INTERNATIONAL COMMITTEE ON ANTHROPOGENIC SOILS (ICOMANTH)

Circular Letter No. 3  Jan. 15, 1998

CHARGES:  ICOMANTH is charged with defining appropriate classes in Soil
Taxonomy for soils that have their major properties derived from human activities. The
committee should establish which criteria significantly reflect human activities, or when
a soil's properties are dominantly the result of human activities.

Included in this 3rd Circular Letter are:
• Activities report and announcements
• Action items
• Responses to the questions from Circular Letter No. 2
• Questionnaire #3

ACTIVITIES AND ANNOUNCEMENTS
In August and September, 1997, the USDA-NRCS staff at the National Soil Survey
Center mailed out Circular Letter No. 2. The circular contained some background
material concerning ICOMANTH and the clarification of soils where humans have
profoundly affected formation or existing morphology. A questionnaire posed seventeen
conceptual questions concerning Anthropogenic soils. A Web site was established at
the following WWW URL address: "http://wwwscas.cit.cornell.edu/icomanth"

A tour is being planned to view Anthropogenetic soils in Nevada and California in
September, 1998. See enclosed flier. Interested persons should contact: Terry Cook at
e-mail: ICOMANTH@aol.com or Robert Ahrens at the USDA - NRCS @ 402-437-5389
or by email: bahrens@nssc.nrcs.usda.gov.

ACTION ITEMS
Committee members and other interested persons are asked to do the following:
• Carefully review the questions and proposals in the current questionnaire and submit
  comments by 4/30/98.
• Volunteer for one of the following subcommittees by 4/30/98: a) data and photo
gathering; or b) diagnostic horizons and definitions.
• Please submit copies (electronic if possible, hardcopy if not) of lab and description
data of Anthropogenic soils and soil materials to Dr. Bryant beginning 8/1/97.
• Please submit copies of slides (electronic if possible) or prints of Anthropogenic soils
  and soil materials to Dr. Bryant beginning 8/1/97.

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Cornell University
Ithaca, NY 14853-1901 USA
WWW URL address: http://wwwscas.cit.cornell.edu/rbb1/index.html
RESPONSES TO CIRCULAR 2 QUESTIONNAIRE

1. It was agreed upon that Soil Taxonomy needs to be modified by the addition of new classes for recognizing soils modified by human activities.

2. No clear consensus was reached as to the appropriate categorical level for new classes.

3. The following criteria were identified as important reasons for defining new classes:
   a. There is pressure from users for more detailed soil information
   b. There are a significant number of acres
   c. The soil has a significant content of manufactured/processed materials
   d. The soil is drastically polluted and is potentially toxic to humans
   e. The soil occurs in a deeply excavated or thickly filled area
   f. Historical evidence proves recent deposition or drastic alteration
   g. To provide a basis for collection and analysis of data for research
   h. To provide a language for educational purposes
   
   Comment: To provide correct interpretations was also mentioned.

   The following criteria received divided opinion:
   a. Natural geomorphic processes do not result in the soil being where it is
   b. The soil properties have archaeological significance

4. No -- We do not have enough data and representative pedons to propose classes.
   Comments: Lab and descriptive data have been solicited from all sources in order to build a database for Anthropogenic soils.

5. Yes -- We must have a representative soil before adding classes.

6. Half the respondents felt that a technical classification that would set up classes based on specific limits derived from practical experience of specialists is needed.

   Half the respondents felt that a morpho/genetic system based on morphologic or genetic soil properties is needed.

   Comments: A technical system may be more appropriate for soils with artifacts, contamination, garbage. A morpho/genetic system may be better for the other types of Anthropogenic soils.

7. Mixed -- Half the respondents said "yes," all diagnostic evidence for Anthropopedogenesis must come from within the pedon.

