NCSS/NRCS Updates & New Horizon Designation for ^Anthropogenic Soils

Jim Turenne, CPSS
Assistant State Soil Scientist
RI USDA NRCS
http://nesoil.com

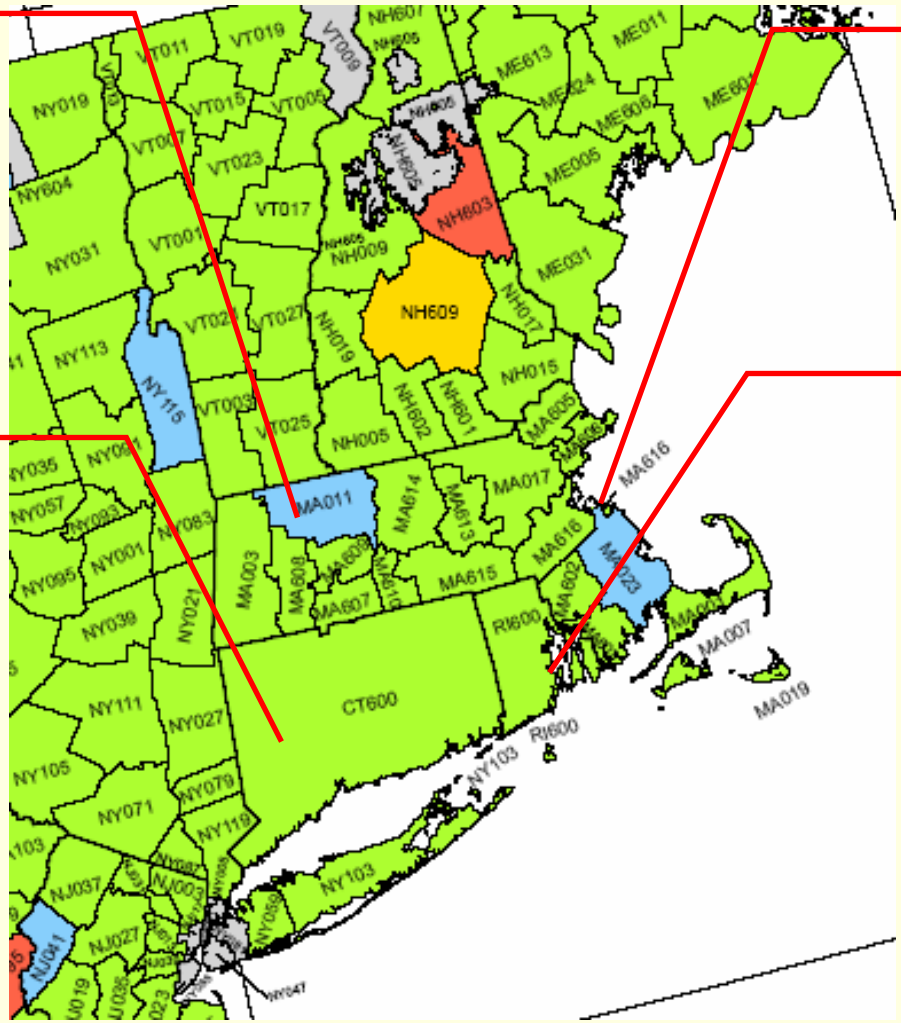
NCSS / NRCS Updates

- Major reorganization of the NCSS by MMA.
- WSS Version 2.0 – many new features (bug fixes, topo image, transparency, map unit information, custom reports).
- Soil Resource Inventory Toolbox – GIS interface and Pedon PC (Access program).
- 2008 Northeast NCSS Conference – CT/RI Host.
- Mapping details available for private sector (?) and hiring of new soil scientists.

Digital Soils Data – CT, MA, RI

Franklin County – using 3D Mapper and ArcMap for a paperless survey.

