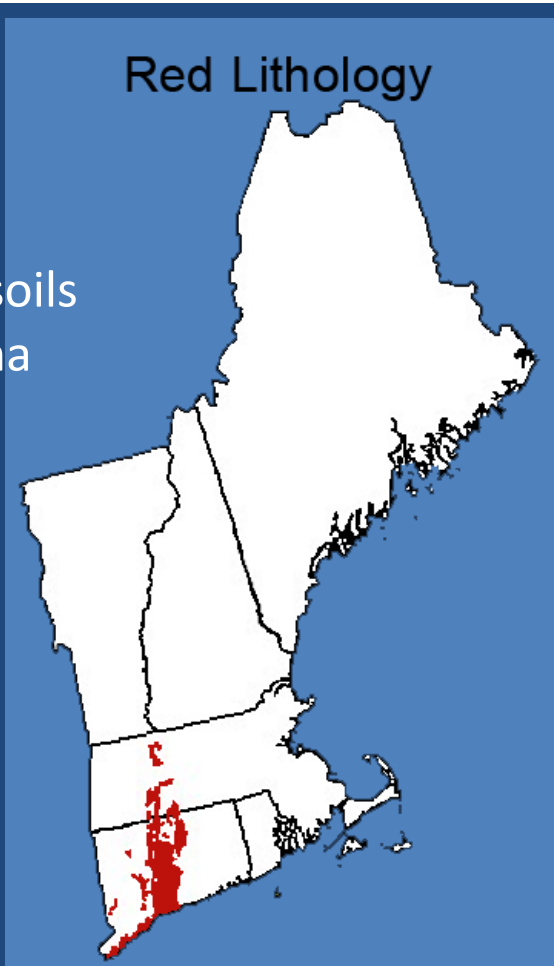
Testing Hydric Soil Indicator TF2. Red Parent Material in MLRA 145

- **MLRA 145-Connecticut Valley**

Auer Farm, Bloomfield – Evaluated 6 soil pits in red till soils of a woodland soil catena and a wet meadow soil catena

Wadsworth Estate, Middletown – Evaluated 5 Soil pits of a woodland soil catena in Red till soils (Ludlow, Wilbraham and Menlo Series)



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MLRA 12-6 Soil Survey Office
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Problematic Red Soils

- Color Change Propensity Index (CCPI)
- A value of 30 or less is problematic *(Rabenhorst and Parikh, 2000)*
- Auer Farm Bw Horizon CCPI = 21.71
- Auer Farm C Horizon CCPI = 17.08
- Wadsworth Estate Bw Horizon = 18.37
- All samples are problematic *(Rabenhorst, 2008)*

Redox in a Red Soil

TF2. test indicator

- **TF2. Red Parent Material.** *For testing in LRRs*
- *with red parent material.* In parent material with hue
- of 7.5YR or redder, a layer at least 10 cm (4 inches)
- thick with a matrix value and chroma of 4 or less and
- **2 percent** or more redox depletions and/or redox
- concentrations occurring as soft masses and/or
- pore linings. The layer is **entirely within 30 cm (12**
- **inches) of the soil surface.** The minimum thickness
- requirement is 5 cm (2 inches) if the layer is the
- mineral surface layer.

