National Technical Committee for Hydric Soils Annual Business Meeting

July 16 and 17, 2019

Elkins, WV

NTCHS Attendees present: Lenore Vasilas, Aaron Miller and Paul Rodrigue (NRCS); Mike Vepraskas (NC State); Ron McCormick (BLM); Colby Moorberg (Kansas State Univ.), Chris Parker (EPA)

NTCHS Attendees via teleconference: Wade Hurt (University of FL), Karen Vaughn (University of WY), Rusty Griffin (USFWS), Jennifer Smith and Steve Monteith (NRCS), Jacob Berkowitz (Corps of Engineers), Dave D'Amore (USFS)

Mid-Atlantic Hydric Soils Committee Members and Guests present: Jake Ziggafoos (Kansas State Univ.), Mike Jones, Jason Teets, Greg Hammer, Jared Beard, Louise Jaques, Alexandra Schmidt, Phil King, and Allison Leapard (NRCS), Greg Serrenbetz (EPA), Gary Jellick (Acorn Environmental), R. Harold Jones (Old Dominion Univ.), Jim Thompson (West Virginia Univ.), Jamie Morgan (Amy Greene Consultants), Joseph A. Valentine (VW Consultants/Delaware Valley Univ.), Stephanie Connelly (USFS), J. Mitchell Doyle (Christopher Newport Univ.), Layla Lang (JMT), C. Evan Park and Barret Wessel (Univ. of MD), Bruce Vasilas (Univ. of DE)

Mid-Atlantic Hydric Soils Committee Member via Teleconference: Marty Rabenhorst (Univ. OF MD)

July 16 – Field Trip

NTCHS-MAHSC Joint Summer Meetings
July 16-17, 2019
Elkins, WV
Meeting and Field Site Summary

CURRENT ISSUE

Soil scientists in WV have observed that, organic soil material accumulation is common starting at the soil surface in upland landforms in forested areas across WV landscapes. This feature is even more pronounced in the higher elevations when influenced by high annual precipitation, low annual temperatures, and under certain vegetative communities. The result is soil morphology that may meet hydric soil indicators while not satisfying the definition of a hydric soil. Of specific concern and currently for use through LRR N in WV is the A10 – 2cm Muck indicator. The morphology required in this indicator occurs across the uplands and bottomlands in MLRA 127 and may also occur in MLRA 125 (see map).

PREPARATIONS

Expedient efforts were made for this meeting to provide a snapshot of the conditions that exist in this area. Preparations include: field observations and description of several sites; deployment of dataloggers to record water table depths for May and June 2019; sampling horizons for lab analysis described as Oa; installation of Mn and Fe IRIS films for May and June 2019.

FIELD OBSERVATIONS

Five stops are planned, four of which have data and descriptions. Elevations range 3700 – 4100 ft. Stop 2 is a bonus.

Lat/Long of field stops in order:

Bench	38 42' 11.6" x 79 52' 24.1"
Rubble Land	38 42' 7.31" x 79 52' 48.74"
Summit	38 41' 51.1" x 79 52' 54.1"
Dry Toe	38 41' 18.7" x 79 52' 45.8"
Wet Toe	38 41' 18.2" x 79 52' 46.6"

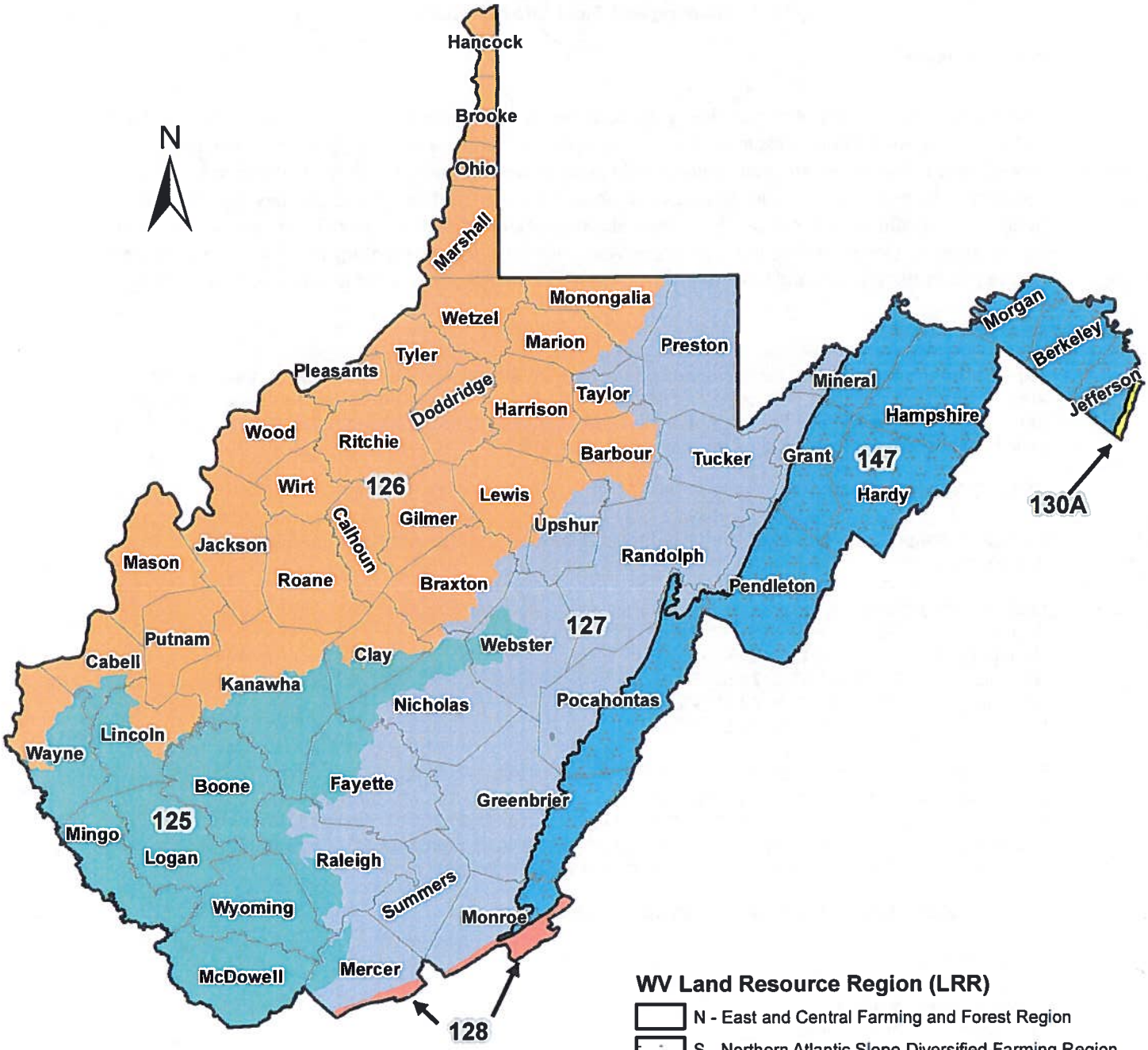
In the packets are the data and descriptions for two other samples taken. Sample 2019WV083005 was in a floodplain at lower elevations in Elkins, elevation approximately 1900 ft. Land use and landform elude to long term high disturbance. Despite that, the soil exhibits significant %OC. Sample 2019WV093001 was in Canaan Valley approximately 3900 ft in elevation. While not instrumented for this purpose the landform and morphology depict a transitional soil outside the wetland boundary.

CHALLENGES IN DESCRIBING AND MONITORING

Rocks in the soil,
Surface stoniness,
extreme acid conditions,
organic/mineral translocation,
excessive live root in samples,
climate influence,
vegetative communities & biomass production and persistence,
soil colors and color patterns,
wild animal intrusion.

Note: Sampling of Oa materials proved to be a challenge regarding the extraction of live roots. We are confident our attempts fell short and the resulting data is skewed to higher rubbed fiber content.

West Virginia
Major Land Resource Areas (MLRAs) and Land Resource Regions (LRRs)



WV Land Resource Region (LRR)

- N - East and Central Farming and Forest Region
- S - Northern Atlantic Slope Diversified Farming Region

WV Major Land Resource Area (MLRA)

- 125 - Cumberland Plateau and Mountains
- 126 - Central Allegheny Plateau
- 127 - Eastern Allegheny Plateau and Mountains
- 128 - Southern Appalachian Ridges and Valleys
- 130A - Northern Blue Ridge
- 147 - Northern Appalachian Ridges and Valleys

0 50 100
Miles

USDA

United States Department of Agriculture
Natural Resources Conservation Service

Rev. 02/16

HYDRIC SOIL INDICATOR
This indicator is the focus of the discussion for this meeting.

A10.—2 cm Muck. *For use in LRR M and N; for testing in LRRs A, B, E, K, L, and S (except for MLRA 148).* A layer of muck 2 cm (0.75 inch) or more thick with value of 3 or less and chroma of 1 or less, starting at a depth ≤15 cm (6 inches) from the soil surface.

User Notes: This indicator requires a minimum muck thickness of 2 cm. Normally, this expression of anaerobiosis is at the soil surface; however, it may occur at any depth ≤15 cm (6 inches). Muck is sapric soil material with a minimum content of organic carbon that ranges from12 to18 percent, depending on the content of clay. Organic soil material is called muck if virtually all of the material has undergone sufficient decomposition to limit the recognition of plant parts. Mucky peat (hemic material) and/or peat (fibric material) do not qualify. Generally, muck is black and has a "greasy" feel; sand grains should not be evident.

CLIMATIC CONDITIONS

WETS Table

WETS Station: SNOWSHOE, WV

Requested years: 1971 - 2019

Month	Avg Max Temp	Avg Min Temp	Avg Mean Temp	Avg Precip	30% chance precip less than	30% chance precip more than	Avg number days precip 0.10 or more	Avg. Snowfall
Jan	29.3	13.6	21.5	5.87	4.65	6.75	14	39.2
Feb	32.4	16.4	24.4	4.81	3.90	5.49	11	33.9
Mar	40.0	23.5	31.8	5.85	4.61	6.73	12	27.1
Apr	51.4	33.0	42.2	4.84	3.42	5.74	10	9.2
May	60.8	43.6	52.2	5.30	3.96	6.20	11	0.5
Jun	67.5	51.7	59.6	5.42	3.90	6.41	10	0.0
Jul	70.7	55.8	63.2	5.33	4.05	6.20	10	0.0
Aug	69.8	55.1	62.5	4.66	3.45	5.46	9	0.0
Sep	64.0	49.2	56.6	4.36	2.64	5.28	7	0.0
Oct	53.1	37.6	45.3	4.29	2.78	5.16	8	3.4
Nov	43.4	28.1	35.8	4.65	3.17	5.55	9	11.8
Dec	34.2	19.5	26.9	5.48	4.25	6.35	12	28.1
Annual:					56.34	65.60		
Average	51.4	35.6	43.5	-	-	-	-	-
Total	-	-	-	60.85			123	153.2

GROWING SEASON DATES

Years with missing data:	24 deg = 12	28 deg = 11	32 deg = 10
Years with no occurrence:	24 deg = 0	28 deg = 0	32 deg = 0
Data years used:	24 deg = 37	28 deg = 38	32 deg = 39
Probability	24 F or higher	28 F or higher	32 F or higher
50 percent *	4/23 to 10/23: 183 days	5/2 to 10/13: 164 days	5/14 to 10/4: 143 days
70 percent *	4/20 to 10/27: 190 days	4/28 to 10/17: 172 days	5/10 to 10/9: 152 days

Monthly Mean Avg Temperature for SNOWSHOE, WV

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2000	21.5	29.6	36.5	41.2	55.6	61.6	60.5	60.6	56.4	49.4	32.8	18.4	43.7
2001	23.0	27.9	25.5	45.5	52.2	59.6	60.9	64.2	55.0	45.2	43.8	33.0	44.7
2002	27.0	27.9	30.7	44.5	49.3	61.2	64.8	64.3	60.0	46.1	31.0	24.9	M
2003	14.7	21.2	36.0	44.1	50.2	55.5	61.5	63.1	54.6	43.0	41.1	24.8	42.4
2004	17.5	23.3	34.9	41.4	56.5	58.1	61.3	59.7	58.3	48.1	38.4	25.7	M
2005	25.3	26.0	26.8	43.3	47.1	60.3	64.5	64.0	59.2	46.3	36.4	21.8	43.6
2006	29.9	20.3	29.4	46.5	47.9	57.2	63.0	64.2	51.9	41.3	38.4	31.4	M
2007	26.5	13.6	36.0	37.1	53.8	59.6	60.2	66.0	59.9	51.1	31.9	30.1	M
2008	21.0	M	31.0	44.6	48.2	60.9	62.0	59.3	57.2	44.1	30.1	28.0	M
2009	18.2	23.3	34.6	42.0	51.5	59.8	57.2	62.1	55.0	42.9	39.0	23.5	42.4
2010	17.3	15.8	32.5	47.4	55.0	62.7	64.9	64.2	57.5	45.7	36.1	14.1	43.0
2011	17.6	27.0	30.6	44.3	52.8	60.8	65.4	62.0	55.5	42.3	39.5	29.9	44.1
2012	24.7	27.3	43.0	41.4	56.1	56.9	65.9	61.2	55.3	44.5	30.9	30.9	M
2013	25.3	19.1	22.3	41.9	49.3	59.2	62.1	58.8	55.3	45.8	30.4	27.8	41.6
2014	14.5	21.8	27.0	43.6	52.1	61.1	59.7	59.1	56.0	44.4	28.6	29.5	41.5
2015	19.5	13.6	30.3	43.0	56.2	61.4	62.8	61.1	58.1	45.6	40.5	40.7	44.6
2016	19.6	22.9	39.0	41.6	50.0	60.0	65.0	64.9	60.7	48.6	38.6	25.9	44.8
2017	28.1	30.6	30.2	48.1	50.8	58.7	63.5	60.0	55.4	50.5	35.1	22.7	44.5
2018	17.9	32.9	25.1	36.5	59.0	60.9	63.0	62.9	61.3	45.4	30.2	28.3	43.7
2019	22.8	29.7	29.8	43.6	56.5	57.4	M	M	M	M	M	M	M
Mean	21.6	23.9	31.6	43.1	52.5	59.6	62.5	62.2	57.0	45.8	36.4	25.9	43.4

Monthly Total Precipitation for SNOWSHOE, WV

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2000	5.14	5.99	4.44	5.01	5.07	7.09	5.70	6.43	5.83	0.79	3.95	3.64	59.08
2001	5.79	3.23	8.04	2.66	6.70	5.67	6.16	2.45	1.80	1.60	0.92	3.98	49.00
2002	3.77	2.60	7.19	8.04	5.77	3.80	7.54	2.77	5.78	6.94	6.11	6.15	66.46
2003	5.62	7.15	3.26	4.82	6.72	7.24	4.23	4.91	7.46	3.45	9.32	5.70	69.88
2004	5.23	M	4.67	7.17	6.71	4.29	3.10	6.01	10.63	3.22	4.59	4.85	M
2005	5.00	4.18	9.05	4.74	3.74	1.76	6.48	4.84	1.04	4.52	7.22	M	M
2006	M	2.82	M	5.52	3.31	M	4.69	2.49	M	6.48	4.13	M	M
2007	M	3.82	5.94	M	M	M	M	M	4.24	M	M	M	M
2008	5.56	M	6.08	6.24	8.45	4.35	3.63	4.07	2.76	2.43	5.94	7.38	M
2009	7.35	3.08	3.77	7.19	9.00	5.05	M	4.96	5.95	6.60	2.68	8.28	M
2010	M	7.45	3.80	1.89	8.89	5.32	6.44	5.75	3.83	3.55	2.62	7.26	M
2011	3.51	4.28	12.36	10.63	5.44	4.28	4.89	5.16	5.93	6.50	6.29	5.55	74.82
2012	M	3.86	6.80	M	M	3.40	M	4.83	6.87	5.19	0.61	5.28	M
2013	6.17	4.03	6.10	3.28	5.23	7.54	6.31	6.96	2.52	1.85	4.55	7.66	62.20
2014	4.77	4.36	4.70	3.83	4.75	3.84	3.41	4.13	1.70	7.42	3.87	3.99	50.77
2015	4.15	6.60	4.97	8.12	2.03	10.39	8.98	2.92	4.64	3.75	3.00	6.66	66.21
2016	5.75	7.23	2.13	4.42	6.66	10.38	3.44	5.89	5.20	4.72	3.14	6.17	65.13
2017	7.79	2.06	5.80	4.88	8.68	6.86	5.61	3.92	2.06	7.82	2.06	3.30	60.84
2018	4.95	7.07	7.25	7.06	9.15	8.30	5.63	5.85	10.90	6.20	7.29	6.65	86.30
2019	6.32	6.02	3.50	6.68	5.90	6.07	M	M	M	M	M	M	M
Mean	5.43	4.77	5.78	5.68	6.23	5.87	5.39	4.69	4.95	4.61	4.35	5.78	64.61

Rainfall Documentation to Use with Historical Aerial Photographs

Weather Station (Name and #): Snowshoe

Photo Date: period leading to May 2019

Growing Season:

County: Randolph

	Long Term Rainfall Records (WETS table data)							
	Month	3 years in 10 less than	Average	3 years in 10 greater than	Actual Rainfall Received	*Condition Value (a)	Weighted Value (b)	Product of (a) X (b)
1st Prior Month	April	3.42	4.84	5.74	6.68	3	3	9
2nd Prior Month	Mar	4.61	5.85	6.73	3.5	1	2	2
3rd Prior Month	February	3.9	4.81	5.49	6.02	3	1	3
							SUM =	14

*Condition Value: Dry (1), Normal (2), Wet (3)

If sum of Products (a) X (b) is 6-9, the period was drier than normal.

If sum of Products (a) X (b) is10-14, the period has been normal.

If sum of Products (a) X (b) is 15-18, the period was wetter than normal.

Conclusion (circle one): **Dry** **Normal** **Wet**

Rainfall Documentation to Use with Historical Aerial Photographs

Weather Station (Name and #): Snowshoe

Photo Date: period leading to June 2019

Growing Season:

County: Randolph

	Long Term Rainfall Records (WETS table data)							
	Month	3 years in 10 less than	Average	3 years in 10 greater than	Actual Rainfall Received	*Condition Value (a)	Weighted Value (b)	Product of (a) X (b)
1st Prior Month	May	3.96	5.3	6.2	5.9	2	3	6
2nd Prior Month	Apr	3.42	4.84	5.74	6.68	3	2	6
3rd Prior Month	March	4.61	5.85	6.73	3.5	1	1	1
							SUM =	13

*Condition Value: Dry (1), Normal (2), Wet (3)

If sum of Products (a) X (b) is 6-9, the period was drier than normal.

If sum of Products (a) X (b) is10-14, the period has been normal.

If sum of Products (a) X (b) is 15-18, the period was wetter than normal.

Conclusion (circle one): **Dry** **Normal** **Wet**

WV PROPOSAL

The A10 hydric soil indicator is problematic as it tends to exist in upland and bottomland positions in MLRA 125. This may produce false positive results for hydric soils based on the indicator alone. Additional morphology that may accompany these organic soil materials in the uplands includes leached horizons (E), accumulations of organic rich mineral materials (like Bh, Bhs), and patterns of high chroma colors (like Bs, Bhs, Bw).

Water table presence in the upland sites during this normal precipitative portion of the year were absent and does not correspond with stripped areas of the IRIS. In these unsaturated soils we attribute (unconfirmed) that stripping of the Mn or Fe where present was a result of highly acid conditions.

Proposal:

- **Change the status of A10. 2cm Muck from "for use" to "for testing" in MLRA 127 and 125 (MLRA 125 climatic and elevational similarities) in LRR N. OR**
- **An alternative would be to remove "for use" the indicator from these two MLRA's entirely.**

There is little confidence that user notes specifying landform or slope shape would improve application of this indicator.

OTHER CONCERN

Use of Mn IRIS technology may be very sensitive in unsaturated extremely (3.5-4.4) and ultra acid (<3.5) conditions and may result in false positive results for anaerobic conditions. Use of Fe IRIS may be less of a concern in these acidic conditions.

Recommendation:

This technology be researched further under these conditions and a cautionary note should accompany these tools about use in such acid environments. Correlations between lab and commonly used field pH tools should be attempted so that there is confidence in understanding prevailing field conditions with field tools where IRIS are used. The Hellige Truog field pH kit is the most commonly used kit by NRCS WV.

USDA-NRCS

PEDON DESCRIPTION

Pedon ID # :

April, 2002

Series or Component Name: [illegible]	Map Unit Symbol:	Photo #:	Classification:	Soil Moist. Regime (Tax.):
Describer(s): Jared Jason	Date: 3/12/2019	Weather: Temp.: Air: Soil: Depth:	Latitude: 38 ° 42 ' 11.6 " N Longitude: 79 ° 52 ' 24.1 " W	Datum: WGS84
UTM: Zone: mE: mN:	Topo Quad.: Millcreek	Site ID: YR: 2019 State: WV County: 083 Pedon #: 001	Soil Survey Area: WV603	MLRA / LRU: 127
Location: Sec. T. R.	Transect: ID: Stop #: Interval:			
Landscape: MT N	Landform: MTN slope	Microfeature:	Anthro:	Elevation: 3808
Aspect:	Slope (%):	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) L/L	
Hillslope Profile Position: Backslope	Geom. Component: Mountainflank	Microrelief:	Physio. Division: App. Highland	Physio. Province: App. Plateau
Physio. Section: Allegheny MTN	State Physio. Area:	Local Physio. Area:		
Drainage:	Flooding:	Ponding:	Soil Moisture Status:	Permeability: Ksat:
Land Cover / Use:				
Parent Material:	Bedrock: Kind: Fract.: Hard.: Depth:	Lithostrat. Units: Group: Fitzsville Formation: new river	Member:	
Erosion: Kind: Degree:	Runoff:	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind:	Diagnostic Horz. / Prop.: Kind: Depth:	
P.S. Control Section: Ave.Clay %: Ave.Rock Frag %: Depth Range:				

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER

MISCELLANEOUS FIELD NOTES / SKETCH :

Component Name:								Map Unit Symbol:							Date:						
	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd % Rnd Sz	Structure Grade	Structure Sz	Structure Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cont. Col Mst Shp Loc					
1		0-1	Oi																		
2		1-2	Oe																		
3		2-5	Oa1			7.5YR 2.5/1															
4		5-14	Oa2	B		5YR 2.5/1															
5		14-18	E/A	W		7.5YR 5/2 2.5YR 3/2	L Ho-L														
6		18-24	Bhs	W	70% 30%	7.5YR 3/3 5YR 4/3	L														
7		24-33+	Bs			7.5YR 5/6	L														
8																					
9																					
10																					

	Redoximorphic Features % Sz Cont. Hrd. Shp Knd Loc Bnd Col	Concentrations % Sz Cont. Hrd. Shp Knd Loc Bnd Col	Ped / V. Surface Features % Dst Cont Knd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

*** Primary Characterization Data ***

Pedon ID: S2019WV083001 (Randolph, West Virginia) Print Date: Jul 3 2019 5:24PM

Sampled as :
Revised to :

SSL - Project I2019USWV051 A10 Hydric Soil Indicator Review by NTCHS
- Site ID S2019WV083001 Lat: 38° 42' 11.60" north Long: 79° 52' 24.10" west WGS84 MLRA: 127
- Pedon No. 19N0306
- General Methods 1B1A, 2A1, 2B

United States Department of Agriculture
Natural Resources Conservation Service
National Soil Survey Center
Soil Survey Laboratory
Lincoln, Nebraska 68508-3866

Layer	Horizon	Orig Hzn	Depth (cm)	Field Label 1	Field Label 2	Field Label 3	Field Texture	Lab Texture
19N02315	Oa1		2.0-5.0	S2019WV083001-3			HPM	
19N02316	Oa2		5.0-14.0	S2019WV083001-4			HPM	

PSDA & Rock Fragments

Layer	Depth (cm)	Horz	Prep	Lab Texture	-1- (- - - - - Total - - - - - -) Clay < .002	-2- Silt .002 -.05	-3- Sand .05 -2	-4- (- - Clay - - -) Fine < .0002	-5- CO_3 < .002	-6- (- - - - Silt - - - - -) Fine .002 -.02	-7- Coarse .02 -.05	-8- (- - - - - - - - - - - - Sand - - - - - - - - - - - -) VF .05 -.10	-9- F .10 -.25	-10- M .25 -.50	-11- C .5 -1	-12- VC 1 -2	-13- (Rock Fragments (mm)) (- - - - - - - - Weight - - - - - - - -) 2 -5	-14- 5 -20	-15- 20 -75	-16- .1- 75	-17- >2 mm wt % whole soil
					(- % of <2mm Mineral Soil -)												(- - - - - - - % of <75mm - - - - - -)				
19N02315	2-5	Oa1	S														1	4	--	--	5
19N02316	5-14	Oa2	S														5	7	3	--	15

Bulk Density & Moisture

Layer	Depth (cm)	Horz	Prep	-1- (Bulk Density) 33 kPa (- - - g cm^{-3} - - -)	-2- Oven Dry	-3- Cole Whole Soil	-4- (- - - - - - - - - - - Water Content - - - - - - - - - - -) 6 kPa (- - - - - - - - - - - - pct of < 2mm - - - - - - - - - - - -)	-5- 10 kPa	-6- 33 kPa	-7- 1500 kPa 3C2a1a	-8- 1500 kPa Moist	-9- (Air Dry-Oven Dry) (- - - - Ratio - - - -) 3D1	-10- Corrected	-11- WRD Whole Soil cm^3 cm^{-3}	-12- Aggst Stabl 2-0.5mm %	-13- (- - Ratio/Clay - -) CEC7	-14- 1500 kPa
19N02315	2-5	Oa1	S							106.5		1.127					
19N02316	5-14	Oa2	S							45.6		1.068					

*** Primary Characterization Data ***

Pedon ID: S2019WV083001 (Randolph County, West Virginia) Print Date: Jul 3 2019 5:24PM

Sampled As :

USDA-NRCS-NSSC-National Soil Survey Laboratory ; Pedon No. 19N0306

Carbon & Extractions

Layer	Depth (cm)	Horz	Prep	-1- C (- - - - - Total - - - - -) (- - - - - - - - - - % of <2 mm - - - - - - - - - -) 4H2a	-2- N 4H2a	-3- S 4H2a	-4- Est OC 4H2a	-5- OC (WB)	-6- C/N Ratio	-7- (- - - Dith-Cit Ext - - -) Fe (- % of < 2mm - - - - - - - - - - - - - - - - - - -)	-8- Al	-9- Mn	-10- (- - - - - - Ammonium Oxalate Extraction - - - - - -) Al+½Fe	-11- ODOE	-12- Fe	-13- Al	-14- Si	-15- Mn mg kg^{-1}	-16- (- - - Na Pyro-Phosphate - - -) C (- - - - - - % of < 2mm - - - - -)	-17- Fe	-18- Al	-19- Mn
19N02315	2-5	Oa1	S	51.89	2.37	0.28	51.9		22													
19N02316	5-14	Oa2	S	24.46	1.46	0.17	24.5		17													

