Technical Memorandum

Date: September 15, 2010

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Division of Water Supply Management

Copy: Jodi Slater, Environmental Scientist III
Division of Water Supply Management

From: Robert Freese, Ph.D., Soil Scientist
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Re: Summary of Soil Investigations at Silver River, Marion County, Florida, in Support of the MFLs Program

Introduction

This memorandum summarizes the results of two investigations of soil morphology conducted in 2006 and 2009 at four Minimum Flows and Levels (MFLs) transects at the Silver River, Marion County. These transects (identified as 3, 5, 7, and 9) traverse the floodplain from the uplands bordering the north side of the river to the uplands bordering the south side of the river. The transects are designed to detect the elevations at which various biologically significant features occur. Transect locations are shown in Figure 1, *Silver River MFLs Transect Locations*. The presence and distribution of deep organic soils (Histosols or histic epipedons) are of particular interest since they are important criteria for setting MFLs. The types of Hydric Soil Indicators (HI) are of interest since they are one factor determining wetland boundaries and are useful in interpreting hydrologic processes. Classification is necessary in order to assign soil series and thereby correlate field observations with soil survey data collected by the United States Department of Agriculture/ Natural Resources Conservation Service (USDA/NRCS).

Dr. G. B. "Sonny" Hall, Technical Program Manager, authorized the investigation in order to field check the work previously conducted by Dr. Albert Stoddard (AEV Consulting, LLC) at these same transects. Dr. Stoddard conducted his investigations over the course of nine field days from November 14 to December 20, 2006, and presented his findings in a report entitled, "*Silver River State Park, FL – Observed Soil Series and Hydric Soil Indicators on Selected Cross-Sectional Floodplain Transects*."

Methods

The soil reevaluation was conducted by Dr. Robert Freese, SJRWMD Soil Scientist, over the course of six field days from February 3 to April 9, 2009. Loss-on-ignition field data was collected in April 23, 2010. Field efforts focused on documenting soil characteristics within the wetland zones and on locating the hydric/ non-hydric soil boundaries. Relatively little effort was expended describing soil characteristics of the upland areas. The approach was to spot check the upland zones but to rely mainly on the 2006 work, provided the descriptions were consistent with

the 2009 findings. Wetland areas were the focus of the reevaluation. There, the approach was to sample each distinct landscape or geomorphic position at an intensity such that stations were generally no further apart than 100 feet. The data from the two investigations are compared but presented separately. Inconsistencies in the findings of the two investigators, Albert Stoddard (AS) and Robert Freese (RF), are documented and resolutions are justified.

Histosols and histic epipedons are composed of soil material having a sufficient amount of organic carbon to qualify as muck, mucky peat, or peat and a sufficient thickness of these materials to meet standards defined by soil taxonomy[1]. In cases where there was uncertainty whether soil material had sufficient organic carbon to qualify as muck, soil samples were collected and analyzed in the University of Florida Environmental Pedology Lab by the "Loss on Ignition (LOI)" method[2]. Soil material with greater than 18 percent organic carbon is classified as muck while soil material with less than 5 percent organic carbon is classified as mineral soil. Soil material with intermediate levels of organic carbon may classify as either muck, mucky mineral, or mineral soil material depending on clay content. Clay content of the soil material was estimated based on the dominant textures from the soil profile. Soil samples were collected and analyzed in April 2010.

Soil profile descriptions follow standardized guidelines developed by the USDA/NRCS (Schoeneberger et al. 2002[3]). The conventional codes from this publication are the basis for the abbreviations used to describe morphologic features. These abbreviations refer to the size, abundance, and contrast of redoximorphic features; size and abundance of roots or other soil fragments; grade, size, and class of soil structure; and degree of stickiness and plasticity. All borings were evaluated for the presence of HI. Those soil pedons sampled to a sufficient depth were classified to the great group or subgroup level of Soil Taxonomy (Soil Survey Staff 1999[4]). Assumptions regarding soil chemistry were based on information in the Soil Survey of Marion County Area (Soil Survey Staff 1979[5]). Soil profile descriptions were inspected to determine the diagnostic surface/ subsurface horizons, and particle size class of the control section. This information was used to select a soil series of matching classification, where possible. If there were no established series with this classification, a taxajunct soil series was assigned. Taxajunct soil series indicate that the soil has a different classification from the named series but is otherwise similar. Taxajunct soil series were used in cases where the particle size class and drainage class matched that of an established series. Finally, some soil pedons had significant differences from all established series and were, therefore, designated with only a taxonomic category such as great group (e.g., Fluvaquent) or subgroup (e.g., Fluvaquentic Haplosaprist).

