

Soil and Plant Science Division

National Technical Committee for Hydric Soils Annual Meeting Minutes April 4-6, 2023

Boise, Idaho

Tuesday – April 4th, 2023 – Pre-meeting field trip

8:00 am Meet at Idaho State Office for discussion of field sites and data

Presentation by Natural Resource Conservation Service (NRCS) – Idaho (ID) State Staff: Shanna Bernal-Fields, Resource Soil Scientist; Shawn Nield, State Soil Scientist; and Tasha Paul, Resource Soil Scientist

- Problematic soils have prevented local soil scientist staff from properly identifying hydric soils at wetland boundary and this has led to litigation over where the boundary should be documented.
- Installed monitoring wells in 2022 to record hydrology between problematic areas and identifiable wetland areas that would support Hydric Soil Technical Standard (HSTS).
- Installed Iron Reduction in Soils (IRIS) tubes.
- In the first year of monitoring, the problematic areas did not meet water table hydrology. This was due to dry conditions during runoff season (period of seasonal high-water table). IRIS tubes did not deliver a positive hydric response in problematic areas.
- Difficult to meet HSTS, the normal antecedent precipitation conditions are due to hydrology driven by melt off from snowpack in high country as stream stage is controlled.

9:00 am leave for the field

Idaho Problematic Hydric Soils Study
Ft. Boise WMA Site Microtopography (0.5 ft contour lines)

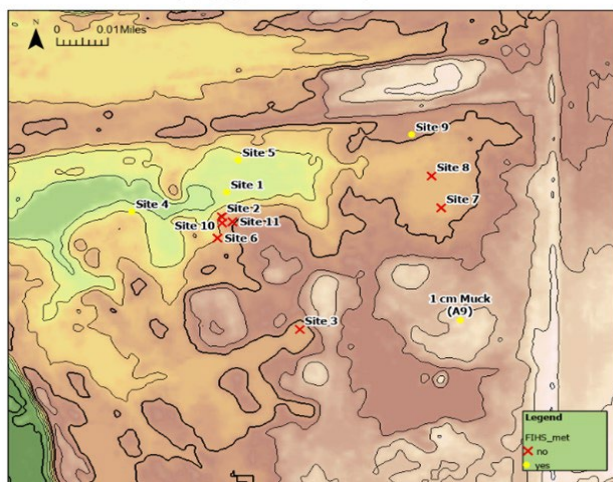


Figure 1: on-site visit field site map



- First stop: Site 2 (problematic well site) stratified sands and loams
 - Soils Description:
 - 0-30 cm, LS, 10YR 4/2, with faint Mn concentrations, pH 8.6
 - 30-50 cm, L, 10YR 4/2, with 3% distinct to prominent F3M, and 3% MnM, pH 8.6
 - Notes on Site:
 - Both Fe and Mn dissolution are suppressed at these pHs, but there also appears to be high amounts of Mn such that Fe does not become e- acceptor.
 - No reaction to dipyrldyl strips
 - After 45 min, at the 10 cm depth, the exposed matrix brightened to 7.5YR 4/3, and some F3M became apparent.
- Second Stop: Site 1 (hydric soil - meets F3 indicator)
 - Soils Description:
 - 0-2 inches, 2-5% presents of organic bodies of mucky material, pH 8.6
 - 2-22 inches, L, upon exposure to air, mutagenic matrix from 2.5Y 4/2 to 10YR 4/2, possibly Mn precipitation brightening the hue, pH 8.6
 - 22-30 inches +, presence of FeS reacted to H₂O₂ especially along root channels, 2% distinct and prominent F3M, Mn concentrations, reduced matrix
 - Notes on Site:
 - Water table rising, at least to 35 cm depth by time we left.
- Visited a micro-catena from a depression/playa type of feature and several points towards a higher position 20 meters away and 1 meter higher in relief.
 - Swale had high amounts of tannins in ponded water.
 - FeS present within 25 cm depths in these soils.
 - Most pH in area greater than 9.0 and up to 9.6. This impacts Fe solubility.
 - Salt crusts with these tannins cover about 35% of the ground surface in area. Richard Griffin proposed there may be Mn concentrations in salt crusts. There is a clear capillary connection from water table to the soil surface here (The Critical Depth concept).
 - Few faint redox concentrations in the playa floor position, color of 2.5Y 4/1 would not meet depleted matrix.
 - High position had 3 cm thick mucky surface layer, would meet A9 field indicator of hydric soils (1 cm muck).
 - It's likely there is a wetland center at the floor position, and closer to wetland rim at the high point.
- Other high positions in the direct vicinity also appear to meet A9. This supports that much of area is a wetland center. Need to focus on higher areas to meet indicators.
- Question of whether alpha alpha dipyrldyl strips work at higher pH. In clearly reduced matrices, we are only getting a weak response. Colors do develop but the chemistry appears to take longer.