CEC & Bases

Layer	Depth (cm)	Horz	Prep	-1- (- - - - - - NH_4OAC Extractable Bases - - - - -) Ca (- - - - - - - - - - - - - - - - - - cmol(+) kg^{-1} - - - - - - - - - - - - - - - - - - -) 4B1a1a	-2- Mg 4B1a1a	-3- Na 4B1a1a	-4- K 4B1a1a	-5- Sum Bases	-6- Acid-ity 4B2b1a1	-7- Extr Al 4B3b1a	-8- KCl Mn mg kg^{-1} 4B3b1a	-9- CEC8 Sum Cats (- - - - cmol(+) kg^{-1} - - -)	-10- CEC7 NH_4 OAC 4B1a1a	-11- ECEC Bases +Al	-12- Al Sat (- - - - - - - - % - - - - - - - -)	-13- (- - - - Base - - - -) (- Saturation -) Sum	-14- NH_4OAC
19N02315	2-5	Oa1	S	14.6	3.6	0.1	1.8	20.1	173.5	0.9	172.5	193.6	107.3	21.0	4	10	19
19N02316	5-14	Oa2	S	1.0	0.7	tr	0.5	2.2	94.4	6.1	11.4	96.6	55.6	8.3	73	2	4

Salt

| Layer | Depth (cm) | Horz | Prep | -1- (- - - - - - - - - - - - - - - - - - - -

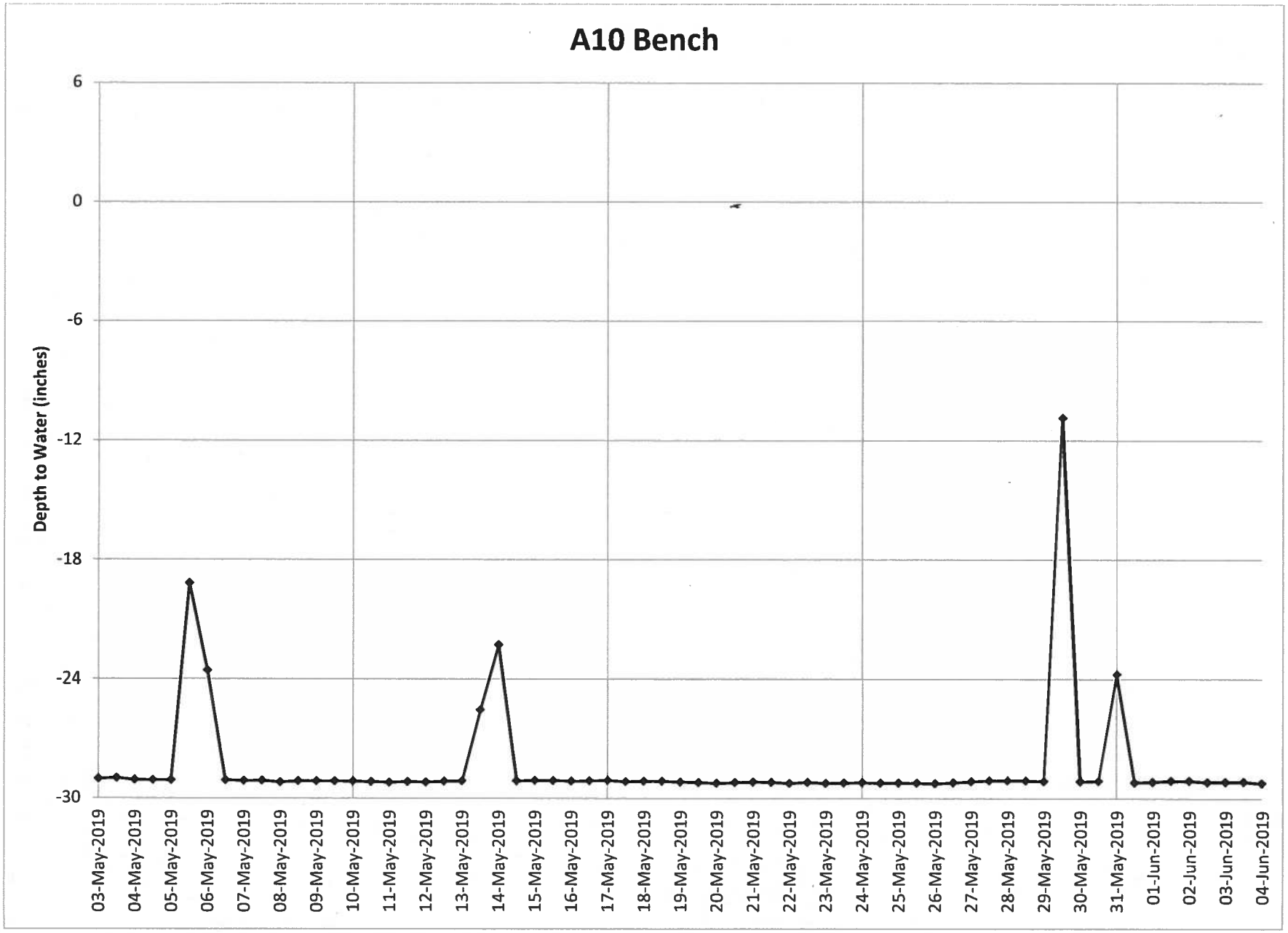
*** Primary Characterization Data ***

Pedon ID: S2019WV083001 (Randolph County, West Virginia) Print Date: Jul 3 2019 5:24PM

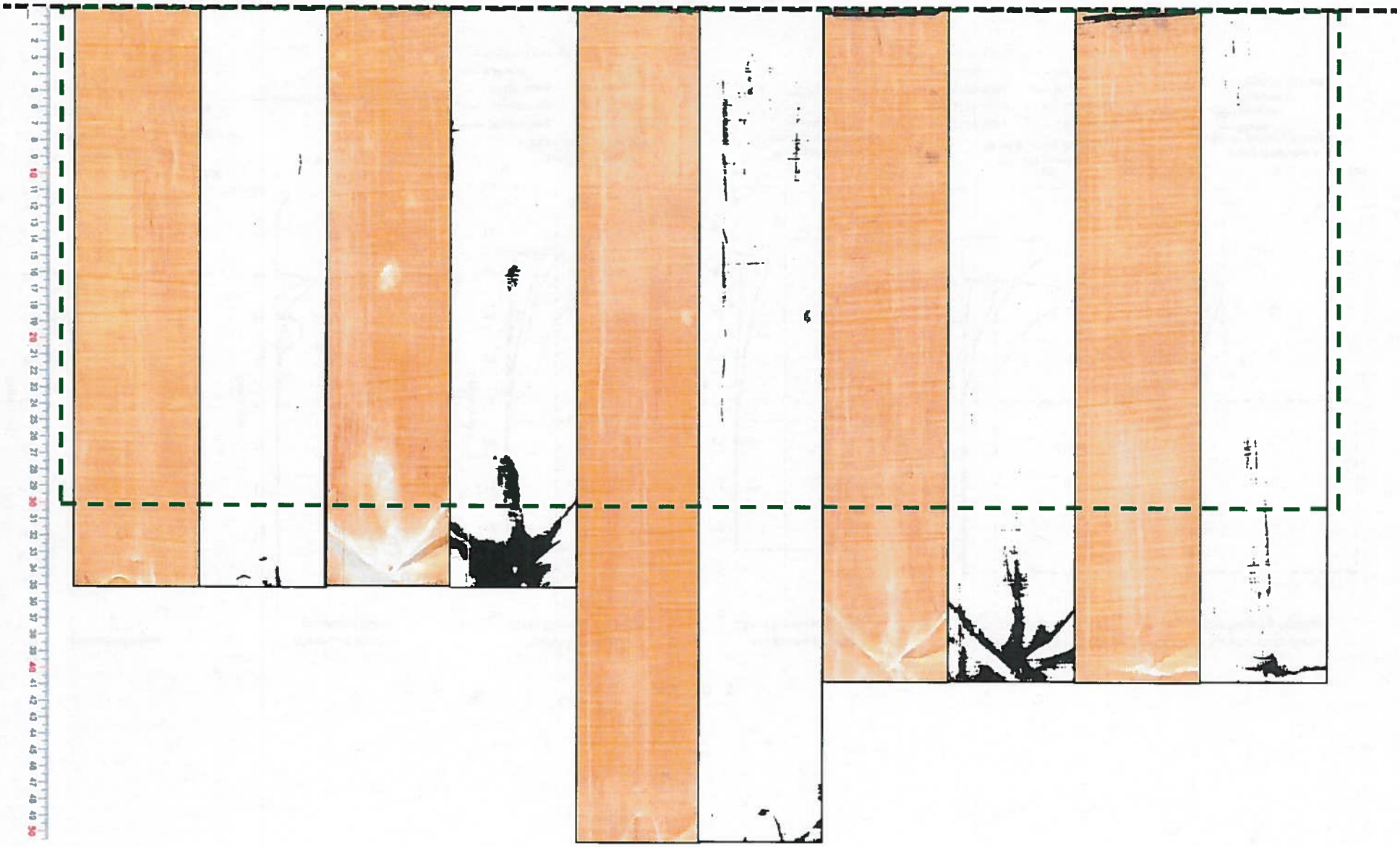
Sampled As :

USDA-NRCS-NSSC-National Soil Survey Laboratory ; Pedon No. 19N0306

Organic				-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	-9-	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-
				Mineral	Est	Min +	Est	Total	Est OC	Fiber Content		NaPyro	Decomp	Limnic	(- - - - pH - - - -)		(- - - Bulk Density - - -)			Proj
	Depth			Content	OM	Est OM	OC	N	/N	Unrub	Rub	Color	State	Matter	$CaCl_2$	H_2O	33 kPa	33 kPa rewet	OD	Subs
Layer	(cm)	Horz	Prep	(- - - - - - - - - - - - - - % - - - - - - - - - - - - - - -)					ratio	% (by vol)								g cm^{-3}		cm cm^{-1}
				5A				4H2a		5C	5C	5C			5C	4C1a2a				
19N02315	2-5	Oa1	S		89	99	51.9	2.37	22							3.9				
19N02315	2-5	Oa1	MW	10						80	56	10YR 8/2			3.1					
19N02316	5-14	Oa2	S		42	97	24.5	1.46	17							3.3				
19N02316	5-14	Oa2	MW	55						56	44	10YR 6/3			2.8					

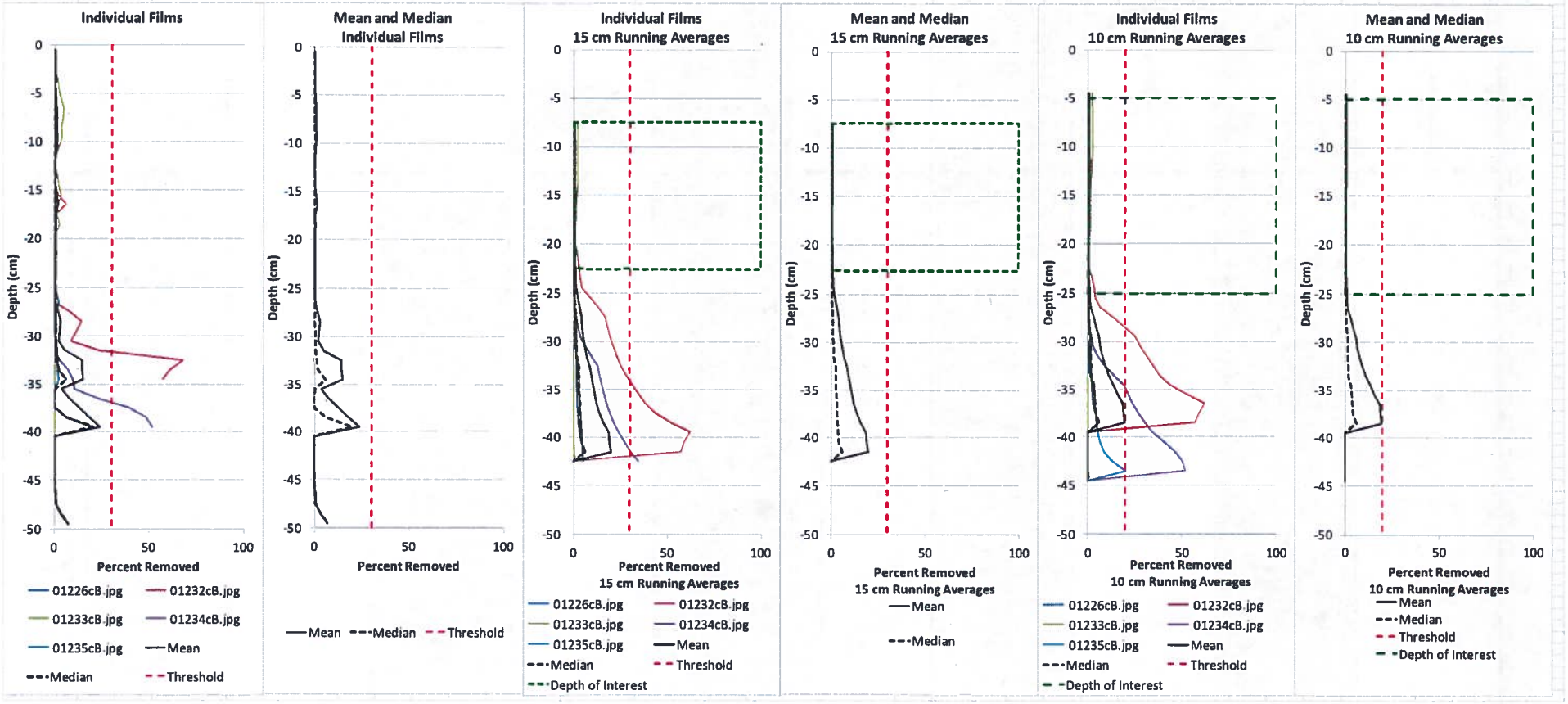

A10 Bench
Depth to Water (inches)
6
0
-6
-12
-18
-24
-30
03-May-2019
04-May-2019
05-May-2019
06-May-2019
07-May-2019
08-May-2019
09-May-2019
10-May-2019
11-May-2019
12-May-2019
13-May-2019
14-May-2019
15-May-2019
16-May-2019
17-May-2019
18-May-2019
19-May-2019
20-May-2019
21-May-2019
22-May-2019
23-May-2019
24-May-2019
25-May-2019
26-May-2019
27-May-2019
28-May-2019
29-May-2019
30-May-2019
31-May-2019
01-Jun-2019
02-Jun-2019
03-Jun-2019
04-Jun-2019

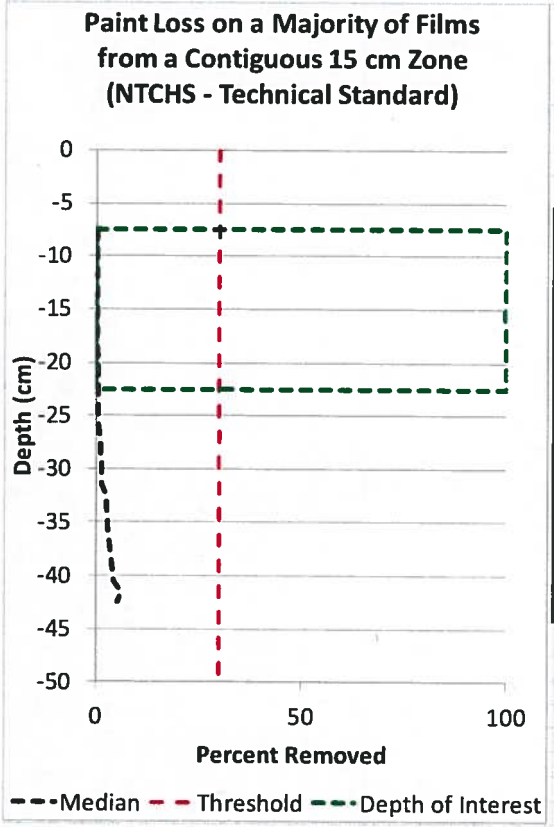
Films 01226, 01232, 01233, 01234, 01235
Fe Group 1 - Bench



WV A10 - 1

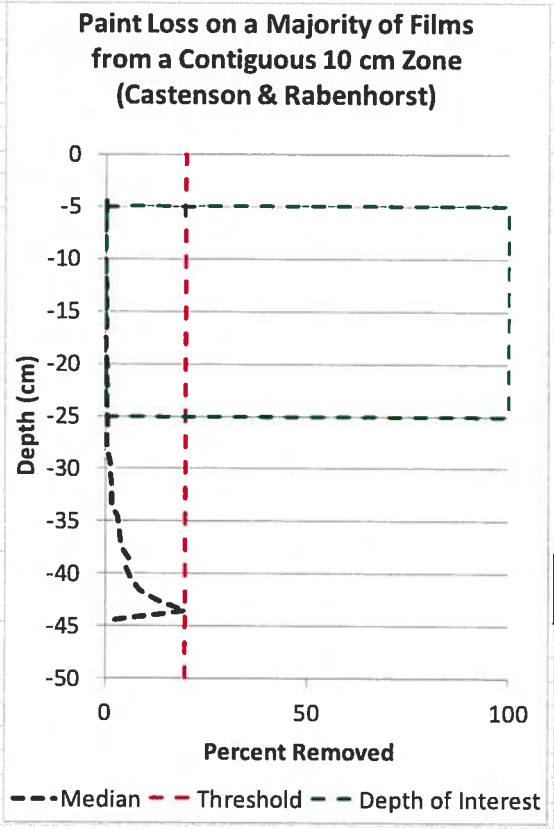
Fe


Individual Films
Depth (cm)
Percent Removed
01226cB.jpg
01232cB.jpg
01233cB.jpg
01234cB.jpg
01235cB.jpg
Mean
Median
Threshold
Mean and Median
Individual Films
Depth (cm)
Percent Removed
Mean
Median
Threshold
Individual Films
15 cm Running Averages
Depth (cm)
Percent Removed
15 cm Running Averages
01226cB.jpg
01232cB.jpg
01233cB.jpg
01234cB.jpg
01235cB.jpg
Mean
Median
Threshold
Depth of Interest
Mean and Median
15 cm Running Averages
Depth (cm)
Percent Removed
15 cm Running Averages
Mean
Median
Individual Films
10 cm Running Averages
Depth (cm)
Percent Removed
10 cm Running Averages
01226cB.jpg
01232cB.jpg
01233cB.jpg
01234cB.jpg
01235cB.jpg
Mean
Median
Threshold
Depth of Interest
Mean and Median
10 cm Running Averages
Depth (cm)
Percent Removed
10 cm Running Averages
Mean
Median
Threshold
Depth of Interest



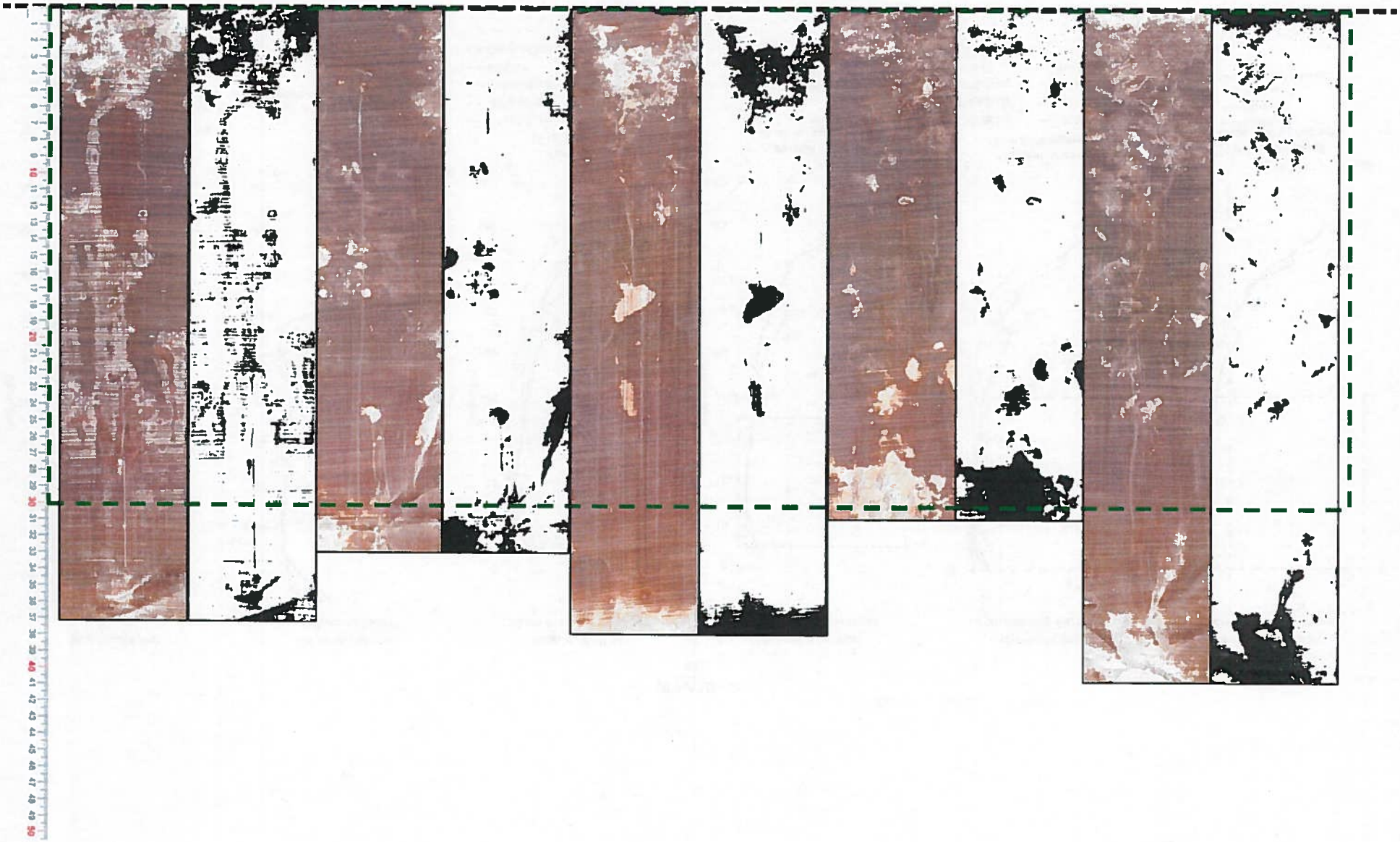
WV A10 - 1
Fe

	%
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 30 cm	0.5
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 50 cm	19.7
Meets Technical Std?	NO



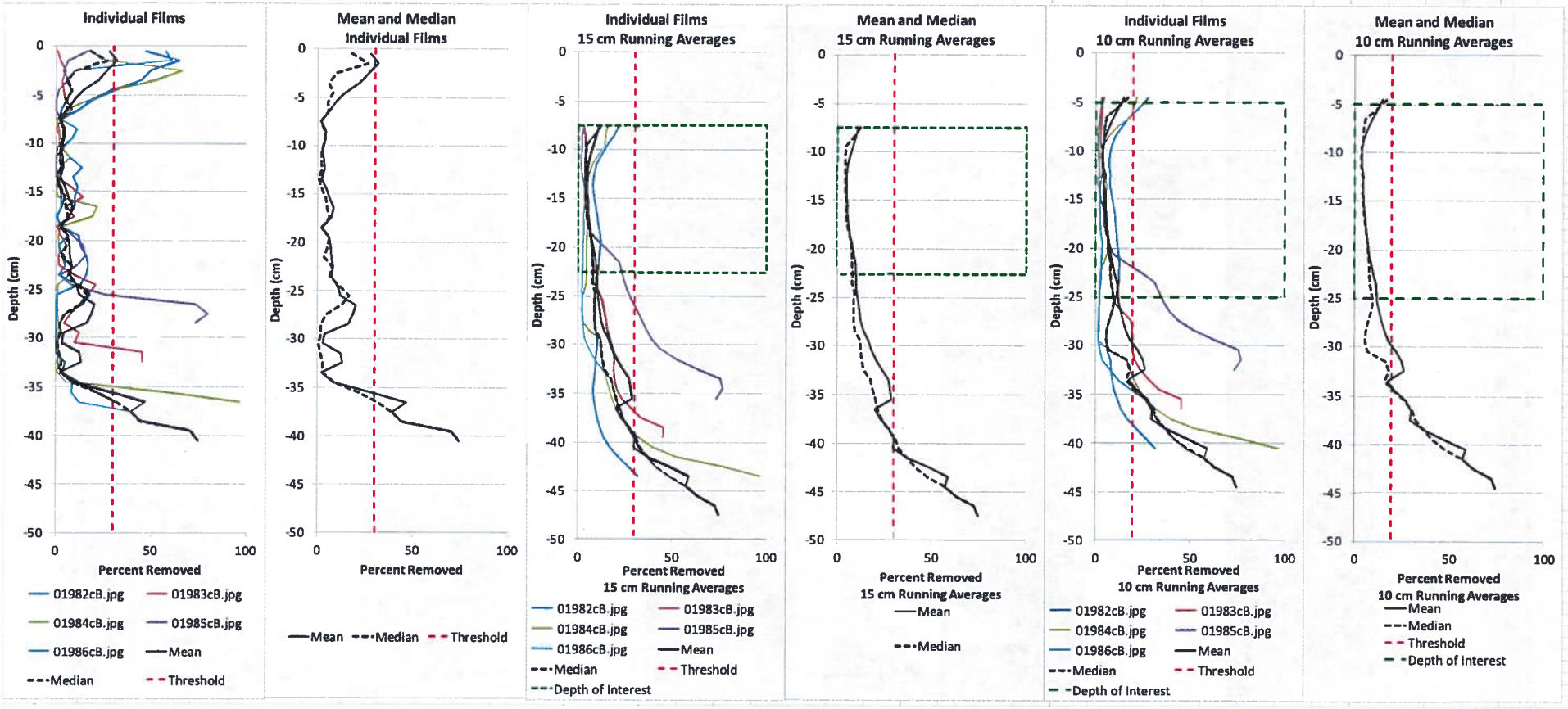
	%
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 30 cm	0.6
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 50 cm	20.1
Meets C&R Minimum of 20%?	NO

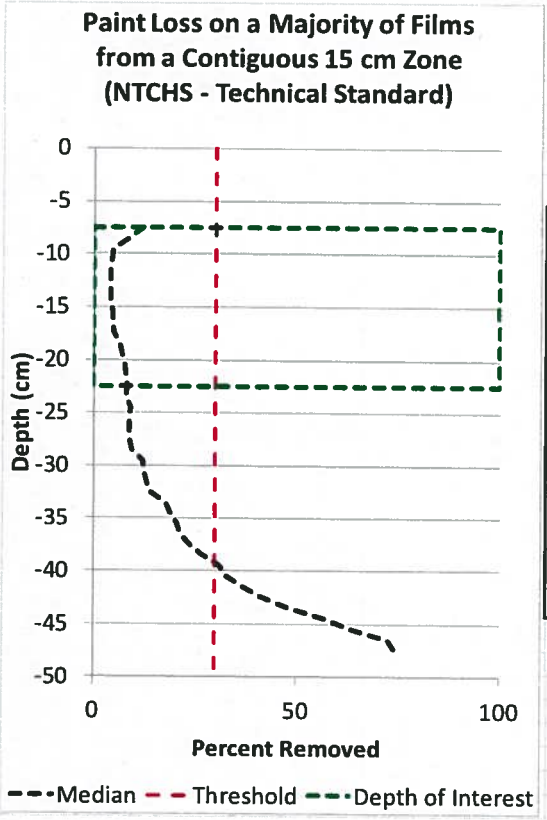
Films 01982, 01983, 01984, 01985, 01986
Mn Group 2 - Bench