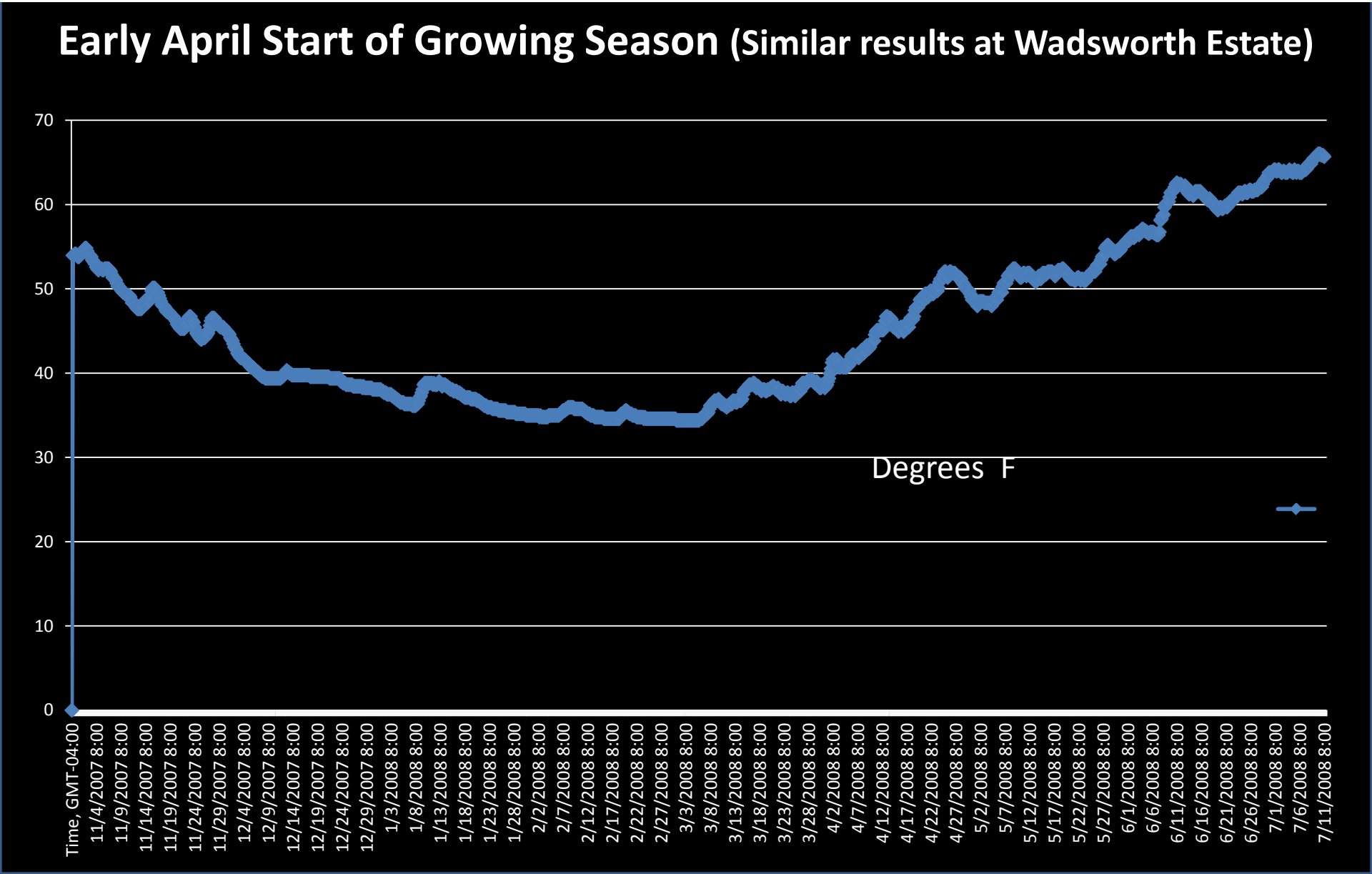
F21. New Indicator for testing in SNE

- **F21. Red Parent Material.** *For use in MLRAs 147 and 148 of LRR S and MLRA 127 of LRR N; for testing in all soils derived from red parent materials.* A layer derived from red parent materials (see glossary) that is at least 10 cm (4 inches) thick, **starting within 25 cm (10 inches)** of the soil surface with a hue of 7.5YR or redder. The matrix has a value and chroma greater than 2 and less than or equal to 4. The layer **must contain 10 percent or more depletions and/or distinct or prominent redox concentrations occurring as soft masses or pore linings.** Redox depletions should differ in color by having:
- Value one or more higher and chroma one or more lower than the matrix,
- Or Value of 4 or more and chroma of 2 or less.

Auer Farm

Soil Temperature, Site 4- A at 30cm

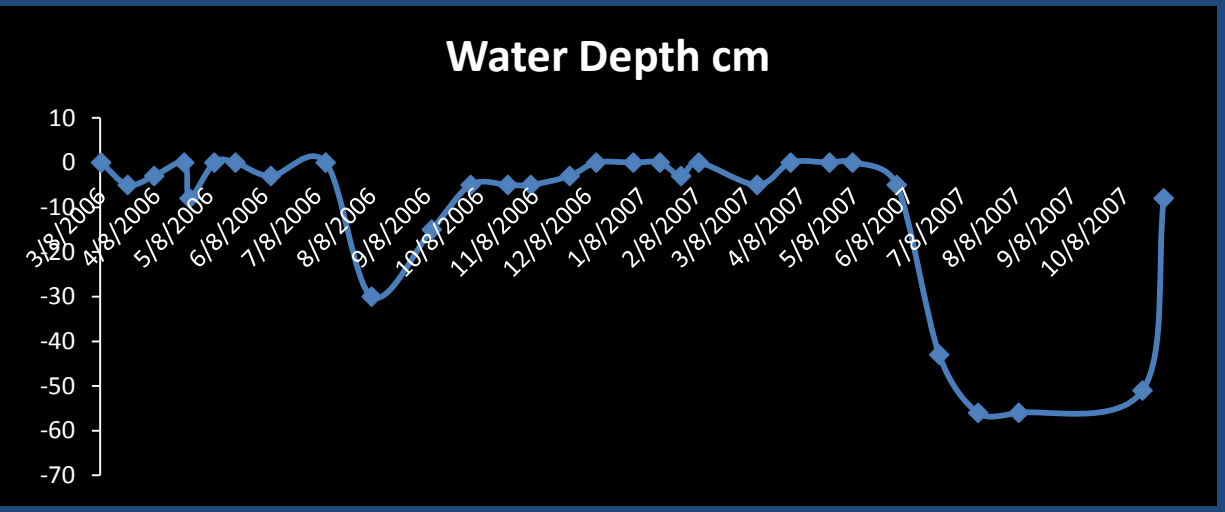
Early April Start of Growing Season (Similar results at Wadsworth Estate)