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[1] Soil Survey Staff, 1999. Soil Taxonomy, Second Edition. Natural Resources Conservation Service, national Soil Survey Center, Lincoln, NE.
[2] Nelson, D.W., and L.E. Sommers, 1996. Total carbon, organic carbon, and organic matter. *In* Methods of Soil Analysis – Part 3 (Chemical Methods), D.L. Sparks (ed). Soil Science Society of America, Inc. Madison, WI.
[3] Schoeneberger, P. J., Wysocki, D.A., Benham, E.C., and Broderson, W.D. (editors), 2002. Field book for describing and sampling soils, Version 2.0. Natural Resources Conservation Service, National Soil Survey Center, Lincoln, NE.
[4] Soil Survey Staff, 1999. Soil Taxonomy, Second Edition. Natural Resources Conservation Service, national Soil Survey Center, Lincoln, NE.
[5] Soil Survey Staff, 1979. Soil Survey of Marion County Area, Florida. Natural Resources Conservation Service, National Soil Survey Center, Lincoln, NE.

Due to constraints imposed by the scale of mapping, high variability, and a lack of anticipated land uses, the Marion County soil survey report did not accurately characterize the soils of the Silver River floodplain. Some taxonomic categories (e.g., Fluvaquents) do not have defined series. Although this reevaluation did not attempt to map the extent of soil series, an effort was made to delineate the lateral extent of HI, which the close spacing of borings made feasible. Landscape breaks such as changes in slope, elevation, or landform type were also relied upon when estimating HI breaks. The use of topography to map soil features is used extensively in soil surveys and is justified by the fact that topography is one of five factors influencing soil formation.

Results

The lateral extents of HI are shown in Table 1, *Soil Sample Locations and Primary HI Described in 2006 and 2009*. Although some stations had multiple HI, only those HI that were most strongly indicative of wetness were included in this summary (Hurt et al. 2007[6]). Soil morphology and landscape position are strongly correlated (Soil Survey Division Staff 1993[7]). Figure 2, *Transect 3: Hydric Soil Distribution*, Figure 3, *Transect 5: Hydric Soil Distribution*, Figure 4, *Transect 7: Hydric Soil Distribution*, and Figure 5, *Transect 9: Hydric Soil Distribution* show the distribution of HI at each of the four transects and demonstrate the relationship between soil properties and landscape position. For example, A8 (muck presence) occurs in slight depressions and on broad flat areas of the floodplain on all transects. A1 (Histosol) and A2 (histic epipedon) occur in narrow backswamp depressions of Transects 5 and 7 and in broad flat areas bordering the river at Transect 9. F3 (depleted matrix) and F6 (redox dark surface) are generally restricted to the terraces or toeslope areas that border the uplands. F13 (umbric surface) occurs in floodplain depressions at the edge of the uplands on Transects 5,7, and 9. In Transect 3, F13 occurs on toeslopes or in slight rises in backswamps. Non-hydric soil pedons occur in uplands and along berms or rises in the floodplain on all transects.

Deep organic soils (Histosols and histic epipedons) are most extensive at Transect 9 and occupy approximately 370 linear feet, occurring in two segments. These organic accumulations may be associated with Half Mile Creek, a small tributary creek located immediately upstream of Transect 9.The prevalence and depth of deep organic soils generally decreases downstream on the spring run, occupying approximately 180 linear feet of Transect 7, approximately 190 linear feet of Transect 5, and approximately 110 linear feet of Transect 3. This may be related to the progressive increase in floodplain microtopography at points downstream. At Transect 9, the deep organic soils occur on broad flat portions of the floodplain while at the other transects they are restricted to backswamp depressions.