WV A10 - 2

Mn

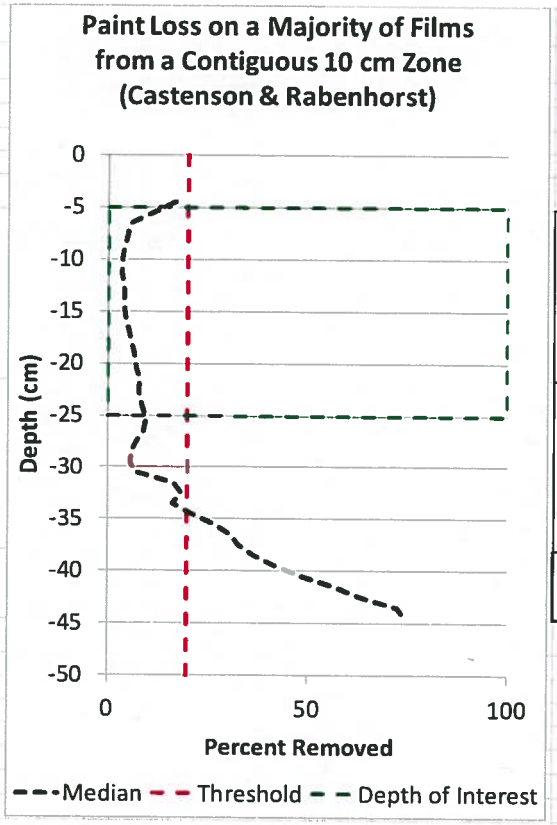

Individual Films
Depth (cm)
Percent Removed
01982cB.jpg
01983cB.jpg
01984cB.jpg
01985cB.jpg
01986cB.jpg
Mean
Median
Threshold
Mean and Median
Individual Films
Depth (cm)
Percent Removed
Mean
Median
Threshold
Individual Films
15 cm Running Averages
Depth (cm)
Percent Removed
15 cm Running Averages
01982cB.jpg
01983cB.jpg
01984cB.jpg
01985cB.jpg
01986cB.jpg
Mean
Median
Threshold
Depth of Interest
Mean and Median
15 cm Running Averages
Depth (cm)
Percent Removed
15 cm Running Averages
Mean
Median
Individual Films
10 cm Running Averages
Depth (cm)
Percent Removed
10 cm Running Averages
01982cB.jpg
01983cB.jpg
01984cB.jpg
01985cB.jpg
01986cB.jpg
Mean
Median
Threshold
Depth of Interest
Mean and Median
10 cm Running Averages
Depth (cm)
Percent Removed
10 cm Running Averages
Mean
Median
Threshold
Depth of Interest



WV A10 - 2
Mn

	%
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 30 cm	12.1
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 50 cm	48.3
Meets Technical Std?	*

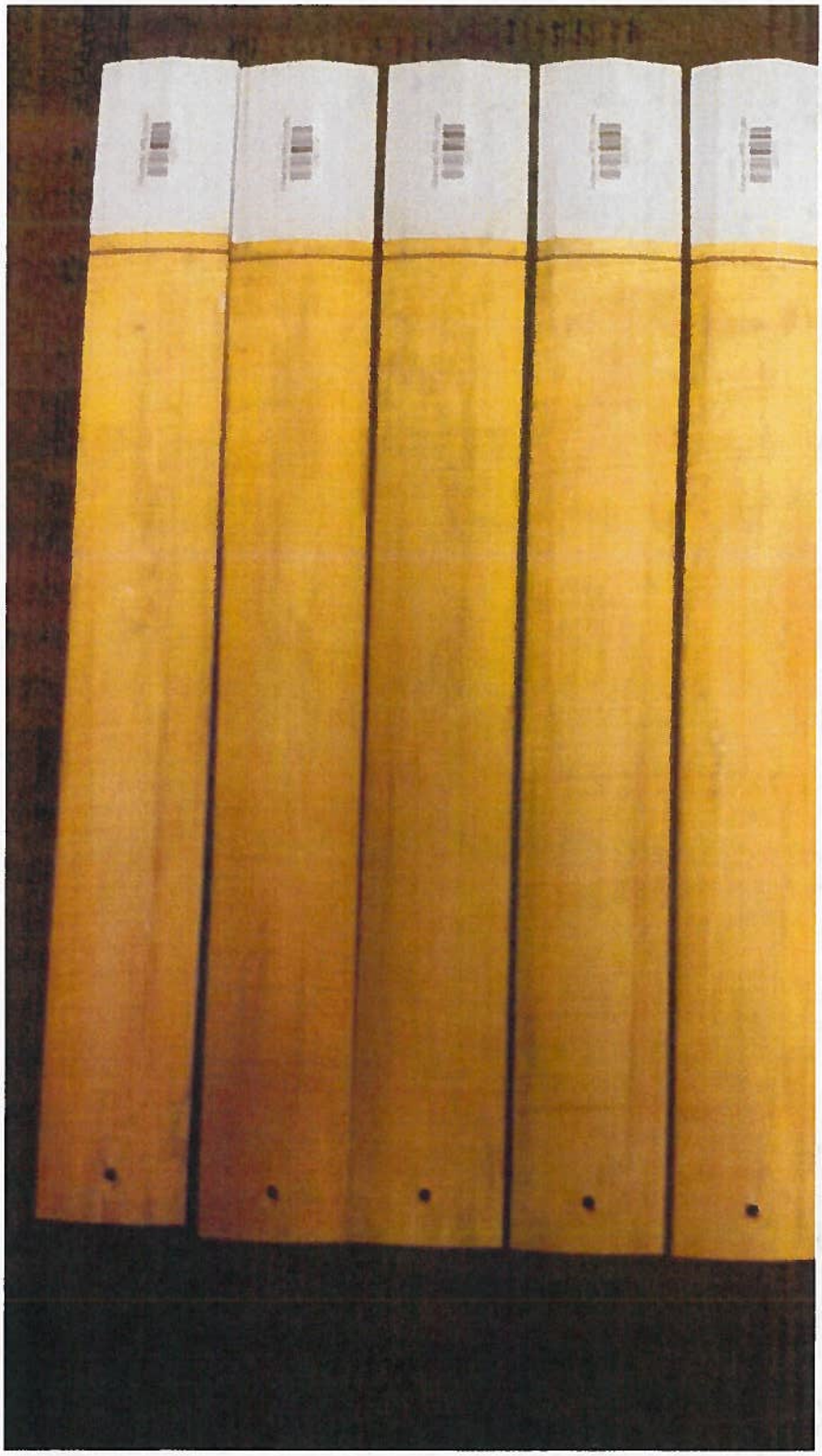
No Technical Std Established for Mn



	%
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 30 cm	17.1
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 50 cm	74.6
Meets C&R Minimum of 20%?	*

No Std Established for Mn

Bench; Fe; 2019 June



Bench; Mn; 2019 June

USDA-NRCS

PEDON DESCRIPTION

Pedon ID # :

April, 2002

Series or Component Name:	Map Unit Symbol:	Photo #:	Classification:	Soil Moist. Regime (Tax.):

Describer(s): Beard Teets	Date: Oct 14 2019	Weather: Temp.: Air: Soil: Depth:	Latitude: 38 · 41 · 51.1 "N Longitude 079 · 52 · 54.1 "W	Datum: WGS84
Location: Sec. T. R.				

UTM: Zone: mE: mN:	Topo Quad.: Millcreek	Site ID: YR: State: County: Pedon #: 2019 WV 083 004	Soil Survey Area: WV603	MLRA / LRU: 127	Transect: ID: Stop #: Interval:		

Landscape: MTN	Landform: MTN Slope	Microfeature:	Anthro:	Elevation:	Aspect:	Slope (%):	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) L / L	

Hillslope Profile Position: Summit	Geom. Component: MTN top K	Microrelief:	Physio. Division: App. Highland	Physio. Province: App Plateau	Physio. Section: Allegheny Mtn	State Physio. Area:	Local Physio. Area:

Drainage:	Flooding:	Ponding:	Soil Moisture Status:	Permeability: Ksat:	Land Cover / Use:

Parent Material:	Bedrock: Kind: Fract.: Hard.: Depth:	Lithostrat. Units: Group: Pottsville Formation: New River Member:		

Erosion: Kind: Degree:	Runoff:	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind:	Diagnostic Horz. / Prop.: Kind: Depth:

P.S. Control Section: Ave.Clay %: Ave.Rock Frag %: Depth Range:	

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER

MISCELLANEOUS FIELD NOTES / SKETCH :

Component Name:		Map Unit Symbol:		Date:

	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cont. Col Mst Shp Loc
1		0 - 8	Oal			2.5YR 2.5/1		50 cb						
2		8 - 19	Oa2			2YR 2.5/1		50 cb						
3		19 - 40	E/Bh			7.5YR 5/1 5YR 3/1		20 gr 50 cb			E Bh	fi fr		weathering rinds 20 7.5YR 5/8 5YR 4/6
4														
5														
6														
7														
8														
9														
10														

	Redoximorphic Features % Sz Cont. Hrd. Shp Knd Loc Bnd Col	Concentrations % Sz Cont. Hrd. Shp Knd Loc Bnd Col	Ped / V. Surface Features % Dst Cont Knd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1										
2										
3			15% 5YR 4/6 B.S material							
4										
5										
6										
7										
8										
9										
10										

*** Primary Characterization Data ***

Pedon ID: S2019WV083004 (Randolph, West Virginia) Print Date: Jul 3 2019 5:24PM

Sampled as :
Revised to :

SSL - Project I2019USWV051 A10 Hydric Soil Indicator Review by NTCHS
- Site ID S2019WV083004 Lat: 38° 41' 51.10" north Long: 79° 52' 54.10" west WGS84 MLRA: 127
- Pedon No. 19N0309
- General Methods 1B1A, 2A1, 2B

United States Department of Agriculture
Natural Resources Conservation Service
National Soil Survey Center
Soil Survey Laboratory
Lincoln, Nebraska 68508-3866

Layer	Horizon	Orig Hzn	Depth (cm)	Field Label 1	Field Label 2	Field Label 3	Field Texture	Lab Texture
19N02320	Oa1		0.0-7.0	S2019WV083004-1			HPM	
19N02321	Oa2		8.0-19.0	S2019WV083004-2			HPM	

PSDA & Rock Fragments

Layer	Depth (cm)	Horz	Prep	-1- Lab Texture	-2- (- - - - - Total - - - - - -) Clay < .002	-3- Silt .002 -.05	-4- Sand .05 -2	-5- (- - Clay - - -) Fine < .0002	-6- CO_3 < .002	-7- (- - - - Silt - - - - -) Fine .002 -.02	-8- Coarse .02 -.05	-9- (- - - - - - - - - - - - Sand - - - - - - - - - - - - -) VF .05 -.10	-10- F .10 -.25	-11- M .25 -.50	-12- C .5 -1	-13- VC 1 -2	-14- (Rock Fragments (mm)) (- - - - - - - - Weight - - - - - - - -) 2 -5	-15- 5 -20	-16- 20 -75	-17- .1- 75	-18- >2 mm wt % whole soil
					(- % of <2mm Mineral Soil -)												(- - - - - - - % of <75mm - - - - - -)				
19N02320	0-7	Oa1	S														--	--	--	--	65
19N02321	8-19	Oa2	S														11	3	--	--	68

Bulk Density & Moisture

Layer	Depth (cm)	Horz	Prep	-1- (Bulk Density) 33 kPa (- - - g cm^{-3} - - -)	-2- Oven Dry	-3- Cole Whole Soil	-4- (- - - - - - - - - - - Water Content - - - - - - - - - - -) 6 kPa (- - - - - - - - - - - - pct of < 2mm - - - - - - - - - - - -)	-5- 10 kPa	-6- 33 kPa	-7- 1500 kPa 3C2a1a	-8- 1500 kPa Moist	-9- (Air Dry-Oven Dry) (- - - - Ratio - - - -) 3D1	-10- Corrected	-11- WRD Whole Soil cm^3 cm^{-3} %	-12- Aggst Stabl 2-0.5mm	-13- (- - Ratio/Clay - -) CEC7	-14- 1500 kPa
19N02320	0-7	Oa1	S							106.1		1.135					
19N02321	8-19	Oa2	S							72.1		1.107					

*** Primary Characterization Data ***

Pedon ID: S2019WV083004 (Randolph County, West Virginia) Print Date: Jul 3 2019 5:24PM

Sampled As :

USDA-NRCS-NSSC-National Soil Survey Laboratory ; Pedon No. 19N0309

Carbon & Extractions

Layer	Depth (cm)	Horz	Prep	-1- C (- - - - - % of <2 mm - - - - - -) 4H2a	-2- Total N 4H2a	-3- Total S 4H2a	-4- Est OC	-5- OC (WB)	-6- C/N Ratio	-7- Dith-Cit Ext Fe (- - - - - % of < 2mm - - - - -)	-8- Dith-Cit Ext Al	-9- Dith-Cit Ext Mn	-10- Ammonium Oxalate Extraction Al+½Fe (- - - - - % of < 2mm - - - - -)	-11- Ammonium Oxalate Extraction ODOE	-12- Ammonium Oxalate Extraction Fe	-13- Ammonium Oxalate Extraction Al	-14- Ammonium Oxalate Extraction Si	-15- Ammonium Oxalate Extraction Mn mg kg^{-1}	-16- Na Pyro-Phosphate C (- - - - - % of < 2mm - - - - -)	-17- Na Pyro-Phosphate Fe	-18- Na Pyro-Phosphate Al	-19- Na Pyro-Phosphate Mn
19N02320	0-7	Oa1	S	54.21	2.55	0.29	54.2		21													
19N02321	8-19	Oa2	S	44.71	2.19	0.26	44.7		20													

CEC & Bases

Layer	Depth (cm)	Horz	Prep	-1- Ca (- - - - - - cmol(+) kg^{-1} - - - - - -) 4B1a1a	-2- Mg 4B1a1a	-3- Na 4B1a1a	-4- K 4B1a1a	-5- Sum Bases	-6- Acid-ity 4B2b1a1	-7- Extr Al 4B3b1a	-8- KCl Mn mg kg^{-1} 4B3b1a	-9- CEC8 Sum Cats	-10- CEC7 NH_4 OAC (- - - - cmol(+) kg^{-1} - - -) 4B1a1a	-11- ECEC Bases +Al	-12- Al Sat (- - - - - - - - % - - - - - - - -)	-13- Base Saturation Sum	-14- Base Saturation NH_4OAC
19N02320	0-7	Oa1	S	2.5	1.9	0.1	1.0	5.5	223.3	4.6	28.3	228.8	130.4	10.1	46	2	4
19N02321	8-19	Oa2	S	0.2	0.7	0.1	0.6	1.6	173.5	6.2	7.2	175.1	111.5	7.8	79	1	1

Salt

Layer	Depth (cm)	Horz	Prep	-1- Ca (- - - - - mmol(+) L^{-1} - - - - -)	-2- Mg	-3- Na	-4- K	-5- CO_3 (- mmol(-) L^{-1} -)	-6- HCO_3	-7- F	-8- Cl	-9- PO_4	-10- Br	-11- OAC	-12- SO_4	-13- NO_2	-14- NO_3	-15- H_2O (- - - - % - - - -)	-16- Total Salts	-17- Elec Cond (- - dS m^{-1} - -)	-18- Elec Cond 1:2	-19- Exch Na %	-20- SAR
19N02321	8-19	Oa2	S																			tr	

pH & Carbonates

Layer	Depth (cm)	Horz	Prep	-1- KCl (- - - - - - - - - - - - - - - - - - pH - - - - - - - - - - - - - - - - -)	-2- $CaCl_2$ 0.01M 1:2 4C1a2a	-3- H_2O 1:1 4C1a2a	-4- Sat Paste	-5- Oxid	-6- NaF	-7- (- - Carbonate - -) As $CaCO_3$ <2mm (- - - - - - - - - - - - % - - - - - - - - - - -)	-8- As $CaCO_3$ <20mm	-9- (- - Gypsum - - -) As $CaSO_4$*$2H_2O$ <2mm	-10- As $CaSO_4$*$2H_2O$ <20mm	-11- Resist ohms cm^{-1}
19N02320	0-7	Oa1	S		2.5	3.1							
19N02321	8-19	Oa2	S		2.5	3.0							

*** Primary Characterization Data ***

Pedon ID: S2019WV083004 (Randolph County, West Virginia) Print Date: Jul 3 2019 5:24PM

Sampled As :

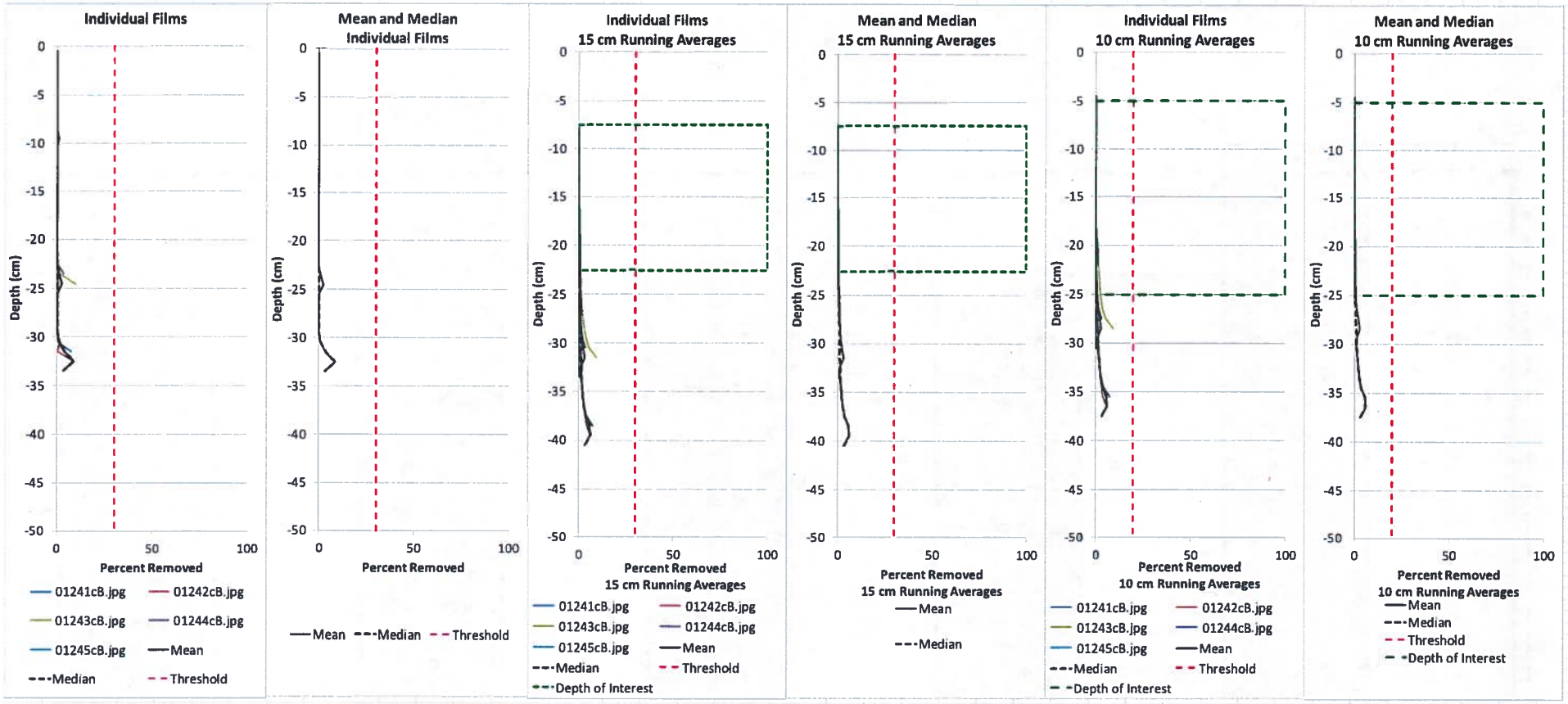
USDA-NRCS-NSSC-National Soil Survey Laboratory ; Pedon No. 19N0309

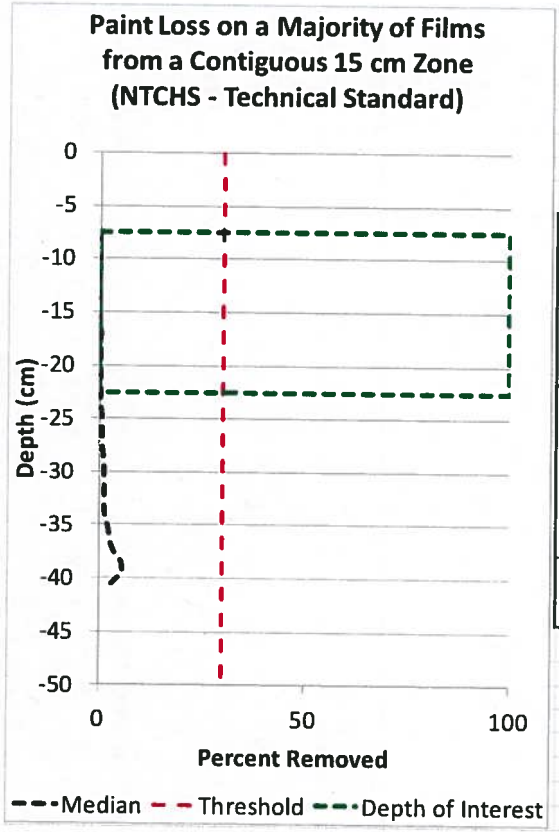
Organic				-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	-9-	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-
				Mineral	Est	Min +	Est	Total	Est OC	Fiber Content		NaPyro	Decomp	Limnic	(- - - - pH - - - -)		(- - - Bulk Density - - -)			Proj
	Depth			Content	OM	Est OM	OC	N	/N	Unrub	Rub	Color	State	Matter	$CaCl_2$	H_2O	33 kPa	33 kPa rewet	OD	Subs
Layer	(cm)	Horz	Prep	(- - - - - - - - - - - - - - % - - - - - - - - - - - - - - -)					ratio	% (by vol)								g cm^{-3}		cm cm^{-1}
				5A				4H2a		5C	5C	5C			5C	4C1a2a				
19N02320	0-7	Oa1	S		93	101	54.2	2.55	21							3.1				
19N02320	0-7	Oa1	MW	8						60	36	10YR 8/3			2.5					
19N02321	8-19	Oa2	S		77	104	44.7	2.19	20							3.0				
19N02321	8-19	Oa2	MW	27						40	16	10YR 6/4			2.5					

Films 01241, 01242, 01243, 01244, 01245
Fe Group 2 - Summit

WV A10 - 2

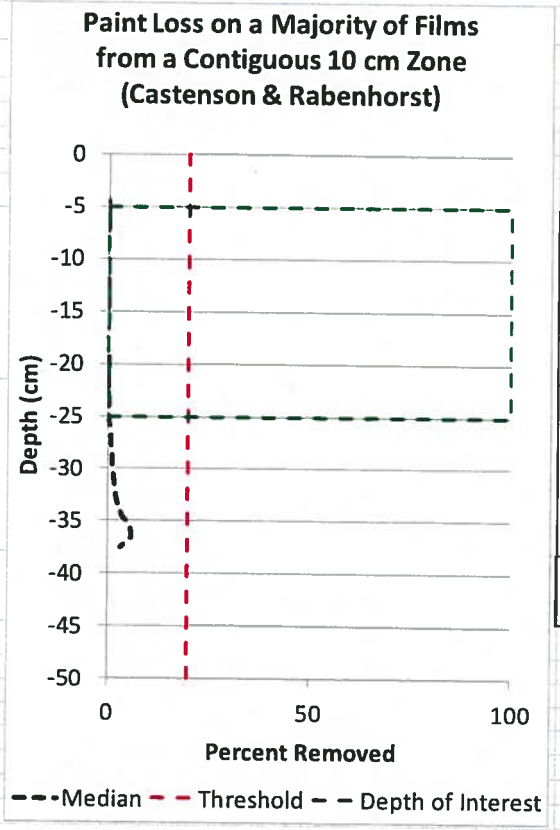
Fe


Individual Films
Mean and Median
Individual Films
Individual Films
15 cm Running Averages
Mean and Median
15 cm Running Averages
Individual Films
10 cm Running Averages
Mean and Median
10 cm Running Averages
Depth (cm)
Percent Removed
15 cm Running Averages
10 cm Running Averages
01241cB.jpg
01242cB.jpg
01243cB.jpg
01244cB.jpg
01245cB.jpg
Mean
Median
Threshold
Depth of Interest



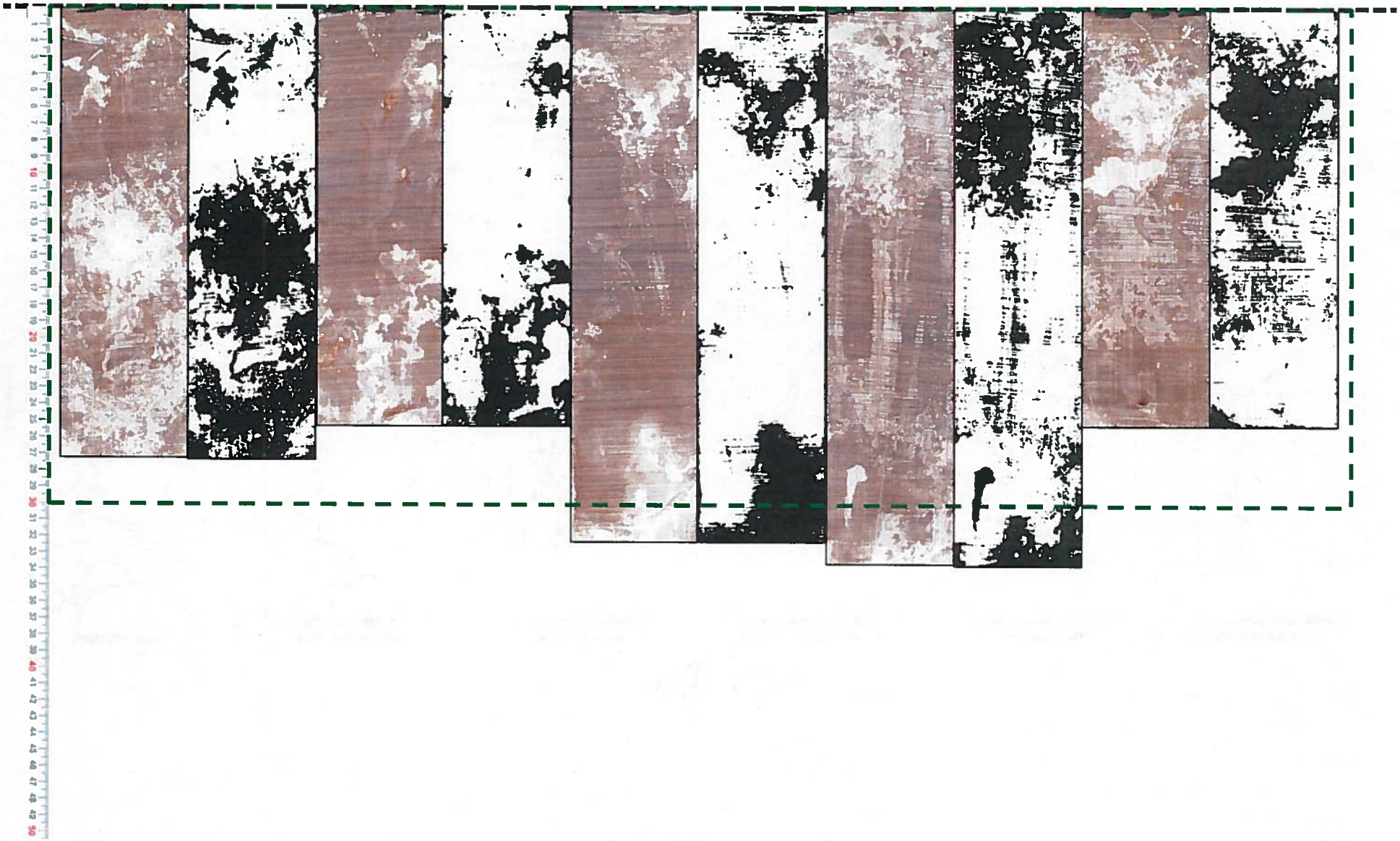
WV A10 - 2
Fe

	%
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 30 cm	0.1
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 50 cm	5.9
Meets Technical Std?	NO



