

TA-6 Mesic Spodic Indicator – the final step!

TA6. Mesic Spodic. *For testing in MLRAs 144A and 145 of LRR R and MLRA 149B of LRR S.* A layer 5 cm (2 inches) or more thick, starting within 15 cm (6 inches) of the mineral soil surface, that has value of 3 or less and chroma of 2 or less and is underlain by either:

- a. A layer(s) 8 cm (3 inches) or more thick occurring within 30 cm (12 inches) of the mineral soil surface, having value and chroma of 3 or less, and showing evidence of spodic development; or
- b. A layer(s) 5 cm (2 inches) or more thick occurring within 30 cm (12 inches) of the mineral soil surface, having value of 4 or more and chroma of 2 or less, and directly underlain by a layer(s) 8 cm (3 inches) or more thick having value and chroma of 3 or less and showing evidence of spodic development.

User Notes: This indicator is used to identify wet soils that have spodic materials or that meet the definition of Spodosols, only in MLRAs 144A and 145 of LRR R and in MLRA 149B of LRR S. The layer



Jim Turenne
RI NRCS

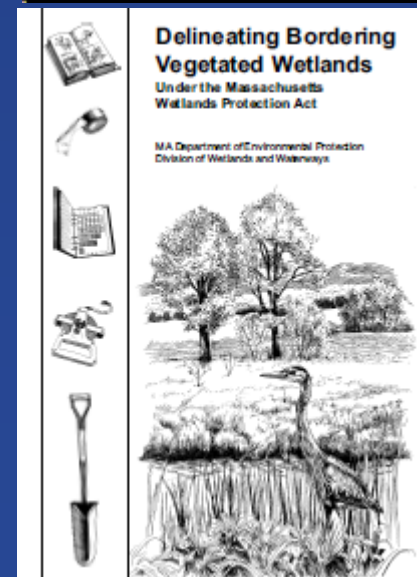
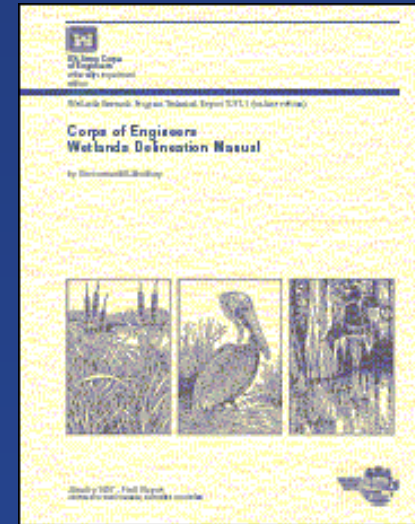
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Background Information

- 87 COE manual – “Wet Spodosols (and other soils with E horizons)” listed in Problem Soil section.
- MA – Delineating Bordering Vegetated Wetlands – Difficult to Analyze “Evergreen forest soils”.
- NEHSTC “Field Indicators” – most of the spodic indicators developed for frigid soils – redox in E, etc.
- Spodosols not really mapped in mesic area (even though they exist).



Hydric Soil Tour 2004: RI Vernal Pools

- NEHSTC hosted the 2004 tour in RI looking at Frank Golet's vernal pool study.
- Most of the sites consisted of spodosols.
- Version 3 was not meeting indicators despite obvious wetland hydro/veg.
- Subcommittee formed to develop indicator (Stolt, Fletcher, Tunstead, Turenne)



Thus, 40% of the hydric soils reviewed did not meet any indicator and suggested the need for the development of an effective indicator for hydric spodic soils.

Mesic Spodic Developed

- Reviewed over 30 pedon descriptions, OSED's, soil survey, etc.
- Data entered to spread sheet with colors, depths, horizons, redox.
- Tested in subsequent tours (Plymouth).
- Converted NE wording to National, submitted to National for test, accepted as TA-6.
- Discussed and VOTED on at 3 NE Regional SS conferences – hydric soil committee!

