International Union of Soil Sciences (IUSS)
Universal Soil Classification System WG

Task Group to Compare Standards for Soil Profile Descriptions

Progress Report

NCSS Conference

Annapolis, MD

June 2013

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Task Group to Compare Standards for Soil Profile Descriptions

Definition: A group of pedologists interested in developing a new set of standards for soil profile descriptions to be used in conjunction with the proposed Universal Soil Classification System (USCS).

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Task Group to Compare Standards for Soil Profile Descriptions

Summary of Actions

Objectives:

1.) Compare at least 6 major existing national systems for soil profile descriptions, such as USDA-NCSS, FAO, England-Wales, Australian, etc., and compile a document (an MS-Excel spreadsheet) summarizing the comparison.

2.) Eventually propose a set of descriptive standards which is accepted and used globally.

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Summary of Actions

Products:

1.) A presentation (either poster or MS-PowerPoint) on the group's efforts to date, in June 2012.

2.) An IUSS handbook for the new Field Description Handbook (FDH) by December 2016 in English and available for translation into other languages such as Spanish, German, Russian, Chinese, etc.

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Task Group to Compare Standards for Soil Profile Descriptions

Summary of Actions

The chair of the task group replies to Jon Hempel by email in Sept 2011 and provided:

- ✓ task objectives
- ✓ deliverable products
- ✓ deadlines for draft and final reports
- ✓ list of task group members

Task Group to Compare Standards for Soil Profile Descriptions

Summary of Actions

- Jon Hempel contacted the group by email on 18, Jan 2012 announces Joe as chair of the task group
- Chair contacted the group on 23, Jan 2012 to introduce himself, distribute the task group objectives, and request comment on national systems to compare

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Task Group to Compare Standards for Soil Profile Descriptions

Members:

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Summary of Actions

Chair contacted the group on 23, Feb 2012 to both introduce Laurelin Henderson as a new member and to receive answers to 3 questions by 1, Mar 2012:

- ✓ How many systems should we compare?
- ✓ Which systems should we compare?
- ✓ Can you provide e-copies for systems other than USDA-NCSS or FAO?

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Summary of Actions

Doug Wysocki responded on 27, Feb 2012 and mentions that the during development of the FBDSS the systems of England, Germany, Canada, and Australian were reviewed. He suggests the group develop a “critical list” of attributes that a complete soil description needs. All the members that replied agree to this suggestion.

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Summary of Actions

Chair sends email on 6 Mar 2012 with a draft "critical list" of specific attributes divided among two general categories and requests responses by 27 Mar:

- ✓ site description (32)
- ✓ pedon description (54)

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General information topics	Specific attribute topics
Site description	Describers name
Site description	Date of description
Site description	Weather
Site description	General location (country, state, county, other political divisions, farm)
Site description	Georeferenced location
Site description	Topographic maps
Site description	Identification number
Site description	Regional identification
Site description	Taxon name
Site description	Taxonomic classification (field, correlated)
Site description	Diagnostics (horizons, characteristics, properties, materials, depths)
Site description	Diagnostics (particle-size control section depth range)
Site description	Estimated soil climate regimes

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General information topics	Specific attribute topics
Site description	Geomorphic description (landscape, landform, microfeature, anthro. feature)
Site description	Geologic description, lithostratigraphic unit-bedrock (kind, hardness)
Site description	Geologic description, lithostratigraphic unit-surficial deposits (kind)
Site description	Geologic description, surficial deposits
Site description	Parent material (kind, origin) includes human-transported material under kind of parent material
Site description	Age of landscape
Site description	Elevation
Site description	Bathymetry (for subaqueous soils)
Site description	Slope, gradient
Site description	Slope, complexity
Site description	Slope, shape (form)
Site description	Aspect
Site description	Water status (saturation, drainage class, surface water depth)
Site description	Accelerated erosion (kind, degree)
Site description	Surface fragments
Site description	Surface crusts/pedoderm
Site description	Bottom type (for subaqueous soils)
Site description	Vegetation (crops, existing plants, native plants, submerged aquatic plants)
Site description	Earth cover kinds

