An Overview of Recent NRCS Changes in the Classification and Description Standards for Urban Soils

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Helping People Help the Land

Photo courtesy of www.soils.org

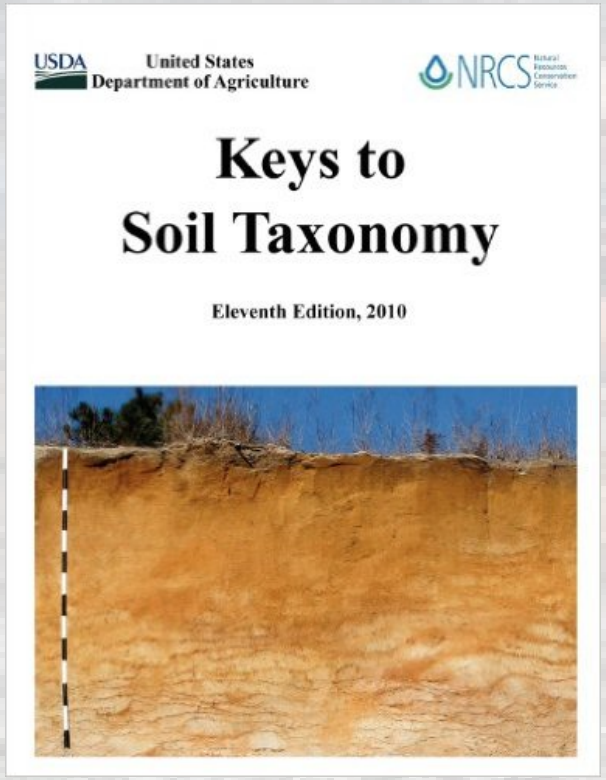
Discussion Overview

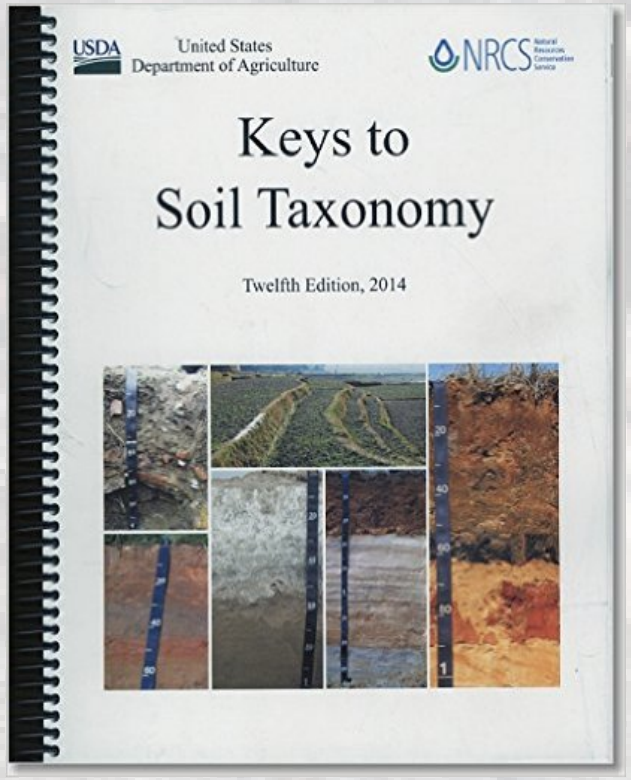
- Changes to Keys to Soil Taxonomy 12th edition (Udorthent subgroups, Anthropic Epipedon Requirements, Human-Altered and Human-Transported Materials)
- What is a buried horizon and how is it Identified?
- Changes made to the "Field Book for Describing and Sampling Soils: version 3.0" in relation to urban soils (i.e. addition of new terms, modifications to the fragment, texture, and horizon designation sections)
- Urban mapping guidance and helpful tips
- Questions and discussion

Udorthents in the 11th edition of Soil Taxonomy

In the 11th edition of Soil Taxonomy you had *six* subgroups of Udorthents:

- **Lithic**
- **Vitrandic**
- **Aquic**
- **Oxyaquic**
- **Vermic**
- **Typic**





Udorthents in the 12th edition of Soil Taxonomy

In the 12th edition you have *nine* subgroups with the additions of:

- **Anthrodensic Sodic** (a densic contact due to mechanical compaction in more than 90% of the pedon & an exchangeable sodium percentage of 15 or more in a 25cm thick horizon within 100cm of the soil surface)
- **Anthrodensic** (a densic contact due to mechanical compaction in more than 90% of pedon within 100cm of soil surface),
- **Anthroportic** (50cm or more of human-transported-material).

*Only Lithic Udorthents key out before these new subgroups.

Other Subgroups Added to the Keys

Keys to Soil Taxonomy 12th edition, 2014 pgs. 35 and 36

1. **Anthraquic** (modified from Gr. anthropos, human, and L. aqua, water). Soils that have anthraquic conditions (i.e., anthric saturation). These soils are extensive in flooded rice paddies.
2. **Anthropic** (modified from Gr. anthropos, human). Soils that have an anthropic epipedon based on the presence of artifacts or midden material.
3. **Plaggic** (modified from Ger. plaggen, sod). Soils that have a plaggen epipedon.
4. **Haploplaggic** (Gr. haplous, simple, and Ger. plaggen, sod). Soils that have a surface horizon 25 cm to less than 50 cm thick that meets all of the requirements for a plaggen epipedon except thickness.
5. **Anthraltic** (modified from Gr. anthropos, human, and L. alterāre, to change). Soils that formed in 50 cm or more of human-altered material. This adjective is used primarily for human-altered material where ripping or deep plowing has fractured and displaced diagnostic subsurface horizons that were root-limiting (e.g., duripans) and in excavated areas (e.g., borrow pits).