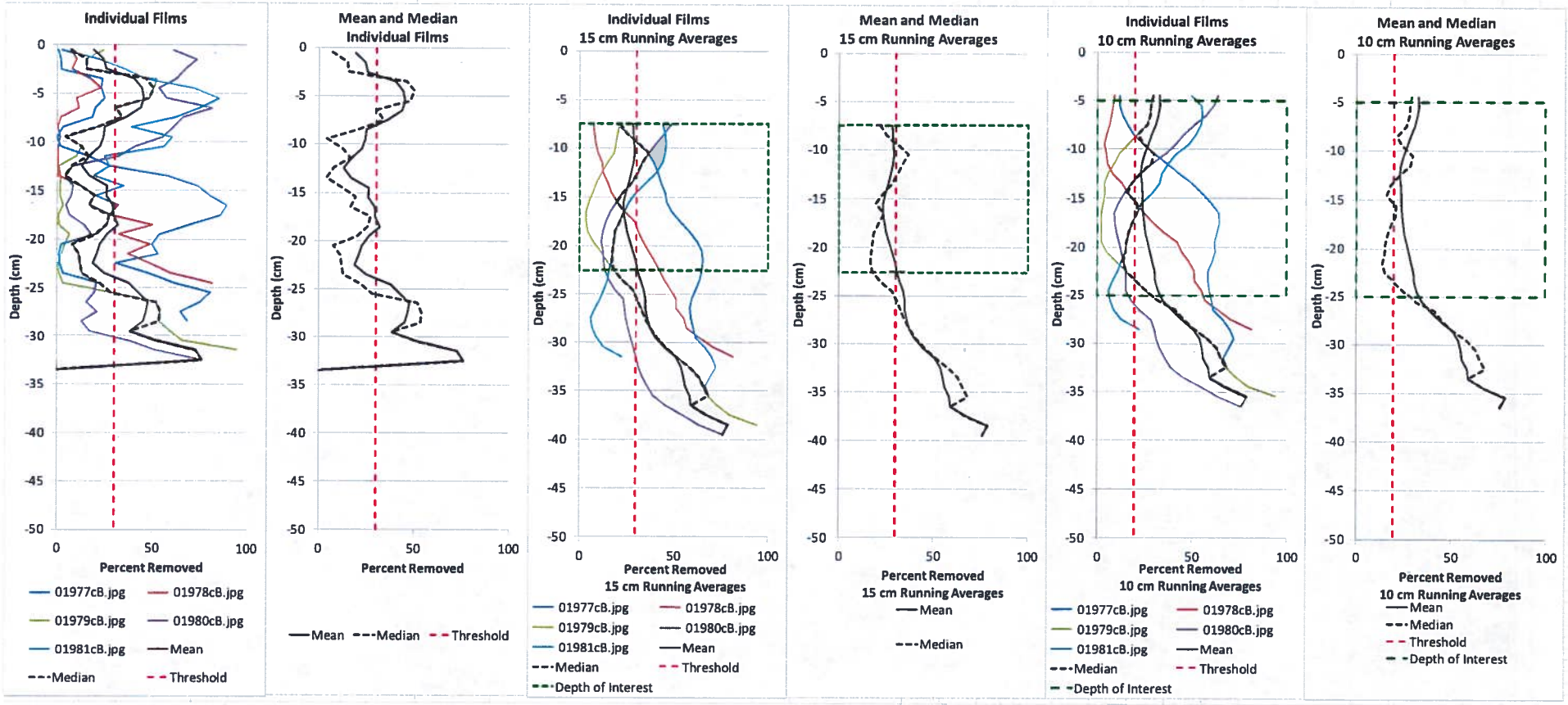
	%
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 30 cm	0.2
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 50 cm	5.9
Meets C&R Minimum of 20%?	NO

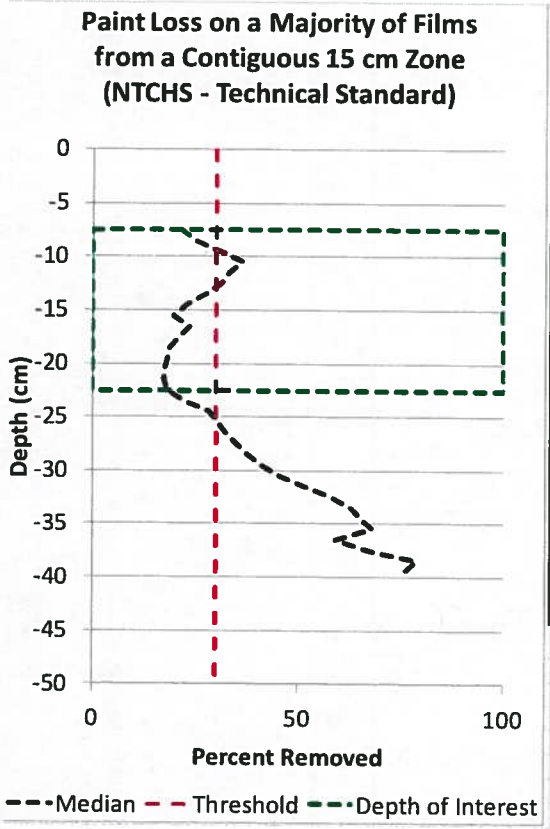
Films 01977, 01978, 01979, 01980, 01981
Mn Group 1 - Summit



WV A10 - 1

Mn

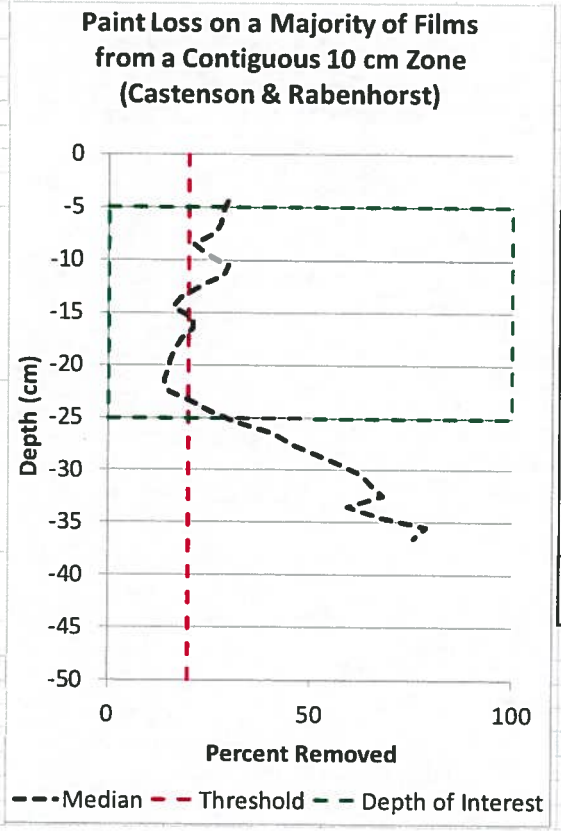

Individual Films
Depth (cm)
Percent Removed
01977cB.jpg
01978cB.jpg
01979cB.jpg
01980cB.jpg
01981cB.jpg
Mean
Median
Threshold
Mean and Median
Individual Films
Mean
Median
Threshold
Individual Films
15 cm Running Averages
Depth of Interest
Mean and Median
15 cm Running Averages
Individual Films
10 cm Running Averages
Mean and Median
10 cm Running Averages



WV A10 - 1
Mn

	%
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 30 cm	36.3
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 50 cm	78.8
Meets Technical Std?	*

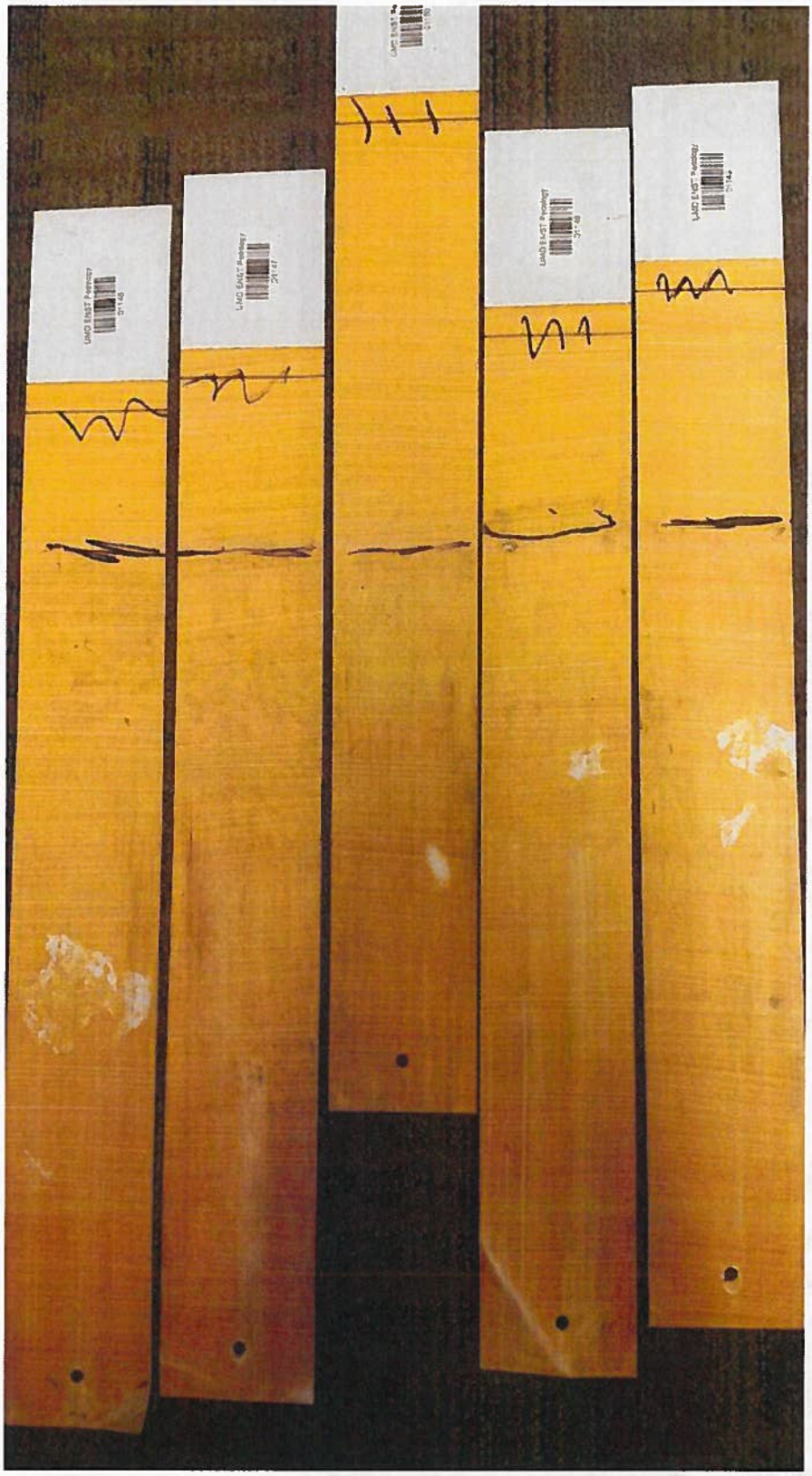
No Technical Std Established for Mn



	%
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 30 cm	29.9
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 50 cm	78.8
Meets C&R Minimum of 20%?	*

No Std Established for Mn

Summit; Fe; 2019 June



Summit; Mn; 2019 June

USDA-NRCS

PEDON DESCRIPTION

Pedon ID # :

April, 2002

Series or Component Name:	Map Unit Symbol:	Photo #:	Classification:	Soil Moist. Regime (Tax.):

Describer(s): Beard Teets	Date: 3/14/2019	Weather: Temp.: Air: Soil: Depth:	Latitude: 38 · 41 · 18.7 " N Longitude: 79 · 52 · 45.8 " W	Datum: WGS84
Location: Sec. T. R.				

UTM: Zone: mE: mN:	Topo Quad.: Mill creek	Site ID: YR: 2019	State: WV	County: 083	Pedon #: 002	Soil Survey Area: WV603	MLRA / LRU: 127	Transect: ID: Stop #: Interval:	

Landscape: MTN	Landform: MTN Slope	Microfeature:	Anthro:	Elevation:	Aspect:	Slope (%):	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) L / L	

Hillslope Profile Position: backslope	Geom. Component: MTN Flank	Microrelief:	Physio. Division: App. Highland	Physio. Province: App. Plateau	Physio. Section: Allegheny Mtn	State Physio. Area:	Local Physio. Area:

Drainage:	Flooding:	Ponding:	Soil Moisture Status:	Permeability: Ksat:	Land Cover / Use:

Parent Material:	Bedrock: Kind: Fract.: Hard.: Depth:	Lithostrat. Units: Group: Formation: Member: Petersville New River	

Erosion: Kind: Degree:	Runoff:	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind:	Diagnostic Horz. / Prop.: Kind: Depth:

P.S. Control Section: Ave.Clay %: Ave.Rock Frag %: Depth Range:	

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER

MISCELLANEOUS FIELD NOTES / SKETCH :

Component Name:								Map Unit Symbol:							Date:						
	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd % Rnd Sz	Structure Grade	Structure Sz	Structure Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cont. Col Mst Shp Loc					
1		0-1	Oi																		
2		1-6	Oa			5YR2.5/1															
3		6-12	A/E			7.5YR3/2 10YR4/3	HO Sicl Sicl														
4		12-41	BS			7.5YR5/8	CL														
5		41-66	BW1			10YR 5/6	CL	10 Ch	2 5 15												
6		66-80+	BW2			2.5Y 6/4	Cl														
7																					
8																					
9																					
10																					

	Redoximorphic Features % Sz Cont. Hrd. Shp Knd Loc Bnd Col	Concentrations % Sz Cont. Hrd. Shp Knd Loc Bnd Col	Ped / V. Surface Features % Dst Cont Knd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1										
2										
3										
4										
5			20% 15%							
6	5 Red 6	8 Mn N2.5/0 10 Fe 7.5YR5/8								re
7										
8										
9										
10										

*** Primary Characterization Data ***

Pedon ID: S2019WV083002 (Randolph, West Virginia) Print Date: Jul 3 2019 5:24PM

Sampled as :
Revised to :

SSL - Project I2019USWV051 A10 Hydric Soil Indicator Review by NTCHS
- Site ID S2019WV083002 Lat: 38° 41' 18.70" north Long: 79° 52' 45.80" west WGS84 MLRA: 127
- Pedon No. 19N0307
- General Methods 1B1A, 2A1, 2B

United States Department of Agriculture
Natural Resources Conservation Service
National Soil Survey Center
Soil Survey Laboratory
Lincoln, Nebraska 68508-3866

Layer	Horizon	Orig Hzn	Depth (cm)	Field Label 1	Field Label 2	Field Label 3	Field Texture	Lab Texture
19N02317	Oa		1.0-6.0	S2019WV083002-2			HPM	

PSDA & Rock Fragments

Layer	Depth (cm)	Horz	Prep	-1- Lab Texture	-2- Total Clay < .002	-3- Total Silt .002 -.05	-4- Total Sand .05 -2	-5- Clay Fine < .0002	-6- Clay CO_3 < .002	-7- Silt Fine .002 -.02	-8- Silt Coarse .02 -.05	-9- Sand VF .05 -.10	-10- Sand F .10 -.25	-11- Sand M .25 -.50	-12- Sand C .5 -1	-13- Sand VC 1 -2	-14- Rock Fragments (mm) Weight 2 -5	-15- Rock Fragments (mm) Weight 5 -20	-16- Rock Fragments (mm) Weight 20 -75	-17- Rock Fragments (mm) Weight .1- 75	-18- >2 mm wt % whole soil
					(- - - - - % of <2mm Mineral Soil - - - - - -)												(- - - - - - % of <75mm - - - - - -)				
19N02317	1-6	Oa	S														1	--	--	--	1

Bulk Density & Moisture

Layer	Depth (cm)	Horz	Prep	-1- (Bulk Density) 33 kPa	-2- Oven Dry	-3- Cole Whole Soil	-4- Water Content 6 kPa	-5- Water Content 10 kPa	-6- Water Content 33 kPa	-7- Water Content 1500 kPa	-8- Water Content 1500 kPa Moist	-9- Air Dry-Oven Dry Ratio	-10- Air Dry-Oven Dry Corrected	-11- WRD Whole Soil	-12- Aggst Stabl 2-0.5mm	-13- Ratio/Clay CEC7	-14- Ratio/Clay 1500 kPa
				(- - - g cm^{-3} - - -)			(- - - - - - - - - - - pct of < 2mm - - - - - - - - - - -)							cm^3 cm^{-3} %			
										3C2a1a		3D1					
19N02317	1-6	Oa	S							83.7		1.112					

Carbon & Extractions

Layer	Depth (cm)	Horz	Prep	-1- Total C	-2- Total N	-3- Total S	-4- Est OC	-5- OC (WB)	-6- C/N Ratio	-7- Dith-Cit Ext Fe	-8- Dith-Cit Ext Al	-9- Dith-Cit Ext Mn	-10- Ammonium Oxalate Extraction Al+½Fe	-11- Ammonium Oxalate Extraction ODOE	-12- Ammonium Oxalate Extraction Fe	-13- Ammonium Oxalate Extraction Al	-14- Ammonium Oxalate Extraction Si	-15- Ammonium Oxalate Extraction Mn	-16- Na Pyro-Phosphate C	-17- Na Pyro-Phosphate Fe	-18- Na Pyro-Phosphate Al	-19- Na Pyro-Phosphate Mn
				(- - - - - - - - - - % of <2 mm - - - - - - - - - -)						(- - - - - - - - - - - - - - - - - - - % of < 2mm - - - - - - - - - - - - - - - - -)								mg kg^{-1}	(- - - - - - % of < 2mm - - - - -)			
				4H2a	4H2a	4H2a																
19N02317	1-6	Oa	S	43.98	2.18	0.25	44.0		20													

*** Primary Characterization Data ***

Pedon ID: S2019WV083002 (Randolph County, West Virginia) Print Date: Jul 3 2019 5:24PM

Sampled As :

USDA-NRCS-NSSC-National Soil Survey Laboratory ; Pedon No. 19N0307

CEC & Bases

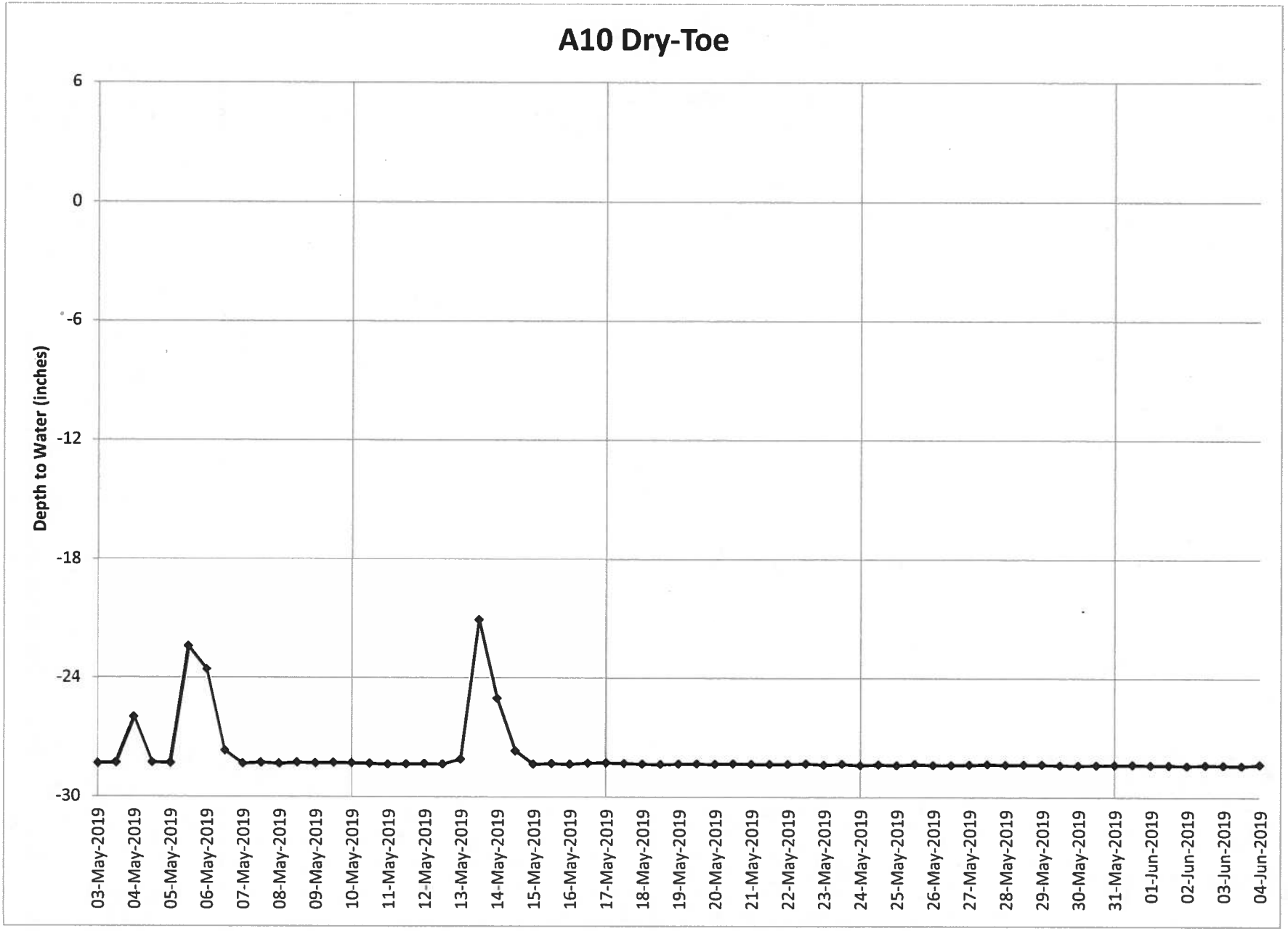
Layer	Depth (cm)	Horz	Prep	-1- Ca	-2- Mg	-3- Na	-4- K	-5- Sum Bases	-6- Acid-ity	-7- Extr Al	-8- KCl Mn	-9- CEC8 Sum Cats	-10- CEC7 NH_4 OAC	-11- ECEC Bases +Al	-12- Al Sat	-13- Base Saturation Sum	-14- Base Saturation NH_4OAC
				(- - - - - - NH_4OAC Extractable Bases - - - - -)												(- - - - Base - - - -)	
				(- - - - - - - - - - - - - - - - - - cmol(+) kg^{-1} - - - - - - - - - - - - - - - - - - -)							mg kg^{-1}	(- - - - cmol(+) kg^{-1} - - -)			(- - - - - - - - % - - - - - - - -)		
				4B1a1a	4B1a1a	4B1a1a	4B1a1a		4B2b1a1	4B3b1a	4B3b1a		4B1a1a				
19N02317	1-6	Oa	S	9.7	2.3	0.2	1.9	14.1	139.4	5.0	105.0	153.5	85.3	19.1	26	9	17

pH & Carbonates

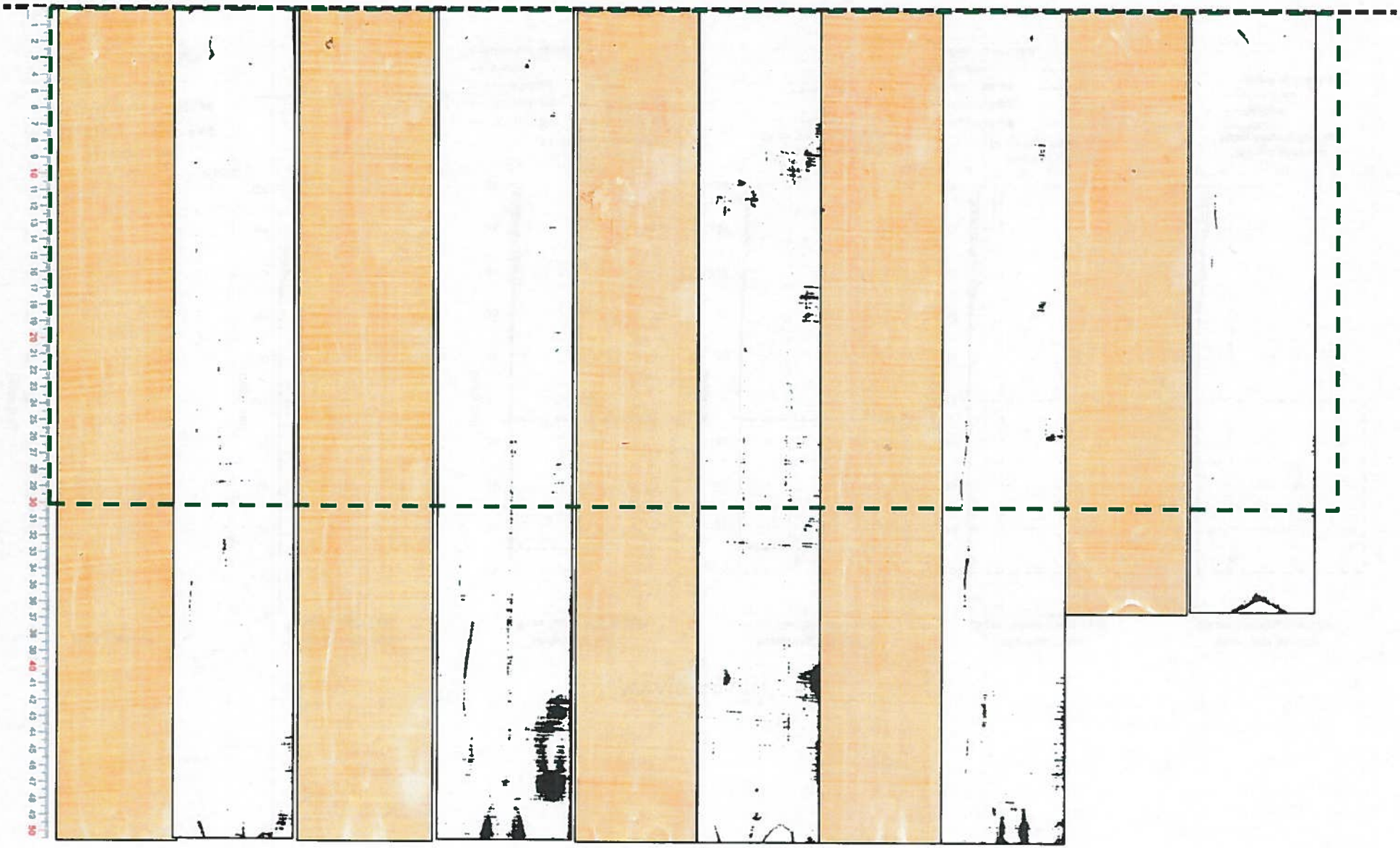
Layer	Depth (cm)	Horz	Prep	-1- KCl	-2- $CaCl_2$ 0.01M 1:2	-3- H_2O 1:1	-4- Sat Paste	-5- Oxid	-6- NaF	-7- Carbonate As $CaCO_3$ <2mm	-8- Carbonate As $CaCO_3$ <20mm	-9- Gypsum As $CaSO_4$*$2H_2O$ <2mm	-10- Gypsum As $CaSO_4$*$2H_2O$ <20mm	-11- Resist ohms cm^{-1}
				(- - - - - - - - - - - - - - - - - - pH - - - - - - - - - - - - - - - - - -)						(- - Carbonate - -)		(- - Gypsum - - -)		
										(- - - - - - - - - - - - % - - - - - - - - - - - -)				
					4C1a2a	4C1a2a								
19N02317	1-6	Oa	S		3.3	3.9								

