

# Standards Committee Report

NCSS Southern Regional Conference

Presented by Jennifer Mason (NRCS) – Committee Co-Chair

# New Proposals for Changes in Soil Taxonomy for 2016 Regional Meetings

B. These proposals will need review by the committee

These proposals can be located:

<http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/partnership/ncss/?cid=NRCSEPRD1037606>

- i. [Proposed Densic Great Groups of Udepts and Aquepts – Mark H. Stolt, Deborah Surabian, Donald Parizek, James Turenne, and Jacob Isleib](#) (PDF; 189 KB)
- ii. [Proposed Changes for Spodosols and Spodic Horizon Designations – Mark H. Stolt and Martin C. Rabenhorst](#) (PDF; 439 KB)
- iii. [Proposed Changes in Limnic Horizons and Materials – Ed Tallyn, Thor Thorson, et al.](#) (PDF; 182 KB)

# Comments from the Cooperative

## i. Proposed Densic Great Groups of Udepts and Aquepts

Comments-

The significance to land use is important and should be recognized. This proposal makes sense and is applicable.

## ii. Proposed Changes for Spodosols and Spodic Horizon Designations

Comments-

There were no comments

## iii. Proposed Changes in Limnic Horizons and Materials

Comments/Questions-

What are the implications regarding land use and management? This has a broader impact than just the NW. The proposal makes sense.

# Issues for Discussion and Further Development

a. These are proposals and topics for discussion and will be reviewed to elevate them further.

These proposals can be located:

- <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/partnership/ncss/?cid=NRCSEPRD1037606>
- - i. [Surface Mantle Clarifications – Craig Ditzler, Ken Scheffe](#) (PDF; 23 KB)
  - ii. [Bedrock, Fragments, and Densic Materials Decision Tree – Wayne Gabriel, Ed Tallyn, et al.](#) (PDF; 128 KB) **(1)**
  - iii. [Isotopic Mineralogy in Sandy Soils – Joe Chiaretti et al., Ken Scheffe, Mike England](#) (PDF; 41 KB)
  - iv. [Initiation of Yermic Diagnostic Feature Investigations Project – Ken Scheffe](#) (PDF; 96 KB)
  - v. [Oxyaquic Subgroup for Fragiudults – Kevin Godsey, Ken Scheffe](#) (PDF; 183 KB) **(2)**

**1.** Found my notes on the Senior Regional SS meeting and This looks like it has been completed and ready to add to NSSH as an exhibit. Should move to old business.

**2.** Took a quick look, this seems reasonable, there is a niche for it, several existing series of typic Fragiudults that would fall into, proposal doesn't identify placement in keys, think it should key out between Glossic and Humic subgroups.

# Issues for Discussion and Further Development

## Proposals from Region 3

### 1. Taxonomy proposals:

- a. Recommend removal of soil temperature class from family with 'Wass' suborder, these classes were established for row crops and terrestrial soils. If soil temp class is relevant for these soils then temperature limits and depths will need to be established
- b. It is likely that there are temperatures that are necessary for the establishment of native submerged aquatic vegetation or for some other reason. If so then use of temperature would be merited. If not then it could be cut with no loss.

• \*On a broader note it may be that there are other variables that are important for the functioning of subaqueous soils as habitat or a substrate for plant or animal development. If so these variables should be explored (e.g. depth to iron reducing conditions or development of toxic conditions at some point in the SAV or benthic faunal growing season. E.G. should soils of dead zones be included (even though dead zones are a water quality problem?)

# Issues for Discussion and Further Development

## ***Standards***

1. Ag Handbook 296 update:
  - a. Current MLRA maps and descriptions do not include non-terrestrial territory along the ocean coast. Many of these bays, estuaries, and lagoons are being proposed as subaqueous MLRA updates in the 'coastal zone survey initiative' yet they are not officially part of any LRR, MLRA or LRU/CRA land resource hierarchy.
    - i. Propose updating AgHB 296 maps and definitions to include.
    - ii. Update official Regional Office and MLRA Soil Survey Office boundaries to include subaqueous areas.

\*i. If we recognize them as soils they should be in the ag handbook. But have subaqueous soils been described sufficiently to produce map units and delineations of the type in ag handbook 296? Yes Region 3 is currently mapping subaqueous soils.

\*ii. Would MLRA Soil survey offices want to add subaqueous soils to their portfolio? Would it be more helpful to establish even a temporary office for subaqueous soils and have them work with mlra soil scientists until NRCS as a whole developed sufficient expertise?