8. Mixed -- Half the respondents said "yes," we can use other evidence to classify and identify pedons. They thought written/published historical evidence and comparative landform/soils study could be used as evidence, but not geomorphology (Identification of distinct artificial landforms).
9. Human effects and actions of major significance to soil formation or soil parent material accumulation include the following:
   - Deposition of dredged sulfidic material in oxidizing landform positions
   - Exposure of sulfidic material to oxidation by excavation or deposition
   - Accelerated erosion of cropland by wind and water
   - Land filling with transported soil and/or rock
   - Land filling with debris, refuse, waste, scrap, and ash
   - Land filling with dredged sediments
   - Land leveling of soils
   - Land leveling for irrigation
   - Removal and filling of soil and rock during excavation
   - Changing surface reaction by conventional plowing (calcification)
   - Deep plowing that destroys some or all diagnostic horizons
   - Severe compaction by machinery during filling
   - Sedimentation in fields by soil material from human caused accelerated erosion
   - Eolian deposition of soil material from human caused accelerated erosion
   - Sedimentation in fields from frequent irrigation
   - Reduction/illuviation/oxidation of Fe and Mn by artificial saturation (paddy soil)

   Human effects and actions of lesser or uncertain significance to soil formation or soil parent material accumulation include the following:
   - Contamination by airborne heavy metals
   - Contamination by heavy metal or radioactive additives and spills
   - Contamination by inorganic chemicals or organic pollutants or toxins
   - Deep mixing of shallow diagnostic horizons during logging operations
   - Addition of asphalt layers or synthetic water barriers and landfill liners
   - Severe surface compaction by machinery or human traffic
   - Sedimentation in floodplains by material from human caused accelerated erosion
   - Accelerated erosion of rangeland by wind and water
   - Liming by chemical or mineral additives to offset natural acidification
   - Mass movement (slippage, landslides) after human landscape modification
   - Surface removal (removing topsoil or organic material such as peat)
   - Artificial drainage of sulfidic material that results in extreme acidification
   - Prevention of frequent flooding
   - Artificial flooding or raising of shallow water tables by water impoundment
   - Creation of sodic or natric soils by alteration of natural drainage or irrigation
   - Insignificant or easily-reversible effects and actions
   - Changing surface texture by conventional plowing
   - Destroying shallow (<18cm) diagnostic horizons by conventional plowing
   - Addition of chemicals or minerals that acidify soils
   - Addition of air pollutants that result in acid rain
   - Redoximorphism by reduct gasses or water-soluble organic compounds
   - Recycling of soil fertility by slash/burn rotational farming
   - Changing surface compaction, structure by conventional plowing
   - Loss of surface organic matter (increased oxidation, loss by erosion)
   - Loss of soil fertility (exportation in crops, loss by erosion)
Changing soil fertility by fertilizing
Artificial drainage of soil
Creation of saline seeps
Alteration of runoff by ditching or terracing

10. It was agreed that soil horizons and layers formed in Anthropotransported material should have a separate designation to notify the users of soil information. Opinion was divided between using a prefix or a new master horizon. Several said it should be the same (Arabic numeral) prefix as is currently used. The current convention has not been applied, and would not separate transported material from other soil of similar geology. It was suggested that a master letter of H, F, or Ctf "transported fill" be used. The change to a different master horizon would cause the loss of much information supplied by the current master letters. If a new letter was added to the old system, we could not recognize transitional horizons or they would become very long and lose their functionality. Another suggestion was to use a "superscript" instead of a subscript, "a" for soil with contamination or artifacts, and "n" for soil without. One suggestion was to use a subscript of "u" for "human".

11. All of the current epipedons may form in artifact free, uncontaminated Anthropotransported material.

12. All of the current epipedons may form in material with artifacts or contaminated Anthropotransported material.

13. Undecided -- There was no consensus on whether all types of Anthropotransported material should be considered part of a "mantle of new material" in the definition of buried soils.

14. Undecided -- There was no consensus on whether rarely but deeply mixed soil (>50 cm) should be treated like a mantle of new material. Rarely was not defined.

15. Yes -- Respondents agreed that the definition of buried soils should be simplified so that the minimum depth for identification of new material mantles is standardized to 50 cm, rather than the "sliding scale" of 30 to 50 cm as it is now.

16. Undecided -- There was no consensus on whether the "mantle" should be moved up in status from within the definition of buried soil to be a recognized diagnostic surface layer, separate from the epipedons.

17. No -- A key to identify buried soils should not be formally included in the Key to Soil Orders.

18. Concerning the following changes to family classes:
   a. Coal ash and Iron-ore slag should be mentioned in the lists with cinders for determining substitute particle-size classes.
b. We should define the following as rock fragments: concrete, brick, iron, steel, bronze, copper, other metals, cinder blocks, glass, hard plastic, and possibly asphalt.

c. We should not define the following as coarse fragments or pararock fragments: wood, cardboard, paper, cotton clothing, carpet, styrofoam, gypsum board.