Table 2, *Soil Taxonomy and Series as Determined in 2006 and 2009*, provides information on soil classification and assignment of soil series. Sixty-one soil descriptions had sufficient detail to identify diagnostic horizons and to classify according to soil taxonomy. Thirty-four were

[6] GW Hurt, FC Watts, and JM Galbraith. 2007. Using hydric soil indicators for identification of seasonal high saturation. *In* Hydric Soils of Florida Handbook. Ed. GW Hurt Florida Association of Environmental Soil Scientists. Gainesville FL

[7] Soil Survey Division Staff, 1993. Soil Survey Manual. United States Department of Agriculture Handbook No. 18. U.S. Government Printing Office, Washington DC.

described in 2006 and twenty-seven were described in 2009. Twenty of the soil pedons from 2006 were re-assigned to new series in 2009 based on soil taxonomic and series criteria shown in Table 2. In the 2009 study, diagnostic surface and subsurface horizons were determined first and were used in conjunction with the control section particle size class to determine the taxonomy.

Based on the 2009 revisions to the taxonomic status of the soil profiles, sixteen soil series or taxonomic equivalents occur on the four transects (Table 2). Each occupies a distinct landscape position. **Paisley**, a fine-textured and poorly-drained soil, occupies the uplands of Transects 3, 5, and the north side of Transect 7. Sandy, moderately well- to poorly-drained soils such as **Pomona**, **Sparr**, **Jumper**, and **Tavares** occupy the uplands of transect 9 and the south side of transect 7. **Nittaw** and **Bluff** are fine and fine-loamy textured, very poorly-drained soils that occupy low river terraces on Transects 3, 5, and 7. **Bluff** also occurs in the floodplain of transect 9. Coarse-loamy and coarse-silty **Fluvaquents** and **Fluvaquentic Endoaquolls,** for which there are no established series, occur extensively in the active floodplain of transects 3, 5, and 7. **Anclote**, a sandy and very poorly-drained soil, occurs in depressions bordering sandy uplands on transects 7 and 9. **Denaud**, a coarse-loamy soil with a histic epipedon, occurs as an inclusion within an area of Histosols in Transect 5. Shallow Histosols such as **Gator** and **Okeelanta** occur in backswamp areas of transects 5 and 7 and in a transition to deeper organic soils on transect 9. Deep Histosols such as **Terra Ceia** and **Fluvaquentic Haplosaprists** (no established series) occur extensively on the floodplain of transect 9. This latter category describes Histosols that have mineral layers interspersed within a profile dominated by organic horizons. These Histosols are similar to and grade into **Thapto-Histic Endoaquolls** (no established series), which are dominantly mineral soils that also contain thick, subsurface, organic horizons. The presence of such soils indicates that the Silver River has had a dynamic history with alternating episodes of organic accretion and mineral deposition.

Soil profile descriptions were collected from 133 soil pedons in 2006 and are shown in Appendix 1, *Soil Profile Descriptions from Silver River (2006)*. Soil profile descriptions were collected from 98 soil pedons in 2009 and are shown in Appendix 2, *Soil Profile Descriptions from Silver River (2009)*. The level of detail of these descriptions ranges from brief comments to full soil profile descriptions. Observed HI included A1 (Histosol), A2 (histic epipedon), A4 (hydrogen sulfide), A5 (stratified layers), A6 (organic bodies), A7 (mucky mineral), A8 (muck presence), A11 (depleted below dark surface), A12 (thick dark surface), F3 (depleted matrix), F6 (redox dark surface), F13 (umbric surface), S6 (stripped matrix), and S7 (dark surface).

The results of LOI analysis for 13 soil samples from Transects 3, 5, and 7 are presented in Appendix 3, *Measured Organic Carbon Levels from Selected Horizons*. Four of the sampled soils qualified as muck with organic carbon levels ranging from 18.5 to 27.5 percent. Five of the sampled soils qualified as mucky mineral with organic carbon levels ranging from 9.9 to 12.1 percent. Four of the sampled soils qualified as mineral with organic carbon levels ranging from 4.2 to 8.0 percent.

