.
2. Units. Percent to nearest whole percent.
3. Example. Average embeddedness of the Salmon River is 13 percent.
4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Evapotranspiration Rate. The rate of movement of water to the atmosphere from water, land, or plant surfaces (evaporation) or through a plant (transpiration).

1. Valid Values. Not Applicable.
2. Units. Inches or millimeters per unit of time.
3. Example. 10 inches of the total rainfall in King County is lost to evapotranspiration each year.
4. Source for Data Standard. Chow, Ven Te, ed. 1964. Handbook of applied hydrology: a compendium of water-resources technology. New York, NY: McGraw-Hill. 1 vol.

Fecal Coliform Count. A species of intestinal bacteria used as an index of potential disease transmission by the presence of animal wastes.

1. Valid Values. Refer to STORET (STOrage and RETrieval system and national water quality database devised and operated by the U.S. Environmental Protection Agency).
2. Units. Colonies per 100 milliliters (100 ml).
3. Example. The fecal coliform count of a water sample from Pyramid Beach swimming area was 350 colonies per 100 ml.
4. Source for Data Standard. U.S. Department of the Interior, Geological Survey. 1977. National handbook of recommended methods for water-data acquisition. Reston, VA: U.S. Department of the Interior, Geological Survey. 2 vol.

Flushing Period. Time required for an amount of water equal to the volume of the lake to pass through its outlet.

1. Valid Values. Not Applicable.
2. Units. Hours or days.
3. Examples. The flushing period of Crystal Lake was 11 days in June 1982.
4. Source for Data Standard. Veatch, Jethro Otto; Humphrys, Clifford R. 1966. Water and water use terminology. Kaukauna, WI: Thomas Printing. 375 p.

Hydrologic Unit. A delineated watershed in a six-level hierarchical system used by government agencies in the United States.

1. Valid Values. See Source.
2. Units. Not Applicable.



3. Example. West Fork San Gabriel River is a Hydrologic Unit.
4. Source for Data Standard. U.S. Geological Survey, Hydrologic Unit Codes for the United States and maps for each State.

Lake Volume. Total amount of water in a water body at a given time.

1. Valid Values. Not Applicable.
2. Units. Acre-feet.
3. Example. The volume of Spruce Lake is 12,150 acre-feet.
4. Source for Data Standard. U.S. Geological Survey.

Large Woody Debris. Woody material having a diameter greater than 10 cm and a length greater than 1 meter that intrudes into a stream channel.

1. Valid Values. Not Applicable.
2. Units. Cubic meters/unit distance.
3. Examples. Logs, root wads, boles, sweepers per mile.
4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard Methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Littoral Area. A narrow zone influenced by wave action including both land and water immediately bordering the shoreline of a water body.

1. Valid Values. Not Applicable.
2. Units. Acres.
3. Example. Stuart Lake has 3 acres of littoral area.
4. Source for Data Standard. Veatch, Jethro Otto; Humphrys, Clifford R. 1966. Water and water use terminology. Kaukauna, WI: Thomas Printing. 375 p.

Maximum Depth. The greatest distance measurable from the water surface to the bottom of a water body at a given time.

1. Valid Values. Not Applicable.

2. Units. Feet.
3. Example. The maximum depth of San Gabriel Reservoir was 234 feet on July 1.
4. Source for Data Standard. Veatch, J.O; Humphrys, C.R. 1966. Water and water use terminology. Thomas Printing and Pub. Kaukauna, WI.

Sediment Discharge. Amount of sediment passing a point per unit of time.

1. Valid Values. Not Applicable.
2. Units. Weight (pounds, kilograms, tons, and so forth) per unit of time.
3. Example. 30 tons per year.
4. Source for Data Standard. U.S. Department of Agriculture, Forest Service, and Environmental Protection Agency. 1980. Water resources evaluation of non-point silvicultural sources (WRENS). A handbook for predicting effects on water quality and quantity from Forest Service management activities.