- We recommend adding MRIS (Manganese Reduction in Soils) tubes to HSTS study as MN is for more likely to be active in this high pH system.
- It is also clear that the team will need to monitor the area for HSTS another year for more normal water table activity in a wetter year.

Wednesday – April 5th, 2023

Opening of NTCHS Annual Meeting

NTCHS In Attendance:

Chelsea Duball, Richard Griffin, Tony Jenkins, Karen Vaughn, David D'Amore, Mike Vepraskas, Steve Monteith, Rebecca Borgault, Lenore Vasilas, Chris Parker, Jacob Berkowitz, Colby Moorberg, Aaron Miller, Rusty Griffin, and Ron McCormick.

NRCS ID in attendance:

Shawn Neild, Shanna Bernal-Fields, Allyson Young, Tasha Paul

8:00 am Discussion of Field Trip:

Data collected and what was seen in the field to formulate plan for moving forward.

- Steve Monteith – At what concentration of S is the minimum required to produce Iron Sulfide (FeS)?
- Aaron Miller – It appears that there is a need for an FeS indicator that would help in areas like these. Is there any reason why the positive ID of FeS at a practical hydric depth wouldn't be enough to indicate the soil meets hydric standards? Why do we need a percentage requirement to use FeS as an indicator? Given the conditions required to produce FeS precipitates, that should be sufficient evidence.
- Shawn Neild – it would be good to determine if FeS is present on IRIS tubes during high water table moment so that we can capture the reduced period, in case the Ferric Iron (Fe³⁺) is not mobilized, and FeS is the only indicator.
- Colby Moorberg – would like to change the IRIS working in HSTS from “Fe-removal” to “Fe-evolution” such that presence of FeS is equivalent to removal of Fe³⁺.





8:45 am Science of FeS

Update by Chelsea Duball

9:30 am Break

9:45 am Start of NTCHS Business Meeting

Introductions

10:00 am Review of previous meeting minutes

10:15 am NRCS updates

- Lenore Vasilas – The longest running NTCHS Chair, is 1.5 years from retirement eligibility.
 - Looking for a 2-year temporary promotion detail to start later this year to help with completing/continuity of duties.
 - Any incoming NTCHS Chair must be National Position to serve; conflict of interest with NCSS Chair position.
- Problem soils description in Army Corps of Engineers (ACOE) Regional Supplements are not scheduled for updates nor have been updated, and no expectations in near future. NTCHS may need to take on that role.
- NWCA – NRCS is involved with the soils portion of program.
 - Some of the 2021-22 data is beginning to become available to the public.
- Discussion on adding additional NTCHS members. NTCHS needs a hydrologist member. Soil Microbiologist would also be an asset, we used to have one.
- Steve Monteith – Kellog Soil Survey Lab (KSSL) is involved in NWCA processing ~ 1000 sites, including Guam. Processing is in progress.
- KSSL is moving to new building location by end of year. Sample archive will also need to be moved in a large effort.
- Mid-Infrared (MIR) technology is being deployed to NRCS field offices nationwide. Very complicated to set up and train, but when in place, will help to alleviate much of the workload of the KSSL and permit NRCS field offices to have good data in shorter time span.
- KSSL has 20,000 thin sections in the archive that are going to be scanned in high resolution and made available to public in database.
- Tony Jenkins – NRCS changed the definition of organic soils, removing the sliding scale diagnostic requirement. Indicators needs to reflect this in publication.
- Aaron Miller – Soil Geomorphology Institute (SGI) launched again after 4-year Covid hiatus, in the Southeast US. 21 out of 24 enrolled completed the course. Will be nominating at end of Summer for same course to be run in 2024. Hydric soil morphology as function of hydrology along a catena, is a major focus for SGI, and has a larger emphasis especially in the Southeast. Biogeochemistry of FeS, though not yet an indicator, is taught.