## 2. A list of NASIS data dictionary changes for subaqueous soils

### a. horizon table: Addition of satiated bulk density

**\* saturated bulk density?; if so would be informative.**

### b. Need to identify water column depth above SAS, 2 methods I can think of

1. Change component month 'ponding depth' to 'surface water depth', allow to be populated for very frequently flooded, expand high range from 185 to 500cm

2. Update standard NSSH 618.30 and 618.49 Or allow for population of W horizon above mineral soil surface.

**\*If we allow for W horizons that would indicate that subaqueous soils could be classified in terms of their correlation with anoxic conditions. These change with time but the reality of a subaqueous soil which becomes sterile would seem to be worthy of classification and mapping. Identified much as hydric soils are in terms of frequency of development of Fe-reducing conditions in normal years....**

### c. Addition of landform terms and parent material terms for SAS

d. Addition of water ph, water temp, water salinity(classification criteria for 'frasi' great group)

**\*provide some justification**

e. Change bottom type from 'Mud' to 'loamy' and 'organic'

# 1. Scale issue

## a. Mapping vs correlating vs publishing

- i. Correlating differing scales in SDJR and MLRA update projects based on SSAs
- ii. Trying to publish 2 differing scales for 1 survey acres, there was discussion that the 'NE coastal zone survey initiative' would be conducted at a scale of 1:12,000 but this is determined by SSA publication scale

**\* No comments were made on the Scale Issue**

# Taxonomy Proposal

## Stan Buol

- 1) Use of the Perudic soil moisture regime in Ultisols, Inceptisols, and Entisols. At present the Udupts and Udepts are keyed as other Ultisols or Inceptisols, respectively and Udorthents as other Orthents after the other soil moisture regimes have been defined. This thus includes both the udic and perudic moisture regimes. While chairman of the Oxisol international committee (ICOMOX) we created the suborder Perox to define those Oxisols where ppt exceeds PET every month apart from Udox. The reason for this was the lack of a sufficient dry period that is necessary for a hot burn which is vital for successful the slash and burn method of farming in tropical jungles. Perox soils are limited to fruit and nut production and precluded from grain production because of insufficient dry periods for grain harvest. Since ICOMOX was limited to Oxisols the 'Per' (Perudic) criteria could not be extended to other orders, mainly Ultisols, Inceptisols, and Entisols that have the same soil moisture regimes. At that time I attempted to ascertain how the Perudic soil moisture regime, which is present in limited areas near the southern extent of the Appalachian mountains (NC, SC, GA) boarder that receive about 90 inches of ppt per year and meet the perudic criteria affected timber growth and was informed from a Forest Service soil scientist the tree growth was greater in those areas but no hard data. I also understand that some perudic areas are present in Pennsylvania at high elevations and from past visits to Puerto Rico remember such areas there. I think this would be a topic for consideration by the southern region.

# Taxonomy Proposal

## Stan Buol

### 1. *Comments from the Cooperative*

**\* Is this significant to develop a suborder, sounds like this is a very specific and limited situation. I am not averse to proposing further discussion. There may be different or better approaches to identifying these areas other than soil taxonomy.**

**\*Perudic is sufficiently distinct from Udic to merit its usage where it applies. I support the use of per for suborders where it more accurately reflects soil moisture.**

# Taxonomy Proposal

## Stan Buol

- 2) I would also suggest that consideration be given to including an alternative method of base saturation percentage in the definition delimiting Alfisols and Ultisols. The long standing definition of 35% by 'sum of cations', i.e. pH 8.2 method has worked well in the USA but this method is seldom available in data from other countries where the BS% is most commonly reported for pH 7 methods. I have known of three data sets that compare pH 8.2 data with pH 7 data from mainly Kaolinitic dominated subsoil samples and found excellent correlation of BS% 35 via the pH 8.2 method with BS% 50 via the pH 7 methods. In several cases over the years I have personally been forced to use BS% 50 via pH 7 methods to classify Ultisols from Alfisols in countries where pH 8.2 data was not available and although I can not recover or cite the studies that compared the two methods I am comfortable in doing so. I would like to see the national lab make a similar study of the data, albeit limited to samples of material at the soil depths defined in the Alfisols-Ultisols definitions and then consider adding '*...or less than BS 50% via pH 7 methods (by NH<sub>4</sub>OAC)*' to H. 1. in the key to Orders in Soil Taxonomy.

# Taxonomy Proposal

## Stan Buol

### *Comments from the Cooperative*

\* Yes this is a very good proposal and discussion topic. I would like to see an optional alternative using the pH 7 method if there is a strong correlation

\*This is a reasonable request and I would support that such a trial be undertaken at the Lincoln or otherwise technically competent labs. If much of the world uses pH 7 for base saturation then such a modification will help in a broad use of USDA Soil Taxonomy.