Created a Definition and Added Requirements for Anthropic Epipedons

The anthropic epipedon consists of mineral soil material that shows evidence of the purposeful alteration of soil properties or of earth-surface features by human activity. The field evidence of alteration is significant and excludes agricultural practices such as shallow plowing or addition of amendments, such as lime or fertilizer. The anthropic epipedon includes elluvial horizons that are at or near the soil surface, and it extends to the base of horizons that meet all the criteria shown below or it extends to the top of the first underlying diagnostic illuvial horizon (defined below as an argillic, kandic, natric, or spodic horizon). *Information below added to the required characteristics section in the 12th edition.*

3. Formed in human-altered or human-transported material (defined below) *on an anthropogenic landform or microfeature* (defined below); *and either*:

a. Directly overlies mine or dredged spoil material which has rock structure, a root-limiting layer, or a lithologic discontinuity with horizons that are not derived from human-altered or human-transported material (defined below); *or*

b. Has *one or more* of the following throughout:

(1) Artifacts, other than agricultural amendments (e.g., quicklime) and litter discarded by humans (e.g.,aluminum cans); *or*

(2) Midden material (i.e., eating and cooking waste and associated charred products); *or*

(3) Anthraquic conditions

Landforms and Microfeatures for Human-Altered and Human-Transported Soils Developed

Keys to Soil Taxonomy 12th edition, 2014 pgs. 32-33

- **Types of Anthropogenic Landforms** (landforms mappable at common survey scales (e.g., 1:10,000 or 1:24,000)
  - Constructional (e.g., fill or dumps)
  - Destructional (e.g., leveled land or log landings)
- **Types of Anthropogenic Microfeatures** (discrete, artificial features formed on or near earth's surface typically too small to delineate at common survey scales)
  - Constructional (e.g., burial mounds or manure piles)
  - Destructional (e.g., ditches or skid trails)

Definition of Human-Altered Materials

Keys to Soil Taxonomy 12th edition, 2014 pgs. 33-34

Human-altered material is a parent material for soil that has undergone anthroturbation (soil mixing or disturbance) by humans. It occurs in soils that have either been used for gardening, been deeply mixed in place, excavated and replaced, or compacted in place for the artificial ponding of water.

- Human-altered material may be composed of either organic or mineral soil material.
- Human-altered material occurs in soils which are disturbed for various reasons e.g agricultural soils which are deeply-plowed or gravesites in cemeteries.
- Densic contacts often form at the top of wet, slowly permeable (i.e., puddled) layers when they are compacted by humans and destroy structure and impede water percolation. (This process is often done intentionally to generate artificial ponding when growing rice).
- Diagnostic horizons formed by significant illuviation (e.g.,spodic or argillic) have not been documented as occurring in human-altered material; however, you can use the abrupt changes in diagnostic horizons as evidence of human alteration within a soil profile.

Two Requirements for Human-Altered Materials

1. It must be a deeply tilled field (>=50cm), a destructional anthropogenic landform or microfeature, or a field artificially ponded for agriculture and;
2. It does not meet the definition of human-transported material AND has evidence of purposeful alteration by humans.
   - The purposeful human alteration must result in one of the following *eight* outcomes:

8 Soil Alterations that Qualify as Human-Altered Material

1. 3 percent or more (by volume) mechanically detached and re-oriented pieces of diagnostic horizons or characteristics in a horizon or layer 7.5 cm or more thick; or
2. 50 percent or more (by volume) divergent-shaped structures (from L. divergent, to veer)‡ in a horizon or layer 7.5 cm or more thick formed from traffic or mechanical pressure exceeding the shear strength of moist loamy or clayey soil material; or
3. Excavated and replaced soil material overlying either bones or artifacts arranged in ceremonial position or human body parts prepared to prevent decay; or
4. Mechanically-abraded rock fragments; or
5. Excavated and replaced soil material unconformably overlying features (e.g., scrape marks) that indicate excavation by mechanical tools in some part of the pedon; or
6. An abrupt lateral discontinuity of subsurface horizons and characteristics at the edge of a refilled or unfilled destructional (excavated) anthropogenic landform or microfeature; or
7. Anthraquic conditions in a horizon or layer 7.5 cm or more thick; or
8. A densic contact or thick platy structure in at least 50 percent of a pedon accompanied by additional evidence (e.g., scrape marks) that it was formed by human-induced mechanical compaction.

Definition of Human-Transported Material

Keys to Soil Taxonomy 12th edition, 2014 pgs. 34-35

Human-transported material is parent material for soil that has been moved horizontally onto a pedon from a source area outside of that pedon by purposeful human activity, usually with the aid of machinery or hand tools.