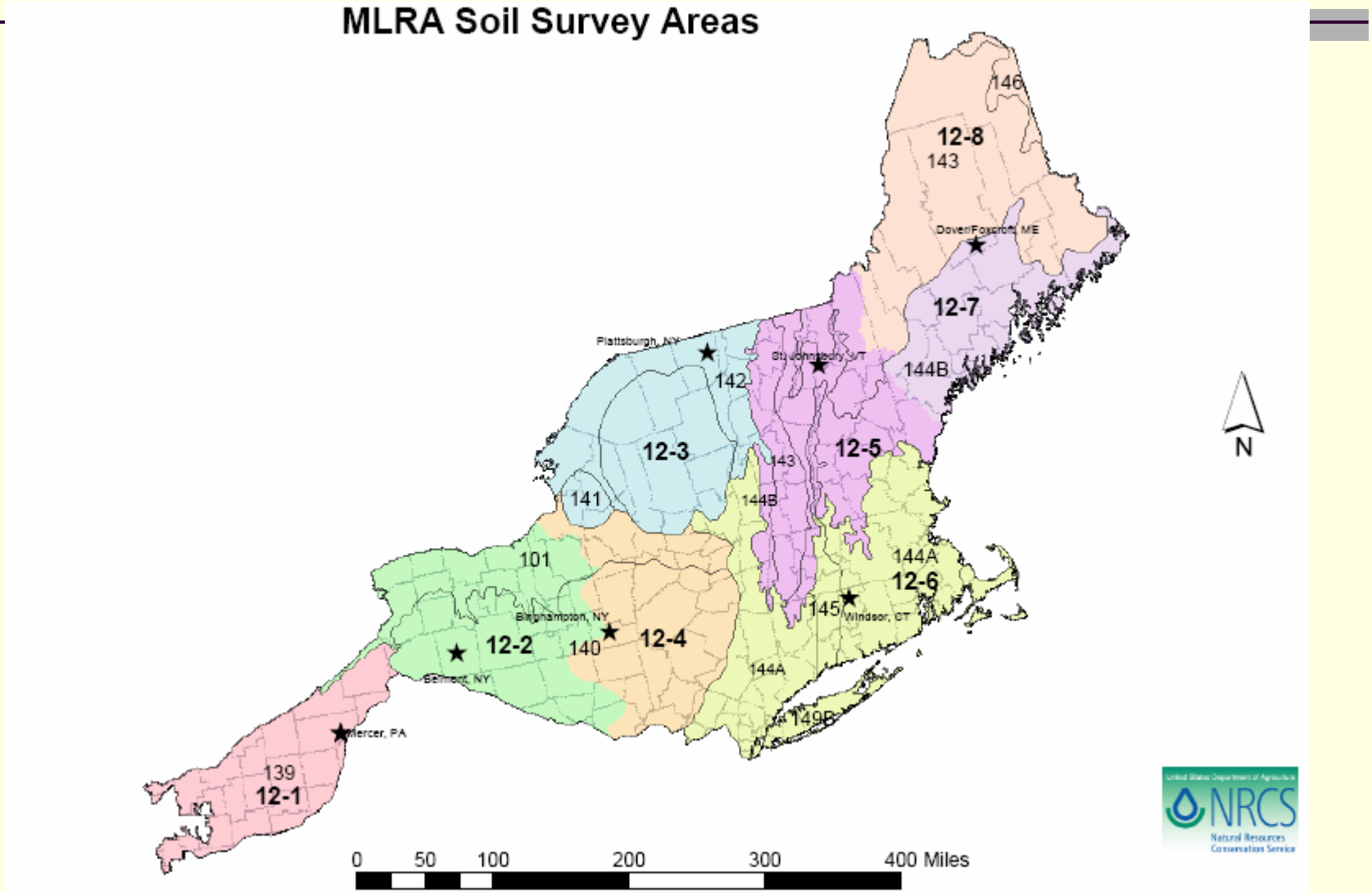
Statewide survey (CT600) – some new interps/ratings.



Plymouth County – some areas digitized (eastern part).

State-wide survey, archived surveys and DVD ROM.