Auer Farm Wet Meadow

Typic Endoaquoll

Well #	Depth cm	Horizon Soil Texture	Matrix Color	Redox Features
1	0 -18	Ap, MKSIL	7.5YR 2.5/1	10 %, fine, prominent, 7.5YR 4/6 pore linings
	18 - 46	Bg, SIL	7.5YR 5/1	10 %, fine, prominent, 7.5YR 5/6 masses of iron accumulation
	46 - 61	2Cd, L	7.5YR 4/3	5 %, medium, prominent, 7.5YR 5/6 masses of iron accumulation



Indicators

A11. Depleted Below Dark Surface

F3. Depleted Matrix

F6. Redox Dark Surface

TF2 Red Parent Material

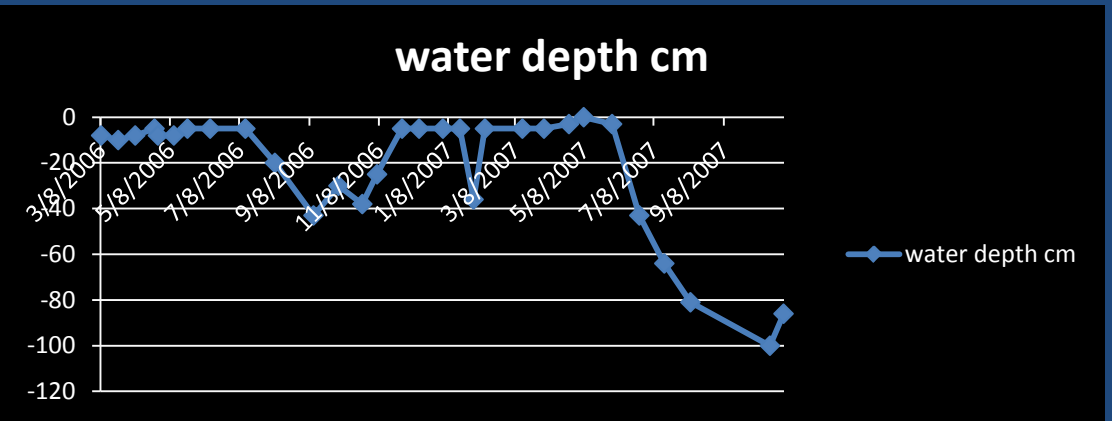
positive reaction to alpha,alpha-dipyridyl on 6/4/08, upper 30 cm, Peterson


Auer Farm Wet Meadow

Auer Farm Wet Meadow

Aeric Endoaquept

Well #	Depth cm	Horizon, Soil Texture	Matrix Color	Redox Features
2	0 -10	Ap1, SIL	7.5YR 4/3	10 %, fine, prominent, 5YR 4/6 masses of iron accumulation
	10 - 20	Ap2, GRSIL	7.5YR 4/3	15 %, medium, distinct, 7.5YR 5/6 masses of iron accumulation, diffused in the matrix and 2% medium, faint 7.5YR 5/2 zones of iron depletion
	20 - 36	Bw, SIL	7.5YR 5/3	25 %, medium, distinct, 7.5YR 5/6 masses of iron accumulation diffused in the matrix and 10% medium, faint 7.5YR5/2 zones of iron depletion
	36 - 56	2Cd, GRSL	5YR 4/3	5%, manganese concentrations, on surface of rock fragments