Key Features of a Human-Transported Material

Keys to Soil Taxonomy 12th edition, 2014 pgs. 34-35

- ***This material often contains a lithologic discontinuity or a buried horizon just below an individual deposit.*** In some cases it is not possible to distinguish between human-transported material and parent material from mass movement processes (e.g., landslides) without intensive onsite examination and analysis.
- ***Human-transported material may be composed of either organic or mineral soil material and may contain detached pieces of diagnostic horizons which are derived from excavated soils.*** It may also contain artifacts (e.g., asphalt) that are not used as agricultural amendments (e.g., biosolids) or are litter discarded by humans (e.g., aluminum cans).
- ***Human-transported material has evidence that it did not originate from the same pedon which it overlies.*** In some soils, irregular distribution with depth or in proximity away from an anthropogenic landform, feature, or constructed object (e.g., a road or building) of modern products (e.g., radioactive fallout, deicers, or lead-based paint) may mark separate depositions of human-transported materials or mark the boundary with in situ soil material below or beside the human-transported material.

Two Requirements for Human-Transported Material

1. It occurs either on either constructional or destructional anthropogenic landforms or microfeatures and;
2. It has evidence of purposeful transportation of materials that have an origin outside of the pedon by humans.
    - The purposeful human transportation evidence must match at least *one* of the following *nine* parameters:

9 Parameters that Qualify as Human-Transported Material

1. A layer of soil material 7.5 cm or more thick which unconformably overlies material that has no evidence of originating outside of the pedon (e.g., an in situ, laterally continuous kandic horizon); or
2. Artifacts other than agricultural amendments (e.g., quicklime) and litter discarded by humans (e.g., aluminum cans); or
3. Mechanically detached pieces of diagnostic horizons or characteristics or saprolite (isovolumetric, weathered, uncemented pseudomorphs of weathered bedrock) that do not correspond with the underlying material. The pieces often have random orientation relative to each other and the soil surface and contrast abruptly in texture, mineralogy, or color with the surrounding material; or
4. Soil material that contains mechanically abraded rock or pararock fragments; or
5. Mechanically fractured rock or pararock fragments with splintered or sharp edges that do not correspond with the fragments in the underlying soil material (i.e., fractures that cut through rather than between individual minerals); or

Continued…

9 Parameters that Qualify as Human-Transported Material

6. Mechanical scrape marks at some part of the boundary between materials that do not correspond with each other; or

7. Soil material 7.5 cm or more thick that overlies a manufactured layer contact; or

8. Bridging voids§ between rock fragments in a horizon or layer 7.5 cm or more thick in mine spoil with at least 35 percent (by volume) rock fragments; or

9. An irregular distribution pattern of modern anthropogenic particulate artifacts (e.g., radioactive fallout or immobile pollutants) or discrete artifacts that are unrelated to the deposition or transportation processes of natural parent materials such as eolian material, alluvium, or colluvium. The irregular distribution occurs above or across the contact between soil materials that do not correspond with each other or laterally with distance away from a source (e.g., the amount of lead-based paint decreases away from a building).

Surface Mantles of Human-Transported Materials and the "Buried" Soils Beneath

Photo Courtesy of: http://volcanoes.usgs.gov/

Definition of a Buried Soil and Buried Genetic Horizon

- **A *buried soil* is a sequence of one or more genetic horizons covered with a surface mantle of new soil material that is 50 cm or more thick.**
  - Any horizons or layers underlying a plaggen epipedon are also considered to be a buried soil.
- **A *buried genetic horizon* is an identifiable buried horizon with major genetic features that were developed before burial.**
  - Buried genetic horizons are connoted by the use of suffix symbol “b” in horizon designations.
  - It is important to note that buried genetic horizons are not always part of a horizon sequence that meets the definition of a buried soil.

Definition of Surface Mantle of New Soil Material

USDA NRCS Soil Survey Technical Note #10

- **A *surface mantle of new soil material* is a layer of natural or human-deposited mineral material that is largely *unaltered*, at least in the lower part, and is underlain by one or more buried genetic horizons.**

http://sci.waikato.ac.nz/farm/content/soils.html

4 Key Components of Surface Mantle Deposits

1. A surface mantle can be any thickness (Must be >=50cm for the underlying soil to be considered “buried”)
2. Mantle can have epipedons and/or cambic horizons (no other ***diagnostic*** subsurface horizons allowed; if present not considered altered/transported)
3. There must be a layer at least 7.5cm thick that is not part of any diagnostic horizon (generally a C horizon) at the base of the deposit between the mantle and the original buried soil
4. Between the mantle and buried soil there is an ***abrupt boundary*** and it forms a ***lithologic discontinuity***.