Soil Survey Reorganization by MLRA

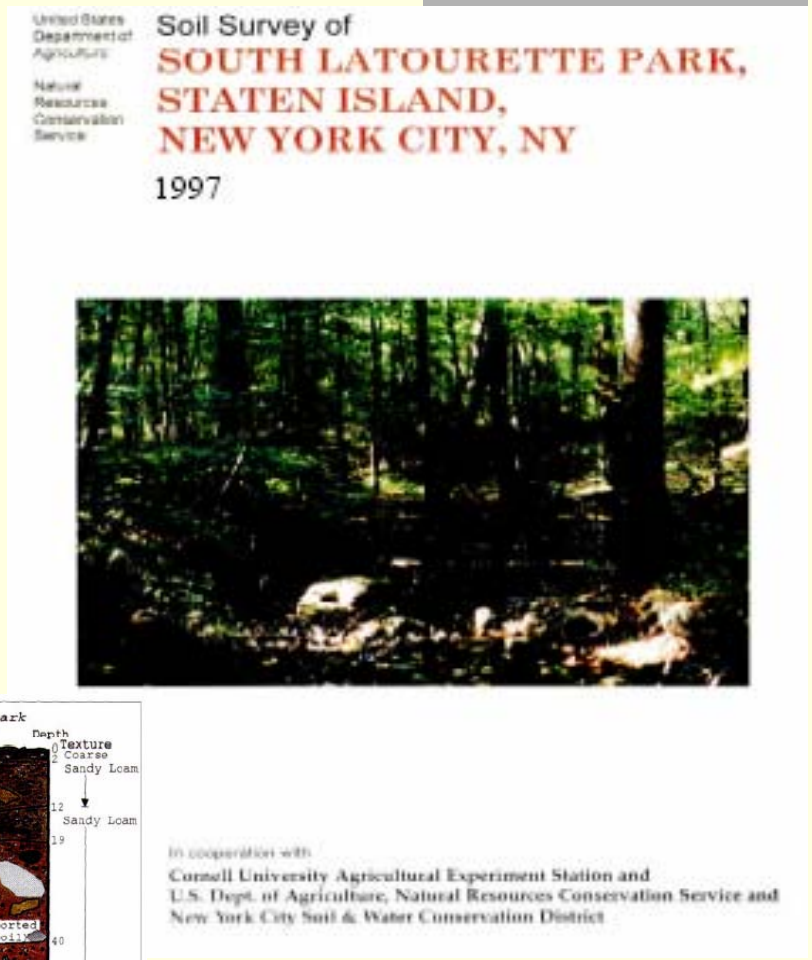


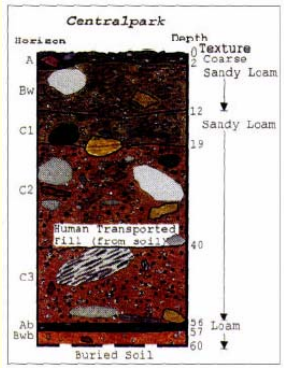
Recent History of Anthropogenic Soils

- ICOMANTH – formed in 1995, charged with defining appropriate classes in Soil Taxonomy for soils that have their major properties derived from human activities.
- Prior – most soil surveys mapped undifferentiated units for human altered landforms (Udorthents, Udipsamments, Arents, etc.).
- Ideas ranged from a new soil order, great group level (urbic, garbic), map unit phases and series, master horizons for fill and so on.

History

- Major soil survey work on anthropogenic soils were made with the mapping of NYC.
- 24 soil series established, urban interpretations built, pedon descriptions taken.
- Anthropogenic tours conducted.





ICOMANTH Circular 6 – most recent

- http://clic.cses.vt.edu/icomanth/ICOMANTH_Circular6.pdf

human transported material – Organic or mineral soil material (or any other material that can function as a soil material) that has been moved horizontally onto a pedon from a source area outside of that pedon by directed human activity, usually with the aid of machinery. There has been little or no subsequent reworking by wind, gravity, water, or ice. Human transported materials are most commonly associated with building sites, mining or dredging operations, land fills, or other similar activities that result in the formation of a constructional anthropogenic landform. – NSSH Definition.

See handout from Mark Stolt talk at the 2005 recent advances in soil science session.

Circular 6 highlights

- Does not address classification of HTM – main purpose is in describing HTM.
- Make recommendations for NSSH, SSM, etc.
- Define HTM as a type of parent material.
- Define Anthropogenic features, manufactured layers, and artifacts (along with categories of artifacts)
- Detailed descriptions of artifacts.
- Horizon designation: M, ^, u.

Keys to Taxonomy 10th edition

M layers: *Root-limiting subsoil layers consisting of nearly continuous, horizontally oriented, human-manufactured materials*

Examples of materials designated by the letter M are geotextile liners, asphalt, concrete, rubber, and plastic.

u *Presence of human-manufactured materials (artifacts)*

This symbol indicates the presence of manufactured artifacts that have been created or modified by humans, usually for a practical purpose in habitation,

Use of the Caret Symbol

The "caret" symbol (^) is used as a prefix to master horizon designations to indicate mineral or organic layers of human-transported material. This material has been moved horizontally onto a pedon from a source area outside of that pedon by directed human activity, usually with the aid of machinery. All horizons and layers formed in human-transported material are indicated by a "caret" prefix (e.g., ^A-^C-Ab-Btb). When they can contribute substantially to an understanding of the relationship of the horizons or layers, Arabic numeral prefixes may be used before the caret symbol to indicate the presence of discontinuities within the human-transported material or between the human- transported material and underlying layers (e.g., ^A-^C1-2^C2-3Bwb).

USDA United States Department of Agriculture

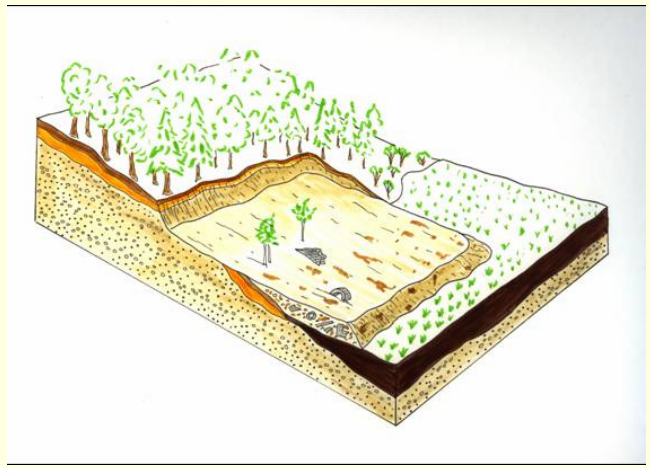
NRCS Natural Resources Conservation Service