Mesic Spodic Indicator Review													
Pedon	Series (hydric)	Data	National	Proposed	Notes	O thick	A, thick	A, color	E, thick	E, color	Spodic, de	Spodic, Co	Link to Pedon and/or Data
S93-MA-023-001	Mattapoisett (Y)	Lab, water table data, A0, 5L, 5S, 5S, 5S	None so described but meets some with lab data	7s	Moist A10 but this is a test indicator for S, moist S1 with the lab data (A has 6% carbon so moist much) does not meet wet without lab data (many textures described)	18	6	3/0	12	4/1	18	3/2 with redox	http://soilcons.com/mattapoisett/
Squawamscott (Dwep), 2502104		Pedon, photo	None	5s or 7s	Has a SL AE so S cannot be used.						5/1 and	2/52	http://soilcons.com/mattapoisett/
S91-MA-023-005	Deerfield (N)	Lab, pedon, water table	None	None	MVD soil non-hydric						36	4/1	http://soilcons.com/mattapoisett/
S91-MA-023-003	Mattapoisett (Y)			7s	Bk under E described need to be a Bk for proposed	18	6	3/0	12	4/1	18	3/2, rplchty	http://soilcons.com/mattapoisett/
S2306305	Mattapoisett (Y)	Pedon		5s, 7s	Bk needs to be changed to Bk	9	6	2/1	17	6/2	5/3	3/3, rplchty	http://soilcons.com/mattapoisett/
Muskeget OSED	Muskeget (Y)	Pedon		5b, 6b, 7b, 5c, 6c, or 7c	Bk needs to be changed or added.	13	6	3/1	9	7/1	15	3/2	http://ortho.fws.nrcs.usda.gov/
Macrosoil OSED	Macrosoil (Y)	Pedon	None		5a, 6a, 7a, 5b, 6b, 7b, 5c, 6c, or 7c	8	5	2/51	15	4/1	20	2/52, duplications	http://www2.fws.nrcs.usda.gov/
MA023-2007-01007	Berryland (Y)	Pedon, Lab	None	7s	Need to combine Bk horizons to make thickness	13	14	2/1	6	5/2	22	2/52	http://soilcons.com/mattapoisett/
MA023-2007-03709	Muskeget (Y)	Pedon, water, RIB		7c		2	4	2/1	11	6/1	15	3/3	
MA023-2007-03709													
S07MA022004	Muskeget (Y)	Lab, ped, hydro	none	6a	E is too shallow, if stripped matrix it would make 6a, AE is 50/50 color	12	5	3/1 and 5c	6	6/1	11	2/52, rplchty	http://soilcons.com/mattapoisett/
MA023-2009-03704	Macrosoil	Pedon, photo, well		5a, 7a, 5b, 7b, 5c, 7c, 5d, 7d	Monitoring site								http://soilcons.com/abswell/

Spodic Indicators for the Mesic Temperature Regime (this proposed indicator is developed for use in MLRA 144A, 149B, and 145 ONLY – it is generally agreed upon by the NETCHS that soils with strong spodic development in this region is typically limited to the fringe area of wetlands and rarely found in uplands)

(P. C. Fletcher)

A soil (any texture) with evidence of **spodic development** that has any one or more of the following combinations of listed soil features: **starting within 12 inches of the mineral soil surface:**

- An **Os or Oa** horizon that is greater than 3 inches thick, and/or
- a mucky **A** or **Ap** horizon that is greater than 3 inches thick, and/or
- a very dark **A** or **Ap** horizon (includes transitional and combination horizons like **AE** and **A/E**), and/or
- an **A** or **Ap** horizon that has redoximorphic features within 6 inches of the mineral soil surface, and/or
- an **E** or **Eg** horizon with redoximorphic features, and/or
- an **E** or **Eg** horizon with a **stripped matrix**, and/or
- a very thick (>3 inches) **E** or **Eg** horizon

that is directly underlain by either:

- a very dark* **Bh** horizon that is 3 inches or greater in thickness, or
- a **Bh** horizon that is directly underlain by a horizon with 2% or more redoximorphic features;
- a **Bh** horizon with 2% or more redoximorphic features**;
- a partially cemented horizon (**Bhs**, and/or **Bh** horizon) with 2% or more nodules and/or concretions; or a more completely cemented horizon (**Ban** and/or **Bhan** horizon);
- **Bh** horizon that has a **plotchy pattern** of two or more colors (indicative of translocated iron, and/or manganese, and/or aluminum) and/or organic matter; at least one of the colors must have a distinct or prominent contrast (appendix 4) from the matrix directly underlain by a horizon with a depleted matrix or 2% or more redoximorphic features.

Comment [1071]: Suggest making to determine if AE indicators and change to spodic materials and delete the examples 5b, etc. as left pointed out.

Comment [12]: Will this catch a situation where one combined thickness of an O, A, and/or E horizon is greater than 12 inches?

Comment [13]: Does Oa/Oap can have 11 P of 10" and then this morphology and will be 10" 1" below the morphology used to start within 12" on the organic surface, but certainly not 12"

Comment [14]: Stripped matrix will need up to better definition of node thickness and landscape requirements

Comment [15]: **AE** is colorism

Comment [16]: I'm not – what matrix is this referring to? Above or below this line or is beneath? If so, needs to be revised differently, if that can't be made, then it will need to be revised

Comment [17]: Reply to 16: I agree comment typically these are not above have 2-3 colors, one is the matrix (50% the other two are more colors on one of the more colors has to be distinct or prominent contrast from matrix – this indicator needed to separate the matrix from non plotchy part

Comment [18]: If you require the spodic matrix to be directly underlain by a horizon that has a depleted matrix or 2% or more redox features aren't you caught by the second bullet above?

Comment [19]: Because each of those can be alone, I think each one of those needs to be checked



Dark surface at least 2" thick and;

1) Layer at least 3" thick starting within 12" of soil surface that is 3/3 or darker and shows evidence of spodic morphology; or

2) A layer 2" or more thick occurring within 12" of the mineral soil surface, having value of 4 or more and chroma of 2 or less, and

directly underlain by a layer 3" or more thick having value and chroma of 3 or less and showing evidence of spodic development.

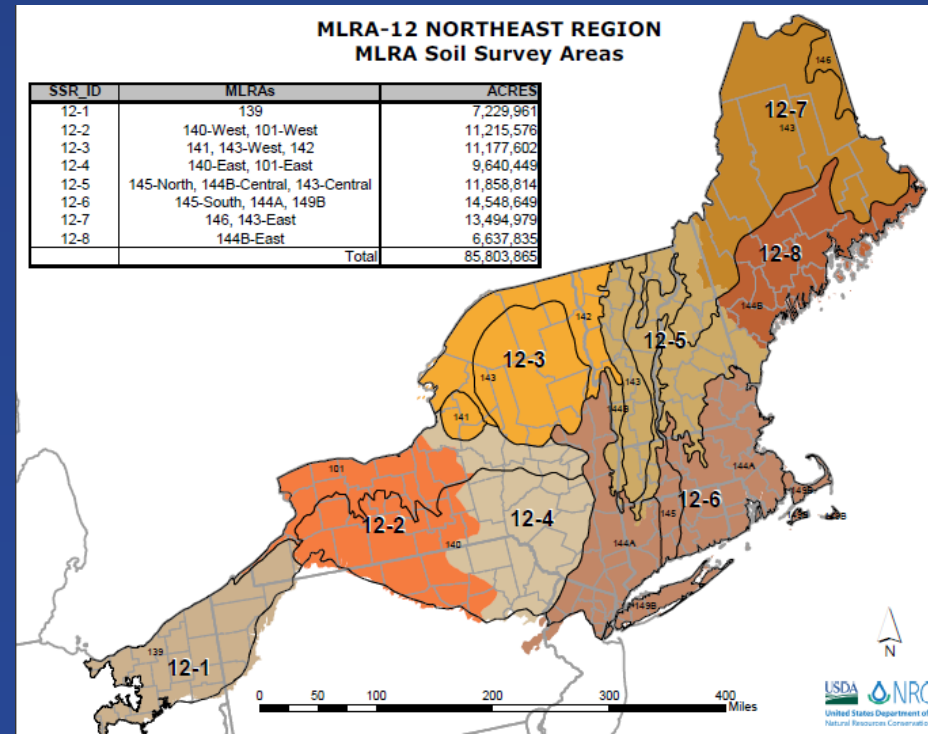
Issue: Redox or not?