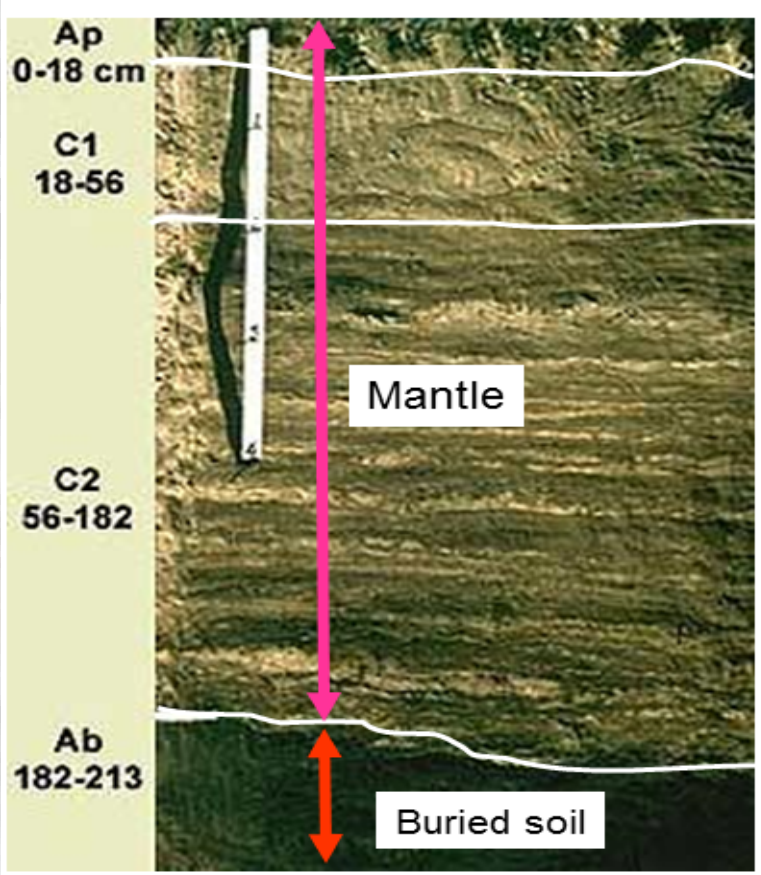
Significance of a Mantle Over 50cm Thick

- Classification is based primarily on the surface mantle
- Soil order is based on diagnostic horizons (if any) in mantle
- Soil surface is used as depth starting point for:
  - Soil moisture and temperature classes
  - Depth to aquic conditions
  - Depth to and thickness of diagnostic horizons or other diagnostic characteristics
  - Start of the control section for soil family classes

Significance of a Mantle Under 50cm Thick

- Classification is based primarily on the soil below surface mantle
- The top of the underlying soil is considered the soil surface and is the starting point for:
  - Determining soil order
  - Depth to and thickness of diagnostic horizons or other diagnostic characteristics
- The top of the new mantle is used as the starting point for:
  - Soil moisture and temperature classes
  - Depth to aquic conditions
  - Start of the control section for soil family classes

An Example of a Mantle and a Buried Soil Beneath



Epipedon—none. What would have been an ochric epipedon is an Ap horizon that directly overlies freshly stratified sediments with an irregular decrease in carbon.

Textures are loams and silt loams.

There is a mantle because the lower 7.5 cm of the recent deposit is not part of a diagnostic horizon.

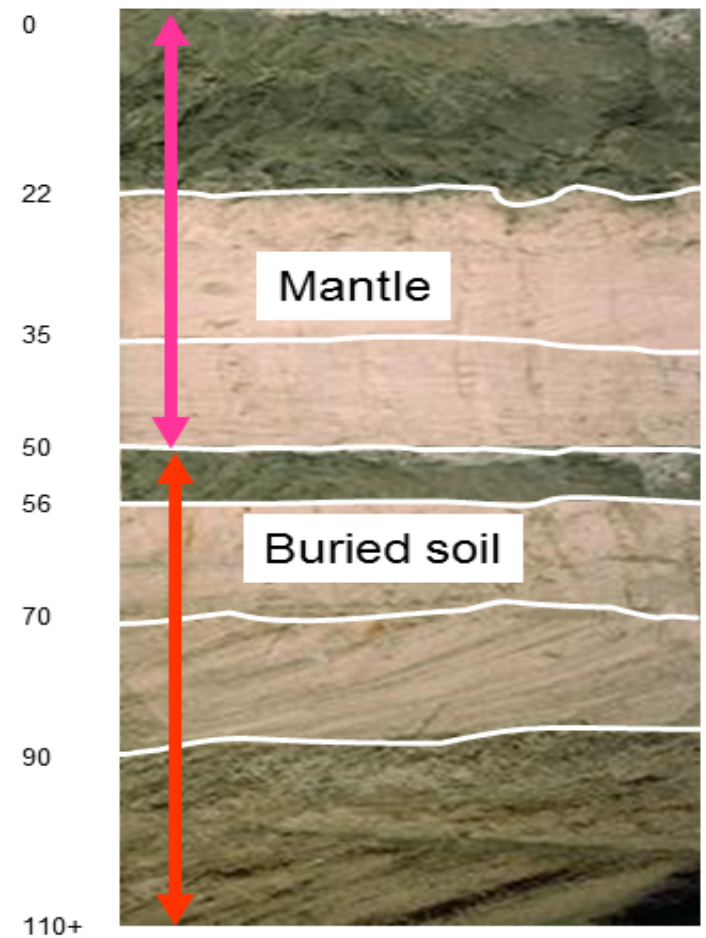
There is no cambic horizon in the mantle.

There is a buried mollic (Ab) epipedon and buried soil beginning at 182 cm. The mollic epipedon is not considered, except to confirm an irregular decrease in carbon.

classify

This soil is an Entisol, a Typic Xerofluvent.