Indicators

TF2 Red Parent Material

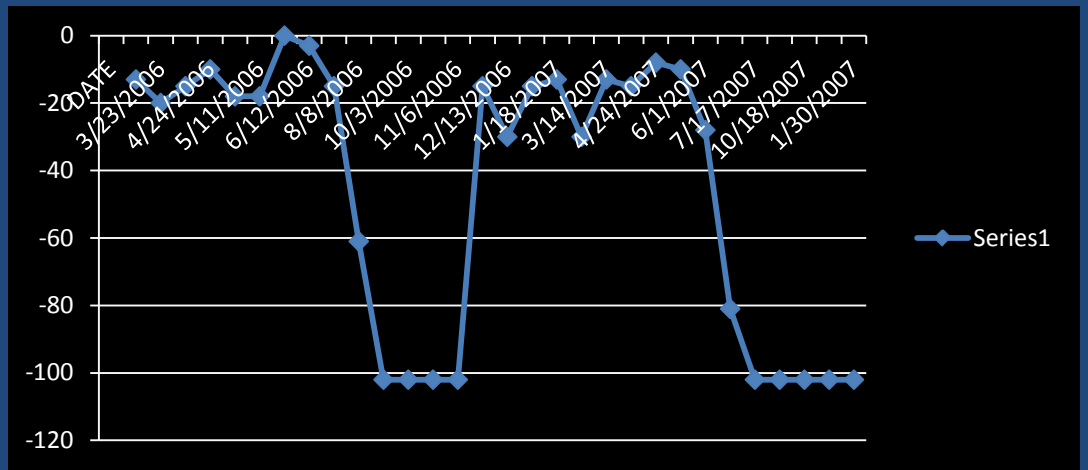
F21 Red Parent Material

positive reaction toalpha,alpha-dipyridyl on 6/4/08, upper 30 cm, Peterson

Auer Farm Wet Meadow

Aeric Endoaquept

Well #	Depth cm	Horizon, Soil Texture	Matrix Color	Redox Features
3	0 -20	Ap, SIL	7.5YR 3/2	1 %, fine, prominent, 7.5YR 5/6 masses of iron accumulation
	20 - 38	Bw1, SIL	7.5YR 4/4	10 %, medium, distinct, 7.5YR 5/6 masses of iron accumulation, diffused in the matrix
	38 - 61	Bw2, SIL	7.5YR 4/4	15 %, medium, distinct, 7.5YR 5/6 masses of iron accumulation diffused in the matrix and 10% medium, faint 7.5YR 5/2 zones of iron depletion
	61 - 102	2Cd, GRL	5YR 3/3	2%, fine, distinct, 7.5YR 5/6 masses of iron accumulation, diffused in the matrix



Indicators

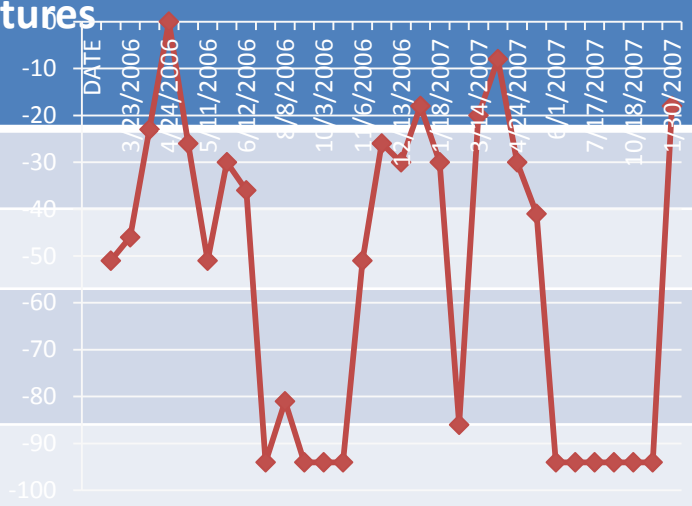
TF2 Red Parent Material

F21 Red Parent Material

Auer Farm Woodland

Aquic Dystrudept

Well #	Depth cm	Horizon, Soil Texture	Matrix Color	Redox Features
4	0 - 3	A1, SIL	5YR 2.5/1	none
	3 - 20	A2, SIL	5YR 3/3	none
	20 - 36	Bw1, SIL	7.5YR 4/6	none
	36 - 46	Bw2, GR SIL	5YR 4/4	none
	46 - 76	Cd1, GRL	5YR 4/4	5%, fine, prominent , 5YR 5/8 masses of iron accumulation and 10% medium distinct 5YR 5/2 zones of iron depletion diffused in the matrix
	76 - 102	Cd2, SIL	5YR 4/3	20%, fine, prominent , 5YR 5/6 masses of iron accumulation and 30% medium distinct 5YR 6/2 zones of iron depletion diffused in the matrix