11:00 United States Fish and Wildlife Services (USFWS) Update

- Rusty Griffin – Status and Trends Report for 2024 is in writing and peer-review process.

11:15 United States Forest Service (USFS) update

- Dave D'Amore - Forest Carbon Partnership Program – to enhance carbon sequestration. Soil Moisture Program - to monitor soil moisture efforts, national discussions about national moisture mapping program. DSM – dynamic soil survey includes soil moisture.
- Drought.gov has a National Soil Moisture Workshop.
- There is a Wetlands Intrinsic Potential tool developed by the University of Washington (UW) TEAL Carbon team to find wetlands through DSM (Demand Side Management) tactics that are not mapped in current inventories. TEAL Carbon is wetland carbon in forested areas.

11:30 - 12:30 Lunch

12:30 Colby Moorberg update

National Wetland Condition Assessment (NWCA) Ecological Site Description (ESD) Project:

- Develop technical bulletin on how to use NWCA data for developing ESDs (due out in Summer 2023). Generated statistics on general trends in Land Resource Regions (LRR)s.

Chairing Soil Science Society of America (SSSA) Wetland Soils Division.

- Planning field tour at conference in the St. Louis Neighborhood as an urban soils and wetlands tour.

Ducks Unlimited

- CRP enrollment areas don't meet indicators in Kansas wetlands without applying F8, or the pH is too high, or other methodology issues tied to problematic hydric soils.

12:45-4:30

Discussion on updates to the Field Indicators of Hydric Soils (FIHS) in the United States

Discussion of addition of problem soils section

- Update Problematic Soils section
 - ACOE Regional Supplements are not happening
 - Probably need to develop a second NTCHS document for problematic hydric soils.
 - National Problematic Hydric Soils document that lists issues by LRR or Major Land Resource Area (MLRA)
 - Section of FIHS that lists topics on headers for Problematics.
 - “Difficult Hydric Situations” is terminology in ACOE Regional Supplements.
 - There is language in the ACOE Regional Supplements that allows high pH environments with vegetation and hydrology to pass for hydric...is dangerous! Many pitfalls in both legal and ecological arenas.



- Proposal for use of FeS as an indicator is forthcoming from Chelsea Duball and Karen Vaughn. This will help with alkaline situations.
- Aaron Miller - mentioned the last version of this proposal had a lot of confusing numbers for percent of visible this and that. Poses question: if FeS is positively identified at a depth by one of several means, is there any reason to question that there needs to be a specific quantity to suggest would meet the technical standard for hydric if depth requirements met? Is the Eh not low enough already to precipitate FeS at that observed depth to suggest Fe³⁺ would be completely reduced? And if mutagenic feature was present in , wont quantifying percentage of matrix just be that much more complicated?
- Chelsea Duball and Karen Vaughn and all NTCHS members present agree.
- All comfortable with a draft for FeS indicator to not include percentage ocular requirement in the proposal for new indicator.
- Also add that FeS indicator will help to address the alkaline situations documented in the ACOE Regional Supplements
- Richard Griffin – made a motion to address changes within the HSTS for FeS. Colby Moorberg seconds. All members agree.
 - NTCHS created a Sub Committee for FeS
 - Members to include Aaron Miller (will serve as Chair), Jacob Berkowitz, Karen Vaughn, Chelsea Duball, and Colby Moorberg.
 - Deadline of June 10, 2023
 - Consider FeS in the HSTS as proof soil are anaerobic
 - Develop indicator using FeS
 - Change definition of what reductions are...
 - Make useable for all LRRs
 - Add appropriate appendix definitions.
- Lenore Vasilas – reminds us that the guidance published in the indicators overrides the language in the Regional Supplements, so it's useful to stick to this publication going forward to address the problematic hydric situations.
- Field Indicators of Hydric Soils also needs to provide advice as to techniques for how and when one can improve upon the hydric soil indicators.
- Aaron Miller – motioned to update the Field Indicators of Hydric Soil publication to include the “situations that are problematic for identifying hydric soils” section. Richard Griffin seconded the motion. All were in favor, and the NTCHS passed the motion.
- Begin by evaluation of all ACOE Regional Supplements, look for most current status.
 - Lenore Vasilas will start by sorting through supplements and send out for review to relevant owners
 - Make a draft of National list of problematic hydric soil situations and sort them by region.
 - Chris Parker will disseminate the draft to EPA for review
 - Jacob Berkowitz will disseminate to ACOE for review
 - Lenore Vasilas will share with NRCS State Soil Scientist's (SSS)s for comment