Another Example of a Mantle and a Buried Soil Beneath



A

C1

C2

Ab

C′1

2C2

3C3

Epipedon—ochric. The A horizon is 10YR 6/2 (dry) and has 0.0% $CaCO_3$. Textures are loams.

There is a mantle because the lower 7.5 cm of the recent deposit is not part of a diagnostic horizon. There is no cambic horizon in the mantle.

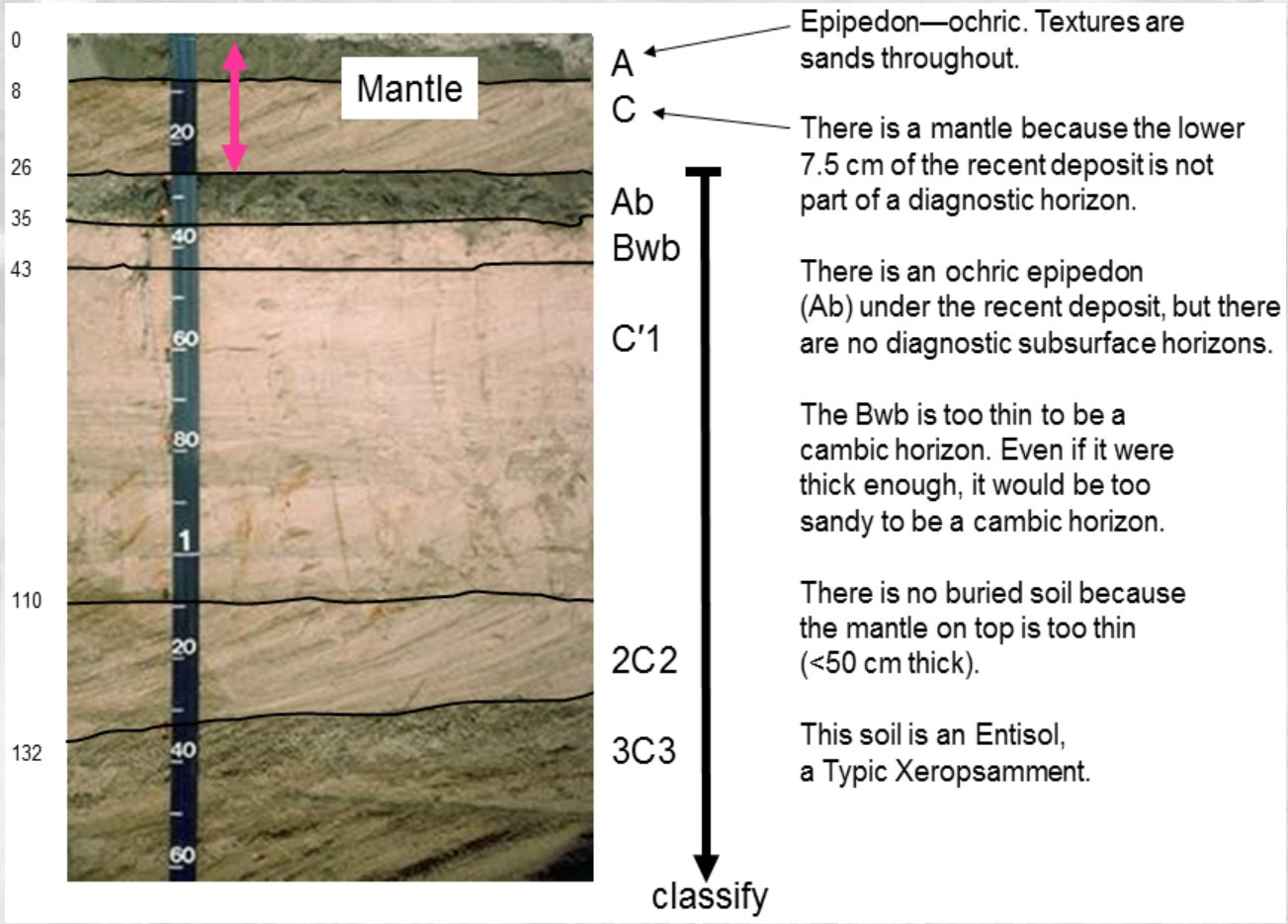
There is a buried ochric epipedon (Ab). There are no buried diagnostic subsurface horizons.

The mantle on top is thick enough to qualify the buried horizons as a buried soil (50 cm).

This soil is an Entisol, a Typic Xerofluvent.