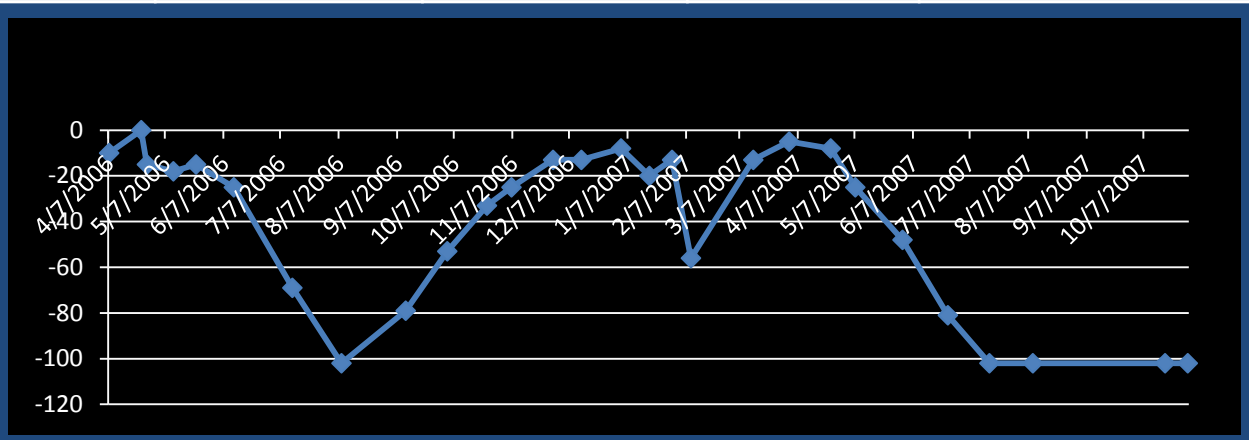


No Hydric Soil Indicators Present

Auer Farm Woodland

Aeric Endoaquept

Well #	Depth cm	Horizon, Soil Texture	Matrix Color	Redox Features
4-A	0 - 15	Ap, SIL	7.5YR 3/2	none
	15 - 41	Bw, SIL	7.5YR 4/4	5%, fine, distinct , 7.5YR 5/6 masses of iron accumulation and 5% medium, distinct 5YR 5/2 zones of iron depletion diffused in the matrix
	41 - 51	BC, GRL	5YR 4/3	5%, fine, distinct , 7.5YR 5/6 masses of iron accumulation and 5% medium, distinct 5YR 5/2 zones of iron depletion diffused in the matrix
	51 - 102	Cd, GRL	5YR 4/3	None



Indicators

TF2 Red Parent Material

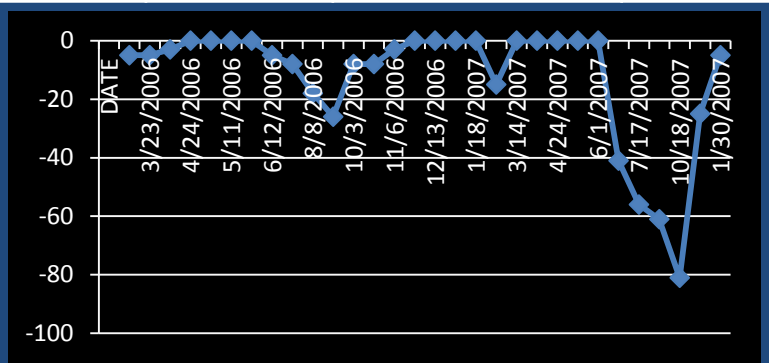
F21 Red Parent Material


Auer Farm Site 5

Auer Farm Woodland

Aeric Endoaquept

Well #	Depth cm	Horizon, Soil Texture	Matrix Color	Redox Features
5	0 - 10	Ap1, SIL	7.5YR 4/2	5%, medium, faint , 7.5YR 4/3 masses of iron accumulation and 2% fine, distinct 7.5YR 4/6 masses of iron accumulation on ped faces
	10 - 18	Ap2, SIL	7.5YR 4/2	15%, fine, prominent , 5YR 4/6 masses of iron accumulation
	18 - 28	Bw, SIL	7.5YR 5/3	10%, medium, distinct , 10YR 4/6 masses of iron accumulation and 5% medium, faint 5YR 5/2 zones of iron depletion
	28 - 54	BC, SIL	5YR 4/4	10%, medium, distinct , 5YR 4/6 masses of iron accumulation and 5% coarse, distinct 5YR 5/2 zones of iron depletion



Indicators

F3. Depleted Matrix (A horizons)

TF2. Red Parent Material

F21 Red Parent Material

Remember to Look Very Closely at the A Horizons

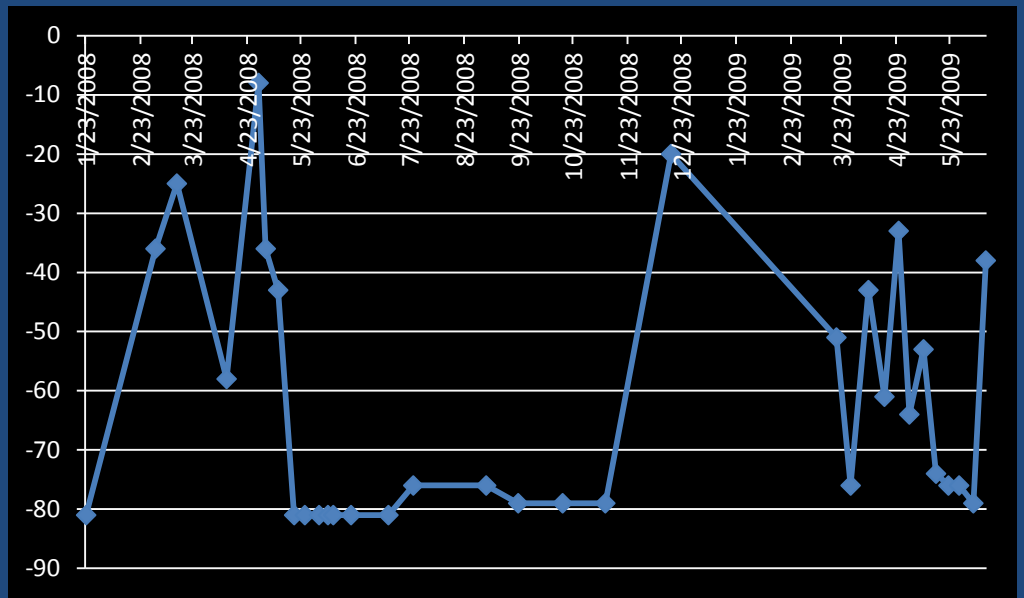
- In many instances the A horizon redox features were the determining factor
- A horizons can be recognized as a depleted matrix F3. if they have a value of 4 or more and chroma 2 or less with common or many, distinct or prominent redox concentrations *(Field Indicators of Hydric Soils in the United States, version 7.0, 2010)*