Discussion on Updating and Printing Field Indicators of Hydric Soil

- Aaron Miller– asked “Are we printing Field Indicators of Hydric Soils as a new hard copy in next publication update? Are we up to 9.0?” There is a big demand for the hardcover versions as field tools.
- Lenore Vasilas– We will update e-version now and start process to fund a printed version.
- Jacob Berkowitz – What is the timeline for updated Field Indicators of Hydric Soils completion?
- Lenore Vasilas – we are 50% complete at this time, by end of FY 2023 should be done with e-version of 8.x
 - Need to include terminology for colors in between color chips
 - Need overall edits and updates
 - Picture needs
 - Cover photos needed.
 - FeS, Red Parent Material?
- We need new entries for another depleted matrix, sandy indicators, etc.
 - Edits
- Credits for editors will include Richard Griffin, Colby Moorberg, Jacob Berkowitz, and others where necessary.
- LRR map needs to be updated. May ask MLRA offices for help on this, if not too busy.
- Richard Griffin - mentions that the timing of hydric soil determinations may need a blurb in the Field Indicators of Hydric Soils publication to address seasonal features.

Discussion on New Committee Members

- Aaron Miller– seasonality topics might be helped by bringing in a soil microbiologist again. Have some contacts will reach out for interest.
- Richard Griffin – Universities need to vet any new technical skills for the committee, send names to Richard Griffin, Chelsea Duball, Karen Vaughn, Colby Moorberg, and Mike Vepraskas.

Thursday – April 6th, 2023

8:00 am Environmental Protection Agency (EPA) updates

Updates given by Chris Parker

8:15 am Army Corps of Engineers (ACOE) Updates

Updates given by Jacob Berkowitz

- NC Problem Study Area – red Fe oxides are seasonal. What’s up?
 - Slate Belt of Virginia (VA) to South Carolina (SC) has troublesome soils with high chroma colors and clear hydrology and hydrophytic vegetation.
 - Positive reaction to alpha alpha dipyridyl
 - Preliminary data shows decrease in the chroma during the growing season, then increases in chromas in the leaf-off season.





- Automated ACOE regional wetland data collection forms
 - Lots of interest
 - Calculates the indicators based on form data entry. Brilliant!
- Guidance on alpha alpha dipyridyl
 - Should we include use of the strips in HSTS or just the guidance?
 - Technical note 8 and policy should match when possible.

8:30 am BLM updates

Updates given by Ron McCormick

8:45 am University updates

North Carolina State University updates given by Mike Vepraskas

Prairie View A& M University updates given by Richard Griffin

- Soil Health and Ca sequestration, if you build carbon, how do you retain it over time with changing land management?

Grand Valley State University updates given by Chelsea Duball

- working with Dylan Beaudette on tech note for IRIS analyses in R package (Statistically Software) for quantifying IRIS film results. Richard Griffin wants to know about timing of film image with respect to FeS stains?

University of Wyoming updates given by Karen Vaughn

- A hydric soil photo repository would be super valuable to public

Bloomsburg University in Pennsylvania updates given by Rebecca Bourgault (Former Professor)

- Taught soils for 9 years on wetland delineation. Now works as a consulting engineer. Would like to stay with NTCHS if possible.

10:00 am Continued discussion of Field Indicators of Hydric Soils updates

11:00 am Wrap up and discussion of where and when to meet next

- NTCHS 2024 meeting will be in North Carolina at Jacob Berkowitz's field sites for seasonal hydric soils.
- Richard Griffin motions for North Carolina to be the site of the meeting in 2024 with Jacob Berkowitz as host. Aaron Miller seconded the motion. All were in favor, and the motion passed.

12:00 pm NTCHS 2023 Annual Meeting is now closed.



