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SUBJECT: SOI - Mapping Procedures - Small Areas

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TO: State Conservationists

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The procedure for mapping of riparian and other small areas as outlined in the enclosed document is hereby adopted for use. Comments that were received from the earlier comment periods have been considered and incorporated as appropriate. The necessary adjustments to the National Soil Survey Handbook, including modifications to SSURGO digitizing procedures, are now being made and will be distributed as soon as possible.

I ask you to share this information with the National Cooperative Soil Survey and other cooperators and partners in your state.

HORACE SMITH
Director
Soil Survey Division

AUG 5 1997

Enclosure

cc:

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TECHNOLOGY POLICY PAPER
Mapping Procedures for Riparian and Other Small Areas
June 1997

Interest has increased in recent years to map and describe the characteristics and properties of small areas on the landscape. Due to the scale of mapping these small areas cannot be shown as polygons on soil survey maps. To address the need for procedures to map small areas of significance, such as riparian areas, the following procedures are adopted for use in conjunction with soil surveys. **It should be noted that these procedures apply to mapping of any small, highly contrasting areas, not just riparian areas. This includes areas traditionally identified by spot symbols.**

Appropriate changes to the National Soil Survey Handbook (1996 edition) will accommodate these procedures, and will be distributed as soon as possible. This includes modifying the SSURGO digitizing procedures accordingly.

IMPLEMENTATION:

These procedures are optional for current ongoing soil surveys. All surveys begun from this date forward, will follow these procedures, where mapping of such areas are identified in the Memorandum of Understanding for the survey area.

DESCRIPTION AND CORRELATION PROCEDURES:

1. If the mapping of small areas is to be included as part of an ongoing soil survey, it will be so noted in the Memorandum of Understanding for the survey area. Mapping scale, mapping intensity, resources available, and the need for and use of information are to be considered in making this decision. It is recognized that this procedure may involve mapping these areas more intensely than other areas of the survey.
2. If these areas consistently occur in conjunction with another larger map unit, they will be identified as components of the larger map unit. Their setting and characteristics are to be adequately described. If they can not be described as a part of a larger unit, they are identified as separate units.
3. Descriptions of areas identified as having riparian value are made by an interdisciplinary team that will inventory and describe characteristics of the various resources present, such as soils, vegetation, wildlife, and hydrology. The characteristics of the site are recorded in the soil map unit description and any associated Ecological Site Descriptions. Templates for Ecological Site Descriptions for range and forestland may be found in the NRCS National Forestry Manual and the National Range and Pasture Handbook. Other agencies have similar templates included in their respective guidebooks such as the BLM document *Riparian Area Management TR 1737-7 1992 - Procedures for Ecological Site Inventory with Special Reference to Riparian-Wetland Sites*, (pages 103-114). The USFS document, *A Hierarchical Framework of Aquatic Ecological Units in North America (Nearctic Zone)*, also has guides for developing ecological site descriptions.
4. Areas that are too small to be shown on the maps as polygons at the scale of mapping are to be shown as point or line features. Generic marker and line symbols are used for all point and line features. Map symbols are attached to each point or line feature and shown on the maps.

5. Areas shown on maps as point or line features will be described, named, and correlated the same as traditional map units. The units will be included in the map unit data base. A different map symbol convention is useful to separate these units from symbols used for area features-- i.e., alpha vs. numeric symbols.

- Classify soils to the taxonomic level that can be supported by the documentation available.
- Populate the NASIS Map Unit Record (MUR) database accordingly, including applicable soil, landscape, climate, and vegetation characteristics.
- Attributes populated are those needed to meet the needs of the customers.
- Record "line segment width" and "point feature area" in the database. These data elements have High, Low, and Representative Values to be used in calculating the area (acres) represented by the line segment or point feature. These data elements will be added to the NASIS data structure. Additional descriptive elements may be added as needed at a later date.

Attached to this procedure is an example of a map unit description from Arizona that includes characteristics of such an area.

6. Digitizing procedures are included in Part 647, NSSH.

IDENTIFICATION PROCEDURES -- RIPARIAN AREAS

We will not specifically identify these areas as "riparian areas." This designation is considered to be an interpretation based on the presence of soil, hydrologic, and vegetative features as outlined below. The map unit description and/or Ecological Site Description are used to indicate whether or not an area has riparian value.

Definitions for riparian areas used by the various agencies have many commonalities, but may be applied differently by the agencies to address their respective agency mission. To map such areas, the following identification criteria have been identified. They are general statements that may be made more specific as needed for the local area, such as the Major Land Resource Area or Ecological Subsection. The presence of all three criteria are considered essential for riparian areas.

Soil Criteria

Soils in natural riparian areas generally exhibit distinct features that are influenced by flooding and/or a water table. Riparian soils will typically have free water (water table) available for plant use at some time during the growing season.

Hydrology Criteria

Hydrologic characteristics of riparian areas include flooding and/or free water in the rooting zone. Flooding and/or free water are present at a frequency and duration sufficient to influence plant community composition. Riparian areas are associated with watercourses and/or water bodies.