Shoreline Development Ratio. Ratio of the length of the shoreline to the circumference of a circle of equal area.

1. Valid Values. Not Applicable.
2. Units. Expressed as numerical ratio.
3. Example. The shoreline development ratio for Cuddihy Lake is 2.7.
4. Source for Data Standard. Veatch, Jethro Otto; Humphrys, Clifford R. 1966. Water and water use terminology. Kaukauna, WI: Thomas Printing. 375 p.

Snow Pack Depth. The depth of snow accumulation at a specific site and time.

1. Valid Values. Not Applicable.
2. Units. Inches or feet.
3. Example. 40 inches.

4. Source for Data Standard. SNOwpack TELelemetry (SNOTEL) system of the Soil Conservation Service. An automated climatic and hydrological data acquisition network and resulting database.

Specific Conductance. Ability of a solution to conduct an electrical current, determined by the total concentration of dissolved ions in the water.

1. Valid Values. Not Applicable.
2. Units. Microsiemens per centimeter at 25 degrees Celsius.
3. Example. 25 uS/cm @ 25 °C.
4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Stratification. The separation of water layers in a water body by abrupt temperature gradients.

1. Valid Values. Presence or absence.
2. Units. Depth in feet.
3. Example. No stratification occurs in Black Bear Lake.
4. Source for Data Standard. Veatch, Jethro Otto; Humphrys, Clifford R. 1966. Water and water use terminology. Kaukauna, WI: Thomas Printing. 375 p.

Stream Discharge. Volume of water flowing past a specific point per unit time.

1. Valid Values. Not Applicable.
2. Units. Cubic feet per second (cfs).
3. Example. 10 cfs.
4. Source for Data Standard. U.S. Geological Survey.

Stream Order. The relative position of a reach of defined channel in a stream network. An unbranched reach is a 1st order stream; the junction of two 1st-order streams produces a 2nd-order stream; the junction of two nth order streams produces an n+1 order stream.

1. Valid Values. Not Applicable.

2. Units. Not Applicable.
3. Example. Refer to diagram on p. 28, American Fisheries Society glossary (see Source).
4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Stream Shade. The amount of shade covering a stream surface averaged for the day.

1. Valid Values. 0-100.
2. Units. Percent (%).
3. Example. Tyee Creek above Mad River measured 60% shade on July 12, 1976.
4. Source for Data Standard. U.S. Department of Agriculture, Forest Service, Resource Inventory Coordination Task Group. 1989. Interim resource inventory glossary. Washington, DC: U.S. Department of Agriculture, Forest Service. 96 p.

Stream Width. Width of the water surface measured at right angles to the direction of flow and at a specific discharge.

1. Valid Values. Not Applicable.
2. Units. Feet or metric equivalent.
3. Example. The width of the North Fork Clearwater River at Purple Beach was 35 feet on August 25, 1974.
4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Substrate. The mineral and/or organic material that forms the bed of a stream or lake.

1. Valid Values. See Source.
2. Units. Mean diameter in inches or centimeters.
3. Example. Cobbles, sand, gravel, boulder.

4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Surface Water Gradient. The change in elevation of water surface per unit of horizontal length of a stream (synonymous with slope or energy gradient).

1. Valid Values. Not Applicable.
2. Units. Percent.
3. Examples. The slope (gradient) of Big Butch Wash is 12 percent.
4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Suspended Sediment. Measure of the portion of total sediment load that moves in suspension, free from contact with the stream bed.

1. Valid Values. Not Applicable.
2. Units. Milligrams per liter (mg/l)(concentration), or weight per unit time (discharge).
3. Example. Suspended Sediment Concentration on Blue Creek peaked at 260 mg/l during the storm event of January 27-30, 1973.
4. Source for Data Standard.

American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Schwarz, C.F. 1976. Wildland planning glossary. Gen. Tech. Rep. PSW-13. Berkeley, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Forest and Range Experiment Station. 252 p.