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General information topics	Specific attribute topics
Profile/Pedon description	Observation method
Profile/Pedon description	Horizon designation
Profile/Pedon description	Horizon depth (top and bottom)
Profile/Pedon description	Horizon boundary (distinctness and topography)
Profile/Pedon description	Matrix soil color (moist and dry), location
Profile/Pedon description	Matrix soil color (moist and dry), condition
Profile/Pedon description	Soil texture, class
Profile/Pedon description	Soil texture, rock fragment modifier
Profile/Pedon description	Soil texture, pararock fragment modifier
Profile/Pedon description	Soil texture, artifact modifier
Profile/Pedon description	Soil texture, terms used in lieu of texture
Profile/Pedon description	Fragments (percent, size, shape, kind, hardness)
Profile/Pedon description	Artifacts (percent, kind, size, shape, cohesion, roundness, penetrability, persistence, safety)
Profile/Pedon description	Fiber content of organic soil material, unrubbed
Profile/Pedon description	Fiber content of organic soil material, rubbed
Profile/Pedon description	Soil structure, grade
Profile/Pedon description	Soil structure, size
Profile/Pedon description	Soil structure, type

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General information topics	Specific attribute topics
Profile/Pedon description	Consistence, rupture resistance
Profile/Pedon description	Consistence, cementation
Profile/Pedon description	Consistence, manner of failure (brittleness, fluidity, smeariness) description of thixotropy included under smeariness
Profile/Pedon description	Consistence, stickiness
Profile/Pedon description	Consistence, plasticity
Profile/Pedon description	Consistence, penetration resistance
Profile/Pedon description	Consistence, excavation difficulty
Profile/Pedon description	Redoximorphic features (kind, amount, size, contrast, color, moisture state, shape, location, hardness, boundary)
Profile/Pedon description	Concentrations (kind, amount, size, contrast, color, shape, location, hardness)
Profile/Pedon description	Inherited mineral grains (diatoms, ferromagnesian minerals, mica flakes, opal, selenite crystals, volcanic glass, etc.)
Profile/Pedon description	Ped and void surface features (kind, amount, distinctness, location, color)
Profile/Pedon description	Roots, quantity
Profile/Pedon description	Roots, size
Profile/Pedon description	Roots, shape
Profile/Pedon description	Roots, location
Profile/Pedon description	Pores, quantity
Profile/Pedon description	Pores, size
Profile/Pedon description	Pores, shape (or type)

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General information topics	Specific attribute topics
Profile/Pedon description	Cracks, kind
Profile/Pedon description	Cracks, depth
Profile/Pedon description	Cracks, width
Profile/Pedon description	Cracks, relative frequency
Profile/Pedon description	Chemical response, reaction (pH)
Profile/Pedon description	Chemical response, effervescence class
Profile/Pedon description	Chemical response, effervescence location
Profile/Pedon description	Chemical response, effervescence chemical agent
Profile/Pedon description	Chemical response, reducing conditions
Profile/Pedon description	Chemical response, salinity
Profile/Pedon description	Chemical response, sodicity
Profile/Pedon description	Biological features (charcoal, earthworm casts, fecal pellets, invertebrate nests, krotovinas, etc.)
Profile/Pedon description	Special features (cryoturbation, hydrophobicity, pipes, tongues, etc.)
Profile/Pedon description	Odor, kind
Profile/Pedon description	Odor, intensity
Profile/Pedon description	Clay content, percent, estimated by feel method
Profile/Pedon description	Sand content, percent, estimated by feel method