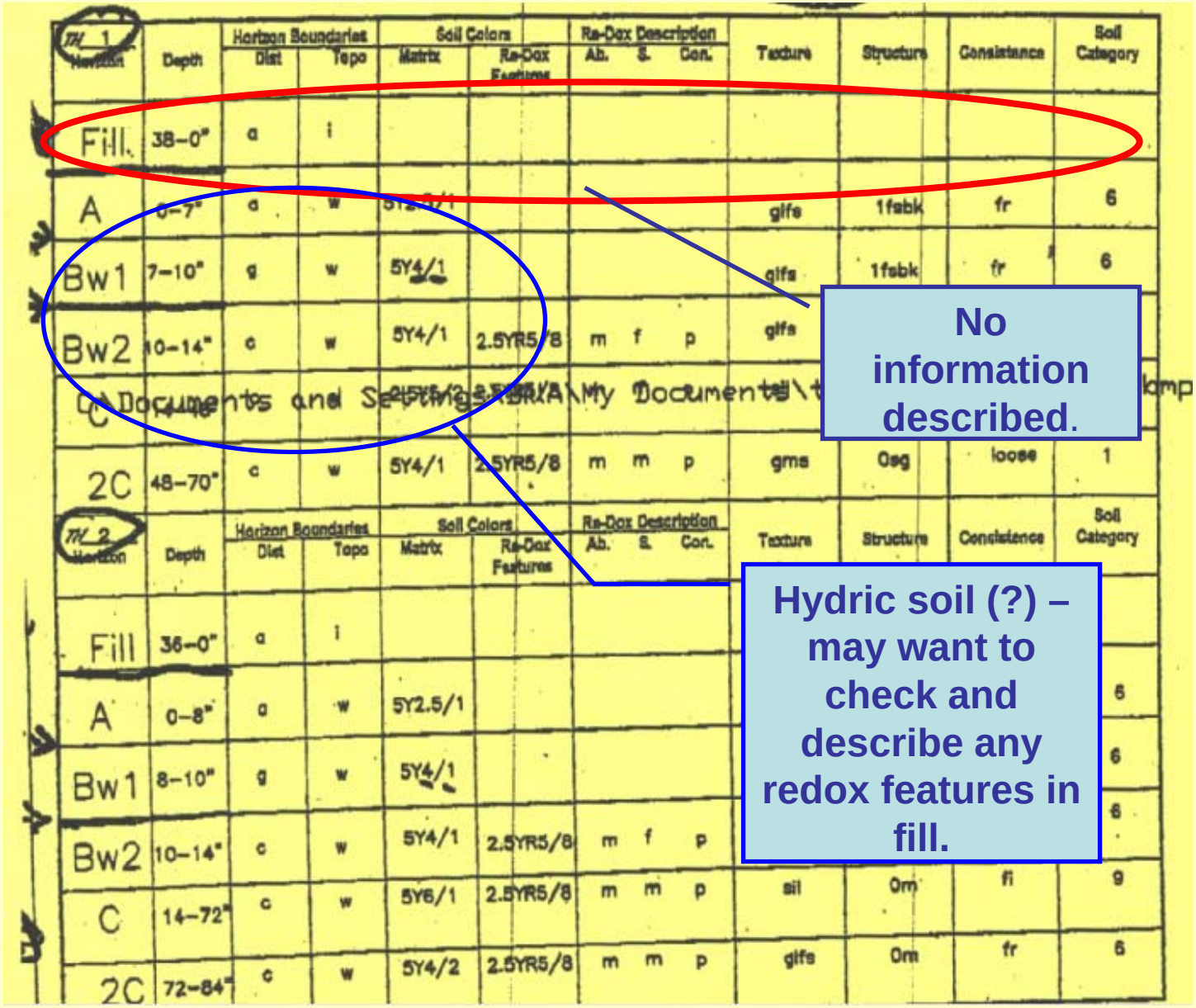
Keys to Soil Taxonomy

Tenth Edition, 2006

Why Needed?

- Major human modification of soils in the SNE region.
- Major soil work involves describing and interpreting soils for septic system evaluations and hydric soil delineation.
- Need to use this new nomenclature consistently.