- Samples of spodic horizons (Bh, Bh_s, Bh_{sm}) have been collected and heated to 550C to remove SOM.
- Results show little iron in system and most of color is organic and Al.
- This mottled appearance has been described as redox [], w/o Fe and Mn they are not redox but mottles.
- TA-6 uses term “patterns of translocated iron, al and/or SOM.
- E horizons – same look for two or more colors of light and dark (stripped matrix – S6 confusion).



TA-6 – Mesic Spodic

- Currently in version 7 as a test indicator.
- Allowed for use in NE Regional Supplement.
- Only used in 144A, 145, and 149B of Region R – caution along northern boundaries.
- Working to move to an indicator.



2011 Status

- According to National need to submit data for 3 additional study sites with support data showing they meet the tech standards.
- NEHST currently has 4 sites, 2 in RI and 2 in MA.
- Monitoring wells, IRIS, Alpha tests, lab analysis.
- Sites visited during the 2010 Hydric tour.

2. Adding or deleting a test indicator: Minimally, the following should accompany all requests for adding or deleting a test indicator in *Field Indicators of Hydric Soils in the United States*:

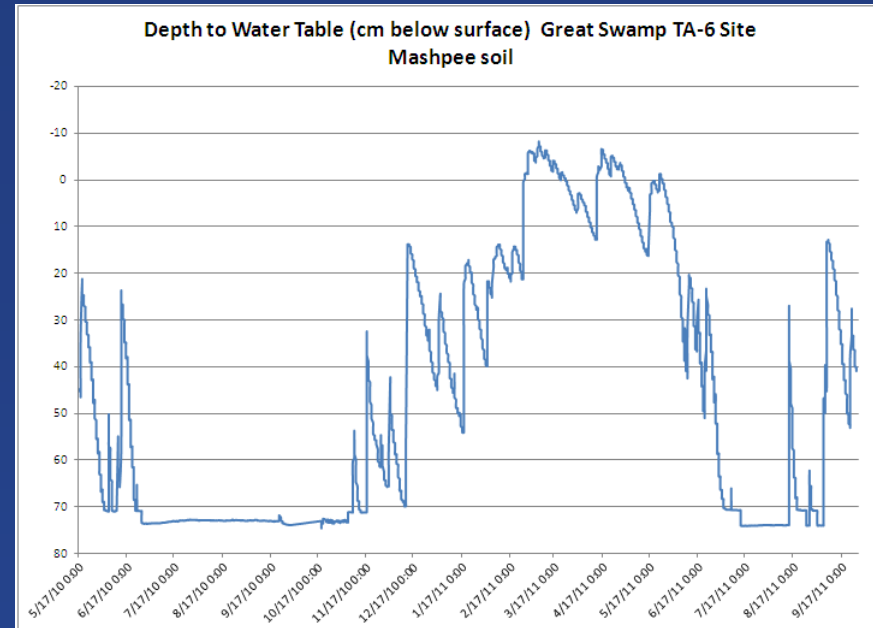
- a) Detailed descriptions of at least three pedons that document the test indicator and detailed descriptions of three neighboring nonhydric pedons.
- b) Detailed vegetative data collected to represent the vegetation of the six pedons.

3. All requests involving 1 and 2 above require a short written plan that: a) identifies the problem, b) explains the rationale for the request, and c) provides the following—person responsible and point of contact (e-mail and postal addresses and phone



Support Data

- Support data (MW, IRIS, etc.) need to show soils meet technical standard for a hydric soil.
- Four study sites being monitored, data is supporting TA-6 as meeting the technical criteria for a hydric soil.
- Data was studied by URI mesum student (Raina).
- Several additional tours by the NEHSTC up north also showed indicator worked well.