Wadsworth Estate East Wetland

Wadsworth Estate East – 1

Oxyaquic Dystrudept

Horizon	Depth cm	Soil Texture	Matrix Color	Redox Color	Redox Type	Redox %	Redox Location	Redox contrast
Oe	0-5	MPM	10YR 2.5/2	None	None	None	None	None
Ap	5-23	SIL	7.5YR 3/3	None	None	None	None	None
Bw1	23-38	SIL	5YR 4/3	None	None	None	None	None
Bw2	38-61	L	5YR 4/3	5 YR 4/4	Concentrations	5%	matrix	faint
Cd	61-90	FSL	5YR 4/3	7.5YR 4/6	Concentrations	5%	matrix	Prominent

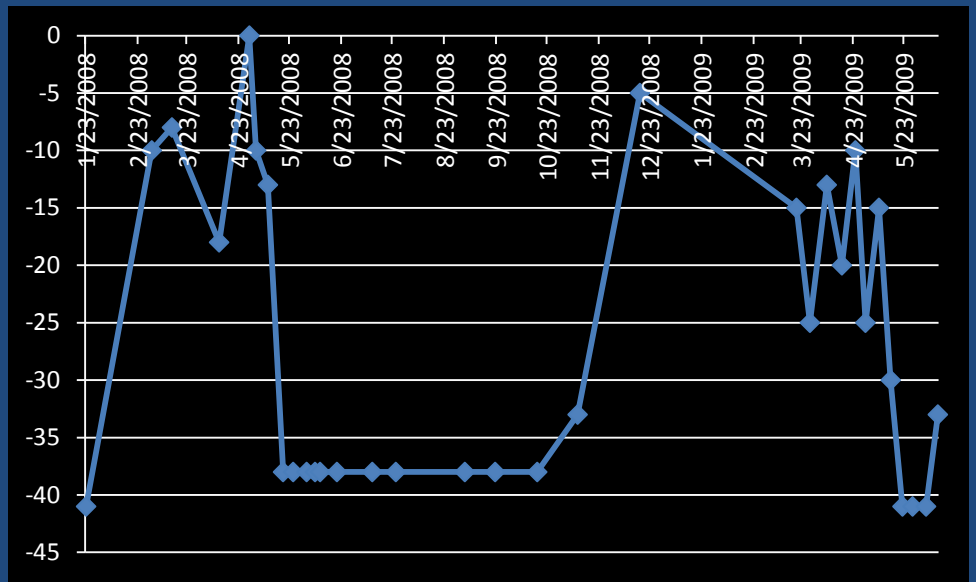


No Hydric Soil Indicators

Wadsworth Estate East -2

Aeric Endoaquept

Horizon	Depth cm	Soil Texture	Matrix Color	Redox Color	Redox Type	Redox %	Redox Location	Redox contrast
A1	0-17	SIL	7.5YR 3/2	none	none	none	none	none
A2	17-33	SL	7.5YR 3/2	10YR 2/1 10YR 2/1	concretions concentrations	2% 2%	Matrix	Faint Faint
Bw	33-55	L	5YR 4/3	10YR 2/1 10YR 2/1 5YR 4/4	Concretions Concentrations concentrations	2% 5% 2%	Matrix	Prominent Prominent Faint
Cd	55-74+	L	5YR 4/3	10YR 6/2 7.5YR 5/6 5YR 4/4	Depletions concentrations concentrations	2% 2% 2%	matrix	Distinct Prominent prominent