TH 1 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab.	Re-Dox Description S.	Re-Dox Description Con.	Texture	Structure	Consistence	Soil Category
Fill	38–0"	a	i									
A	0–7"	a	w	5Y2.5/1					glfs	1fsbk	fr	6
Bw1	7–10"	g	w	5Y4/1					glfs	1fsbk	fr	6
Bw2	10–14"	c	w	5Y4/1	2.5YR5/8	m	f	p	glfs			
C	14–48"											
2C	48–70"	c	w	5Y4/1	2.5YR5/8	m	m	p	gms	0sg	loose	1

TH 2 Horizon	Depth	Horizon Boundaries Dist	Horizon Boundaries Topo	Soil Colors Matrix	Soil Colors Re-Dox Features	Re-Dox Description Ab.	Re-Dox Description S.	Re-Dox Description Con.	Texture	Structure	Consistence	Soil Category
Fill	36–0"	a	i									
A	0–8"	a	w	5Y2.5/1								6
Bw1	8–10"	g	w	5Y4/1								6
Bw2	10–14"	c	w	5Y4/1	2.5YR5/8	m	f	p				6
C	14–72"	c	w	5Y6/1	2.5YR5/8	m	m	p	sil	0m	fi	9
2C	72–84"	c	w	5Y4/2	2.5YR5/8	m	m	p	gls	0m	fr	6

No information described.

Hydric soil (?) – may want to check and describe any redox features in fill.

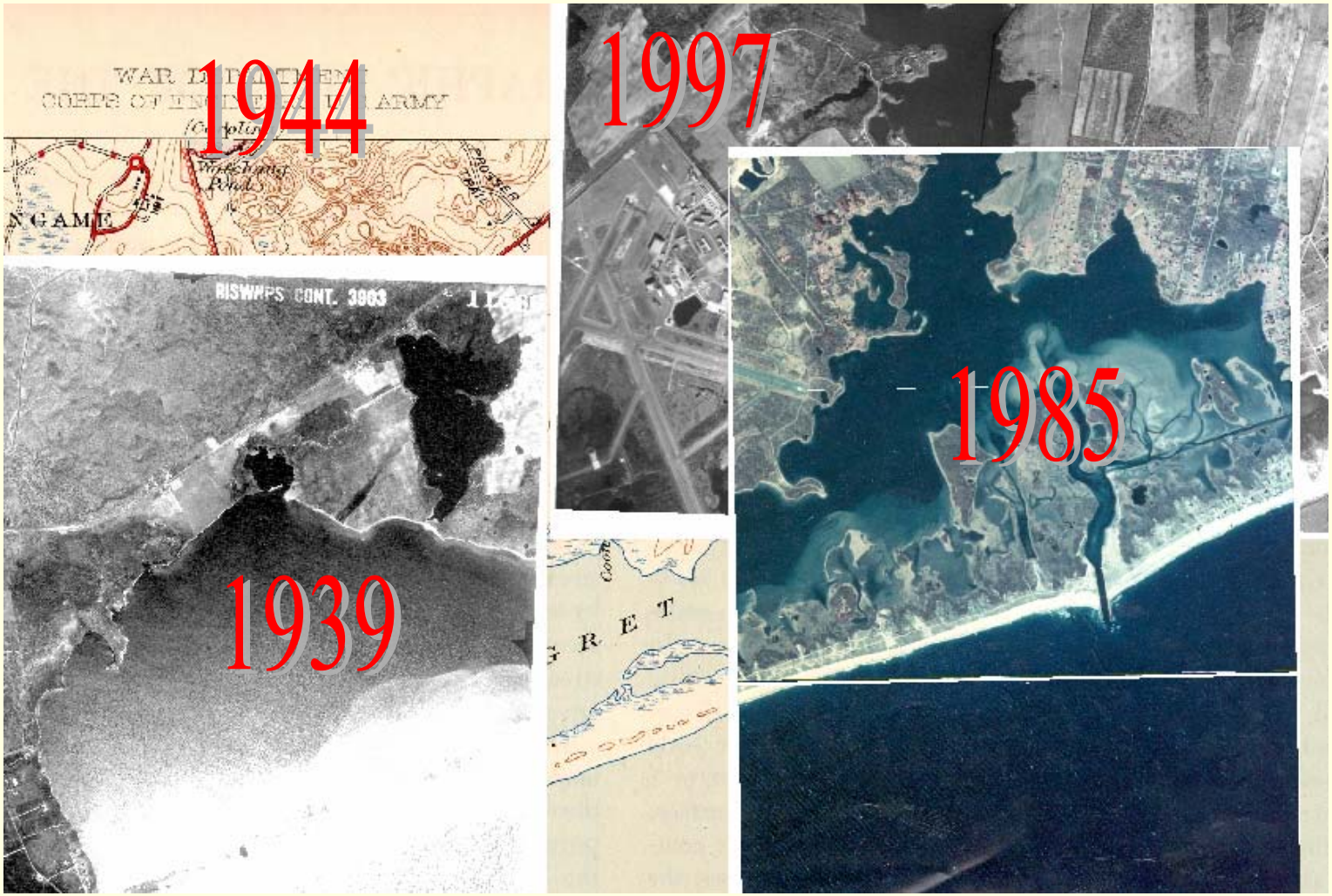
Is it Soil?