Trophic Classification. Classification of lake fertility.

1. Valid Values.

<u>Value</u>	<u>Meaning</u>
Eutrophic	Well provided with basic nutrients needed for plant and animal production.
Mesotrophic	Having intermediate fertility.
Oligotrophic	Poorly provided with basic nutrients needed for plant and animal production.

2. Units. Not Applicable.
3. Examples. Blue Lake is eutrophic.
4. Source for Data Standard. Veatch, Jethro Otto; Humphrys, Clifford R. 1966. Water and water use terminology. Kaukauna, WI: Thomas Printing. 375 p.

Turbidity. The extent to which light transmission is reduced by suspended sediment in water.

1. Valid Values. Not Applicable.
2. Units. Milligrams per liter (mg/l).
3. Example. The turbidity of Blue Creek peaked at 850 mg/l during the storm event of January 27-30, 1973.
4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Velocity. Rate of water movement in a stream.

1. Valid Values. Not Applicable.
2. Units. Feet/second.
3. Example.

Critical velocity. (a) The maximum water velocity against which a fish can sustain a position over a specified length of time, (b) the velocity in a channel at which flow changes from laminar to turbulent.

Focal velocity. The velocity measured at a fish's snout.

Mean column velocity. The average velocity over the entire cross section of water flow. The average velocity measured on a vertical line at any point in a stream; measured at 60% depth in water less than 3 feet deep, and at 20% and 80% of depth in water over 3 feet deep.

4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Water Equivalent. Total water content of a snow pack.

1. Valid Values. Not Applicable.
2. Units. Inches.
3. Example. 6 inches.
4. Source for Data Standard. SNOwpack TELelemetry (SNOTEL) system of the Soil Conservation Service. An automated climatic and hydrological data acquisition network and resulting database.

Water pH. A measure of acidity; the hydrogen-ion activity in a solution, expressed as the negative log (base 10) of the hydrogen ion concentration on a scale of 0 to 14.

1. Valid Values. 0-14.
2. Units. Standard pH units.
3. Example. 7.0 (neutral).
4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

Water Temperature. The specific degree of hotness or coldness of a water body.

1. Valid Values. Not Applicable.

2. Units. Degrees (Celsius or Fahrenheit).
3. Example. 20 degrees Celsius.
4. Source for Data Standard. Webster's II new Riverside university dictionary. 1984. Boston, MA: Riverside Pub. 1536 p.

Watershed Area. Total land area draining to a point.

1. Valid Values. Not Applicable.
2. Units. Square miles, acres.
3. Example. The drainage area of the Bull Run River above the Headworks facility is 96,050 acres.
4. Source for Data Standard. American Fisheries Society, Western Division, Habitat Inventory Committee. 1985. Aquatic habitat inventory: glossary and standard methods. S.L: American Fisheries Society, Western Division, Habitat Inventory Committee. 1 vol.

## **21.17 - Air/Climate Theme**

The Air/Climate theme organizes information about characteristics of the weather, air, and related measurements and interpretations about the atmosphere. It includes the Lightning Strike and Pollution Source features.

### **21.17a - Air/Climate Features**

Lightning Strike. Ground locations of lightning strike points (for example, fire origin).

Pollution Source. A point source of pollution.

### **21.17b - Air/Climate Attributes**

Air/Climate features have one or more of the following attributes:

Ambient Air Nitrogen Dioxide Concentration. NO<sub>2</sub> concentrations at sites on or representative of National Forest System lands.

1. Valid Values. Standard chemical notation and common name.
2. Units. Parts per million (ppm) or micrograms per cubic meter (ug/m<sup>3</sup>).



3. Example. 5 ppm of NO<sub>2</sub>.
4. Source for Data Standard. Forest Service, State Air Pollution Control Agencies, others.

Ambient Air Ozone Concentration. Ozone concentrations at sites on or representative of National Forest System lands.