Conclusions

The 2006 and 2009 soil investigations had different goals and focused on different aspects of the Silver River system. The 2006 investigation provided detailed soil descriptions, as well as brief comments regarding soils from both upland and wetland zones. The 2009 investigation focused more intensively on the wetland zones and on estimating the lateral extent of the various HI. In general, the findings of the two investigations are in good agreement. Some discrepancies occur due to the following reasons:

- Different sample locations (bore holes) were used for the two investigations.
- The 2009 study used soil-landscape relationships extensively in order to estimate and delineate the boundaries of HI, which had not been a goal in the 2006 study.
- Some field disturbances occurred in the years separating these studies. Extensive hog rooting and crayfish burrowing obliterated some thin, muck-based indicators. In most cases, other HI were present and the overall HI extent did not change.
- Additional bodies of deep organic soils were found that were previously not identified. Soils with interlayered muck and mineral horizons ("Fluvaquentic Haplosaprists") were much more extensive than anticipated. The depth of some borings from the 2006 study may have been insufficient to identify such soils.
- Additional wetland borings allowed refinement and/ or shifting of the lateral extent of HI.
- Soils series designations in the 2006 study were updated based on principles of soil taxonomy.

Some important findings are that the extent and depth of organic accumulations (Histosols and histic epipedons) in the Silver River floodplain system generally decrease downstream on the spring run and corresponds to an increase in floodplain microtopography. The deep and extensive organic accumulations at Transect 9 may be associated with nearby Half Mile Creek. The presence of interlayered muck and mineral horizons indicate that the Silver River has had a dynamic history with alternating episodes of organic accretion and mineral deposition. The soil series and HI in all transects occur in regular patterns that correspond to geomorphic landforms.

Table 1. Soil Sample Locations and Primary HI Described in 2006 and 2009

Transect	Station-HI (2006)	Station-HI (2009)	RF (2009) Evaluation of AS (2006) Descriptions	Estimated* extent of primary HI
3	0-none	0-none	Description confirmed.	
3	33-none		Descriptions consistent with findings at stations 0, 290 and 310. No HI expected in this upland area.	
3	130-none			
3	245-none			
3		290-none		
3	310-none	310-none	Description confirmed.	**none**: 0-314
3	314-F6		Descriptions consistent with findings at station 320. However, recent hog rooting has eliminated F6.	
3	320-F6	320-F3		
3	328-F6			
3	346-F6			**F3**: 314-369*
3		388-A12		
3	390-A12		Descriptions consistent with findings at station 388 and 465.	
3	415-A12			
3	432-A8		HI **not** consistent with findings at station 465.	
3		465-A12		**A12**: 369*-468
3	468-A8		HI not confirmed but A8 expected in this upper backswamp area.	**A8**: 468-480*
3		482-A8	(insufficient depth of boring)	
		500-A1		
3	515-A8		HI not consistent with findings at stations 500 and 550. Insufficient depth of boring.	
3		550-A2		
3	555-A8		HI not consistent with findings at stations 500 and 550. Insufficient depth of boring.	**A1/A2:** 480*-580*
3	586-A8			
3		600-A8		
3		622-A8		
3	640-A8			**A8**: 580-640
3		689-A5		
3	705-none		HI **not** consistent with findings at station 689 but otherwise similar; may be an inclusion of non-hydric soil	**A5**: 640-728
				river: 728-814
3		825-none		
3	875-none		Description consistent with findings at stations 825, 900, and 1006. HI not expected on berm.	**none**: 814-1205*
3		900-none		