**QUESTIONNAIRE 3**

The third questionnaire is designed to stimulate thought and discussion on topics that will emerge during the scheduled field trip in September (see Action Items and Announcements). We will have an opportunity to see examples of some of the types of disturbances listed in question 9 of questionnaire 2. We also need to come to grips with the issue of what kind of evidence of human alteration will be used as criteria for classification of human altered soils or transported parent materials (questions 7 and 8).

Please answer the following questions and return by mail or email to Dr. Bryant. We encourage additional comments about these questions by email or word-processor computer file. Please use the same numbering system as the questions.

1. Please list any morphological indicators of human alteration or transportation which occur in the pedons of such soils with which you are familiar. __________________________________________

2. Please list any micromorphological indicators of human alteration or transportation which occur in the pedons of such soils with which you are familiar. __________________________________________

3. Please list any chemical, radioactive, or mineralogical indicators of human alteration or transportation which occur in the pedons of such soils with which you are familiar. __________________________________________

4. Should soil material that is known to be transported and deposited by human labor/machinery occur in separate classes in Soil Taxonomy, even if there are no artifacts left in the transported soil? ___ Yes ___ No

If you answered yes, what evidence would you use to prove they were transported?
5. In areas where near-surface excavation mining has taken place, the area may be restored to its original landform shape. If this is done without leaving artifacts in the soil as evidence, should these soils be put into a separate class for Anthropogenic soils or identified by their properties into natural genetic soil classes?

_____Anthropogenic classes  _____natural genetic classes

If you answered Anthropogenic, what evidence would you use to prove they were transported?

______________________________________________________________________________

6. Should sulfuric horizons that form in dredged material or mine spoil be put into a different class than other sulfuric horizons?   _____Yes   _____No

If you answered yes, what evidence would you use to prove they were transported?

______________________________________________________________________________

7. Some surface horizons of "soils" constructed by reclamation of near-surface excavation mining meet all the criteria of a Mollic epipedon. Should the epipedon be identified as Mollic, or be put into a separate class?   _____Mollic   _____Separate

Should the soil be classified as a Mollisol if it meets all other requirements, such as base saturation, or be put into a separate class?   _____Mollisol   _____Separate

8. Soils polluted with petroleum and hydrocarbon products, radioactivity, or high heavy metal concentrations pose a threat to humans and animals who live on/in them or eat food grown on/in them. Should Soil Taxonomy include separate classes for these soils based on these characteristics?   _____Yes   _____No

9. Dredging and long-term irrigation with sediment-laden water has produced soils with thick mantles and morphology that resemble floodplain deposits, but they may or may not occur in natural floodplains. Should these soils be put in the same class as Fluvents and Fluvaquents?   _____Yes   _____No

If you answered "No", what evidence would you use to prove humans transported them?

______________________________________________________________________________

10. Terracing, ditching, land leveling, levee and diversion building, mechanical excavations, and slumping within excavated areas also produce soils with morphology that resemble floodplain deposits, but they do not occur in floodplains. Should these soils be put in the same class as Fluvents and Fluvaquents?

_____Yes   _____No
If you answered “Yes”, this would allow inclusion in the “Fluv” classes of soil with a variety of processes that cause the irregular carbon distribution with depth. Should the name of the classes be changed to reflect the fact that “Fluvial” processes are not the only source of the diagnostic morphology?  

____Yes  ____No

Submitted by Dr. John M. Galbraith, Cornell University. Members may forward this letter to others who would like to be placed on the ICOMANTH mailing list.
First Announcement
International Workshop
Classification, Correlation and Management of Anthropogenic Soils

September 21 - October 2, 1998.

This meeting is being organized to help in the understanding of Anthropogenic Soils. The meeting will consist of invited papers and a series of field stops where questions will be raised and discussed. The meeting will be a working one where all participants will have a chance to take part in discussions. This meeting is being organized to bring together the leading experts on anthropogenic soils and to give the committee Chair by Dr. Ray Bryant a forum to gather information and ideas to deal with the ever expanding of man changed soils. We are not able to handle them that well in our classification system at this time. We also need to develop better interpretations for these soils. This meeting is being held to have state of the art papers presented covering classification, land use and interpretations. Along with the papers a field tour will be organized to look at actual problems and solutions.