Vegetation Criteria

The kind, size, and amount of current or potential vegetation reflect the influence of soil and hydrologic characteristics, and contrast with adjacent upland vegetation.

CARTOGRAPHIC PROCEDURES: (See attached sample map for illustration of how these will look in a published soil survey. Note the use of color to identify linear and point features and labels.)

All delineations of soils and miscellaneous areas identified on the soil map represent “areas” on the Earth’s surface. Depending on the size of these areas and the scale of mapping, some will be shown as polygons on the map, while the smaller areas are shown as points or lines as follows:

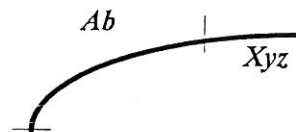
1. Delineate areas of sufficient size at the scale of mapping as polygons.
2. Delineate elongated areas too small to show as polygons at the mapping scale (less than about 150 feet wide at 1:24,000) as line features. If a line feature represents more than one map unit mapped end-to-end, the line is segmented. The respective labels are associated with each segment.
3. Delineate non-elongated areas too small to show as polygons at the mapping scale (less than about 5 acres at 1:24,000; or about 1.5 acres at 1:12,000) as point features.

Examples:

Point Feature

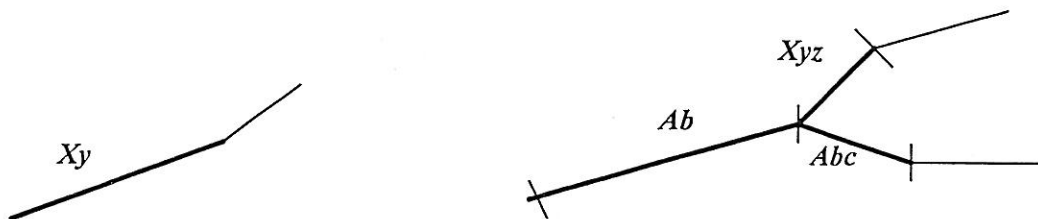


Line Feature



Coinciding Features

A linear soil feature is placed so it most accurately represents the location of the area being described. This may cause it to coincide with drainage features where the two are geographically related. If a linear soil feature and a single line hydrology linear feature coincide, the soil feature has precedence. Example:

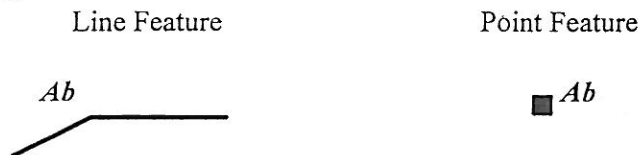


Feature Symbolization

1. A single generic line symbol is designated to represent all linear soil features. This new symbol is designed so as not to be confused with polygon boundaries.

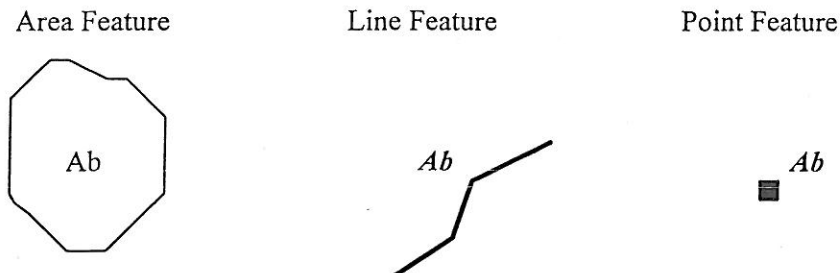
2. A single marker symbol is designated for use with all types of point soil and water features. Ad hoc and special features traditionally used to represent points will no longer be symbolized.

Example:



Feature Labeling

1. All point and linear soil features are labeled with the appropriate map symbol.
 - A. Linear Features - Each linear feature has at least one label. Long linear features may require more than one label for easy identification.
 - B. Point Features - Each point feature will have one label
2. Labels for point and linear features are in a different font or color than those associated with polygons to avoid confusion.



Line Attributes

An attribute for the average width of the area represented by the linear feature will be added to the NASIS Map Unit Record (MUR) database. The data element will allow entry of high, low, and representative values for the width of the area. A similar element will be added for point features to record the area represented by each marker.

Feature Statistics

The cumulative total area for each map unit is estimated and included in the NASIS Map Unit Record (MUR) data -- map unit acres. The lengths of linear features is measured, multiplied by their representative widths, and their areas converted to a specified unit (acres). Point features are counted and multiplied by the average size for the mapping scale.

DIGITIZING PROCEDURES:

Refer to the National Soil Survey Handbook, Part 647 - Soil Map Development.