classify

An Example of a Soil with a Mantle but No Buried Soil



Buried Genetic Horizons, Not a Buried Soil

- **A**—0 to 4 cm; brown (7.5YR 4/4) loam; weak medium granular structure; friable; common very fine, fine, and medium roots; few fine flakes of mica; very strongly acid; clear smooth boundary.
- **Bw1**—4 to 24 cm; dark yellowish brown (10YR 4/4) silty clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; common fine flakes of mica; few medium faint brown (10YR 5/3) iron depletions; very strongly acid; gradual wavy boundary.
- **Bw2**—24 to 46 cm; dark yellowish brown (10YR 4/4) clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; many fine flakes of mica; common medium faint grayish brown (10YR 5/2) iron depletions and common medium distinct strong brown (7.5YR 4/6) masses of oxidized iron; very strongly acid; gradual wavy boundary.
- **Ab**—46 to 60 cm; black (10YR 2/1) loam; weak fine granular structure; very friable; many fine roots; few fine pebbles; common fine flakes of mica; strongly acid; abrupt wavy boundary.
- **Btgb**—60 to 80 cm; light brownish gray (10YR 6/2) clay loam; moderate medium subangular blocky structure; friable; moderately sticky and moderately plastic; many medium prominent yellowish brown (10YR 5/6) friable iron masses; common distinct clay films on faces of peds; few fine pebbles; common fine flakes of mica; strongly acid; gradual wavy boundary.
- **Cg**—80 to 120 cm; gray (5Y 6/1) loam; massive; friable; many medium prominent dark yellowish brown (10YR 4/4) friable iron masses; about 5 percent, by volume, fine pebbles; few fine flakes of mica; strongly acid.

The Ab and Btgb horizons are buried genetic horizons. The material from 0 to 46 cm does not constitute a surface mantle of new soil material because the lower part (Bw2) does not contain unaltered material. The gradual boundary at 46 cm does not represent unaltered material. The profile does not represent a buried soil, and classification is based on the entire profile. Note that the original soil (46–120 cm) was a Typic Endoaqualf. After the addition of the newer material on top, the soil classifies as an Aeric Endoaqualf.

A Buried Genetic Horizon, Not A Buried Soil

- **Oa**—0 to 10 cm; muck (sapric material), black (10YR 2/1) broken face, black (N 2.5/) rubbed; about 12 percent fiber, less than 5 percent rubbed; moderate medium granular structure; primarily herbaceous fibers; neutral (pH 7.0 in water); abrupt wavy boundary.
- **A**—10 to 14 cm; brown (7.5YR 4/4) clay loam; weak medium granular structure; friable; common very fine, fine, and medium roots; few fine flakes of mica; very strongly acid; clear smooth boundary.
- **Bw1**—14 to 24 cm; dark yellowish brown (10YR 4/4) clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; common fine flakes of mica; few medium faint brown (10YR 5/3) iron depletions; very strongly acid; gradual wavy boundary.
- **Bw2**—24 to 56 cm; dark yellowish brown (10YR 4/4) clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; many fine flakes of mica; common medium faint grayish brown (10YR 5/2) iron depletions and common medium distinct strong brown (7.5YR 4/6) masses of oxidized iron; very strongly acid; gradual wavy boundary.
- **Ab**—56 to 60 cm; black (10YR 2/1) loam; weak fine granular structure; very friable; many fine roots; few fine pebbles; common fine flakes of mica; strongly acid; abrupt wavy boundary.
- **Cg1**—60 to 80 cm; light brownish gray (10YR 6/2) loam; massive; friable; moderately sticky and moderately plastic; many medium prominent yellowish brown (10YR 5/6) friable iron masses; few fine pebbles; common fine flakes of mica; strongly acid; gradual wavy boundary.
- **Cg2**—80 to 120 cm; gray (5Y 6/1) loam; massive; friable; many medium prominent dark yellowish brown (10YR 4/4) friable iron masses; about 5 percent, by volume, fine pebbles; few fine flakes of mica; strongly acid.

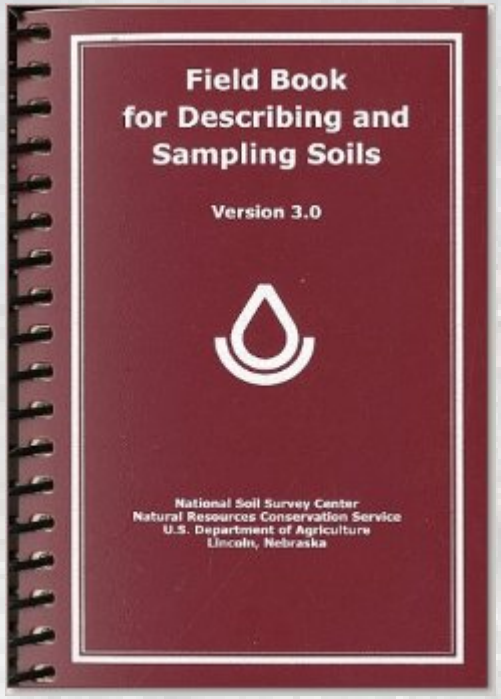
The Ab horizon is a buried genetic horizon. The material from 0 to 56 cm meets the thickness requirement for a buried soil, but the lower part does not contain unaltered material. The gradual boundary at 56 cm does not represent unaltered material. The profile does not represent a buried soil, and classification (Fluvaquentic Dystrudept) is based on the entire profile. Note that the original soil (56 to 120 cm) was likely a Typic Endoaquent.