Organic

Layer	Depth (cm)	Horz	Prep	-1- Mineral Content	-2- Est OM	-3- Min + Est OM	-4- Est OC	-5- Total N	-6- Est OC /N ratio	-7- Fiber Content Unrub	-8- Fiber Content Rub	-9- NaPyro Color	-10- Decomp State	-11- Limnic Matter	-12- pH $CaCl_2$	-13- pH H_2O	-14- Bulk Density 33 kPa	-15- Bulk Density 33 kPa rewet	-16- Bulk Density OD	-17- Proj Subs
				(- - - - - - - - - - - - - - % - - - - - - - - - - - - - -)						% (by vol)					(- - - - pH - - - -)		(- - - Bulk Density - - -)			
																		g cm^{-3}		cm cm^{-1}
				5A				4H2a		5C	5C	5C			5C	4C1a2a				
19N02317	1-6	Oa	S		76	105	44.0	2.18	20							3.9				
19N02317	1-6	Oa	MW	29						64	38	10YR 8/2			3.2					

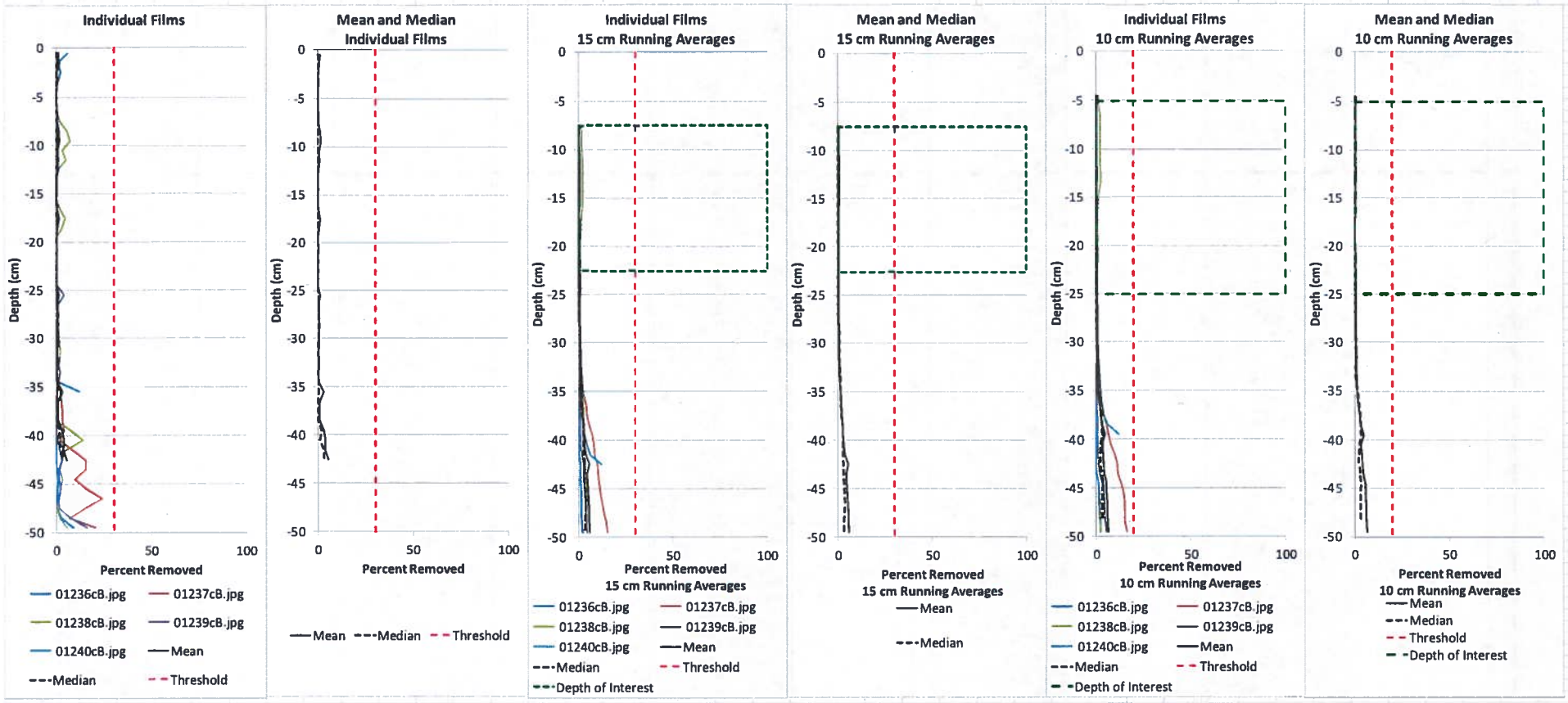

A10 Dry-Toe
Depth to Water (inches)
6
0
-6
-12
-18
-24
-30
03-May-2019
04-May-2019
05-May-2019
06-May-2019
07-May-2019
08-May-2019
09-May-2019
10-May-2019
11-May-2019
12-May-2019
13-May-2019
14-May-2019
15-May-2019
16-May-2019
17-May-2019
18-May-2019
19-May-2019
20-May-2019
21-May-2019
22-May-2019
23-May-2019
24-May-2019
25-May-2019
26-May-2019
27-May-2019
28-May-2019
29-May-2019
30-May-2019
31-May-2019
01-Jun-2019
02-Jun-2019
03-Jun-2019
04-Jun-2019

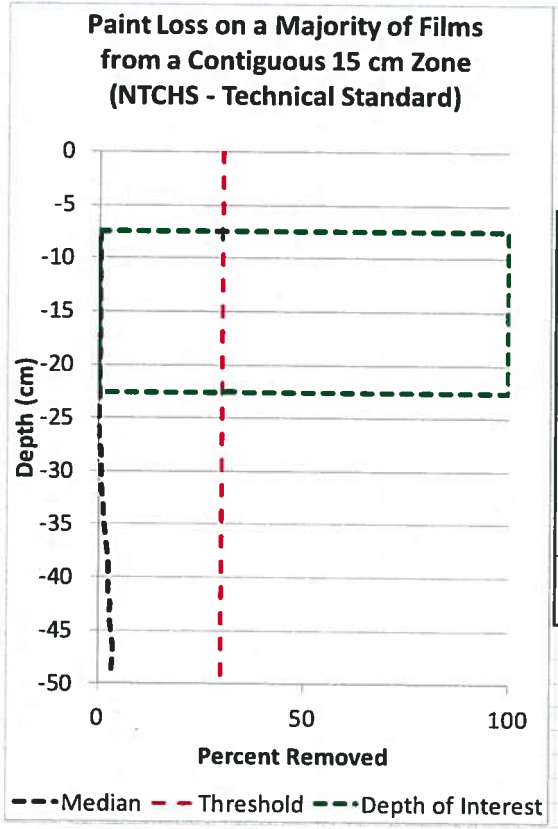
Films 01236, 01237, 01238, 01239, 01240
Fe Group 4 – Dry Toe



WV A10 - 4 Dry Toe

Fe

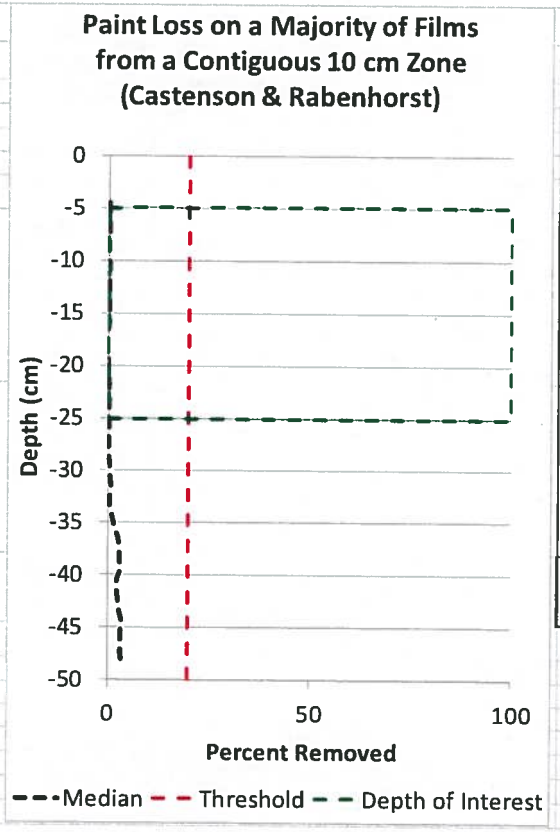




WV A10 - 4 Dry Toe

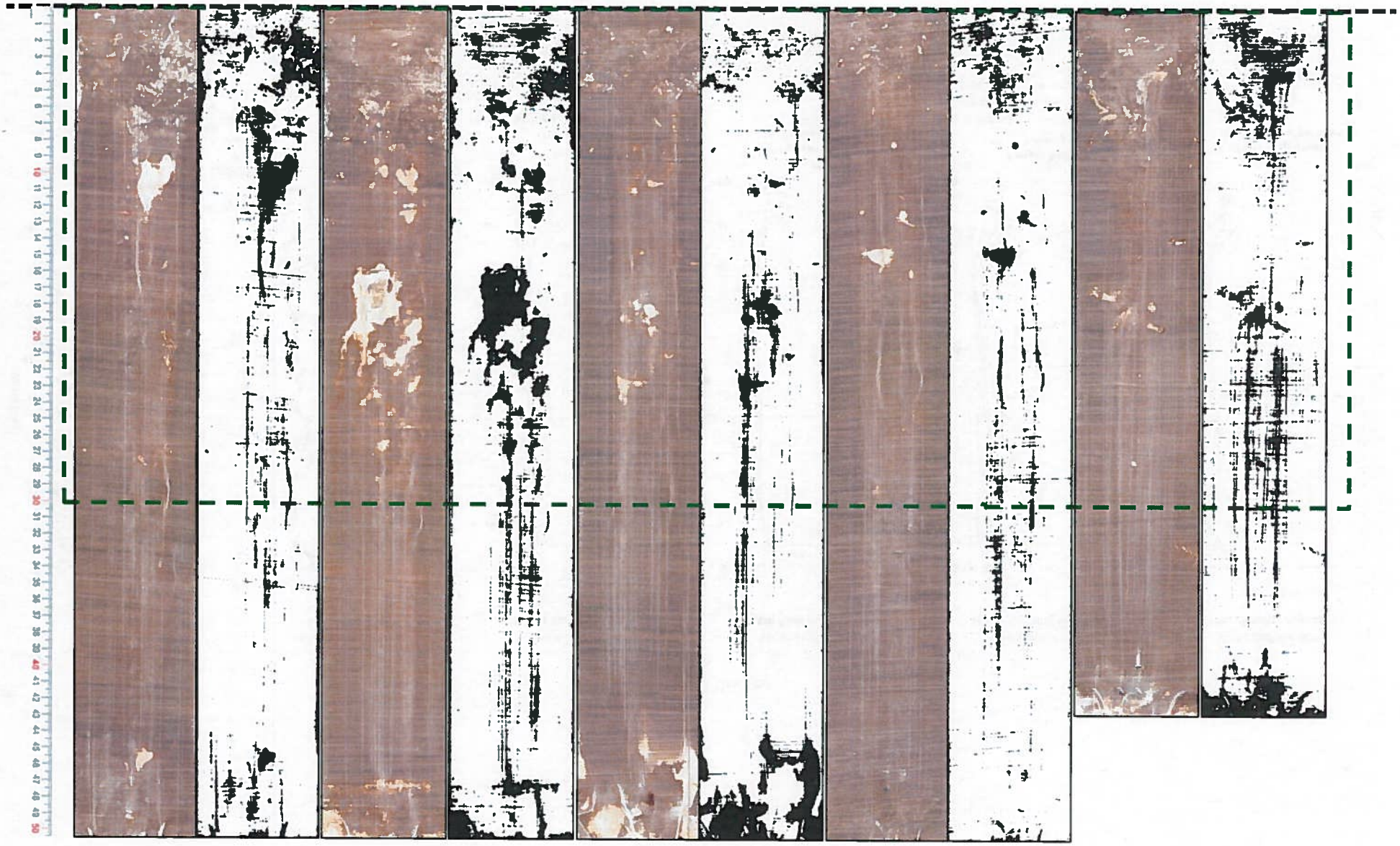
Fe

	%
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 30 cm	0.2
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 50 cm	5.7
Meets Technical Std?	NO



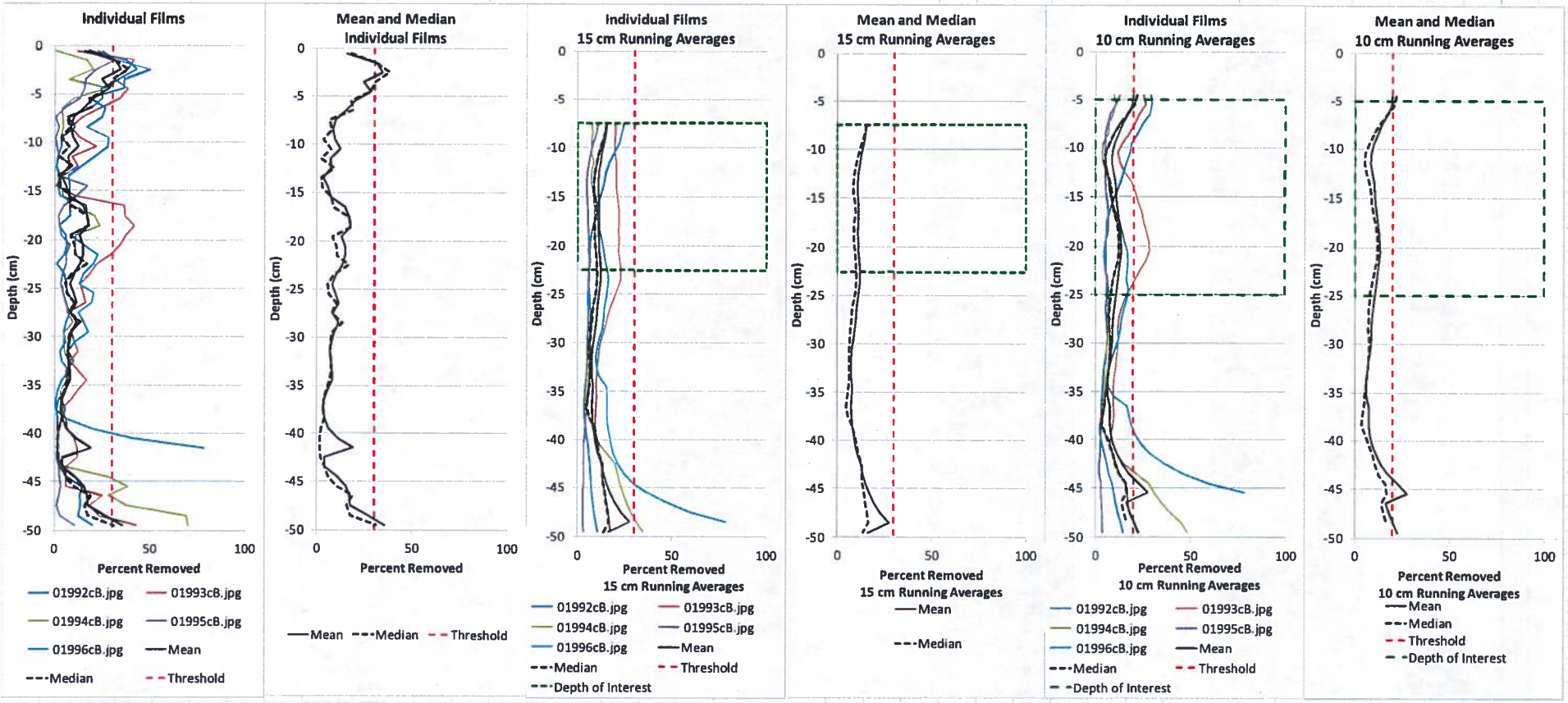
	%
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 30 cm	0.3
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 50 cm	3.7
Meets C&R Minimum of 20%?	NO

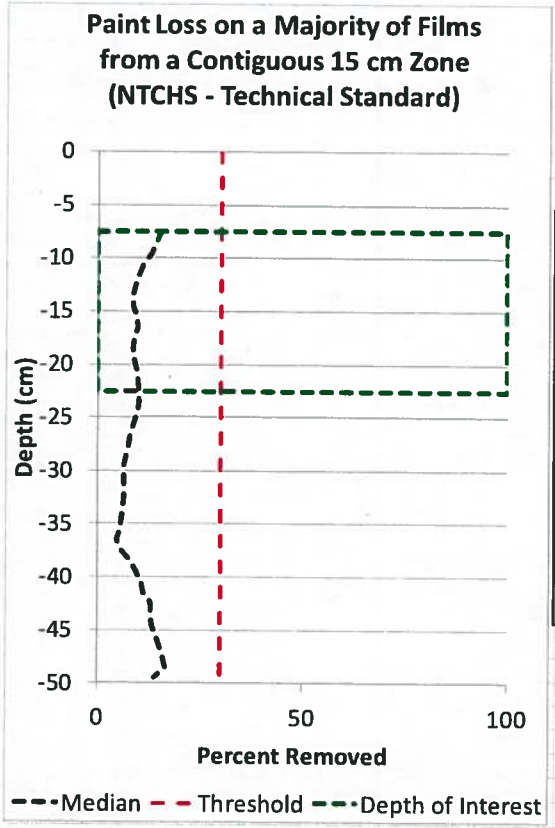
Films 01992, 01993, 01994, 01995, 01996
Mn Group 4 – Dry Toe



WV A10 - 4 Dry Toe

Mn



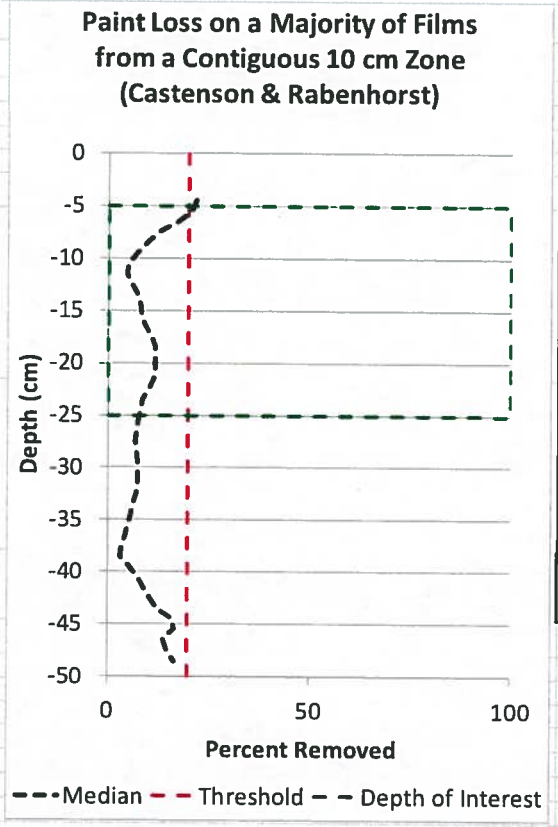


WV A10 - 4 Dry Toe

Mn

	%
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 30 cm	15.3
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 50 cm	15.6
Meets Technical Std?	*

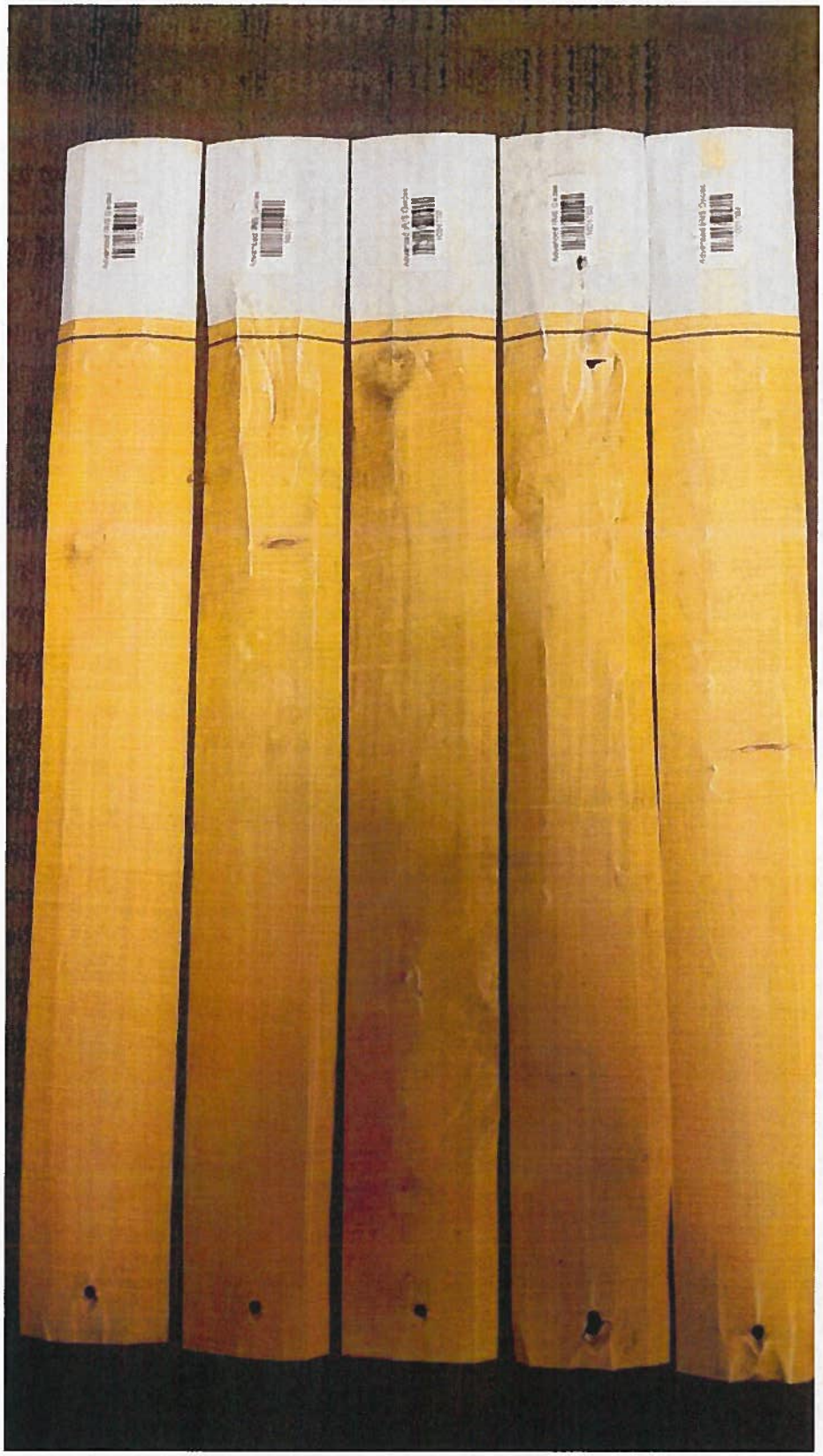
No Technical Std Established for Mn



	%
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 30 cm	22.0
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 50 cm	22.0
Meets C&R Minimum of 20%?	*

No Std Established for Mn

Dry Toe, Fe, 2019 June



Dry Toe; Mn; 2019 June

USDA-NRCS

PEDON DESCRIPTION

Pedon ID # :

April, 2002

Series or Component Name:	Map Unit Symbol:	Photo #:	Classification:	Soil Moist. Regime (Tax.):
Describer(s): Jared Beard Tec	Date: 3/14/2019	Weather: Temp.: Air: Soil: Depth:	Latitude: 38 ° 41 ' 18.2 " N Longitude: 79 ° 52 ' 46.6 " W	Datum: WGS 84
UTM: Zone: mE: mN:	Topo Quad.: Mill Creek	Site ID: YR: 2019 State: WV County: 083 Pedon #: 003	Soil Survey Area: WV 603	MLRA / LRU: 127
Location: Sec. T. R.	Transect: ID: Stop #: Interval:			

Landscape: MTN	Landform: MTN Slope	Microfeature:	Anthro:	Elevation:	Aspect:	Slope (%):	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) L / L
Hillslope Profile Position: Footslope	Geom. Component: MTN base	Microrelief:	Physio. Division: App. Highland	Physio. Province: App. P.	Physio. Section: Allegheny MTN	State Physio. Area:	Local Physio. Area:	
Drainage:	Flooding: —	Ponding: —	Soil Moisture Status:	Permeability: Ksat:	Land Cover / Use:			
Parent Material:	Bedrock: Kind: Fract.: Hard.: Depth:			Lithostrat. Units: Group: Formation: Member: Fettsville New River				
Erosion: Kind: Degree:	Runoff:	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind:		Diagnostic Horz. / Prop.: Kind: Depth:				
P.S. Control Section: Ave.Clay %: Ave.Rock Frag %: Depth Range:								

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER

MISCELLANEOUS FIELD NOTES / SKETCH :

Component Name:		Map Unit Symbol:		Date:

	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry Mst Stk Pls	Mottles % Sz Cont. Col Mst Shp Loc
1		0 - 3	Oa1			5YR 2.5/1					
2		3 - 11	Oa2			5YR 2.5/1					
3		11 - 28	Bg/Bh			2.5YR 6/2 7.5YR 3/3	Sicl				
4		28 - 60	Bw1			2.5Y 6/4	SL				
5		60 - 74	Bw2			10YR 5/4	CL				
6		74 - 84	Bg			N 5/0	C				
7											
8											
9											
10											