EXAMPLE 5

Soil Survey of
Coronado National Memorial

avg. vertical height: 3 feet (range
to 8 feet)

Map unit descriptions (Includes taxonomic unit
descriptions)

Bank composition
bedrock %: 0-5
boulder %: 1-10
stone and cobble %: 20-60
gravel %: 20-80
sand/silt/clay %: 5-30

Aridic Ustifluvents-Riverwash complex, 4 to 7
percent slopes

Depositional bar features: mainly side and
channel bars with few point bars
Meander pattern: irregular
Organic debris: mainly fine floatable with
occasional large anchored debris

~~SETTING~~

Landform: flood plains and channels
Position on landform: point, mid channel and side
bars
Flooding: Aridic Ustifluvents = occasional,
Riverwash = frequent
Slope range: 4 to 7 percent
Elevation: 5,200 to 5,800 feet
Mean annual precipitation: 18 to 23 inches
Mean annual soil temperature: 59 to 64 degrees F.
Frost-free period: 160 to 210 days

~~SOIL COMPOSITION~~

Aridic Ustifluvents and similar soils: 70 percent
Riverwash: 15 percent
Contrasting inclusions: 15 percent
soils dominated by boulders and stones
soils that have slopes greater than 7 percent

~~STREAM SEGMENT PROPERTIES AND
QUALITIES~~

~~TAXONOMIC UNIT DESCRIPTION~~

~~SEGMENT~~

Length: 8,800 feet
Width: 48 feet minimum, 90 feet maximum
Elevation: 5,800 feet upper, 5,200 feet
lower

Aridic Ustifluvents

Classification: Aridic Ustifluvents.

~~HYDROLOGY~~

Flow regimen: ephemeral
Flood zone width: 18 to 38 feet
Flood frequency: frequent
Flood duration: very brief or brief
Flood timing: July-October

A--0 to 3 inches; brown (10YR 5/3) very gravelly
sandy loam, very dark brown (10YR 3/3) moist;
moderate medium platy structure; soft, very friable,
nonsticky and nonplastic; few very fine roots; few
very fine and fine irregular and tubular pores; 50
percent gravel, 5 percent cobble; noneffervescent;
slightly acid (pH 6.4); abrupt broken boundary.

~~MORPHOLOGY~~

Active channel width: 6 to 12 feet
Stability: degrading
Channel composition
bedrock %: 0-2
boulder %: 1-5
stone and cobble %: 25-40
gravel %: 40-65
sand/silt/clay %: 15-25
Bank type
cut %: 10-20
uncut %: 80-90

C1--3 to 23 inches; variegated pale brown (10YR
6/3), light gray (10YR 7/1) and brown (10YR 4/3)
stratified extremely gravelly coarse sand to cobbly
fine sandy loam, grayish brown (10YR 5/2) to brown
(10YR 3/3) moist; massive; soft, very friable,
nonsticky and nonplastic; isolated pockets of many
very fine and fine roots; common very fine and strata
of many fine through common very coarse irregular
and few fine tubular pores; 45 percent gravel, 15
percent cobble, 5 percent stone; noneffervescent;
slightly acid (pH 6.4); clear smooth boundary.

C2-23 to 60 inches; variegated lithochromic, pink
(7.5YR 7/3) fine earth matrix, stratified extremely
cobbly coarse sand with 3 to 5 inch thick strata of
brown (10YR 4/3) sandy loam, black (10YR 2/1)

moist; massive with strata of single grain; soft, very friable, nonsticky and nonplastic; few fine through coarse and isolated mats of very fine roots; common very fine through coarse irregular pores; 20 percent gravel, 30 percent cobble, 20 percent stone; noneffervescent; slightly acid (pH 6.4).

Riverwash

Gravelly and cobbly alluvium derived mainly from granite with minor admixtures of volcanic and metamorphic rock. Some stream reaches are dominated by boulder and stone.

~~SOIL PROPERTIES AND QUALITIES~~

Aridic Ustifluvents

Parent material: alluvium from mixed rock sources
Rock fragments: ranges from 15 to 80 percent
Clay content: ranges from 0 to 12 percent
Organic matter content: ranges from less than .5 to greater than 1 percent
Depth: more than 60 inches
Permeability rate: more than 20 inches/hour
Drainage class: excessively well drained
Available water capacity (total): .6 to 2.9 inches

A horizon

Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3, dry or moist
Texture: coarse sand to loam
In some pedons the A horizon may be

absent.

C horizon

Hue: 7.5YR, 10YR
Value: 4 through 7 dry, 3 or 4 moist
Chroma: 3 or 4, dry or moist
Texture: stratified, coarse sand to sandy

loam

~~BIOTIC COMPONENTS~~

Present Vegetation: silverleaf oak, Arizona white oak, Emory oak, alligator juniper, sycamore, walnut, madrone, canyon grape, skunkbush sumac, deergrass, beggartick threeawn, pinyon ricegrass, squirreltail.

Wildlife: Woodhouse's toad, red spotted toad, green ratsnake, elf owl, hermit thrush, fulvous harvest mouse

~~INTERPRETIVE GROUPS~~

Land capability classification: Aridic Ustifluvents = VIIs-nonirrigated, Riverwash = VIII.

Major Land Resource Area: 41 = Southeastern Arizona Basin and Range.

Major Land Resource Unit: 41-1AZ = Mexican Oak-Pine Woodland and Oak Savannah.

Range Site: Sandy Bottom (QUHY, QUAR), 20-23" p.z. (041XA126AZ)