OBJECTIVES

The workshop will cover the following topics:

- What are anthropogenic soils?
- What are urban soils or soils of urban areas?
- Landforms versus classification and morphology
- Areas of drastic cut and fills?
- Paddy soils (rice), morphological changes, chemical, mineralogical, and/or physical changes?
- Are we concerned with classification or mapping questions?
- Concept of miscellaneous land types and how used?
- Development of interpretations of soils modified by human activities?
- Urban interpretations?
- Soil contaminated with heavy metals.
- Salt effected soils?
- Other topics of interest.
- Altered drainage, irrigation, ground water pumping.

PURPOSE:

To advance the work of the International Committee on Anthropogenic Soils by bringing together a large group of scientists to share ideas and information.
CONFERENCE ORGANIZATION

A group of soil scientists met in Anaheim, California in October 1997. This group is the overall organizing committee. (John Kimble, Ray Bryant, Bob Ahrens, Henry Mount, Randy Southard, Dewayne Mays, Ray Sinclair, Bob Engel, Chine-Lou Ping, Darwin Newton, Maxine Levin, Joyce Scheyer, Lee Norfleet, Loyal Quandt, Eric Vinson, Terry Cook, Horace Smith, Hari Eswaran and Gordon Huntington).

Technical organization will be coordinated by John Kimble, Bob Ahrens, John Galbraith and Ray Bryant.

Logistical organization etc. will be handled by Terry Cook and Roger Poff. They represent the organizing entity PSSAC. Professional Soil Scientists Association of California. All logistical arrangements and payments will be handled by the PSSAC

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Tel/Fax: (530) 753 1062

Roger Poff
Co-Organizer
PSSAC/ICOMANTH
P.O. Box 2073
Nevada City, CA 95959
Tel. (530) 273 1709

PROVISIONAL OVERVIEW of WORKSHOP:


Field Stops
- Subsidence problems in the city due to high gypsum soils / over pumping / 150 cm + displacement / lake bed materials used as fill.
- Heaving problems due to sulfate crystals filling voids - possible discussion only
- Possibly Archeology sites.
- Soils with multiple petrocalcic horizons within 30 cm of the surface to 270 cm; blasted, crushed, and reconstituted for building sites.
- Mine spoil reclamation from a gold mine / spoil from depths of over 500 m / surface deposits scraped from surrounding soils as growing mediums / re-vegetation from native species.
September 25, 1998  Overnight in Bakersfield, CA, Group Basque Dinner.

Field Stops
- Borax Plant / mining and reclamation of spoil soils / surface 120 m of quartz monzonite overburden used as mine spoil / re-vegetation directly in the crushed monzonite without any surface soils added.
- Community of Oldale oil drilling / pumping / pipelines cut / fills / sumps / trenches / roads some areas may have up to > 50% of the area modified.
- Native vs. Irrigated lands -- California Aqueduct. Native nonirrigated hummocky Natargid soils with up to 100 cm relief / modified soils have mixed the natric horizon and have been laser leveled / issues: profile modified / salinity alteration / irrigation.

September 26, 1998  Overnight Fresno, CA

Field Stops
- Ripped vs. non-ripped natric/duripan soils -- native Nadurargids used only for pasture / ripped modified soils used for tree crops -- taxonomic units vs. mapping units -- management of salts -- irrigation management.
- Old marshlands & lake bed now irrigated -- irrigated / continually wet nonvertic soils due to irrigation vs. native nonirrigated Aridic Vertisols -- flood control / controlled drainage systems.
- Native “hogswallow” or “mima - mound” claypan/duripan soils with over 100 cm microrelief vs. blasted and ripped deep cuts & filled leveled soils with 50 year old citrus & other orchards -- Citrus Exp. Sta..
- Equipment Co. with deep ripping plows and tractors -- possible stop showing actual deep modification in process.