No: misc. area – active gravel pit.

No: pavement and buildings

Yes: vegetated area, Fortress and Tihonet Series.

Historic Imagery – 1800's to 2005



^A: 0-4”, 10YR 3/1, sl, 0,m, Fr.

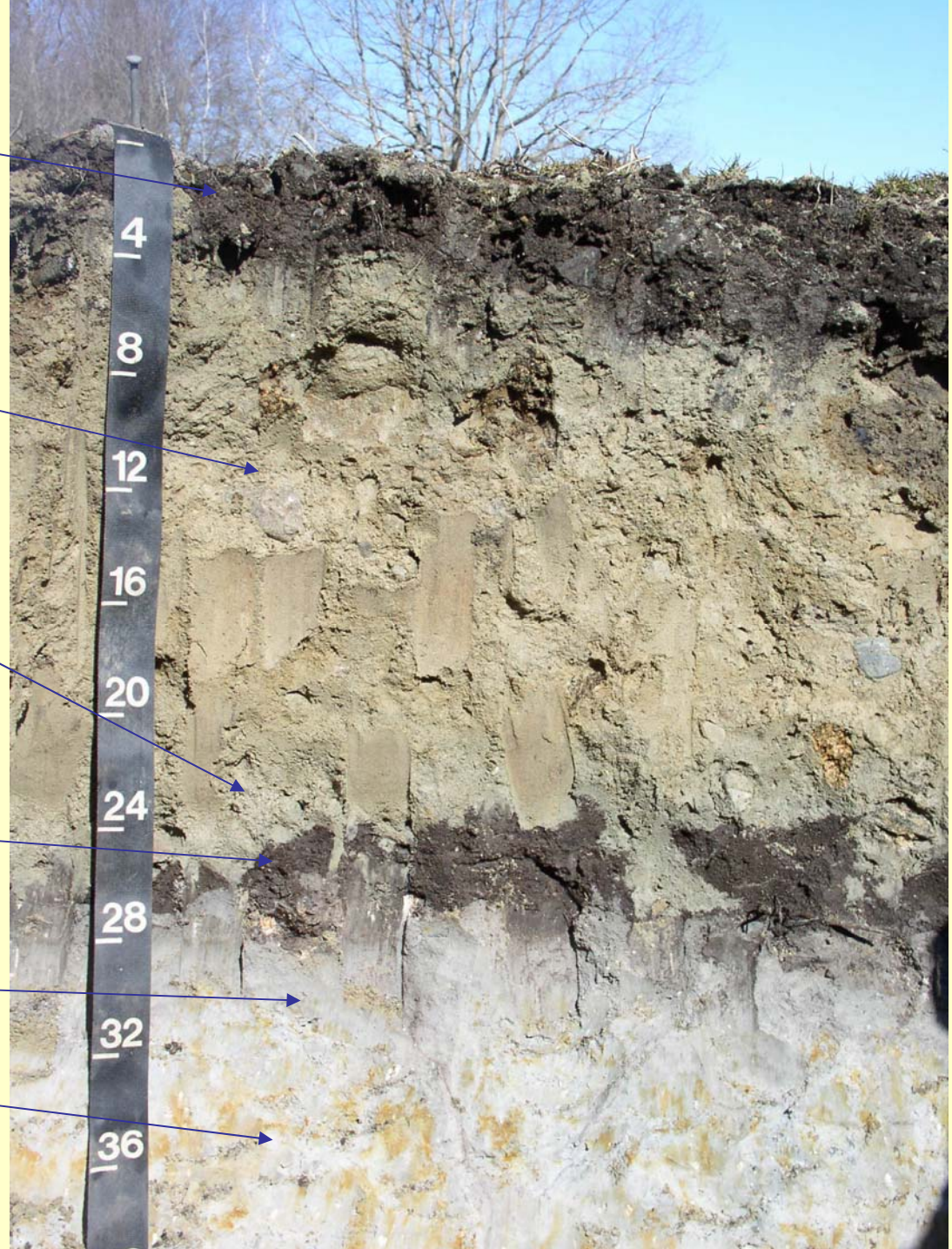
^C1: 4-23”, 2.5Y 5/3, ls, 0,m, Fr (no artifacts).

^Cg: 23-26 5Y 5/2, 5% 5Y 5/1 redox depletions, ls, 0,m, Fr, +rx to alpha dye.

2Ab: 26-28”, 2.5Y 2.5/1, msl, 1,f,sbk, fr

2Bg: 28-33” 2.5Y 5/1, sl, 1msbk, fr.

2Cd: 33-65” 5Y 5/1, 20% 10YR 5/6 conc. Fi.



Recommend using alpha alpha

Positive reaction (turns pink) in ^Cg = reduced iron = my call for ESWT.