Transect	Station-HI (2006)	Station-HI (2009)	RF (2009) Evaluation of AS (2006) Descriptions	Estimated* extent of primary HI
3		1006-none		
3		1215-F3/A11		
3		1256-F3/A11		
3	1270-F3/A11	1270-F3/A11	Description confirmed and consistent with findings at stations 1215 and 1256.	**F3/A11**: 1205*-1330
3	1330-A7	1330-A7	Description confirmed.	
3	1338-A7		Description consistent with station 1330.	**A7**: 1330-1345
3	1345-A8			
3	1350-A8			
3	1374-A8			
3	1385-A8		HI consistent with findings at station 1400.	
3	1395-A8			
3		1400-A8		
3	1420-A8		HI consistent with findings at station 1400.	
3	1445-A8			**A8**: 1345-1445
3	1464-A7/A5		HI not confirmed but dual HI expected in this transition area.	**A7**: 1445-1464
3	1495-A5		HI not confirmed.	**A5**: 1464-1495
3		1502-F13		
3	1504-A8		HI **not** consistent with findings at station 1502. LOI analysis at station 1540 indicates mineral texture. Muck not expected on convex landforms and rises in floodplain.	
3	1510-A8			
3	1540-A8			
3	1550-A8			**F13**: 1495-1567*
3	1555-A8			
3		1577-A8		**A8**: 1567*-1670*
3		1640-A8		
3		1680-A7		
3	1695-A8		Description **not** consistent with findings at station 1680. LOI analysis at station 1695 supports A7 (mucky mineral), not A8 (muck).	**A7**:1670*-1715
3	1715-A8		HI not confirmed but muck presence probable in depression.	
3	1722-A8			**A8**: 1715-1742
3	1742-A2		LOI analysis at station 1750 confirms A2 (histic epipedon).	
3	1750-A2			**A2**: 1742-1750
3		1755-A7		**A7**: 1750-1790

Transect	Station-HI (2006)	Station-HI (2009)	RF (2009) Evaluation of AS (2006) Descriptions	Estimated* extent of primary HI
3	1770-A8		LOI analysis at station 1790 supports A7 (mucky mineral), not A8 (muck).	
3	1790-A8			**A7**: 1750-1790
3	1805-A8	1805-F6	LOI analysis at station 1805 indicates mineral texture, not A8 (muck).	
3		1810-F6		
3	1817-F6		Descriptions consistent with findings at station 1810.	
3	1830-F6			**F6**: 1790-1830
3		1840-none		
3	1885-none		Descriptions consistent with findings at station 1840. No HI expected in this upland area.	
3	1950-none			**none:** 1830-2000
5	40-none		HI not expected in upland area but not confirmed.	**none**: 0-140
5	140-F6	140-F3	Description confirmed. Hog rooting in footslope area has eliminated F6.	
5	150-F6		Descriptions consistent with findings at station 140.	
5	160-F6			**F3**: 140-170
5	170-A8		Descriptions consistent with findings at station 201.	
5	175-A8			
5	180-A8			
5		201-A8		**A8**: 170-204*
5		206-A1		
5		240-A1		
5		285-A1		
5		300-A2		
5		318-A1		**A1**: 204*-320*
5	345-A8		Descriptions not confirmed. A8 (muck presence) likely based on landscape.	
5	360-A8			
5	370-A8			**A8**: 320*-370
5		377-A5		**A5**: 370-405
5	405-A8		Descriptions consistent with findings at station 412.	
5	410-A8			
5		412-A8		
5		446-A8		**A8**: 405-460

Transect	Station-HI (2006)	Station-HI (2009)	RF (2009) Evaluation of AS (2006) Descriptions	Estimated* extent of primary HI
5				**river**: 460-600
5		630-A6/F13		**A6/F13:** 600-640
5	640-A2		Description consistent with findings at station 641.	
5		641-A2		
5	670-A2		Description consistent with findings at station 641.	**A2**: 640-670
5	680-A8		HI not confirmed but consistent with landform.	
5	695-A8			**A8:** 670-700
5		700-A6		**A6**: 700-760*
5	765-A8			
5	800-A4		HI **not** consistent with findings at station 816; may be an ephemeral feature.	
5		816-A8		**A8**: 760*-880*
5		900-A2		**A2**: 880*-925*
5	960-A8		Description consistent with findings at station 1109. Muck expected on this broad flat in floodplain.	
5		1109-A8		
5	1120-A8		Description consistent with findings at station 1109. Muck expected on this broad flat in floodplain.	
5	1145-A4		Not consistent with findings at station 1109; may be an ephemeral feature.	**A8**:925*-1150*
5	1170-A8	1170-A7	Not consistent with findings at station 1170 (2009); muck not expected on this rise in floodplain.	**A7**: 1150*-1193*
5		1204-A8		
5	1295-A8			
5	1310-A8/A12		Descriptions consistent with findings at station 1204; Muck expected on this broad flat in floodplain.	**A8**: 1193*-1320*
5	1315-A8			
5	1330-F13/F6		Consistent with findings at station 1340.	
5		1340-F13/F6		
5	1345-F13/F6			
5	1355-F13/F6		Consistent with findings at station 1340.	**F13/F6**: 1320*-1365*