1. Valid Values. Standard chemical notation and common name.
2. Units. Part per million (ppm) or micrograms per cubic meter (ug/m<sup>3</sup>).
3. Example. 5 ppm of ozone (O<sub>3</sub>).
4. Source for Data Standard. Forest Service, State Air Pollution Control Agencies, others.

Ambient Air PM-10 Concentration. Concentrations by averaging time of particles equal to or less than 10 microns in diameter at sites on or representative of National Forest lands.

1. Valid Values. PM-10.
2. Units. Micrograms per cubic meter (ug/m<sup>3</sup>).
3. Example. 5 ugm/m<sup>3</sup>.
4. Source for Data Standard. Forest Service, State Air Pollution Control Agencies, others.

Ambient Air Sulfur Dioxide Concentration. SO<sub>2</sub> concentrations at sites on or representative of National Forest System lands.

1. Valid Values. Standard chemical notation and common name.
2. Units. Part per million (ppm) or micrograms per cubic meter (ug/m<sup>3</sup>).
3. Example. 5 ppm of sulfur dioxide (SO<sub>2</sub>).
4. Source for Data Standard. Forest Service, State Air Pollution Control Agencies, others.

Mixing Height. The height above the ground surface within which air pollutants are mixed (sometimes also called Mixing Depth).

1. Valid Values. Not Applicable.
2. Units. Meters.

3. Example. The mixing height is 500 meters.
4. Source for Data Standard. National Oceanic and Atmospheric Administration/National Weather Service.

N Concentration, Snowpack. The elemental nitrogen equivalent concentration of the snowpack at a specific sampling site.

1. Valid Values. Not Applicable.
2. Units. Micrograms per liter (ug/l).
3. Example. The N concentration of snowpack at the Fernberg site in R-9 is 5 ug/liter.
4. Source for Data Standard. Fox, Douglas D; Bernabo, J. Christopher; Hood, B. 1987. Guidelines for measuring the physical, chemical, and biological condition of wilderness ecosystems. Gen. Tech. Rep. RM-146. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 48 p.

N Loading, Deposition. The elemental nitrogen equivalent deposited to the surface at a specific sampling site.

1. Valid Values. Not Applicable.
2. Units. Kilograms per hectare per year (kg/ha/yr).
3. Example. The deposition of N at the Glacier Lakes site is estimated at 5 kg/ha/yr.
4. Source for Data Standard. Environmental Protection Agency/National Dry Deposition Network (NDDN).

pH, Deposition. The pH of aerosols deposited to the surface at a sampling site.

1. Valid Values. 0-14.
2. Units. Hydrogen ion average concentration in pH units.
3. Example. The pH of acid deposition of Bell Tower, NV is 5.6.
4. Source for Data Standard. Environmental Protection Agency National Acid Deposition Program (NADP).

pH, Snowpack. The pH of melted snow at a sampling site.

1. Valid Values. 0-14.
2. Units. Hydrogen ion concentration in pH units.
3. Example. The pH of the snowpack at Iceberg, MT is 5.0.
4. Source for Data Standard. Fox, Douglas D; Bernabo, J. Christopher; Hood, B. 1987. Guidelines for measuring the physical, chemical, and biological condition of wilderness ecosystems. Gen. Tech. Rep. RM-146. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 48 p.

Precipitation. The amount of precipitation.

1. Valid Values. Not Applicable.
2. Units. Millimeters (mm).
3. Example. 1 mm.
4. Source for Data Standard. National Oceanic and Atmospheric Administration/National Weather Service.

Relative Humidity, Ambient Air. Ratio of measured vapor pressure of air to the saturation vapor pressure at a specific site.

1. Valid Values. 0-100.
2. Units. Percent.
3. Example. The relative humidity at West Spot, MS is 50 percent.
4. Source for Data Standard. National Oceanic and Atmospheric Administration/National Weather Service.

S Concentration, Snowpack. The elemental sulfur equivalent concentration of the snowpack at a specific site.