Hydric Soil Indicators

TF2. Red Parent Material,
On the line

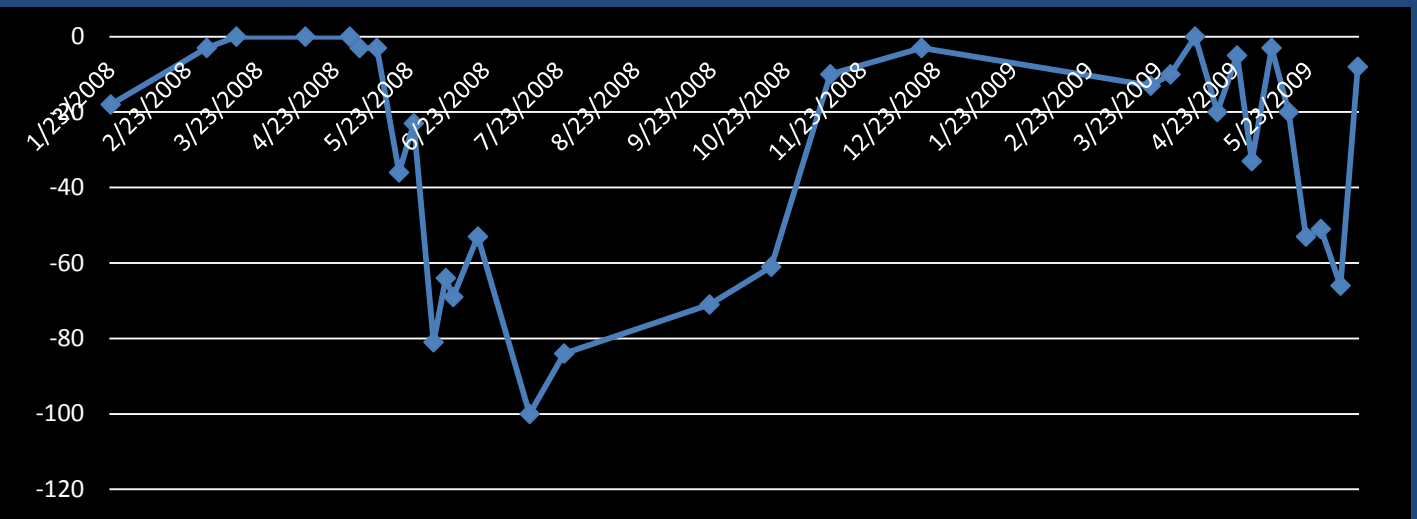
Does Not Meet F21

and concretions

Wadsworth Estate East-3

Aeric Endoaquept

Horizon	Depth cm	Soil Texture	Matrix Color	Redox Color	size	Redox Type	Redox %	Redox Location	Redox contrast
Ap	0-19	SIL	7.5YR 3/2	none	none	none	none	none	none
Bw1	19-28	SIL	7.5YR 4/3	10YR 2/1 5YR 3/4	fine medium	Concretions concentrations	1% 5 %	matrix	Prominent faint
Bw2	28-37	SIL	7.5YR 4/3	7.5YR 4/6	medium	concentrations	20%	matrix	distinct
Cd1	37-55	FSL	5YR 4/4	7.5YR 4/6 10 YR 2/1	Medium fine	concentrations concentrations	10% 1%	matrix coating	distinct prominent
Cd2	55-100	FSL	5YR 4/4	7.5YR 4/6 10 YR 2/1 7.5YR 6/2	Medium Fine medium	concentrations Concentrations depletions	10% 1% 2%	matrix coating matrix	distinct prominent distinct