2014 Final Data Submitted to NTCHS

- All of the data collected for the 3 study sites was compiled (several weeks work).
- At each site the datasheets reviewed to make sure they MET TA-6 but not another National.
- 10 Years in the making – final data and cover ltr sent to NTCHS Chair to be approved at meeting in CT...

March 24, 2014

To: Lenore Vasilas, Chair
NTCHS Field Indicators Subcommittee
USDA-NRCS
P.O Box 2890, Rm 4836-S
Washington, DC 20013

Subject: TA-6 Mesic Spodic support data to move to an "A" indicator.

Background:

In 2005 the New England Hydric Soil Technical Committee (NEHSTC) hosted a hydric soil tour of a vernal pond study that had several years of hydrology/vegetation monitoring data. During the tour numerous of the sites visited had excellent spodic morphology but did not meet any (National or NEHSTC) hydric soil indicator despite the site having obvious wetland hydrology and vegetation. Following the tour a "mesic spodic" subcommittee was established (consisting of Jim Turenne, Dr. Mark Stolt, Peter Flecther, and Rob Tunstead) to develop an indicator for these wet spodosols in MLRA 144A/149B/145. Over 30 pedons and numerous sites, tours, data, etc. were reviewed and assembled into a spread sheet noting depths, color, redox, etc. The result was the proposed TA-6 Mesic Spodic indicator which is in version 7 of Field Indicators (2010).

We established three monitoring sites that had suspected TA-6 morphology. All the sites were within MLRA 144A: West Kingston, RI (Great Swamp), West Greenwich, RI (Alton Jones), and Bridgewater Massachusetts (Carver Pond). Attached are the data from the three sites for NTCHS to review. Our proposal is that the TA-6 indicator be removed from test indicator status and accepted as an "A" indicator.

- **Sites were visited last fall on the NEHSTC tour (did the SOC testing at the same time);**
 - all met the indicator,
 - showed reduction on IRIS tubes, and
 - met wetland hydrology

Drum roll please....

From: "Lenore Vasilas - NRCS, Beltsville, MD" <Lenore.Vasilas@wdc.usda.gov>

To: "Mark Stolt" <mstolt@mail.uri.edu>

Sent: Thursday, September 4, 2014 11:19:12 AM

Subject: RE: Decision of the NTCHS

We did not get any new information on TA-6 that I am aware of. This was not discussed at the meeting. Based on the information that was provided in the past the committee felt we did not have enough info to make it an actual indicator and instead approved it as a test indicator.



Other proposals sent to NTCHS

- IRIS tube standards – this has been discussed at regional since 2010 PA conference (maybe even RI 2008) and we would like the standard changed to 20% removal w/in a 4 inch zone (vs 30% within 6 in) as per Marty's study (see webinar post for more info). If the National folks do not accept this would it be possible to set up two technical standards and just have Marty's be applied to the northeast (LRR R and S)? If not is it possible to see the study that concluded the 30% removal was needed to be reduced?
- S-6 yes the dreaded S-6! Still lots of confusion on the indicator. It was voted to be removed from Region R in 2010 and if TA-6 passes it should cover "stripped" or partially stripped matrixes.