Redox or Mottles?

Need to determine if the color patterns in the HTM are just mixing of material, redox features that were formed originally in place then placed as HTM or if they formed in place after being transported – often difficult!

Redox formed in place

Mottling caused by mixing

HTM over buried Sutton Soil

^Apu: Sl, AW boundary, 5% artifacts of electrical wire and plastic.

2^C: AW boundary, sand, 0,sg, loose, thin 1 cm layer of black material along bottom of horizon.

3^A/Cu: Abrupt irregular boundary, artifcatual sandy loam, 15% artifacts of wood, metal, and concrete.

4Bwb – buried solum of the Sutton soil

Cg: 2.5Y 5/2, gsl, 0,ma, fr, positive rxn to alpha alpha.

Pedogenesis?

Natural Alluvial Deposits (Winooski Soils) = Ap – C – Ab – C’ – Ab’ , etc.

HTM – buried foundation 17th century = 2^Cu

^M: 0-5”, 10YR 3/1, manufactured layer, asphalt, extremely firm.

2^C1

Buried Hinckley Soil 3Ab, etc.

Cranberry Bed Soil – HTM added late 70's – 80's – tape is in CM (< 50 cm not a buried soil but a sanded phase of Freetown).

^A

^Bw – 10YR 5/3 with Redox concentrations.

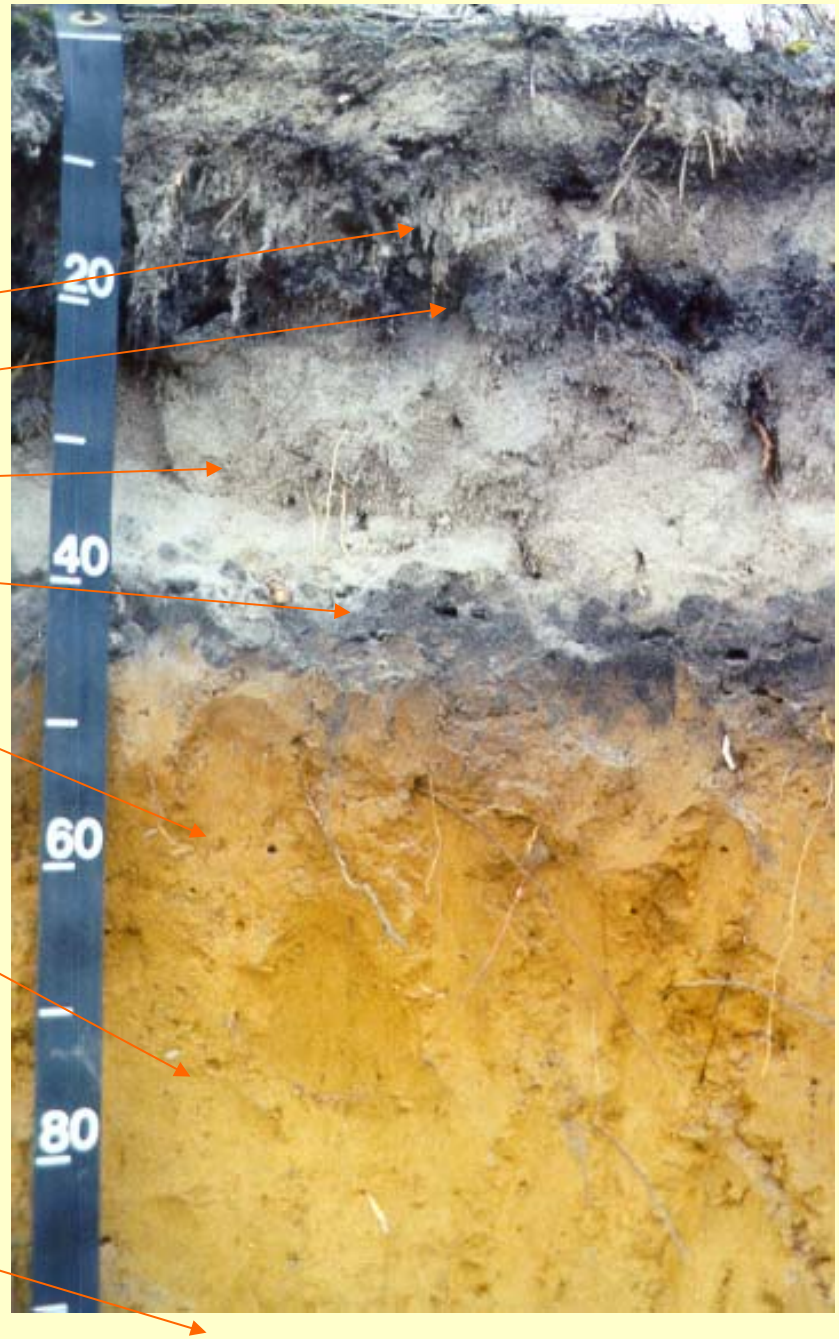
^Cg

2Oab – buried Freetown Soils

Question arise about use of the "b" for organic horizons. It is OK to have Oab!