Transect	Station-HI (2006)	Station-HI (2009)	RF (2009) Evaluation of AS (2006) Descriptions	Estimated* extent of primary HI
5	1390-F6			
5	1415-F6		HI not confirmed but expected and consistent with toeslope landform.	
5	1420-F6			**F6**: 1365*-1420
5	1430-F3		Consistent with findings at station 1458; F3 expected on footslope.	
5	1450-F3			
5		1458-F3		
5	1460-F3		Consistent with findings at station 1458; F3 expected on footslope.	**F3**: 1420-1460
5		1500-none		
5	1555-none		Consistent with findings at station 1550. No HI expected in upland.	**none**: 1460-1600
7	20-none		Consistent with findings at station 24. Does not qualify for F13 due to upland landform.	
7		24-none		
7	135-none		Consistent with findings at station 24. Does not qualify for F13 due to upland landform.	
7	195-none			**none**: 0-200
7	200-F3		Consistent with findings at station 202.	
7		202-F3		
7	215-F3		Consistent with findings at stations 202 and 220.	
7		220-F3		
7	230-F3		Consistent with findings at station 220.	**F3**: 200-235
7	235-F3/F6		Consistent with findings at stations 220 and 240.	
7	240-F6	240-F6	Description confirmed.	
7	245-F6/A8		Consistent with findings at stations 240 and 250.	**F6**: 235-245
7		250-A8		
7		279-A8		
7		294-A8		**A8**: 245-300*
7		306-A1		
7		400-A1		
7		470-A1		**A1**: 300*-478*
7		484-A8		
7		500-A8		
7		555-A8		**A8**: 478*-575*
7		588-A7		**A7**: 575*-596*
7		620-F3		**F3**: 596*-666*

Transect	Station-HI (2006)	Station-HI (2009)	RF (2009) Evaluation of AS (2006) Descriptions	Estimated* extent of primary HI
7		673-A8		**A8**: 666*-725
7				**river**: 725-960
7		1000-A8		
7	1100-A8		Consistent with findings at station 1000.	**A8**: 960-1150*
7	1200-A8		Description consistent with findings at station 1201 but HI different due to crawfish disturbance, noted throughout this area.	
7		1201-A11/F3		
7	1217-A8			
7	1248-A8		Same comment as for station 1200.	
7	1255-no muck		Consistent with stations 1201 and 1315 (2009), which also lacked muck.	
7	1315-A8	1315-A11/F3	Description confirmed but HI different due to crawfish disturbance.	
7	1435-A8			
7	1490-A7/A5		Description consistent with findings at station 1500 (2009); HI different due to extensive crawfish disturbance to mucky mineral layer and thin strata.	
7	1500-A8	1500-A11/F3	Description confirmed but HI different due to crawfish disturbance.	
7	1515-A7		Description consistent with findings at station 1517; extensive crawfish disturbance has disrupted mucky mineral layer.	
7		1517-A11/F3		**A11/F3:** 1150*-1520*
7	1530-A7		HI **not** consistent with station 1542.	
7		1542-none		
7	1555-none		Description consistent with findings at station 1542.	
7	1600-A6		HI **not** consistent with findings at station 1628. HI not expected on rise in floodplain.	
7		1628-none		**none:** 1520*-1668