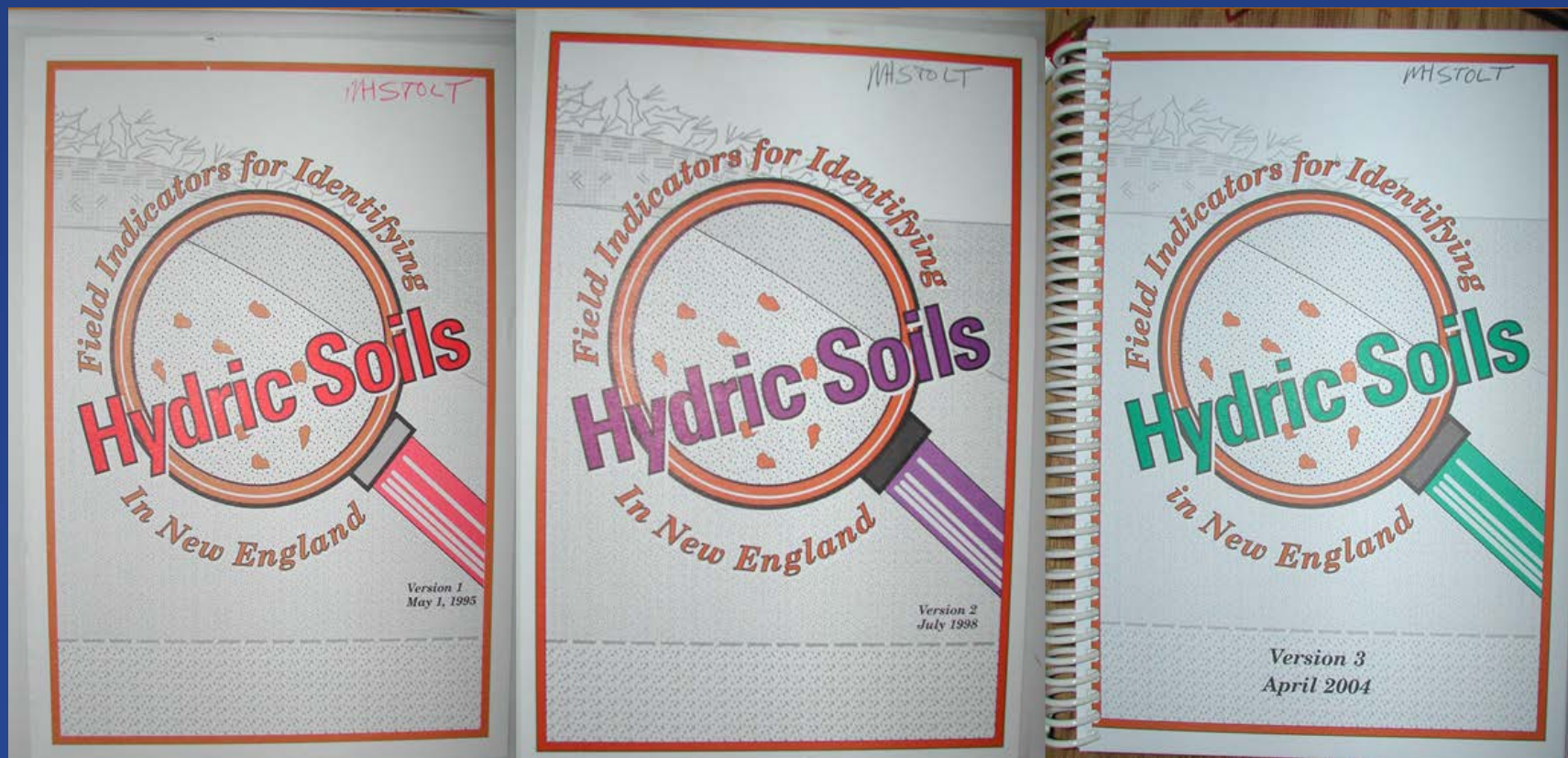
2006 NE Regional

Review for resolution hydric soil indicator S6. In 2006, the Committee recommended revisions to the indicator including supplying a minimum thickness, adding size of stripped zones and minimum volume into the indicator's criteria, describing color of stripped zones and/or contrast between striped zones and matrix color in the indicator's criteria, and use of the term "uncovered and uncoated" to be consistent with other sandy indicators, or define a maximum volume percent that can be covered or masked like other indicators such as indicator S7.

S-6 dropped from region R



Who's up for version 4?



3 Indicators sent to National none approved years of work = time to focus on our field indicators with new version 4!

Questions / Comments?