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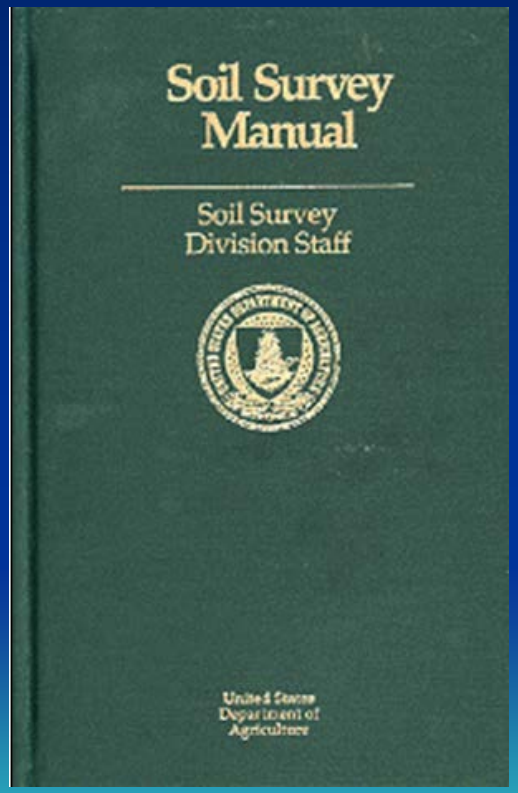
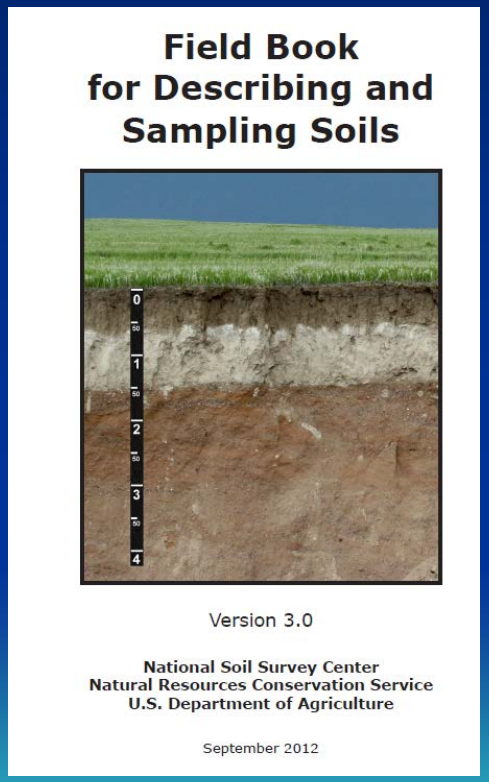
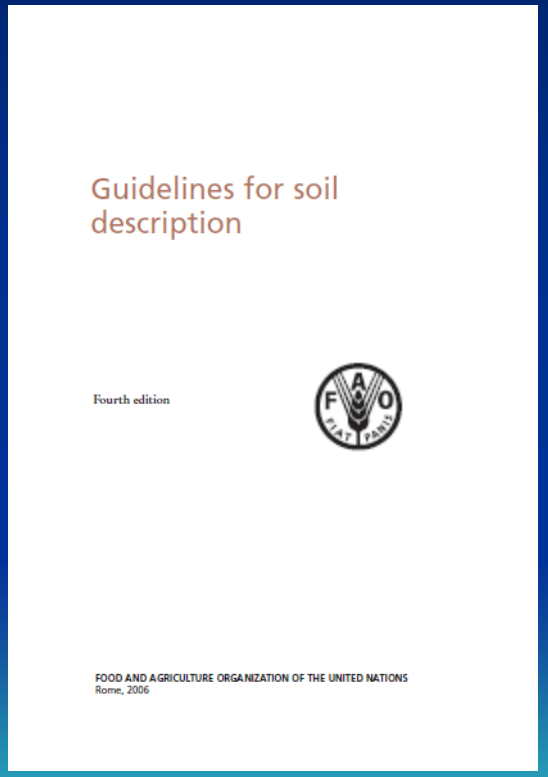
NCSS