A Buried Genetic Horizon, Not a Buried Soil

- **^A**—0 to 8 cm; brown (7.5YR 4/4) loam; weak medium granular structure; friable; common very fine, fine, and medium roots; 15 to 25 percent of the area has a 1/4 inch thick layer of asphalt coating that has broken up into fragments 3 inches in diameter; few fine flakes of mica; very strongly acid; clear smooth boundary.
- **^Bw1**—8 to 24 cm; dark yellowish brown (10YR 4/4) silty clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; common fine flakes of mica; few medium faint brown (10YR 5/3) iron depletions; 5 percent gravel (asphalt); very strongly acid; gradual wavy boundary.
- **^Bw2**—24 to 40 cm; dark yellowish brown (10YR 4/4) clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; many fine flakes of mica; common medium faint grayish brown (10YR 5/2) iron depletions and common medium distinct strong brown (7.5YR 4/6) masses of oxidized iron; 5 percent gravel (asphalt); very strongly acid; abrupt wavy boundary.
- **Btgb**—40 to 80 cm; light brownish gray (10YR 6/2) clay loam; moderate medium subangular blocky structure; friable; moderately sticky and moderately plastic; many medium prominent yellowish brown (10YR 5/6) friable iron masses; common distinct clay films on faces of peds; few fine pebbles; common fine flakes of mica; strongly acid; gradual wavy boundary.
- **Cg**—80 to 120 cm; gray (5Y 6/1) loam; massive; friable; many medium prominent dark yellowish brown (10YR 4/4) friable iron masses; about 5 percent, by volume, fine pebbles; few fine flakes of mica; strongly acid.

The Btgb horizon is a buried genetic horizon under human-transported material. The material from 0 to 40 cm does not constitute a surface mantle of new soil material because the lower part (^Bw2) does not contain unaltered material. The profile does not represent a buried soil, and classification (Aeric Endoaqulaf) is based on the entire profile.

Changes to the Field Book for Describing and Sampling Soils in Relation to Urban Soils



Artifact Section Added to Field Book

Artifacts - Something created, modified, or transported from its source by humans usually for a practical purpose in habitation, manufacturing, excavation, or construction processes.

Examples of artifacts include: processed wood products, liquid petroleum products, coal, combustion by-products, asphalt, fibers and fabrics, bricks, cinder blocks, concrete, plastic, glass, rubber, paper cardboard, iron and steel, altered metals and minerals, sanitary and medical waste, garbage and landfill waste.

- **Artifacts occur in or on the soil and should be described if they are durable enough to persist (resist weathering and leaching) for a few decades or more.**
- **Artifacts should be split into categories that relate to human safety concerns, and then into categories that relate to their properties and behavior as part of the soil.**

Human-Safety Types

Innocuous artifacts - These artifacts have not been documented to cause harm to humans unless they have sharp edges.

Examples include untreated wood products, iron, bricks and cinder blocks, concrete, plastic, glass, rubber, organic fibers, inorganic fibers, unprinted paper and cardboard, and some mineral and metal products. Any sharp innocuous artifacts (or natural objects) can cause injury, but the materials themselves are still considered innocuous.

Noxious artifacts - Potentially harmful or destructive to living beings unless dealt with carefully. The harm may be immediate or long-term, or through direct or indirect contact.

Examples include: toxic metal- or chemical-treated wood products, batteries, waste and garbage, radioactive fallout, liquid petroleum products, asphalt, some types of coal ash, paper printed with metallic ink, and some mineral and metal products.

Artifact Properties Commonly Described

- Kind
- Quantity (Volume %)
- Roundness
- Shape
- Cohesion
- Penetrability
- Persistence
- *Safety (Outlined Previously)*

Changes in Texture Section

New Textural Modifiers Added

For soil descriptions, rock fragments and artifacts are each described separately. When appropriate, compound texture modifiers can be used such as “very artifactual gravelly sandy loam” to describe the volume class.

If artifact fragments are >90% (by vol.), no texture is described and a **Term Used in Lieu of Texture** is applied (i.e., *artifacts*). This term is only used to denote the presence of artificial materials associated with human activities.

http://gibneyce.com

Percent volume artifacts	Modifier
0 to < 15%	N/A
15 to < 35%	Artifactual †
> 35% to < 60%	Very artifactual †
> 60% to < 90%	Extremely artifactual †
> 90%	Artifactual Material †

Horizon Suffixes and Other Horizon Modifiers

A New Horizon Suffix

"u-suffix" – Indicates the presence of human-manufactured materials (artifacts).

Note: Higher amounts of human-manufactured materials would be identified with one of textural modifiers mentioned in a previous slide

The Caret (^) Symbol

Caret Symbol – Used as a prefix to master horizon to indicate human-transported material.

The caret symbol can be applied to all master horizon combinations except B and E, B/E, E and B, E/B, EC, L, M, R, or W.

Addition of a New Master Horizon

Addition of a New Master Horizon

M Horizon – The M Horizon is a root-limiting subsoil layer of human-manufactured materials.

The M horizon should not be used in combinations with other master horizon letters for transitional horizons.

Example:

M – 56 to 70cm; very dark gray (10YR3/1) manufactured layer. Asphalt; massive; extremely firm; no roots; no pores; few cracks about 100cm apart; 65% crushed granite pebbles; neutral; abrupt smooth boundary.