	Redoximorphic Features % Sz Cont. Hrd. Shp Knd Loc Bnd Col	Concentrations % Sz Cont. Hrd. Shp Knd Loc Bnd Col	Ped / V. Surface Features % Dst Cont Knd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1										
2										
3		5 4/								
4	5Y 6/3	mas YR 8	organic 5YR 3/3 coating "Rh material"							sa relt red es c cbs a
5	8 Depletion N 5/0	15 7.5YR 6/8 15 Fe4m N 2.5/0								
6	10 Depletion 10Y 5/0	5 7.5YR 5/8 30 7.5YR 4/4								
7										
8	water table measured @ 18 cm									
9										
10										

*** Primary Characterization Data ***

Pedon ID: S2019WV083003 (Randolph, West Virginia) Print Date: Jul 3 2019 5:24PM

Sampled as :
Revised to :

SSL - Project I2019USWV051 A10 Hydric Soil Indicator Review by NTCHS
- Site ID S2019WV083003 Lat: 38° 41' 18.70" north Long: 79° 52' 46.60" west WGS84 MLRA: 127
- Pedon No. 19N0308
- General Methods 1B1A, 2A1, 2B

United States Department of Agriculture
Natural Resources Conservation Service
National Soil Survey Center
Soil Survey Laboratory
Lincoln, Nebraska 68508-3866

Layer	Horizon	Orig Hzn	Depth (cm)	Field Label 1	Field Label 2	Field Label 3	Field Texture	Lab Texture
19N02318	Oa1		0.0-3.0	S2019WV083003-1			HPM	
19N02319	Oa2		3.0-11.0	S2019WV083003-2			HPM	CL

PSDA & Rock Fragments

Layer	Depth (cm)	Horz	Prep	Lab Texture	-1- Clay < .002	-2- Silt .002-.05	-3- Sand .05-2	-4- Fine Clay < .0002	-5- CO_3 < .002	-6- Fine Silt .002-.02	-7- Coarse Silt .02-.05	-8- VF Sand .05-.10	-9- F Sand .10-.25	-10- M Sand .25-.50	-11- C Sand .5-1	-12- VC Sand 1-2	-13- Rock Fragments (mm) Weight 2-5	-14- 5-20	-15- 20-75	-16- .1-75	-17- >2 mm wt % whole soil
					(- - - - - Total - - - - - -)			(- - Clay - - -)		(- - - - Silt - - - - -)		(- - - - - - - - - - - - Sand - - - - - - - - - - - -)					(Rock Fragments (mm))				
					(- % of <2mm Mineral Soil -)												(- - - - - - - % of <75mm - - - - - -)				
					3A1a1a					3A1a1a		3A1a1a	3A1a1a	3A1a1a	3A1a1a	3A1a1a					
19N02318	0-3	Oa1	S														5	--	--	--	5
19N02319	3-11	Oa2	S	cl	30.0	41.8	28.2			31.8	10.0	11.4	13.5	3.0	0.3	tr	--	tr	1	18	1

Bulk Density & Moisture

Layer	Depth (cm)	Horz	Prep	-1- (Bulk Density) 33 kPa	-2- Oven Dry	-3- Cole Whole Soil	-4- (- - - - - - - - - - - Water Content - - - - - - - - - - -) 6 kPa	-5- 10 kPa	-6- 33 kPa	-7- 1500 kPa	-8- 1500 kPa Moist	-9- (Air Dry-Oven Dry) (- - - - Ratio - - - -)	-10- Corrected	-11- WRD Whole Soil	-12- Aggst Stabl 2-0.5mm	-13- (- - Ratio/Clay - -) CEC7	-14- 1500 kPa
				(- - - g cm^{-3} - - -)			(- - - - - - - - - - - - pct of < 2mm - - - - - - - - - - - -)							cm^3 cm^{-3} %			
										3C2a1a		3D1					
19N02318	0-3	Oa1	S							95.2		1.135					
19N02319	3-11	Oa2	S							35.9		1.067				1.55	1.20

*** Primary Characterization Data ***

Pedon ID: S2019WV083003 (Randolph County, West Virginia) Print Date: Jul 3 2019 5:24PM

Sampled As :

USDA-NRCS-NSSC-National Soil Survey Laboratory ; Pedon No. 19N0308

Carbon & Extractions

Layer	Depth (cm)	Horz	Prep	-1- C (- - - - - Total - - - - -) (- - - - - - - - - - % of <2 mm - - - - - - - - - -) 4H2a	-2- N 4H2a	-3- S 4H2a	-4- OC	-5- Est OC (WB)	-6- C/N Ratio	-7- (- - - Dith-Cit Ext - - -) Fe (- % of < 2mm - - - - - - - - - - - - - - - - - - -)	-8- Al	-9- Mn	-10- (- - - - - - Ammonium Oxalate Extraction - - - - - -) Al+½Fe	-11- ODOE	-12- Fe	-13- Al	-14- Si	-15- Mn mg kg^{-1}	-16- (- - - Na Pyro-Phosphate - - -) C (- - - - - - % of < 2mm - - - - -)	-17- Fe	-18- Al	-19- Mn
19N02318	0-3	Oa1	S	46.71	2.58	0.30	46.7		18													
19N02319	3-11	Oa2	S	17.17	1.12	0.14	17.2		15													

CEC & Bases

Layer	Depth (cm)	Horz	Prep	-1- (- - - - - - NH_4OAC Extractable Bases - - - - -) Ca (- - - - - - - - - - - - - - - - - - cmol(+) kg^{-1} - - - - - - - - - - - - - - - - - - -) 4B1a1a	-2- Mg 4B1a1a	-3- Na 4B1a1a	-4- K 4B1a1a	-5- Sum Bases	-6- Acid-ity	-7- Extr Al 4B2b1a1	-8- KCl Mn mg kg^{-1} 4B3b1a	-9- CEC8 Sum Cats (- - - - cmol(+) kg^{-1} - - -) 4B3b1a	-10- CEC7 NH_4 OAC 4B1a1a	-11- ECEC Bases +Al	-12- Al Sat (- - - - - - - - % - - - - - - - -)	-13- (- - - - Base - - - -) (- Saturation -) Sum	-14- NH_4OAC
19N02318	0-3	Oa1	S	13.7	2.9	0.2	1.6	18.4	185.1	8.2	47.4	203.5	113.0	26.6	31	9	16
19N02319	3-11	Oa2	S	3.7	0.9	tr	0.3	4.9	91.3	12.6	7.6	96.2	46.5	17.5	72	5	11

Salt

| Layer | Depth (cm) | Horz | Prep | -1- (- - - - - - - - - - - - - - - - - - - -

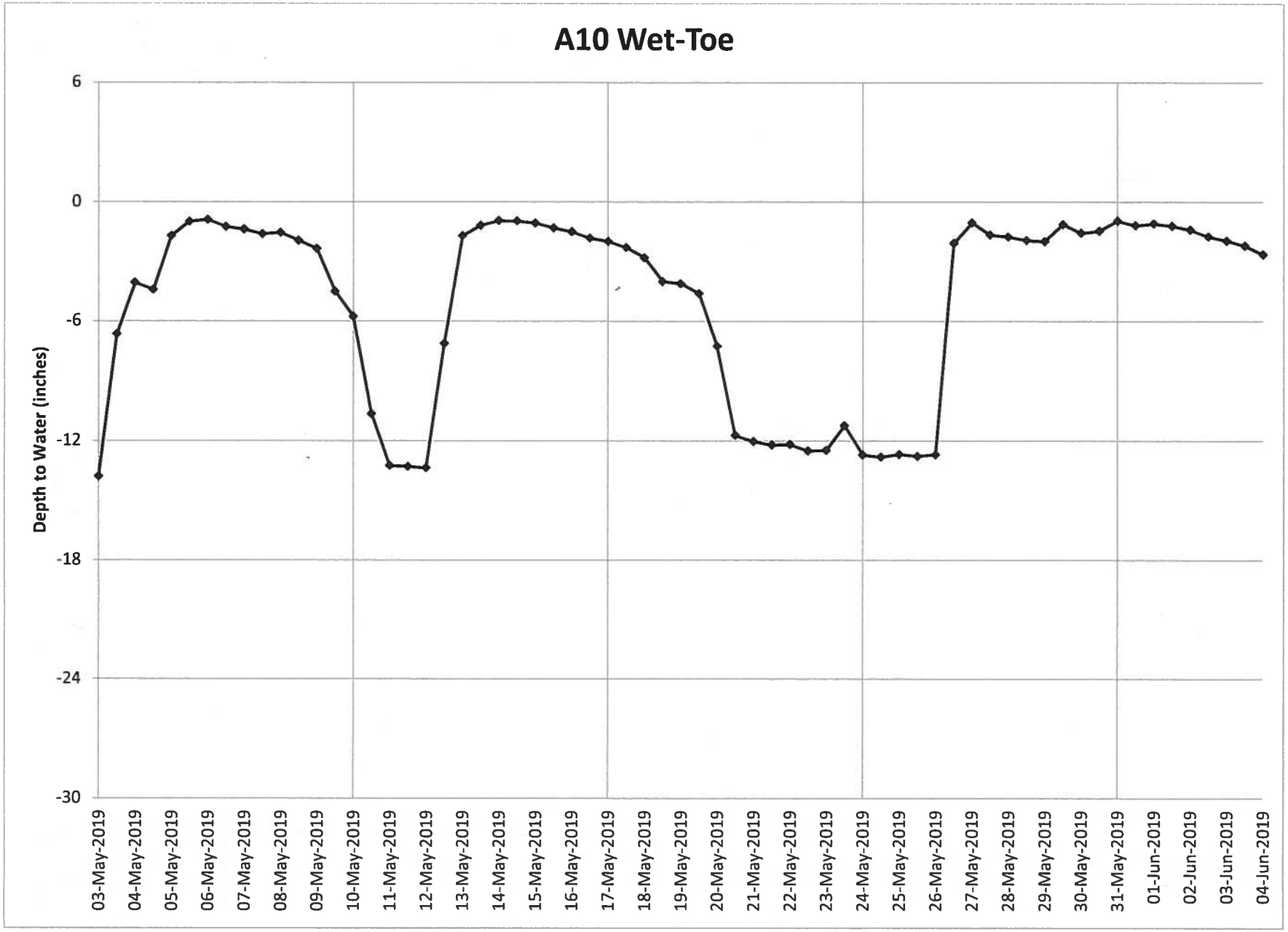
*** Primary Characterization Data ***

Pedon ID: S2019WV083003 (Randolph County, West Virginia) Print Date: Jul 3 2019 5:24PM

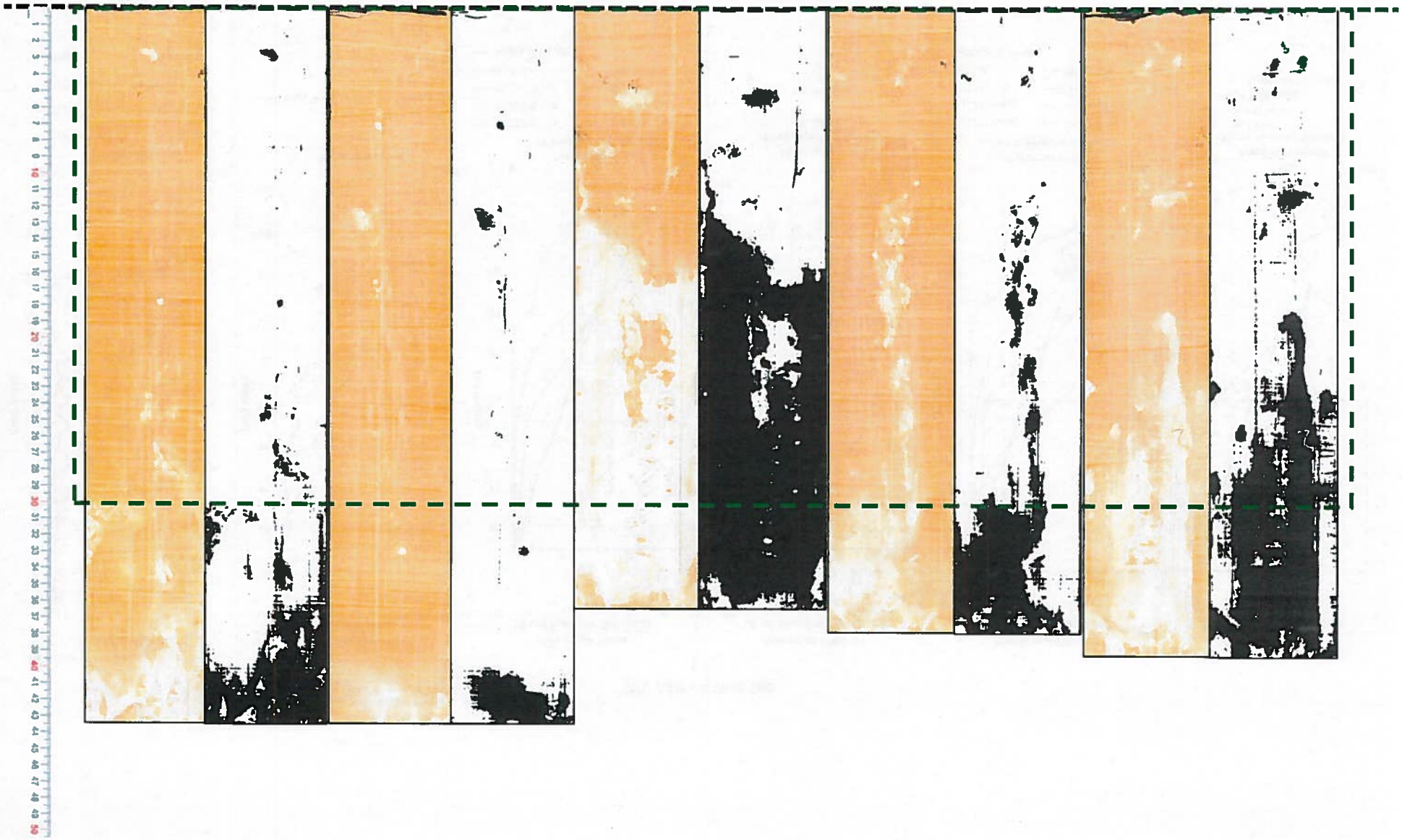
Sampled As :

USDA-NRCS-NSSC-National Soil Survey Laboratory ; Pedon No. 19N0308

Organic				-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	-9-	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-
				Mineral	Est	Min +	Est	Total	Est OC	Fiber Content		NaPyro	Decomp	Limnic	(- - - - pH - - - -)		(- - - Bulk Density - - -)			Proj
	Depth			Content	OM	Est OM	OC	N	/N	Unrub	Rub	Color	State	Matter	$CaCl_2$	H_2O	33 kPa	33 kPa rewet	OD	Subs
Layer	(cm)	Horz	Prep	(- - - - - - - - - - - - - - % - - - - - - - - - - - - - - -)					ratio	% (by vol)								g cm^{-3}		cm cm^{-1}
				5A				4H2a		5C	5C	5C			5C	4C1a2a				
19N02318	0-3	Oa1	S		81	100	46.7	2.58	18							3.8				
19N02318	0-3	Oa1	MW	19						60	32	10YR 8/2			3.1					
19N02319	3-11	Oa2	S		30	98	17.2	1.12	15							3.8				
19N02319	3-11	Oa2	MW	68						28	10	10YR 6/3			3.3					

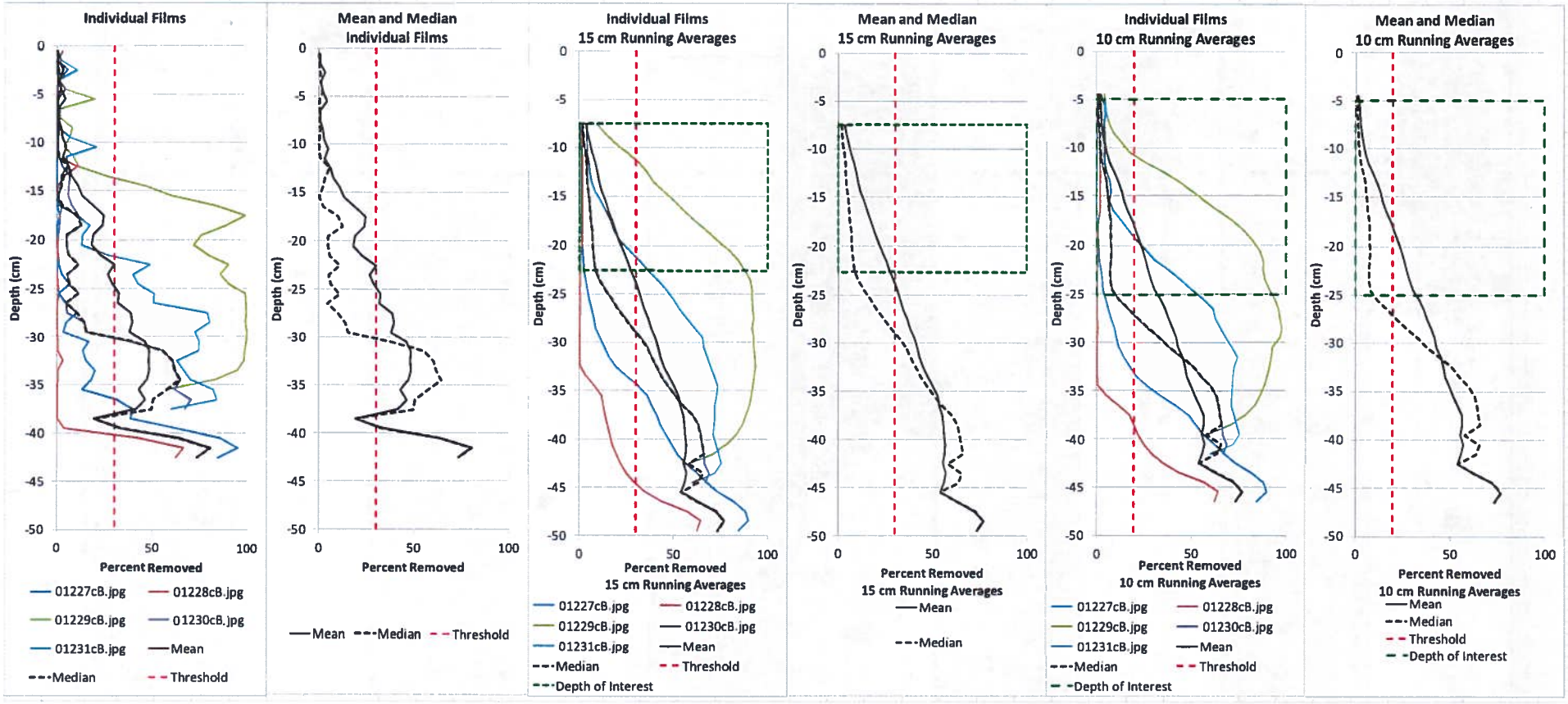

A10 Wet-Toe
Depth to Water (inches)
6
0
-6
-12
-18
-24
-30
03-May-2019
04-May-2019
05-May-2019
06-May-2019
07-May-2019
08-May-2019
09-May-2019
10-May-2019
11-May-2019
12-May-2019
13-May-2019
14-May-2019
15-May-2019
16-May-2019
17-May-2019
18-May-2019
19-May-2019
20-May-2019
21-May-2019
22-May-2019
23-May-2019
24-May-2019
25-May-2019
26-May-2019
27-May-2019
28-May-2019
29-May-2019
30-May-2019
31-May-2019
01-Jun-2019
02-Jun-2019
03-Jun-2019
04-Jun-2019

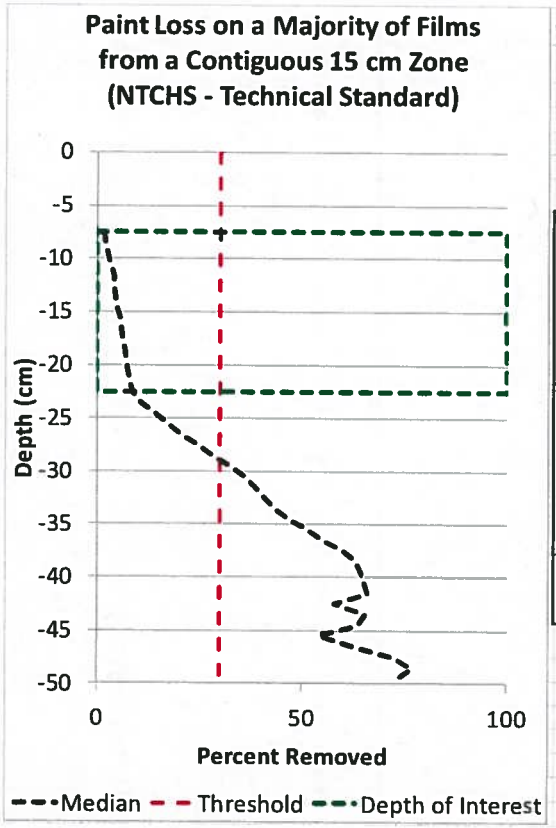
Films 01227, 01228, 01229, 01230, 01231
Fe Group 3 – Wet Toe



WV A10 - 3 Wet Toe

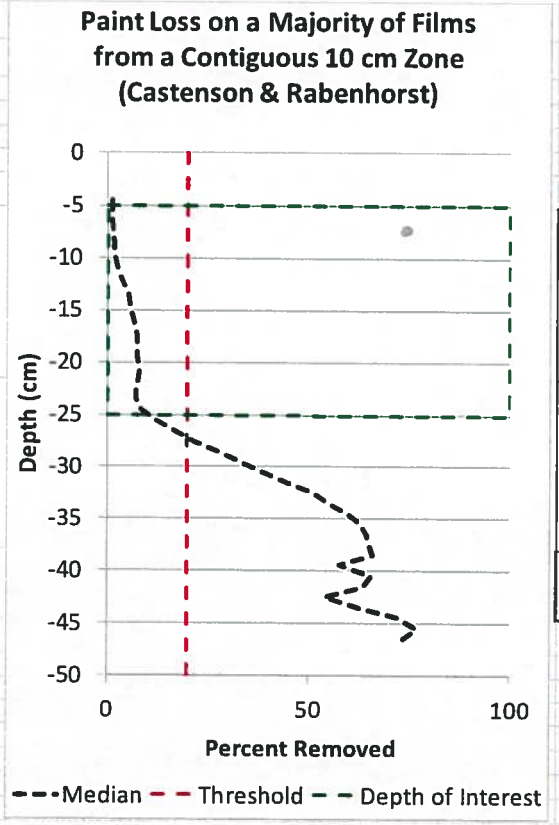
Fe





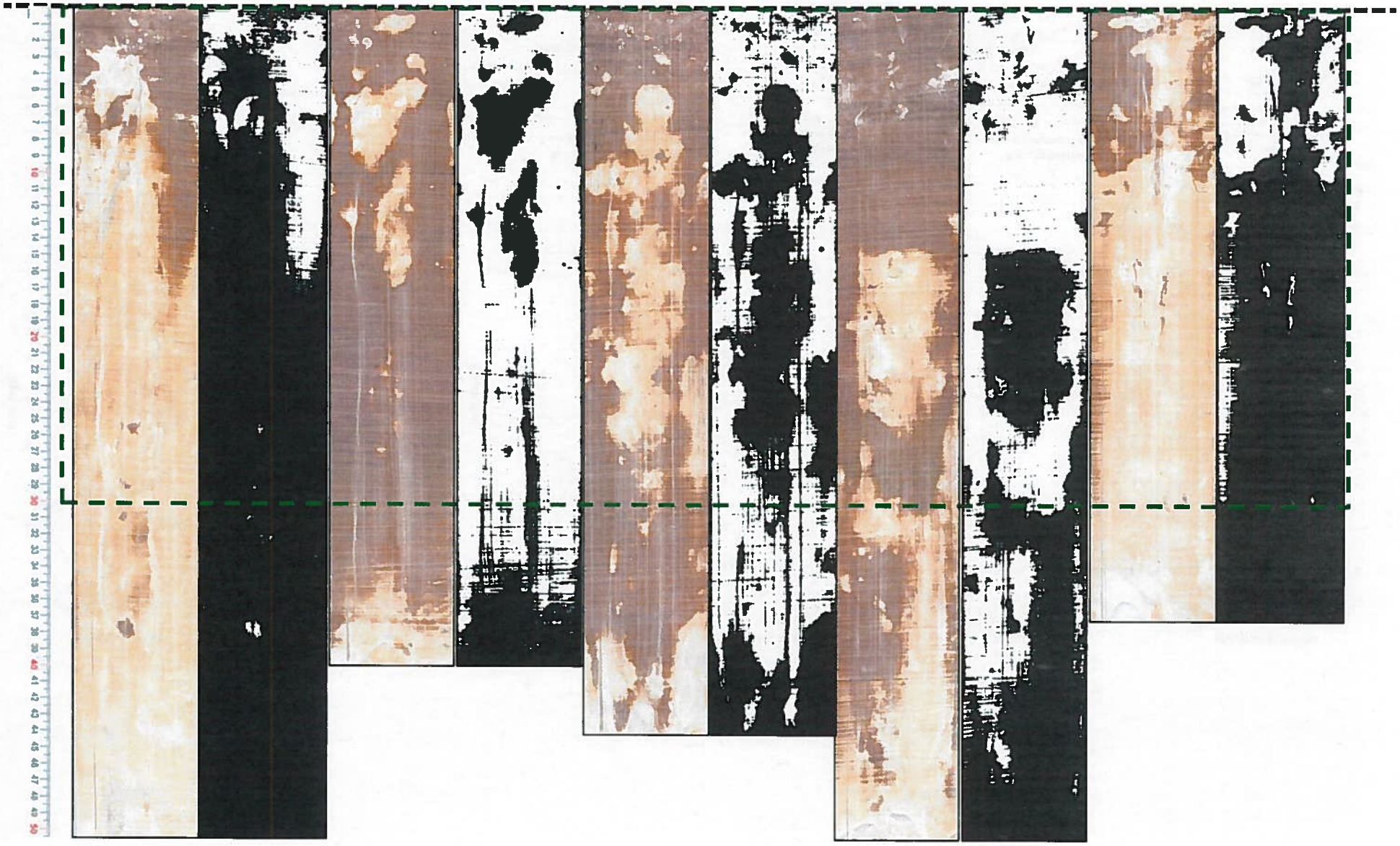
WV A10 - 3 Wet Toe
Fe

	%
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 30 cm	8.4
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 50 cm	56.5
Meets Technical Std?	NO