# Taxonomy Proposal

## Stan Buol

- ) I have other suggestions, probably not germane to the southern regional conference because they concern definitions in *iso* soil temperature regimes but result from my years working in the tropics. One is the 8 degree C limit on isofrigid. From experience in Ecuador and personal conversations with respected soil scientists in Venezuela and Columbia natives do not grow food crops (mainly potatoes) when *iso* soil temperatures are colder than 10 degrees. Thus I suggest a definition of 10 degrees C for isofrigid. Also, the hyperthermic, thermic, and mesic definition limits appear to have little significance in *iso*- areas since they were developed to outline adapted crops, i.e. citrus, cotton, corn for grain areas in temperate (non *iso*) latitudes of the world. Also, the broad definition of ustic in *iso* areas fails to separate areas where the normal rainy season permits two back to back grain crops per year from areas where it is short enough for only one crop per year and also from areas where there are two rainy seasons per year separated by two dry periods as in eastern Africa.
- Thanks for giving me an opportunity to express my opinions on alterations to the best system of soil classification that exists. I hope that the new generation of soil scientists will always keep the subtitle "A Basic System of Soil Classification for Making and Interpreting Soil Surveys" to Soil Taxonomy foremost in their minds as they continue to make improvements.

# Open Discussion David Weindorf

David,

I tried to contact Steve McGowan and get his input on this as well. Wasn't able to talk to him and time is running short to get this in. I did get input from Kelly and his response is more from an interpretive standpoint when understanding soils with high carbonates. For the time being I'm mainly interested in reviewing and perhaps modifying how we describe and classify soils with high carbonates or soils with carbonatic minerology. Hope you can work this information over and come up with a good proposal.

Currently total clay (silica + carbonate) is not considered when classifying a soil. Only silicate clay is used to determine particle-size class. However total clay is used when determining horizon texture. As a consequence (fine-loamy) high carbonate soils with (PSA) horizon textures of clay loam will classify as a coarse-loamy soil after lab data is reviewed. And like soils high in gypsum, soils with high carbonates are at times hard to estimate the horizon texture correctly. And Kelly commented soils that are high in carbonates will even fool plants. Apparently plants do not distinguish between silicate clay and carbonate clay. Ecological sites and the plants that dominate that site mimic the total clay and do not react to strictly silicate clay. It's impossible to have a fine-loamy soil on the High Plains if the clay minerology is carbonatic. Even soils that are not carbonatic but have high carbonates will not or barely squeak into a fine-loamy classification. Yet the plants do not reflect this for ecological sites. What is the reasoning for removing carbonate clays in classification? It is true that soils with high carbonates probably have a lowered AWC, and have KSAT altered, tie up iron, and a lower CEC. But is that a reason to exclude the carbonate clay from classification?

# Open Discussion David Weindorf

## Comments from the Cooperative:

### \* Comment #1:

Soil taxonomy is intended to group soils with similar soil properties throughout the world. In order to do that we attempt to remove local mitigating factors such as anthropogenic features like plowing and vegetation. Particle size specifically removes carbonate clays and salts for this purpose so that a fine-loamy soil in the eastern US is measured the same as a soil in the central US and other parts of the world. The carbonate clay is potentially identified in several other aspects of soil taxonomy ('calci' greatgroup, 'calci' subgroup, 'carbonatic' mineralogy class, cation-exchange activity class, calcareous reaction class, etc.) or at the series level.

Translocation of silicate clays are significant in argillic horizon development (and other diagnostic features) which in turn usually drives the particle size control section along with limiting layers and soil order. Soil genesis and clay activity is what is being classified/grouped. Soil texture is an interpretation of soil properties. Although they are closely related they are different.

In addition, historically, most soil survey interpretations were derived for engineering purposes (review the old series interpretation records). We mapped for agriculture uses but measured (through lab analysis) mostly engineering information. I do not view texture as an engineering interp, otherwise we would use AASHTO or UNIFIED systems and would split the very fine sand fraction. Texture is intended to be a field estimate of soil properties, you do not remove OM, carbonates, etc.

Soil Survey Laboratory Information Manual, Report #45  
Soil Taxonomy, 2<sup>nd</sup> ed, 1999

# Open Discussion David Weindorf

## **\*Comment #2**

**This proposal is a big deal. It makes a lot of sense to include carbonate clays when the overall clay content of the soil is included or when overall functioning of the soil is considered. Any discussion should probably include the perspective of an 'old timer' who would know the justification for the present rules.**

## **\*Comment #3**

**From east to west carbonate contents increase as do the nature of the carbonates. By and large interpretations for AWC may, or may not, correlate to total carbonate content. This might be, and I think we would agree that for many it is, true for nutrient availability interpretations. We only need to look at the P availability assessment and see that Olsen vs EDTA vs Mehlich III vs .... would be quite different and not just based on carbonate content, but the form of the carbonates. What echoes in my head it, there are no substitutes for field trials, but as today so much of the data is picked up and applied for models based on the reported extractable 'M' without the data for field trials this is an issue. Further, the data is also used for regulatory purposes, and again often without the modeler —end user-- understanding the limitations in the applicability of the data.**

**Soil Taxonomy has some responsibility to help limit such confessions. This is more involved than total carbonate.**