1. Valid Values. Not Applicable.
2. Units. Micrograms per liter (ug/l).

3. Example. In Smithville, PA, the S in the snowpack is 6 ug/l (water equivalent).
4. Source for Data Standard. Fox, Douglas D; Bernabo, J. Christopher; Hood, B. 1987. Guidelines for measuring the physical, chemical, and biological condition of wilderness ecosystems. Gen. Tech. Rep. RM-146. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 48 p.

S Loading, Deposition. Elemental sulfur equivalent deposited to the surface at a specific sampling site.

1. Valid Values. Not Applicable.
2. Units. Kilograms per hectare (kg/ha).
3. Example. The deposition of S at the Glacier Lakes site is estimated at 8 kg/ha.
4. Source for Data Standard. Environmental Protection Agency/National Dry Deposition Network (NDDN).

Stability, Atmospheric. Description of the changing atmosphere as stable to unstable depending on decreases or increases of buoyancy forces acting on an upward-moving element at a specific sampling site and season.

1. Valid Values. The accepted classification scheme is the Pasquill-Gifford stability class (A = extremely unstable to G = extremely stable).
2. Units. Not Applicable.
3. Example. The atmosphere's stability in winter at Flagstaff, AZ is B.
4. Source for Data Standard.

Pasquill, F. 1961. The estimate of dispersion of windborne material. Meteorological Magazine vol. 90, chap. 1063, 33 p.

D. Bruce, Turner. 1970. Workbook of atmospheric dispersion estimates. Research Triangle Park, NC: Environmental Protection Agency.

Temperature, Ambient Air. The thermal measure of shielded ambient air.

1. Valid Values. Not Applicable.
2. Units. Degrees Celsius (°C).

3. Example. 5°C.
4. Source for Data Standard. National Oceanic and Atmospheric Administration/National Weather Service.

Temperature, Dewpoint Air. The temperature at which ambient air water vapor condenses at a specific sampling site and time.

1. Valid Values. Not Applicable.
2. Units. Degrees Celsius (°C).
3. Example. 19°C.
4. Source for Data Standard. National Oceanic and Atmospheric Administration/National Weather Service.

Temperature, Wetbulb Air. The temperature of the ambient air around a moistened wick.

1. Valid Values. Not Applicable.
2. Units. Degrees Celsius (°C).
3. Example. 7°C.
4. Source for Data Standard. National Oceanic and Atmospheric Administration/National Weather Service.

Visibility Contrast. The difference in visible light emanating from two points in a scene. Most Forest Service contrast data is derived from photographic densitometry measurements.

1. Valid Values. Numeric.
2. Units. Not Applicable (Nondimensional).
3. Example. .02.
4. Source for Data Standard. Photographic and densitometry measurements.

Visibility Extinction. The absolute loss of light (usually in a narrow part of the electromagnetic (EM) spectrum) along a path.

1. Valid Values. Not Applicable.

2. Units. Percent.
3. Example. 15 percent (or .15).
4. Source for Data Standard. Forest Service Watershed and Air Management Staff.

Visual Range. The daytime distance that an object just becomes visible on the horizon at a specific sampling site. Surrogate for visual range measured using photographs and densitometry.

1. Valid Values. Not Applicable.
2. Units. Kilometers (km).
3. Example. The visual range is 6 km.
4. Source for Data Standard. Forest Service Watershed and Air Management Staff.

Wind Direction. The direction of air movement.

1. Valid Values. 0-360.
2. Units. Azimuth to the nearest whole degree.
3. Example. 247°.
4. Source for Data Standard. National Oceanic and Atmospheric Administration/National Weather Service.

Wind Speed. The rate of movement of air.

1. Valid Values. Not Applicable.
2. Units. Meters per second (m/s).
3. Example. 5.1 m/s.
4. Source for Data Standard. National Oceanic and Atmospheric Administration/National Weather Service.