Hinesburg – overwash phase (not buried < 50cm)

Not HTM – all natural material!



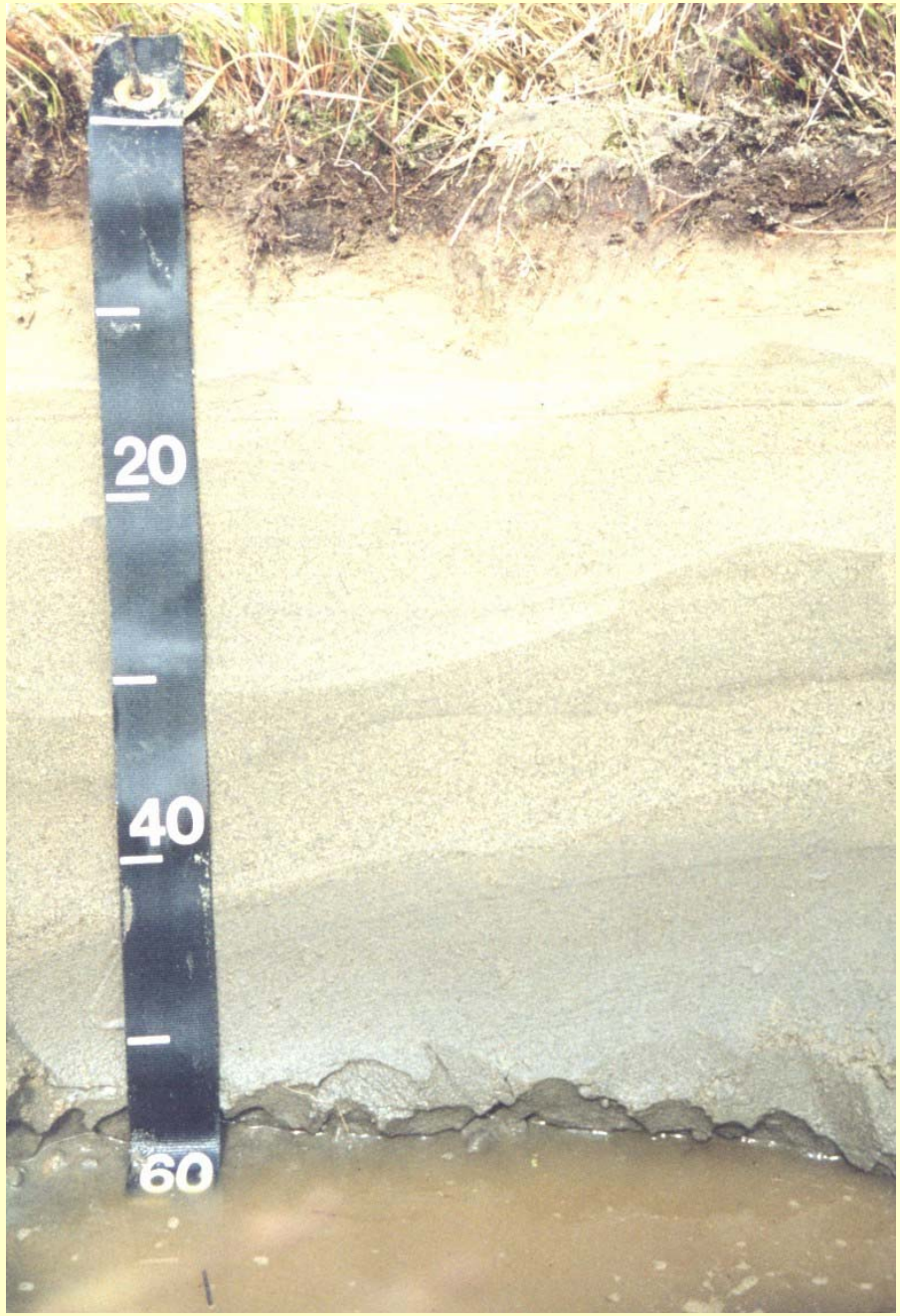
Hinckley Soil with Hinckley PM used for HTM

Tihonet Soil – gravel pit excavated to water table (PD hydric soil)

Oe

2C1

2Cg



- ”b Buried genetic horizon

  This symbol is used to indicate identifiable buried horizons with major genetic features that were formed before burial. Genetic horizons may or may not have formed in the overlying material, which may be either like or unlike the assumed parent material of the buried soil. The symbol is not used to separate organic layers forming at the soil surface from underlying mineral layers. It is not used in organic soils, unless they are buried by mineral soil materials.”