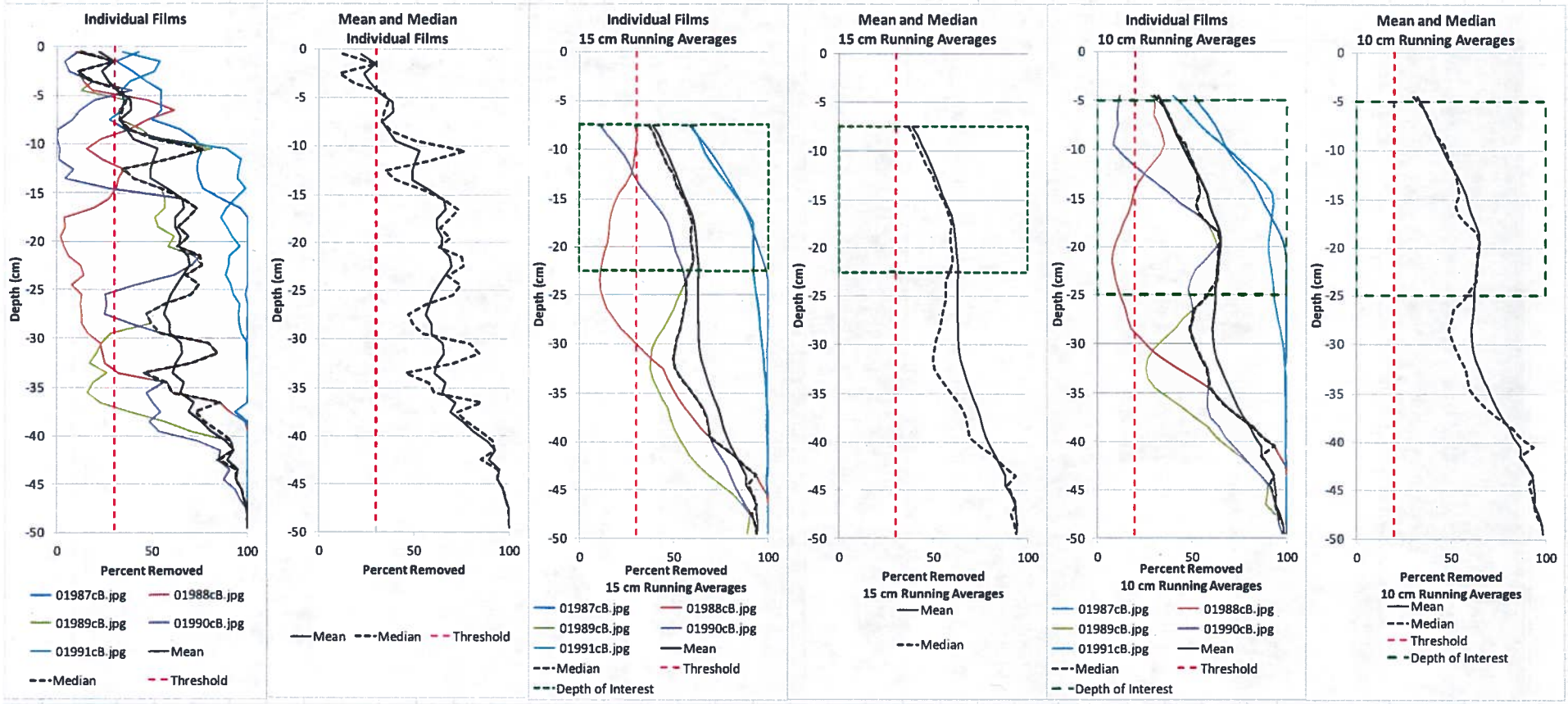
	%
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 30 cm	8.4
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 50 cm	72.6
Meets C&R Minimum of 20%?	NO

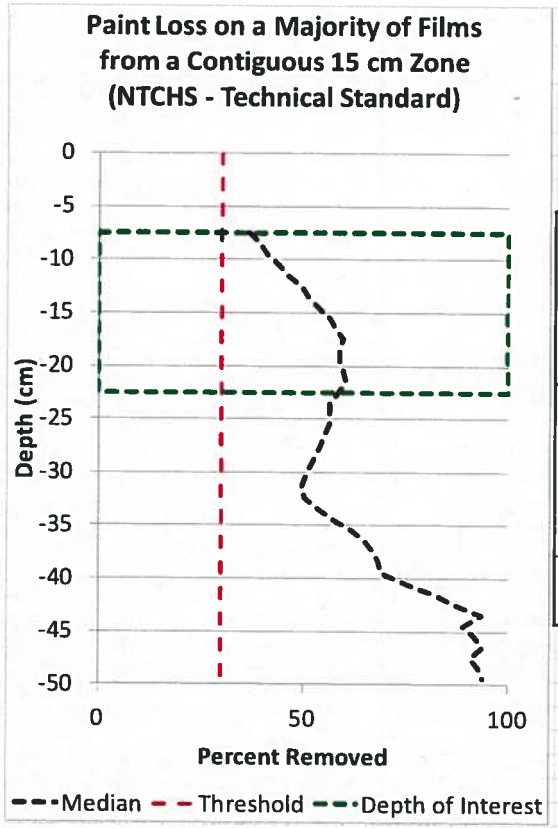
Films 01987, 01988, 01989, 01990, 01991
Mn Group 3 – Wet Toe



WV A10 - 3 Wet Toe

Mn

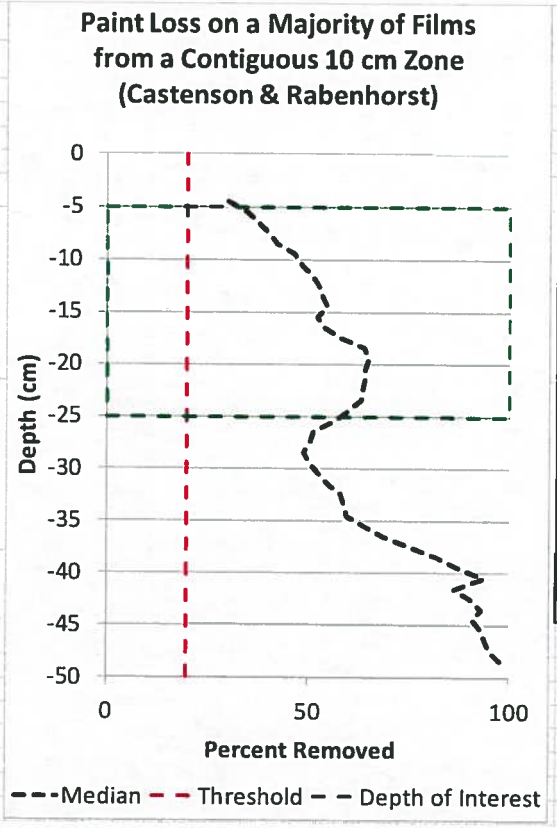




WV A10 - 3 Wet Toe
Mn

	%
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 30 cm	60.4
Maximum Paint Loss on a Majority of Films from a Contiguous 15 cm Zone within the upper 50 cm	85.4
Meets Technical Std?	*

No Technical Std Established for Mn

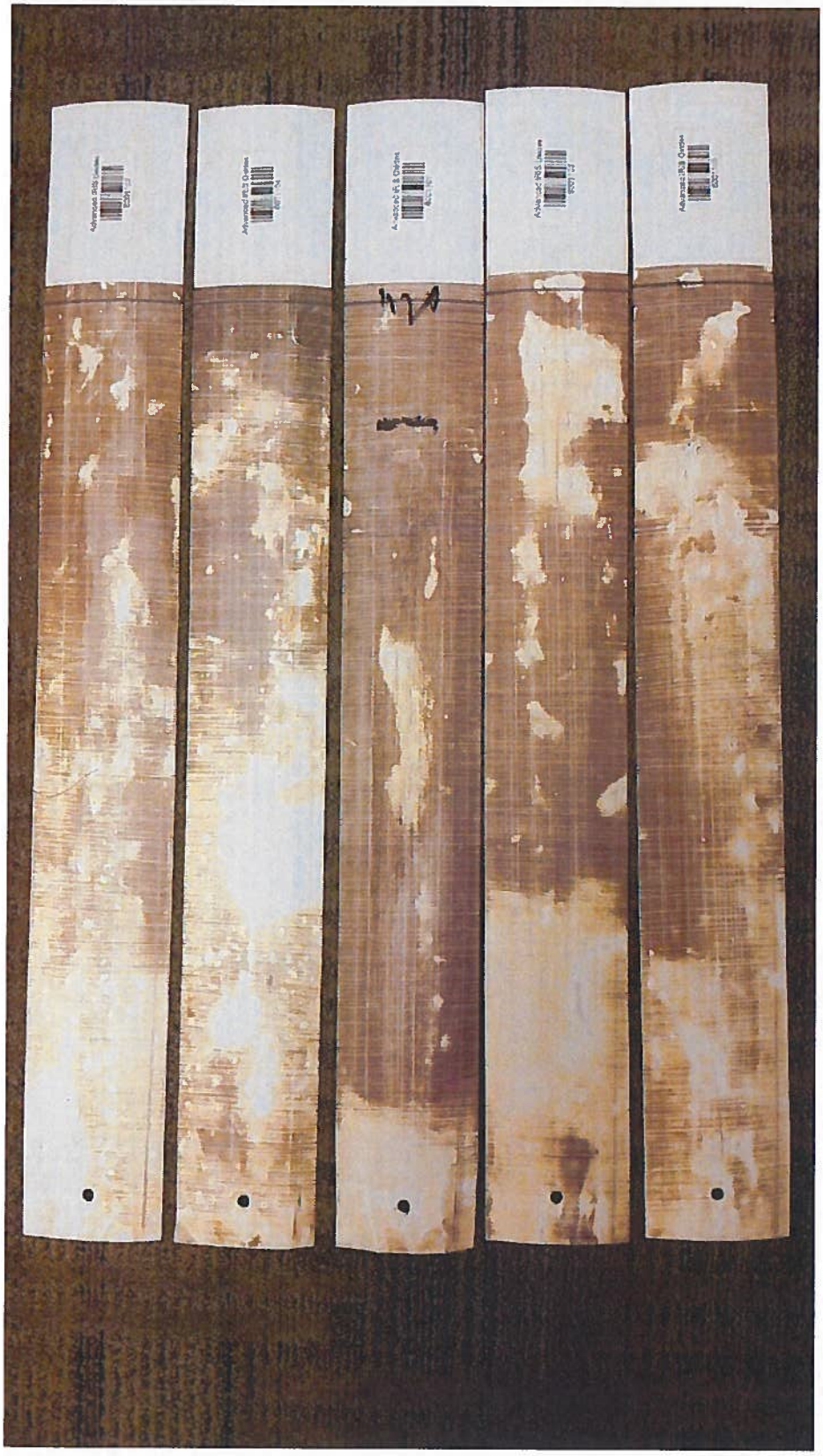


	%
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 30 cm	65.2
Maximum Paint Loss on a Majority of Films from a Contiguous 10 cm Zone within the upper 50 cm	93.6
Meets C&R Minimum of 20%?	*

No Std Established for Mn

Wet Toe; Fe; 2019 June

Wet Toe; Mn; 2019 June



USDA-NRCS

PEDON DESCRIPTION

Pedon ID # :

April, 2002

Series or Component Name:	Map Unit Symbol:	Photo #:	Classification:	Soil Moist. Regime (Tax.):
Describer(s): Beard Teets	Date: 7/18/2014	Weather: Temp.: Air: Soil: Depth:	Latitude: 38 · 55 · 25.7 " N Longitude: 79 · 51 · 37.7 " W Datum: WGS84	Location: Sec. T. R.
UTM: Zone: mE: mN:	Topo Quad.: Elkins	Site ID: YR: State: County: Pedon #: S2014 WV 083 005	Soil Survey Area: WV603	MLRA / LRU: 127
Transect: ID: Stop #: Interval:				

Landscape: Dissected Plateau	Landform: Flood plain	Microfeature:	Anthro:	Elevation:	Aspect:	Slope (%):	Slope Complexity: Simple	Slope Shape: (Up & Dn / Across) L / L
Hillslope Profile Position:	Geom. Component:	Microrelief:	Physio. Division: App. Highland	Physio. Province: App Plateau	Physio. Section: Allegheny Mtn.	State Physio. Area:	Local Physio. Area:	
Drainage:	Flooding:	Ponding:	Soil Moisture Status:	Permeability: Ksat:	Land Cover / Use:			
Parent Material:	Bedrock: Kind: Fract.: Hard.: Depth:		Lithostrat. Units: Group: Formation: Member:					
Erosion: Kind: Degree:	Runoff:	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind:	Diagnostic Horz. / Prop.: Kind: Depth:					
P.S. Control Section: Ave.Clay %: Ave.Rock Frag %: Depth Range:								

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER

MISCELLANEOUS FIELD NOTES / SKETCH :

water table 4'

Component Name:		Map Unit Symbol:		Date:

	Obser. Method	Depth (in)	Depth (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd % Rnd Sz	Structure Grade Sz Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cont. Col Mst Shp Loc
1		0	9	Oa			2.5/N	mf							
2			20	A			7.5YR 4/1 7.5YR3/1	MUCKY L	22 ch						
3		50		Bw		60	7.5YR5/6	sicl	15 ch						
4		50	65+	Cg1		6	7.5YR5/1	SiC							
5		65+		Cg2			7.5YR5/1	SiCl							
6															
7															
8															
9															
10															

	Redoximorphic Features % Sz Cont. Hrd. Shp Knd Loc Bnd Col	Concentrations % Sz Cont. Hrd. Shp Knd Loc Bnd Col	Ped / V. Surface Features % Dst Cont Knd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1										
2										
3	30 7.5YR6/2									
4		4% 2.5YR 5/8								
5										
6										
7										
8										
9										
10										

*** Primary Characterization Data ***

(Randolph, West Virginia)

Pedon ID: S2019WV083005

Print Date: Jul 3 2019 5:24PM

Sampled as :
Revised to :

SSL - Project I2019USWV051 A10 Hydric Soil Indicator Review by NTCHS
- Site ID S2019WV083005 Lat: 38° 55' 25.70" north Long: 79° 51' 37.70" west WGS84 MLRA: 127
- Pedon No. 19N0310
- General Methods 1B1A, 2A1, 2B

United States Department of Agriculture
Natural Resources Conservation Service
National Soil Survey Center
Soil Survey Laboratory
Lincoln, Nebraska 68508-3866

Layer	Horizon	Orig Hzn	Depth (cm)	Field Label 1	Field Label 2	Field Label 3	Field Texture	Lab Texture
19N02322	Oa		0.0-9.0	S2019WV083005-1			MUCK	L
19N02323	A/Bg		9.0-20.0	S2019WV083005-2			CN-MK-L	L

PSDA & Rock Fragments

Layer	Depth (cm)	Horz	Prep	-1- Lab Texture	-2- Total Clay < .002	-3- Total Silt .002 -.05	-4- Total Sand .05 -2	-5- Clay Fine < .0002	-6- Clay CO_3 < .002	-7- Silt Fine .002 -.02	-8- Silt Coarse .02 -.05	-9- Sand VF .05 -.10	-10- Sand F .10 -.25	-11- Sand M .25 -.50	-12- Sand C .5 -1	-13- Sand VC 1 -2	-14- Rock Fragments (mm) Weight 2 -5	-15- Rock Fragments (mm) Weight 5 -20	-16- Rock Fragments (mm) Weight 20 -75	-17- Rock Fragments (mm) Weight .1- 75	-18- >2 mm wt % whole soil
					% of <2mm Mineral Soil												% of <75mm				
					3A1a1a				3A1a1a	3A1a1a		3A1a1a	3A1a1a	3A1a1a	3A1a1a	3A1a1a					
19N02322	0-9	Oa	S	I	17.8	39.9	42.3			26.5	13.4	20.3	17.9	2.7	0.8	0.6	1	2	--	24	3
19N02323	9-20	A/Bg	S	I	15.8	34.1	50.1		0.4	22.7	11.4	18.6	17.4	4.4	5.5	4.2	4	8	3	42	15

Bulk Density & Moisture

Layer	Depth (cm)	Horz	Prep	-1- Bulk Density 33 kPa	-2- Bulk Density Oven Dry	-3- Cole Whole Soil	-4- Water Content 6 kPa	-5- Water Content 10 kPa	-6- Water Content 33 kPa	-7- Water Content 1500 kPa	-8- Water Content 1500 kPa Moist	-9- Air Dry-Oven Dry Ratio	-10- WRD Whole Corrected Soil	-11- Aggst Stabl 2-0.5mm	-12- Ratio/Clay CEC7	-13- Ratio/Clay 1500 kPa
				g cm^{-3}			pct of < 2mm						cm^3 cm^{-3}	%		
										3C2a1a		3D1				
19N02322	0-9	Oa	S							24.7		1.040			1.87	1.39
19N02323	9-20	A/Bg	S							14.2		1.029			1.51	0.90

*** Primary Characterization Data ***

(Randolph County, West Virginia)

Pedon ID: S2019WV083005
Sampled As :
USDA-NRCS-NSSC-National Soil Survey Laboratory ; Pedon No. 19N0310

Print Date: Jul 3 2019 5:24PM

Carbon & Extractions

Layer	Depth (cm)	Horz	Prep	-1- C (Total, % of <2 mm)	-2- N (Total, % of <2 mm)	-3- S (Total, % of <2 mm)	-4- Est OC (Total, % of <2 mm)	-5- OC (WB) (Total, % of <2 mm)	-6- C/N Ratio	-7- Fe (Dith-Cit Ext, % of < 2mm)	-8- Al (Dith-Cit Ext, % of < 2mm)	-9- Mn (Dith-Cit Ext, % of < 2mm)	-10- Al+½Fe (Ammonium Oxalate Extraction, % of < 2mm)	-11- ODOE (Ammonium Oxalate Extraction, % of < 2mm)	-12- Fe (Ammonium Oxalate Extraction, % of < 2mm)	-13- Al (Ammonium Oxalate Extraction, % of < 2mm)	-14- Si (Ammonium Oxalate Extraction, % of < 2mm)	-15- Mn (Ammonium Oxalate Extraction, mg kg^{-1})	-16- C (Na Pyro-Phosphate, % of < 2mm)	-17- Fe (Na Pyro-Phosphate, % of < 2mm)	-18- Al (Na Pyro-Phosphate, % of < 2mm)	-19- Mn (Na Pyro-Phosphate, % of < 2mm)
				4H2a	4H2a	4H2a																
19N02322	0-9	Oa	S	9.33	0.63	0.12	9.3		15													
19N02323	9-20	A/Bg	S	7.41	0.30	0.08	6.6		22													

CEC & Bases

Layer	Depth (cm)	Horz	Prep	-1- Ca (NH_4OAC Extractable Bases, cmol(+) kg^{-1})	-2- Mg	-3- Na	-4- K	-5- Sum Bases	-6- Acidity	-7- Extr Al	-8- KCl Mn (mg kg^{-1})	-9- CEC8 Sum Cats (cmol(+) kg^{-1})	-10- CEC7 NH_4 OAC	-11- ECEC Bases +Al	-12- Al Sat (%)	-13- Base Saturation Sum	-14- Base Saturation NH_4OAC
				4B1a1a	4B1a1a	4B1a1a	4B1a1a		4B2b1a1				4B1a1a				
19N02322	0-9	Oa	S	52.2*	2.8	0.1	0.4	55.5	8.8			64.3	33.2			86	100
19N02323	9-20	A/Bg	S	53.9*	1.7	0.1	0.3	56.0	5.0			61.0	23.9			92	100

*Extractable Ca may contain Ca from calcium carbonate or gypsum. CEC7 base saturation set to 100.

Salt

Layer	Depth (cm)	Horz	Prep	-1- Ca (Water Extracted From Saturated Paste, mmol(+) L^{-1})	-2- Mg	-3- Na	-4- K	-5- CO_3 (mmol(-) L^{-1})	-6- HCO_3	-7- F	-8- Cl	-9- PO_4	-10- Br	-11- OAC	-12- SO_4	-13- NO_2	-14- NO_3	-15- H_2O (%)	-16- Total Salts	-17- Elec Cond (dS m^{-1})	-18- 1:2 Elec Cond	-19- Exch Na (%)	-20- SAR
19N02322	0-9	Oa	S																			tr	
19N02323	9-20	A/Bg	S																			tr	

pH & Carbonates

Layer	Depth (cm)	Horz	Prep	-1- KCl (pH)	-2- $CaCl_2$ 0.01M 1:2 (pH)	-3- H_2O 1:1 (pH)	-4- Sat Paste (pH)	-5- Oxid (pH)	-6- NaF (pH)	-7- Carbonate As $CaCO_3$ <2mm (%)	-8- Carbonate As $CaCO_3$ <20mm (%)	-9- Gypsum As $CaSO_4{*}2H_2O$ <2mm (%)	-10- Gypsum As $CaSO_4{*}2H_2O$ <20mm (%)	-11- Resist ohms cm^{-1}
					4C1a2a	4C1a2a				4E1a1a1a1				
19N02322	0-9	Oa	S		6.9	6.8								
19N02323	9-20	A/Bg	S		7.3	7.6				7				

*** Primary Characterization Data ***

(Randolph County, West Virginia)

Pedon ID: S2019WV083005

Sampled As :

USDA-NRCS-NSSC-National Soil Survey Laboratory ; Pedon No. 19N0310

Print Date: Jul 3 2019 5:24PM

Organic				-1-	-2-	-3-	-4-	-5-	-6-	-7-	-8-	-9-	-10-	-11-	-12-	-13-	-14-	-15-	-16-	-17-
				Mineral	Est	Min +	Est	Total	Est OC	Fiber Content		NaPyro	Decomp	Limnic	(- - - - pH - - - -)		(- - - Bulk Density - - -)			Proj
	Depth			Content	OM	Est OM	OC	N	/N	Unrub	Rub	Color	State	Matter	$CaCl_2$	H_2O	33 kPa	33 kPa rewet	OD	Subs
Layer	(cm)	Horz	Prep	(- - - - - - - - - - - - - - % - - - - - - - - - - - - - - -)					ratio	% (by vol)								g cm^{-3}		cm cm^{-1}
				5A				4H2a		5C	5C	5C			5C	4C1a2a				
19N02322	0-9	Oa	S		16	101	9.3	0.63	15							6.8				
19N02322	0-9	Oa	MW	85						20	10	10YR 7/3			6.0					
19N02323	9-20	A/Bg	S				6.6	0.30	22							7.6				

USDA-NRCS

PEDON DESCRIPTION

Pedon ID # :

April, 2002

Series or Component Name:	Map Unit Symbol:	Photo #:	Classification:	Soil Moist. Regime (Tax.):

Describer(s): Beard Teets	Date: 3/18/2014	Weather: Temp.: Air: Soil: Depth:	Latitude: 39° 01' 26.8" N Longitude: 79° 23' 45.7" W	Datum: WGS84

UTM: Zone: mE: mN:	Topo Quad.: Blackwaterfalls	Site ID: YR: State: County: Pedon #: S2019 WV 093 001	Soil Survey Area: WV002	MLRA / LRU: 127	Location: Sec. T. R.	Transect: ID: Stop #: Interval:			

Landscape: MTN	Landform: MTN Slope	Microfeature:	Anthro:	Elevation:	Aspect:	Slope (%):	Slope Complexity:	Slope Shape: (Up & Dn / Across) L / L	

Hillslope Profile Position: Foot Slope	Geom. Component: MTN Flank	Microrelief:	Physio. Division: App. Highlands	Physio. Province: App. Plateau	Physio. Section: Allegheny Mtn	State Physio. Area:	Local Physio. Area:

Drainage:	Flooding:	Ponding:	Soil Moisture Status:	Permeability: Ksat:	Land Cover / Use:

Parent Material:	Bedrock: Kind: Fract.: Hard.: Depth:	Lithostrat. Units: Group: Formation: Allegheny Member:	

Erosion: Kind: Degree:	Runoff:	Surface Frag %: GR: CB: ST: BD: CN: FL: Kind:	Diagnostic Horz. / Prop.: Kind: Depth:

P.S. Control Section: Ave.Clay %: Ave.Rock Frag %: Depth Range:	

VEGETATION :

SYMBOL	COMMON NAME	%GD COVER

MISCELLANEOUS FIELD NOTES / SKETCH :

Component Name:							Map Unit Symbol:							Date:						
	Obser. Method	Depth (in) (cm)	Horizon	Bnd	Matrix Color Dry	Matrix Color Moist	Texture	Rock Frags Knd % Rnd Sz	Structure Grade	Structure Sz	Structure Type	Consistence Dry	Consistence Mst	Consistence Stk	Consistence Pls	Mottles % Sz Cont. Col Mst Shp Loc				
1		0-1	Oi																	
2		1-3	Oa1																	
3		3-7	Oa2			5YR 2.5/1														
4		7-12	E/Bh			5YR 4/1 5YR 3/4	[illegible]	9t 20												
5		12-33	BS			7.5YR 4/6	CL	9t 20												
6		33-63	Bw			10YR 4/6	CL													
7																				
8																				
9																				
10																				

	Redoximorphic Features % Sz Cont. Hrd. Shp Knd Loc Bnd Col	Concentrations % Sz Cont. Hrd. Shp Knd Loc Bnd Col	Ped / V. Surface Features % Dst Cont Knd Loc Col	Roots Qty Sz Loc	Pores Qty Sz Shp	pH (meth)	Effer. (agent)	Clay %	CCE	Notes
1										
2										
3										
4										
5	4 7.5YR 5/2	6 7.5YR 5/8								
6	6 7.5YR 5/2	8 7.5YR 5/8								
7										
8										
9										
10										

*** Primary Characterization Data ***

(Tucker, West Virginia)

Pedon ID: S2019WV093001

Print Date: Jul 3 2019 5:24PM

Sampled as :
Revised to :

SSL - Project I2019USWV051 A10 Hydric Soil Indicator Review by NTCHS
- Site ID S2019WV093001 Lat: 39° 1' 26.80" north Long: 79° 23' 45.90" west WGS84 MLRA: 127
- Pedon No. 19N0311
- General Methods 1B1A, 2A1, 2B

United States Department of Agriculture
Natural Resources Conservation Service
National Soil Survey Center
Soil Survey Laboratory
Lincoln, Nebraska 68508-3866

Layer	Horizon	Orig Hzn	Depth (cm)	Field Label 1	Field Label 2	Field Label 3	Field Texture	Lab Texture
19N02324	Oa1		1.0-3.0	S2019WV093001-2			HPM	
19N02325	Oa2		3.0-7.0	S2019WV093001-3			HPM	

PSDA & Rock Fragments

Layer	Depth (cm)	Horz	Prep	-1- Lab Texture	-2- Clay < .002	-3- Total Silt .002-.05	-4- Total Sand .05-2	-5- Clay Fine < .0002	-6- Clay CO_3 < .002	-7- Silt Fine .002-.02	-8- Silt Coarse .02-.05	-9- Sand VF .05-.10	-10- Sand F .10-.25	-11- Sand M .25-.50	-12- Sand C .5-1	-13- Sand VC 1-2	-14- Rock Fragments (mm) Weight 2-5	-15- 5-20	-16- 20-75	-17- .1-75	-18- >2 mm wt % whole soil
					(% of <2mm Mineral Soil)												(% of <75mm)				
19N02324	1-3	Oa1	S														--	--	--	--	--
19N02325	3-7	Oa2	S														--	--	--	--	--