Transect	Station-HI (2006)	Station-HI (2009)	RF (2009) Evaluation of AS (2006) Descriptions	Estimated* extent of primary HI
7		1668-F3		
7	1670-A6		HI **not** consistent with station 1668.	
7	1700-A7	1700-F3	HI (2006) **not** consistent with findings at station 1700 (2009).	
7	1740-A6		HI **not** consistent with findings at station 1700 (2009).	**F3**: 1668-1790*
7		1792-F13/A6		
7	1800-F13/A6		Description consistent with findings at stations 1792 and 1826.	
7		1826-F13/A6		
7	1830-F13/A6			
7	1875-F13		Descriptions consistent with findings at station 1826.	**F13/A6**: 1790*-1915
7	1900-F13			
7		1915-A7		
7	1920-none		HI **not** consistent with findings at stations 1915, 1960, 1985. HI expected in this depressional area.	
7	1940-none			
7		1960-A7		
7		1985-A7		**A7**: 1915-1985
7	2000-none		Description **not** consistent with findings at station 2019.	
7		2019-S6		**S6**: 1985-2035*
7		2073-none		**none**: 2035*-2175
7	2145-none		Description consistent with findings at station 2073. No HI expected in upland.	
9	10-none	10-none	Description confirmed.	
9	180-none		HI consistent with station 10 findings. No HI expected in upland area.	**none**: 0-243
9	242-none			

Transect	Station-HI (2006)	Station-HI (2009)	RF (2009) Evaluation of AS (2006) Descriptions	Estimated* extent of primary HI
9	243-S6	243-S6	Description confirmed.	
9	255-S6		Consistent with findings at station 243 (2009).	**S6:** 243-260*
9	294-F13		HI consistent with findings at station 325 (2009).	
9	306-A8		HI **not** consistent with findings at station 325 (2009).	
9	325-A8/F13	325-A8/F13	Description confirmed.	**F13**: 260*-325
9		350-A8		
9		460-A8		
9		575-A8		**A8**: 325-695*
9		600-A8		
9		670-A8		
9		700-A1		
9		775-A1		
9		800-A1		
9		825-A1		
9		856-A1		
9		858-A1		
9		884-A1		**A1**: 695*-901
9				**river**: 901-1075
9	1110-A1		Descriptions consistent with findings at station 1235.	
9	1210-A1			
9		1235-A1		
9	1241-A1		Description consistent with findings at station 1235.	**A1**: 1075-1241
9	1245-A2		Description supports A8, not A2. Not confirmed.	
9	1255-A8		HI not confirmed but muck expected on this broad flat in floodplain.	
9	1262-A8			**A8**: 1241-1262
9	1275-S7	1275-S7	Description confirmed.	**S7**: 1262-1275
9	1280-none			
9	1365-none		No HI expected in this upland.	**none**: 1275-1400

* indicates ranges estimated based on landscape features rather than actual soil borings.

Table 2. Soil Taxonomy and Series as Determined in 2006 and 2009.

Transect-Station (Year)	Initially Designated Series(Taxonomy)	RF Comments and Revisions		
		Diagnostic Horizons	Taxonomic Class	Soil Series
3-0 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	mollic, argillic	fine Typic Argiaquoll	Texture and upland landform fit **Paisley** taxajunct - no ochric, no albic
3-0 (2009)	**Paisley** (fine, Typic Albaqualf)	mollic, argillic	fine Typic Argiaquoll	**Paisley** taxajunct - no ochric, no albic
3-130 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	mollic, argillic	fine Typic Argiaquoll	Texture and upland landform fit **Paisley** taxajunct - no ochric, no albic
3-245 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	ochric	fine Endoaquent	Texture and upland landform fit **Paisley** taxajunct – no albic, argillic
3-310 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	ochric	fine Endoaquent	Texture fits **Nittaw** taxajunct – no argillic
3-390 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	mollic, argillic	fine Typic Argiaquoll	Taxonomy fits **Nittaw** series
3-640 (2006)	(Aquent)	ochric	coarse-loamy Mollic Fluvaquent	No established series
3-875 (2006)	(Fluvaquent)	ochric	coarse-silty Mollic Fluvaquent	No established series
3-900 (2009)	(Fluvaquent)	ochric	coarse-silty Typic Fluvaquent	No established series
3-1270 (2006)	(Fluvaquent)	ochric	coarse-loamy Typic Fluvaquent	No established series
3-1495 (2006)	(Fluvaquent)	mollic	coarse-silty Fluvaquentic Endoaquoll	No established series
3-1817 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	mollic	fine Typic Endoaquoll	**Bluff** taxajunct - not fine-loamy
3-1885 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	mollic	fine-loamy Typic Endoaquoll	Taxonomy fits **Bluff** series
3-1950 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	mollic, argillic	fine Typic Argiaquoll	Texture and upland landform fit **Paisley** taxajunct - no ochric, no albic
5-40 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	ochric	fine Endoaquent	Texture and upland landform fit **Paisley** taxajunct - no albic, no argillic
5-140 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	mollic, argillic	fine Typic Argiaquoll	Taxonomy fits **Nittaw** series
5-201	**Bluff** (fine-loamy,	mollic	fine-loamy	Taxonomy fits **Bluff** series