FAO



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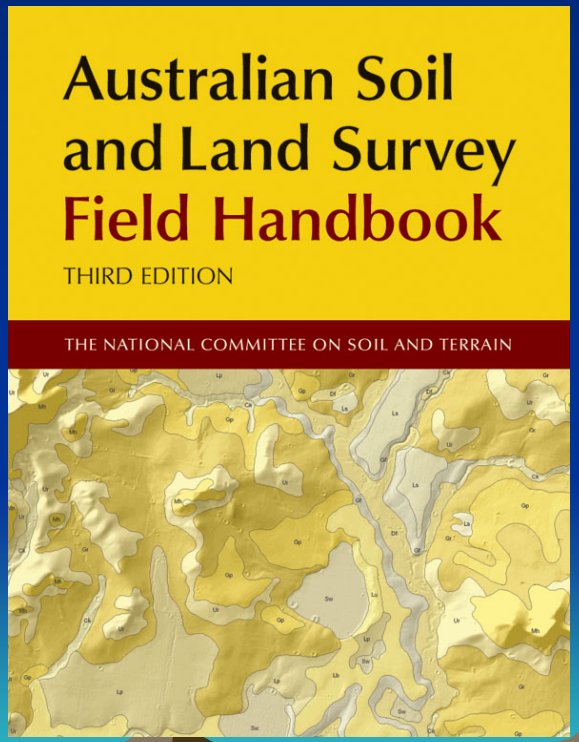
Australian
Soil and Land Survey Field Handbook
(2nd ed. 1990, 3rd ed. 2009)



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Soil Structure, Grade

NCSS

Code	Structure Grade
0	Structureless
1	Weak
2	Moderate
3	Strong

FAO

Code	Structure Grade
WE	Weak
MO	Moderate
ST	Strong
WM	Weak to moderate
MS	Moderate to strong

Australian

Code	Structure Grade
Apedal	
G	Single grain
V	Massive
Pedal	
W	Weak
M	Moderate
S	Strong

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Soil Structure, Size

NCSS

Size Class	Criteria: structural unit size [1] (mm)		
	Granular, Platy [2], (Thickness)	Columnar, Prismatic, Wedge [3] (Diameter)	Angular & Subangular Blocky and Lenticular (Diameter)
Very Fine (Very Thin) [2]	< 1	< 10	< 5
Fine (Thin) [2]	1 to < 2	10 to < 20	5 to < 10
Medium (Medium)	2 to < 5	20 to < 50	10 to < 20
Coarse (Thick) [2]	5 to < 10	50 to <100	20 to < 50
Very Coarse (Very Thick) [2]	≥ 10	100 to<500	≥ 50
Extremely Coarse	—	≥500	—

FAO

Size classes for soil structure types

		Granular/platy	Prismatic/columnar/wedge-shaped	Blocky/crumbly/lumpy/cloddy
		(mm)	(mm)	(mm)
VF	Very fine/thin	< 1	< 10	< 5
FI	Fine/thin	1–2	10–20	5–10
ME	Medium	2–5	20–50	10–20
CO	Coarse/thick	5–10	50–100	20–50
VC	Very coarse/thick	> 10	100–500	> 50
EC	Extremely coarse	–	> 500	–

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Soil Structure, Size

Australian

Size Class	Size Criteria (mm, smallest dimension)		
	Granular, Platy	Angular blocky, Subangular blocky, Polyhedral, and Lenticular	Prismatic and Columnar
1	<2		
2	2-5	2-5	
3	5-10	5-10	5-10
4	>10	10-20	10-20
5		20-50	20-50
6		>50	50-100
7			100-200
8			200-500
9			>500

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Soil Structure, Type

NCSS

Code	Structure Type
PL	Platy
PR	Prismatic
COL	Columnar
ABK	Angular blocky
SBK	Subangular blocky
WEG	Wedge
LP	Lenticular
GR	Granular
MA	Massive
SGR	Single grain

FAO

Code	Structure Type
PL	Platy
PR	Prismatic
PS	Subangular prismatic
CO	Columnar
BL	Blocky
AB	Angular blocky
AW	Angular blocky (wedge-shaped)
SB	Subangular blocky
SN	Nutty subangular blocky
WE	Wedge-shaped
LE	Lenticular
GR	Granular
CL	Cloddy
MA	Massive
SG	Single grain

Australian

Code	Structure Type
PL	Platy
PR	Prismatic
CO	Columnar
AB	Angular blocky
SB	Subangular blocky
PO	Polyhedral
LE	Lenticular
GR	Granular
CA	Cast

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Questions?