Bulk Density & Moisture

Layer	Depth (cm)	Horz	Prep	-1- Bulk Density 33 kPa (g cm^{-3})	-2- Bulk Density Oven Dry (g cm^{-3})	-3- Cole Whole Soil	-4- Water Content 6 kPa (pct of < 2mm)	-5- Water Content 10 kPa (pct of < 2mm)	-6- Water Content 33 kPa (pct of < 2mm)	-7- Water Content 1500 kPa (pct of < 2mm) 3C2a1a	-8- Water Content 1500 kPa Moist	-9- Air Dry-Oven Dry Ratio 3D1	-10- Corrected Soil	-11- WRD Whole Soil (cm^3 cm^{-3})	-12- Aggst Stabl 2-0.5mm %	-13- Ratio/Clay CEC7	-14- Ratio/Clay 1500 kPa
19N02324	1-3	Oa1	S							80.0		1.127					
19N02325	3-7	Oa2	S							39.1		1.086					

*** Primary Characterization Data ***

(Tucker County, West Virginia)

Pedon ID: S2019WV093001
Sampled As :
USDA-NRCS-NSSC-National Soil Survey Laboratory ; Pedon No. 19N0311

Print Date: Jul 3 2019 5:24PM

Carbon & Extractions

Layer	Depth (cm)	Horz	Prep	-1- C	-2- N	-3- S	-4- Est OC	-5- OC (WB)	-6- C/N Ratio	-7- Fe	-8- Al	-9- Mn	-10- Al+½Fe	-11- ODOE	-12- Fe	-13- Al	-14- Si	-15- Mn	-16- C	-17- Fe	-18- Al	-19- Mn
				(----- Total -----)						(--- Dith-Cit Ext ---)			(------ Ammonium Oxalate Extraction ------)						(--- Na Pyro-Phosphate ---)			
				(---------- % of <2 mm ----------)						(---------- % of < 2mm ----------)								mg kg^{-1}	(------ % of < 2mm -----)			
				4H2a	4H2a	4H2a																
19N02324	1-3	Oa1	S	41.55	2.65	0.29	41.6		16													
19N02325	3-7	Oa2	S	26.76	1.33	0.13	26.8		20													

CEC & Bases

Layer	Depth (cm)	Horz	Prep	-1- Ca	-2- Mg	-3- Na	-4- K	-5- Sum Bases	-6- Acid-ity	-7- Extr Al	-8- KCl Mn	-9- CEC8 Sum Cats	-10- CEC7 NH_4 OAC	-11- ECEC Bases +Al	-12- Al Sat	-13- Sum	-14- NH_4OAC
				(------ NH_4OAC Extractable Bases -----)												(---- Base ----) (- Saturation -)	
				(---------- cmol(+) kg^{-1} ----------)							mg kg^{-1}	(---- cmol(+) kg^{-1} ---)			(-------- % --------)		
				4B1a1a	4B1a1a	4B1a1a	4B1a1a		4B2b1a1	4B3b1a	4B3b1a		4B1a1a				
19N02324	1-3	Oa1	S	1.2	1.0	0.1	1.4	3.7	187.6	18.2	15.8	191.3	98.8	21.9	83	2	4
19N02325	3-7	Oa2	S	0.1	0.4	tr	0.5	1.0	132.7	18.3	5.5	133.7	72.9	19.3	95	1	1

Salt

Layer	Depth (cm)	Horz	Prep	-1- Ca	-2- Mg	-3- Na	-4- K	-5- CO_3	-6- HCO_3	-7- F	-8- Cl	-9- PO_4	-10- Br	-11- OAC	-12- SO_4	-13- NO_2	-14- NO_3	-15- H_2O	-16- Total Salts	-17- Elec Cond	-18- Elec Cond	-19- Exch Na	-20- SAR
				(---------- Water Extracted From Saturated Paste ----------)																	1:2		
				(----- mmol(+) L^{-1} -----)				(---------- mmol(-) L^{-1} ----------)										(---- % ----)		(-- dS m^{-1} --)		%	
19N02325	3-7	Oa2	S																			tr	

pH & Carbonates

Layer	Depth (cm)	Horz	Prep	-1- KCl	-2- $CaCl_2$ 0.01M 1:2	-3- H_2O 1:1	-4- Sat Paste	-5- Oxid	-6- NaF	-7- Carbonate As $CaCO_3$ <2mm	-8- Carbonate As $CaCO_3$ <20mm	-9- Gypsum As $CaSO_4$*$2H_2O$ <2mm	-10- Gypsum As $CaSO_4$*$2H_2O$ <20mm	-11- Resist ohms
				(---------- pH ----------)						(-- Carbonate --)		(-- Gypsum ---)		
					4C1a2a	4C1a2a				(---------- % ----------)				cm^{-1}
19N02324	1-3	Oa1	S		3.2	3.5								
19N02325	3-7	Oa2	S		3.2	3.3								

*** Primary Characterization Data ***

(Tucker County, West Virginia)

Pedon ID: S2019WV093001
Sampled As :

Print Date: Jul 3 2019 5:24PM

USDA-NRCS-NSSC-National Soil Survey Laboratory ; Pedon No. 19N0311

Organic Layer	Depth (cm)	Horz	Prep	-1- Mineral Content (% 5A)	-2- Est OM (%)	-3- Min + Est OM (%)	-4- Est OC (%)	-5- Total N (% 4H2a)	-6- Est OC /N ratio	-7- Fiber Content Unrub (% (by vol) 5C)	-8- Fiber Content Rub (% (by vol) 5C)	-9- NaPyro Color 5C	-10- Decomp State	-11- Limnic Matter	-12- pH CaCl2 5C	-13- pH H2O 4C1a2a	-14- Bulk Density 33 kPa	-15- Bulk Density 33 kPa rewet g cm-3	-16- Bulk Density OD	-17- Proj Subs cm cm-1
19N02324	1-3	Oa1	S		72	98	41.6	2.65	16							3.5				
19N02324	1-3	Oa1	MW	26						38	18	10YR 6/4			3.2					
19N02325	3-7	Oa2	S		46	107	26.8	1.33	20							3.3				
19N02325	3-7	Oa2	MW	61						36	14	10YR 6/4			3.0					

July 17 Business Meeting

Joint meeting between NTCHS and Mid-Atlantic Hydric Soils committee

Field Trip Recap

Issue: A10, 2 cm. muck is thought to be found in areas that do not meet the definition of a hydric soil. West Virginia NRCS has started to collect data on these sites to determine if these sites meet the technical standard. Sites do not meet wetland hydrology or hydrophytic vegetation. They are found in MLRA 127 on upland positions. These sites typically have at least 2 cm of muck or more. The organic accumulations are thought to be due to climate and chemistry and not anaerobic conditions. These sites are found on side slopes in a frigid temperature regime. The pH of soils are acidic and typically below 4.0.

Discussion during the field trip included whether the textures were actually muck or mucky peat. The lab analysis showed them to be mucky peat but they plan to resample because they were not careful to exclude live roots. If the textures are truly mucky peat then there is no issue. Mike Vepraskas expressed concern as to whether we are properly identifying muck. Steve Monteith brought up concern over the fact that there was a question as to whether these were muck. All who textured the soil in the field thought that at least some of the organic material was muck in each profile. There was one site where some felt a portion of the organic soil material was mucky-peat and not muck, but everyone agreed that there was still at least 2 cm of muck. If we are not accurately identifying muck then there is a question as to whether the indicator could/should be used at all.

Lenore Vasilas brought up the fact that Mike Vepraskas noted in the field that the start date for data collection was a couple of weeks into the growing season, so they may not have captured the wettest part of the growing season. It was suggested that they continue to collect data for a period of one year to ensure that there is no portion where the soils may meet the technical standard using IRIS and water table monitoring. Karen Vaughn suggested that they leave in one set of IRIS in for the whole year to see if there is any period of reduction throughout the year regardless of growing season. Marty Rabenhorst suggested that there is no harm in leaving IRIS in for longer periods of time and that any removal of iron from the tube would indicate that at some point in the year it was saturated and anaerobic long enough for reduction to occur.

Lenore Vasilas mentioned another discussion about color of the organic soil material possibly being helpful. The color of the organic material in the soils that were thought to not being hydric were mostly described as 5YR or 2.5YR. There is already a histic indicator that uses color as part of the criteria to prove the soils developed under anaerobic conditions. Unfortunately, they also described the one thought to be hydric as 5YR. However, it did not look as red to some. Careful examination of color should be looked at as they evaluate a possible change to the indicator that would help them distinguish the hydric soils from the non-hydric soils with thin layers of muck.

Aaron Miller brought up the possibility of removing MLRA 127 from areas where the indicator can be used. If the further soils investigations are successful at demonstrating non-hydric conditions for their unique system, they will want to consider how unique their situation actually is. Ideally, we would consider limiting use to not include MLRA 127 but that may be too broad if their specific system is not widespread throughout all 4 states included in that concept. I highly recommend that they consider

defining their specific LRU that spells out the physiographic and edaphic conditions unique to this system. Now is a good time considering the upcoming release of HB296 and the opportunity to get this documented to avoid the hassle of getting their concepts published in the future. Wade Hurt asked what the extent of the issue was and if others should be involved in this decision if the area extends outside of WV. Jared Beard suggested it should be excluded from MLRA 125 and 127. Greg Hammer suggested making this a test indicator in these MLRAs while further investigation occurs. It was suggested that WV contact the surrounding states where this would also be an issue to get their input before decisions are made.

Marty Rabenhorst gave a presentation on a field test for identifying red parent material using the Color Change Propensity Index (CCPI). Red parent material is parent material that resists color change under anaerobic conditions due to the presence of large crystals of hematite. The use of F21. Red Parent Material is a very subtle indicator that should only be used in soils derived from red parent material that meets the CCPI threshold. Until now the only way to run the CCPI was in the lab. Marty and his students have developed a field method for running this test with material that is easy to obtain and not too expensive. It can be executed in the field in 1 hour.

A discussion about IRIS/MRIS was initiated. There is now a commercial supplier of IRIS/MRIS films that are similar to the tubes except it is a film that when removed can be laid flat to more easily identify percent removal. These films were used at the sites visited on the field trip. It was noted that often there was removal from the MRIS even if there was no removal from the IRIS. We do not know enough about MRIS to utilize them for hydric soil identification at this time. The percent removal would have to be much higher than IRIS. However, removal of manganese is an indicator of important processes and may be used to identify where the high water table is even if it is not there long enough for the soil to be considered hydric. MRIS may also be an important tool to identify denitrification functions restored in restoration sites. A discussion of the 30% removal of IRIS is debatable but the technical standard is a national test and there is an understanding that environmental conditions could cause more or less removal. The 30% threshold is a good compromise as a national threshold. Studies are currently being done on the use of IRIS.MRIS that should provide further clarification on when IRIS and when MRIS may be more useful. In colder temperature MRIS seems more sensitive than IRIS.

Colby Moorberg presented his research using an automated minirhizotron imaging system. The system allows repeated imaging of roots in-situ. Oxygen data (2D) shows changes from events such as rainfall inputs. Original cameras were very expensive and not cost effective. The mini rhizotrons are cheaper and functional. These may facilitate hydric soil research allowing low site disturbance, potential for study of other analytes such as pH or nitrous oxide, and allowing a high temporal resolution.

Jake Ziggafoos, a student of Colby Moorberg, presented his research project on the use of National Wetland Condition Assessment data for Field Indicators of Hydric Soils assessment and Ecological Site description development for wetlands. He is looking at common associations of hydric soil indicators for ESDs. A spatial comparison of Field Indicator use. He will utilize the data to create provisional ESDs for certain wetland types. He hopes to create state and transition models for wetland sites based on stressors found in certain wetland types. He plans to summarize the relationship between field indicators and location. He will summarize commonly used indicators for a region and/or wetland type. There was some question as to why F3 was not more common. Rusty asked what percent of sites met no indicator and it was thought to be about 15 to 20% but Jake can identify the exact number for us.

Lenore Vasilas cautioned the use of the NWCA data for statistics for delineation purposes. These wetlands were not sampled at the boundary. So, it makes sense that for the NWCA sampling F6 was the most common indicator in many regions. However, if you are only looking at the boundary for delineation purposes the thick dark surface may drop out and F3 would be more likely.

Mike Vepraskas brought up the topic of the use of F19. Piedmont Floodplains as a test indicator in the southeast. It is an indicator that allows chromas higher than 2 and was developed for use in the mid-Atlantic piedmont and coastal plain. There is some suggestion that there is potential for misuse in the southeast. It can only be used on active floodplain subject to deposition. There is some dispute as to whether the indicator is useful in the southeast. Some would like to see it dropped while others would like to retain it. Jacob Berkowitz canvased the Corps and VA, FL, and NC all said they found the indicator to be useful and effective in floodplains with active sediment accumulation and would like to retain it as a test indicator. However, the corps does not think they could get support for funding data collection. Karen Vaughn recalls that some data may already have been collected in VA that shows the indicator does work. Jacob will pursue tracking down the data. Greg Hammer expressed that he felt the indicator is not useful and would like to see it removed from VA. The NTCHS will pursue data that may already be available in support of the indicator. However, if no data is being collected it is the policy of the NTCHS to drop test indicators after 5 years.

An opportunity for the Mid-Atlantic Committee to discuss issues with the NTCHS was given. Greg Hammer discussed and issue in highly disturbed areas in mostly highly managed timber operations that meet the 2-inch requirement of a depleted matrix requirement starting at 4 inches in the F3. Depleted Matrix indicator. These soils will have a thin depleted matrix in the upper part and then turn bright underneath. Most soil scientists are ignoring this condition when mapping. However, it was pointed out that the soils do meet the definition of a hydric soil since they are going anaerobic in the upper part due to man induced compaction from heavy equipment and should not be ignored. They should be recognized as hydric soils. However, because they are man induced they are not subject to Swampbuster. They may, however, if they retain their wetland hydrology and hydrophytic vegetation be subject to the Clean Water Act. Greg Hammer showed some pictures of these soils and there is distinct platy structure beneath the depleted zone which provides further evidence that these soils are man induced hydric soils due to compaction. These soils also have a positive reaction to alpha-alpha dipyridyl in the spring when saturated. Greg Hammer's question was whether these man-induced conditions are creating jurisdictional wetlands and that is a policy question that is outside of the hydric soils designation. From a hydric soil standpoint, they should be labelled as hydric meeting F3. Depleted Matrix. However, whether they are jurisdictional wetlands is dependent on the presence of all three factors and whether there is an exemption for man-induced wetland. This is not a policy call that the NTCHS has the ability to make. It was noted that this condition has also been seen in the Midwest and is probably prevalent anywhere there is heavy equipment use. The NTCHS does encourage identification of all hydric soils regardless of why they are hydric and leave the jurisdictional call until after the evaluation of all three factors and if it meets all three whether it is exempt due to the man-induced nature of the wetland up to those making the jurisdictional call.

At this point the NTCHS and Mid-Atlantic Committee split so that each could conduct the remainder of their business meeting separately.

Review of 2018 minutes. Only to do item was to update the Field Indicators to version 8.2 and that was completed. A formatting issues was found after the update and was fixed by the NRCS editor. A motion was passed to adopt the 2018 minutes by Aaron Miller and seconded by Colby Moorberg. All in favor to adopt.

NRCS Updates

Lenore Vasilas – Co-chaired the Hydric/Subaqueous Committee at the National Cooperative Soil Survey Conference. In the past only the Northeast region had a hydric and subaqueous soil committee. At the previous years regional conference the southeast had decided to add the hydric/subaqueous committees to their region. Mike Vepraskas will chair the committee in 2020. At the National meeting there was a discussion about the northcentral and west conferences also creating committees as well. In the northcentral Colby Moorberg agreed to chair the committee and Jennifer Smith was asked to co0chair with him. In the west Karen Vaughn agreed to chair with assistance from Aaron Miller. Hopefully, the formation of these committees will spark communication among the regions about hydric soil and subaqueous soil issues that could lead to better information and indictor development in those regions. Currently much of the request the NTCHS gets are from the Northeast and it is thought that this is a direct reflection of active regional discussion. Lenore Vasilas agreed to assist the chairs with the creation of these committees and assist in developing a membership list.

Steve Monteith – Discussed fiber analysis and field estimates. Currently there is no consistent standard for estimating fiber content. Lab method uses centrifuge method and sieved at 100 mesh. The VanPost method is being looked at for field estimates. It has 10 categories of field evaluation of fibers. Mike Vepraskas asked if these could be adopted to categorize fibric, hemic and sapric. Steve suggested that there is no official correlation. Jacob Berkowitz mentioned that there is a table in the all the regional supplements except Alaska that classifies categories 1-3 as fibric, 4-7 as hemic, and 8-10 as sapric. Steve mentioned a high demand for Eh on coastal surveys and saturated hydraulic conductivity in organic soils.

Jennifer Smith – There is an S8 hillslope hydrology currently going on in MN. NRCS is partnering with UMN as part of a masters research project.

Aaron Miller – He is working on incorporating the use of Field Indicators in EDIT hierarchy. He is mulling over ways the future versions of the EDIT database will handle LRR, MLRA, and LRU catalogs and allow us to include information such as relevant indicator statuses well as detailed descriptions of each type of system to ensure proper validation of the resource being utilized.

Paul Rodrigue did not have anything to discuss and Tony Jenkins was not present.

Field Indicator Issues

MLRA 92 submitted a series of files for support of the approval of the F21 indicator in MLRA 92. The data was collected in 2018. Mike Vepraskas requested a summary of the data as the data was submitted in a number of separate files and it was difficult to establish where the data needed to prove the soil meets the technical standard was and, therefore, he is unsure if it was met. Lenore Vasilas agreed to create a template of needed information (rainfall analysis, well, IRIS or other reducing conditions data, etc.) for field indicator change/ addition requests and contact MN to get that information. A decision was tabled until that information is provided.

Someone questioned the use of the phrase “from the soil surface” in A12 and thought it should be changed to “from the soil surface”. The change was discussed but because the surface could be either the muck or the mineral surface depending on LRR it was thought that the original phrasing was appropriate. The same person had questions about the term “almost 100 percent masked”. We do not quantify almost. After discussion it was decided that we would put a section in the introductory material that better explains what we mean by “masked sand grains” and how to identify them. We will also refer to this section in the user notes of those indicators requiring masked sand grains. This change was motioned and unanimously passed by the committee. The person also pointed out some obvious typos that will be fixed.

A question was raised in an e-mail of the validity of increasing the extent that S7. Dark Surface can be used. This change was made based on data out of Michigan as well as information from other regions. In Michigan the NTCHS visited multiple sites where the only indicator met was S7 and the masked grains disappeared as you went out of the wetland. The e-mail sent to Lenore Vasilas was the only negative e-mail received by the committee since the increase in where the indicator is applicable. Lenore Vasilas also brought this up at the National Cooperative Soil Survey conference and many expressed the utility of it being added to their region and no one expressed any negative comments.

An e-mail was sent regarding the addition of the Mesic Spodic Indicator that was adopted for use in New England and the fact that the test indicator that was in place before its adoption not being dropped. This was an oversight and the test indicator TA6 will be dropped because it was replaced by the Mesic Spodic indicator.

F19 discussion

This was brought up at the joint portion of the meeting with the mid-Atlantic Committee. The SE state soil scientists support the dropping of this as a test indicator in the SE. However, Jacob Berkowitz canvassed the Corps and they found it to be useful. Jacob asked if data sheets could be used to continue to keep the indicator as test. However, you can use data sheets to create a test indicator but there must be a plan in place to do further research to collect tech standard data or the test indicator will be dropped. Mike Vepraskas motioned that the committee continues to wait for data to be collected in LRRs P and T to verify appropriateness of F19. If 5-year period expires before data is collected than the indicator should be dropped for testing in those regions where it is not approved. Motion passed unanimously.

A10 discussion

The committee recommends that more data be collected to prove the indicator is false positive in these acidic upland side slope landscapes in MLRA 125 and 127. The documentation that is required includes:

- Water table data for a 1-year period of normal or wetter rainfall that shows the sites do not meet the saturation criteria
- IRIS data with at least 1 set that is in through the dry-wet-dry period
- Shallow wells inserted to a depth of 10 inches
- Organic layers should be resampled with care taken to remove live roots and sent to the KSSL for analysis of fiber content

- Effort should be made to reach out to neighboring states within these LRRs for possible assistance and/or concurrence

If this data shows that the sites do not meet the technical standard and the indicator is not working, then the indicator will be deleted from use in these MLRAs and possibly revised so that sites that are wetter and meet the indicator are captured in the revised indicator.

F8 discussion

An e-mail was sent that expressed confusion over whether the indicator F8. Redox Depressions could be used on depressions within floodplains. This is in fact a common use of the F8 indicator. It is not a landscape that is mentioned in the user notes. Because it is a common landscape position it was decided that it would be added as an example in the user notes and the list of landscapes statement will be changed to … includes but not limited to…

Clarification of test indicator adoption

Resetting of test indicator clock can be achieved by submission of data sheets showing that the sites meet the other two factors required for a wetland to exist **and** a plan to collect technical standard data to validate that these soils meet the technical standard.

Template for data submission

Lenore Vasilas will work to draft a template that provides a format for submitting data to the NTCHS in support of the adoption of a test indicator or creation of a new indicator. She will also draft a tech note establishing minimum requirements necessary to establish a test indicator and adopt a test indicator or new indicator. Hopefully this will assist in more effective and timely adoption of new indicators by providing the NTCHS members the data in a concise format eliminating the need to review numerous pages of reports to find the data that is needed for evaluation.

EPA report-Chris Parker

Chris Parker is the newest member of the NTCHS. Since he is a new member and did not have much lead time to prepare for the meeting he opened his time up for questions from the committee. EPA recently went through and reorganization. He understand that at this point he will be the EPA contact for the NTCHS.

USFS report-Dave D'Amore

There is an ongoing effort to update forest plans with array of references to hydric soils and wetlands in the planning process. Exemptions being made in riparian areas due to timber harvest. The is interest in joining the effort to establish better indicators in wet spodosols. Pointed out that A10 is not approved for use in Alaska because the colder climate allows for muck accumulations in soils that are not hydric. Also mentioned that the also have soils that are labelled sapric in the field but come out hemic in the lab. There is an ongoing discussion with Cory Cole to address subaqueous soils in Alaska.

USFWS report-Rusty Griffin

No current issues.

BLM report-Ron McCormick

Spent time in OR and CA investigating compaction on old and new sales. Conducting DNA analysis of streams. BLM soils handbook for field is adding hydric soils section.

USACE report-Jacob Berkowitz

F21 proposal

F21. Red Parent Material is approved for test in areas that meet the appropriate Color Change Propensity Index threshold for red parent material that resists color change. Sarah Mack, a student at University of Maryland, worked on a project funded by USACE to develop a red parent material map for the country. The map was published in 2018. Jacob proposed to change the testing status to approve the indicator for use in all regions mapped as red parent material. He also recommended changing the user note to refer to the map in replacement of suggested geologies. Lenore Vasilas expressed reluctance to approve the indicator in the regions currently listed as test because environmental conditions in some of those regions may cause the indicator to not work properly. New England is an example where they feel the F21 indicator does not give them the appropriate break between hydric and non-hydric. It was suggested that the regions where red parent material are mapped be canvassed to see if they think F21 would work in there region or if the indicator may need to be adjusted. Lenore will send out a request for comment about possibly adding F21 as an approved indicator to all areas to see what the reaction is to the change before making any change. Other NTCHS members will forward the request to their agencies for comment as well. Any region that objects to the change will be left as for testing.

Jacob discussed soils in central TN and south KN that have extensive areas of shallow soils. Some of these soils will meet F22 but others do not meet an indicator. There is currently very limited data.

There is a request to approve A17 Mesic Spodic in FL. Because the soils do not meet the 70% masked sand grains they do not meet any other indicator besides A17. There is one site with data that shows the indicator to work. But, the committee would like to see more. A recommendation to make the A17 indicator testing in FL while the data is being collected is proposed. However, in order for the committee to make this change there needs to be a plan in place to collect more data.

Jacob demonstrated the use of the DAREM analysis tool for using WETS data to analyze rainfall. It could be a valuable tool for analysis of climate data for the Hydric Soils Technical Standard. He will send a copy of the program which requires no external software to use to the NTCHS. It will be available for the public.

Other comments from Jacob are that new indicators are only being developed for problem areas, no funding exists to conduct research for indicator development, and there are few reports of false positives.

Hydric Soils Technical Standard Publication

Jacob has spearheaded an effort to put the Technical Standard in a format for publication so that it can be properly reference when doing hydric soils research. Possible publication is through SSSAJ. He discussed this with the editor and they agreed to publish as an invited review article. There is a fee (approximately $800) to make it open access. A version drafted by Jacob and reviewed by Mike, Karen and Lenore is almost ready for review by the committee. It was suggested that language in the

conclusions should recommend checking for current versions of the standard with NTCHS in case there are future changes with new technology development. Colby Moorberg suggested considering a SSSAJ book instead. If it is a digital publication it could be edited in the future. Mike offered to edit it one more time and then it will be sent to the whole committee for review. Ideally we hope to get this done by the end of the summer. A committee teleconference will follow to finalize the draft to be sent for publication.

Proposed Changes to Organic Texture Terminology

Lenore Vasilas wanted to make the committee aware of a proposed change to soil taxonomy that will change the way that organic textures are classified. The proposal includes getting rid of the sliding percentage scale and making the percentage categories the same regardless of percent clay. Mike Vepraskas questioned if we had many samples analyzed to show if this would be a significant change in the way we label organic and mucky modified textures. Steve Monteith questioned how much reclassification would be needed if the change were made. Mark Stolt had submitted some data with the proposal that the NTCHS should review. Steve said he would send it to the committee. If this change is made to taxonomy then the committee would need to decide whether we need to change the definitions in the Field Indicators as well.

University updates

Wade hurt-Was having technical difficulties with his phone.

Mike Vepraskas-He is working on a project to develop ESDs for Carolina Bay restoration for evaluating sites. The data will be used to develop state and transition madels. He is also working on a tool to estimate saturation periods via models to answer questions like does a restored wetland have restored hydrology. Final product will identify soils on site and estimate number of days of saturation are required to qualify as restoration.

Karen Vaughn-Published paper on Hydric Calcareous soils we visited last year. Microcoasm of the soil showed it was hydric. The study was to determine whether these soils can develop hydric features and meet an indicator. All microcosms reduced FE. FeS formed at very low Eh. She is working on developing a new field indicator for MLRA 34A. These are anamolous areas high in calcium carbonate. She is collaborating with NRCS to explore FeS expression throughout the western US. Chelsea Duball, a grad student, is working on quantification of FeS to address problem soils to identify soils as hydric. She will include soil morphology descriptions, IRIS data, vegetative survey info, hydrology indicators and send soil samples for analysis at the KSSL.

Next Year's Meeting

Lenore Vasilas had a request from the National Technical Committee for Hydrophytic Vegetation to hold a joint meeting next year. The chair of that committee has requested information on the structure and operating procedures of the NTCHS to assist in the formation of their committee, which is relatively new. They plan to meet in Bozeman Montana next year but would be willing to change the location if we were willing to meet with them but wanted a different location. Lenore and Aaron will discuss with NRCS soils scientists in the Bozeman are to see if there is something of interest to the committee that we could look at. Karen also had recently talked to a grad student in Montana who is doing research using IRIS in oxbows and will contact her to see if she had anything that might be of interest. Karen also

mentioned going to NM to look at some of the playas with FeS. However, the committee felt that it might be better to wait another year until her grad student has time to collect more data before we visit the playas. All were in favor of the proposal to meet in Bozeman next year.

Meeting adjourned.