Conventional vs. New Methods for Describing Urban Soils Example

Profile 1	Profile 2	Profile 3	Profile 4	Profile 5
Soil deeply cultivated to 75 cm but not transported	Soil buried by HTM from similar on-site material	Soil buried by HTM from off-site soil material	Soil buried by HTM containing a few artifacts and on-site soil material	Soil with HTM over a geotextile layer over landfill material
0 cm HTM	75 cm HTM	75 cm HTM	75 cm HTM	200 cm HTM
Conventional USDA-NRCS system				
Ap	A	A	A	A
Bw1	C1	Bw	AC	C
Bw2	C2	C	Cd	Cd
BC	BC	2Bgb	Bsb1	2C2 (1 cm thick)
Cd (>1m thick)	Cd (>1m thick)	2BCb	Bsb2	3C3
		2Cdg	BC (> 50 cm thick)	3C4 (> 50 cm thick)
New USDA-NRCS System				
Ap	^A	^A	^Au	^A
Bw1	^C1	^Bw	^ACu	^C
Bw2	^C2	^C	^Cdu	^Cd
BC	BC	2Bgb	Bsb1	2^M (geotextile)
Cd (>1m thick)	Cd (>1m thick)	2BCb	Bsb2	3^Cu1
		2Cdg	BC	3^Cu2 (> 50 cm thick)

ICOMANTH Circular Letter #6 (modified)

Example of an OSD using Conventional Standards and the New Updated Standards

Laguardia Series – This soil is formed in thick deposits of fill material with human artifacts throughout. This soil is easily identified as HTM by considering the evidence in the individual horizons.

Original:

A-- 0 to 20 cm; brown (10YR 4/3) gravelly sandy loam; (10YR 6/3) dry; weak very fine subangular blocky structure; friable; few very fine and medium roots; 15 percent brick and concrete fragments, 5 percent asphalt, and 5 percent glass gravel sized fragments, and 5 percent cobble-sized rock fragments; neutral; gradual wavy boundary. (5 to 30 cm thick.)

BC-- 20 to 66 cm; brown (10YR 4/3) very gravelly coarse sandy loam; weak very fine subangular blocky structure; friable; few very fine roots; 25 percent brick and concrete, 5 percent asphalt, 5 percent metal, and 5 percent plastic gravel sized fragments and 5 percent cobble-sized rock fragments; neutral; gradual wavy boundary. (3 to 51 cm thick.)

C-- 66 to 200 cm; brown (10YR 4/3) very gravelly coarse sandy loam; structureless massive with compaction related plate-like divisions; very friable; few very fine roots; 25 percent brick and concrete, 10 percent asphalt, 5 percent glass, 5 percent metal, and 5 percent plastic gravel sized fragments and 7 percent cobble-sized rock fragments; neutral.

Revised version:

^Au -- 0 to 20cm; brown (10YR 4/3) *artifactual* sandy loam; (10YR 6/3) dry; weak very fine subangular blocky structure; friable; few very fine and medium roots; 5 percent cobbles; *15 percent fine brick and concrete fragments, 5 percent fine glass fragments, and 5 percent fine asphalt fragments*; neutral; gradual wavy boundary. (5 to 30 cm thick.)

^BCu -- 20 to 66 cm; brown (10YR 4/3) *very artifactual* coarse sandy loam; weak very fine subangular blocky structure; friable; few very fine roots; 5 percent cobbles; *25 percent fine brick and concrete, 5 percent fine asphalt, 5 percent fine, metal, and 5 percent fine plastic fragments*; neutral; gradual wavy boundary. (3 to 51 cm thick.)

^Cu -- 66 to 200 cm; brown (10YR 4/3) *very artifactual* coarse sandy loam; structureless massive with compaction related plate-like divisions; very friable; few very fine roots; 7 percent cobbles; *25 percent fine brick and concrete, 10 percent fine asphalt, 5 percent fine glass, 5 percent fine metal, and 5 percent fine plastic fragments*; neutral.

Mapping in Urban Settings

Mapping Suggestions in Urban Landscapes

- Map as close to the natural undisturbed landscape/landform as much as possible
- In areas of mass grading with no evidence of natural landform make breaks on current re-shaped landform (Use all means to find historic evidence of natural landform such as geology or existing historical soil survey data).
- Only phase map units when absolutely necessary to reflect large variations in soil interpretations (i.e. Residential runoff vs Commercial runoff)
- Create minimal polygons based on land use patterns in highly disturbed areas (Exceptions: Dumps or mines)

Be Aware of Land Use Induced Soil Properties

- **Soil properties can be altered in the urban environment in part by the localized development and past land uses** (i.e. Compaction of the surface materials).
- **Soil survey is not designed to map past land uses or properties that can vary due to current practices** (i.e. Redoximorphic features occurring at or near the mineral surface in heavily irrigated lawns, yet there is no prolonged naturally occurring saturation present).

http://www.millerlawn.com

Local knowledge is needed to differentiate between mappable soil properties and land use driven soil conditions.

References

- International Committee for the Classification of Anthropogenic Soils (ICOMANTH) Circular Letter #6; June 2006
- International Committee for the Classification of Anthropogenic Soils Circular Letter #7; January 2011
- USDA-NRCS Soil Survey Technical Note #10, “Buried Soils and Their Effect on Taxonomic Classification”; July 2014
- Riddle, Randy USDA-NRCS Soil Scientist Oxnard, California “MO-2 Urban Mapping Procedures”
- USDA-NRCS Keys to Soil Taxonomy 12th Edition, 2014
- USDA-NRCS Field Book for Describing and Sampling Soils, version 3.0; September 2012

Questions?

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