September 27, 1998 SUNDAY. Group Sessions (No Planned Technical Sessions) Planned Underground Gardens Tour dug 4-5 m deep in underlying duripan formations. Overnight Fresno

September 28, 1998). Overnight Sacramento

Field Stops
- Kerman Ecological Reserve-- Native unaltered soils -- remnants of Sacramento.
- Valley conditions pre-irrigation and farming -- Chemical changes in soils due to reclamation and drainage.
- Desalinization of nonsalty soils due to irrigation drainage waters.
- Land retirement / Selenium accumulations / San Luis Drain.
- Near surface subsidence in soils with gypsum and irrigation.
- Kesterson National Wildlife Refuge -- chemical changes in soils -- excess salts / drainage waters / selenium & heavy metals.
- City of Merced -- industrial wastes on 540 acres used for about 20 years -- deep ripping / plowing / current farming practices on modified soils versus adjacent native soils with a duripan.
September 29 1998  Overnight Sacramento, CA
Field Stops

- Brannon Island State Park -- Park made from Bay mud fill materials. Tentative site
- Terminous -- Sacramento - San Joaquin Delta -- 20 -- 30 foot subsidence due to farming / organic soils / salt water intrusion / loss of organic soils due to farming.
- Constructed vernal pools in altered soils with claypan/duripans.
- Landfill & topsoil restoration -- Conventional caps or Chapter 15 vs. non-conventional / restoration of soil materials used as covers.
- Stream terraces mined by dredges / extremely gravelly & cobbly mine tailings / leveled tailings / differential settling problems / industrial and urban sites.

September 30, 1998  Overnight Burlingame, CA.
Field Stops

- North San Francisco Bay -- natural tidal marsh vs. reclaimed acid sulfate soils & subsidence / high shrink -- low swell soils / taxonomic changes -- Halaquepts, Tropaquepts, Endoaquepts vs. Sulfaquepts - Drive-by
- Photo stop -- Vista stop at north end of Golden Gate Park -- Overview of Bay. - Area Fills -- comments from geologists/geomorphologists/soil scientists.
- Selected sites within the city of San Francisco -- Golden Gate Park / cut & fill.
- Treasure Island -- Artificial island made from bay sediments. Site of 1939 World Fair / subsidence / stability / earthquakes / soil forming processes within about 60 years.
- Hunters Point -- Artificial fill -- Military conversion to private use / decommissioning / landfill / hazardous materials & wastes.

October 1, 1998  Burlingame, CA  Tech Sessions / Closing Banquet
Overnight Burlingame.

October 2, 1998  Departure

PRESENTATIONS

There will be room provided for posters. Most all papers presented will be invited and will be 30 minutes in length. Persons interested in presenting a voluntary paper should return the Notice of Intent as soon as possible so their paper can be consider for inclusion in the meeting.

PUBLICATION

We plan on publishing the proceedings of the meeting after they go through a peer review, if acceptable, will be included.
REGISTRATION

PAYMENT:

The logistical arrangements for the meeting are being handled by the PSSAC all fees (Registration, Transportation, Lodging, and arranged meals must be paid to the PSSAC in advance of the meeting. The Registration Fee must be paid by June 1, 1998.

All lodging and organized meals (all breakfasts, all lunches excluding Sunday 27th and three dinners) will be included in the tour fees. The PSSAC will handle all room reservations and will organize for banquets, and most lunches as we will be on the bus touring.

HOW TO REGISTER:

Submit competed Notice of Intent form to:

PSSAC/ICOMANTH
Terry D. Cook
3214 Lillard Drive
Davis, CA 95616

TEL/FAX 530 753-1062
EMAIL ICOMANTH@aol.com

CANCELLATION POLICY:

Any cancellation after June 19, 1998 will result in the lose the registration fee and the incurred hotel fees. The hotels have a 90 day cancellation policy.
NOTICE OF INTENT
And
REGISTRATION FORM

International Workshop
Classification, Correlation and Management of Anthropogenic Soils

September 21 - October 2, 1998.

Must be returned by May 1, 1998

Name
Title and Profession
Organization
Mailing Address

EMAIL: ____________________________________________
PHONE: __________________________________________
FAX: ____________________________________________

Will you be contributing a paper  Yes  No
Will you be contributing a poster  Yes  No

Title of Paper or Poster: ____________________________________________

The deadline for submission of titles is May 1, 1998. Because of the need to book hotels in advance, the registration fee must be submitted by June 1, 1998.

Single  Yes  No  Smoking  Nonsmoking
Double  Yes  No  Smoking  Nonsmoking
Room mate  Preference  No-preference
There are a limited number of single rooms because of the high cost of the rooms.

Registration Fee: $115.00. Submitted  Yes___  No___

Trip Fees (Lodging/Arranged Meals?)

Single $1540.00
Double $960.00

Payment: Make check (in US Dollars from US Bank) payable to PSSAC/ICOMANTH TOUR

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