Hydric Soil Indicators

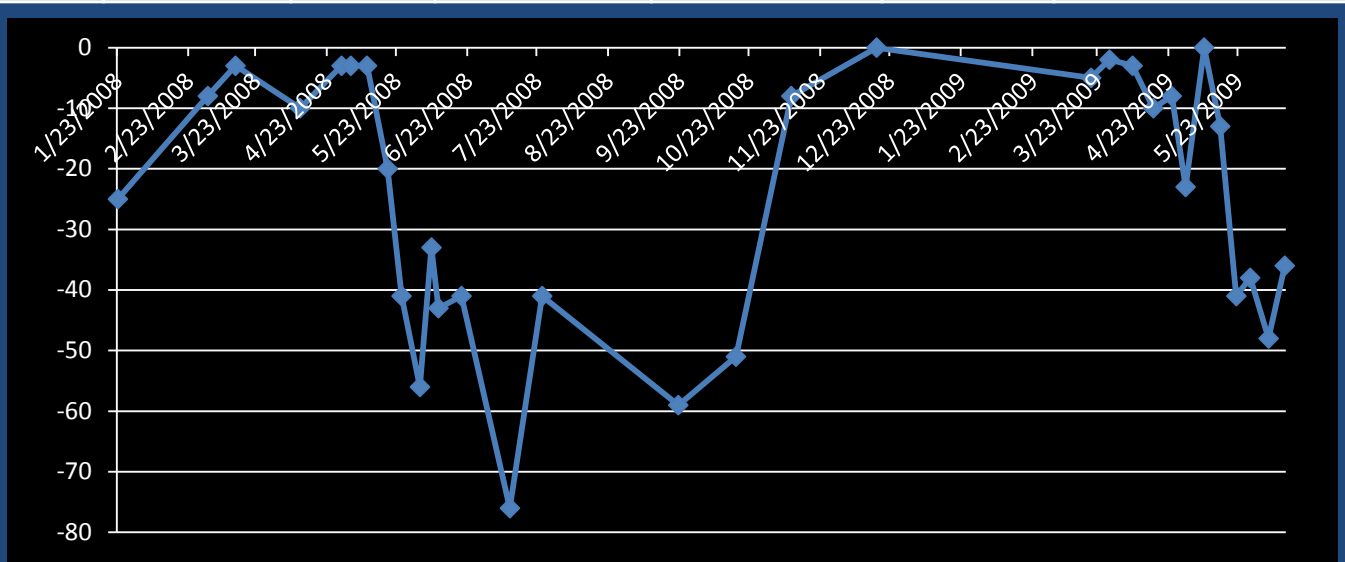
TF2. Red Parent Material

Does Not Meet F21

Wadsworth Estate East-4

Aeric Endoaquept

Horizon	Depth cm	Soil Texture	Matrix Color	Redox Color	size	Redox Type	Redox %	Redox Location	Redox contrast
Ap	0-16	SIL	7.5YR 3/2	none	none	none	none	none	none
Bw1	16-28	SIL	7.5YR 4/4	7.5YR 4 /6	fine	concentrations	2%	matrix	distinct
Bw2	28-45	L	7.5YR 4/3	7.5YR 4/6 7.5YR 4/2	medium	concentrations Iron depletions	15% 2%	matrix pore linings	distinct faint
BC	45-68	L	5YR 4/4	7.5YR 4/6 7.5YR 4/2	medium	concentrations Iron depletions	15% 2%	matrix pore linings	distinct distinct
Cd2	68-100	GR SL	5YR 4/3	7.5YR 4/6	Medium	concentrations	2%	matrix	prominent



Hydric Soil Indicators

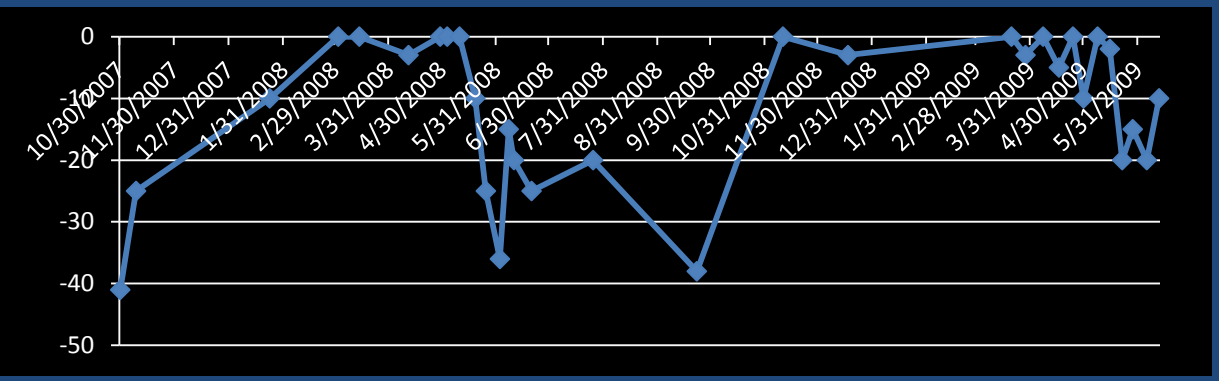
TF2. Red Parent Material

Does Not Meet F21

Wadsworth Estate East-5

Typic Endoaquoll

Horizon	Depth cm	Soil Texture	Matrix Color	Redox Color	size	Redox Type	Redox %	Redox Location	Redox contrast
A1	0-18	SIL	7.5YR 3/2	none	none	none	none	none	none
A2	18-30	SIL	7.5YR 3/2	5YR 4 /6 10YR 2/1	fine	concentrations concretions	2% 1%	matrix	prominent
Bg1	30-44	L	7.5YR 4/2	7.5YR 4/4 10YR 2/1	Medium fine	concentrations concretions	5% 1%	matrix	distinct
Bg2	44-54	GR L	7.5YR 4/2	7.5YR 4/6	medium	concentrations	10%	Matrix	prominent
BC	54-92	GR L	5YR 3/3	7.5YR 4/6	Medium	concentrations	10%	matrix	prominent
Cd	92-100	GR L	5YR 3/3			none			



Hydric Soil Indicators

A11. Depleted Below Dark Surface (starting @30cm, wavy boundary)

TF2. Red Parent Material

Conclusions

- TF2. Red Parent Material worked consistently at the sites tested in MLRA 145
- F21 was not consistent
- It is very important to make detailed observations in the A Horizons
- Concretions of Iron and Manganese are often present along with soft masses and should be in the user notes.
- Be very carful with your estimates of redox %

Conclusions

- Recommendation: study additional sites using TF2 and F21.
- Need to research Red Sandy Parent Materials next.
- Thank you to all that helped out on these projects over the years including folks from: NRCS,USACOE, SSSSNE, URI, UMASS, UCONN, University of Maryland, Auer Farm, City of Middletown, and the New England Hydric Soils Technical Committee.


Questions?