Transect-Station (Year)	Initially Designated Series(Taxonomy)	RF Comments and Revisions		
		Diagnostic Horizons	Taxonomic Class	Soil Series
(2009)	Typic Endoaquoll)		Typic Endoaquoll	
5-206 (2009)	**Gator** (loamy, Terric Haplosaprist)	histic	loamy Fluvaquentic Haplosaprist	**Gator** taxajunct – Fluvaquentic not Terric
5-240 (2009)	**Gator** (loamy, Terric Haplosaprist)	mollic	loamy Fluvaquentic Haplosaprist	**Gator** taxajunct - no histic, Fluvaquentic not Terric
5-285 (2009)	**Okeelanta** (sandy, Terric Haplosaprist)	mollic	sandy Fluvaquentic Haplosaprist	**Okeelanta** taxajunct - no histic, Fluvaquentic not Terric
5-300 (2009)	**Denaud** (coarse-loamy, Histic Humaquept)	histic	coarse-loamy Histic Humaquept	Taxonomy fits **Denaud** series
5-318 (2009)	**Okeelanta** (sandy, Terric Haplosaprist)	histic	sandy, Terric Haplosaprist	Taxonomy fits **Okeelanta** series
5-765 (2006)	(Fluvaquent)	ochric	coarse-loamy Typic Fluvaquent	No established series
5-1310 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	mollic, argillic	fine, Typic Argiaquoll	Taxonomy fits **Nittaw** series
5-1430 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	ochric, argillic, albic	fine Typic Albaqualf	Taxonomy fits **Paisley** series
5-1555 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	mollic	fine Typic Endoaquoll	Texture and upland landform fit **Paisley** taxajunct – no albic, argillic
7-20 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	mollic, argillic	fine Typic Argiaquoll	Texture and upland landform fit **Paisley** taxajunct – no ochric, albic
7-24 (2009)	**Paisley** (fine, Typic Albaqualf)	mollic, argillic	fine Typic Argiaquoll	**Paisley** taxajunct - no ochric, no albic
7-135 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	ochric, argillic	fine Typic Albaqualf	Taxonomy fits **Paisley** series
7-235 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	ochric, argillic	fine Typic Albaqualf	Taxonomy fits **Paisley** series
7-279 (2009)	**Bluff** (fine-loamy, Typic Endoaquoll)	mollic	fine-loamy Fluvaquentic Endoaquoll	**Bluff** taxajunct – Fluvaquentic, not Typic
7-294 (2009)	(Endoaquoll)	mollic	coarse-loamy Fluvaquentic Endoaquoll	No established series
7-306	**Gator** (loamy,	mollic	loamy	**Gator** taxajunct - no histic,

Transect-Station (Year)	Initially Designated Series(Taxonomy)	RF Comments and Revisions		
		Diagnostic Horizons	Taxonomic Class	Soil Series
(2009)	Terric Haplosaprist)		Fluvaquentic Haplosaprist	not Terric
7-400 (2009)	**Gator** (loamy, Terric Haplosaprist)	histic	loamy Terric Haplosaprist	Taxonomy fits **Gator** series
7-470 (2009)	**Okeelanta** (sandy, Terric Haplosaprist)	mollic	sandy Fluvaquentic Haplosaprist	**Okeelanta** taxajunct – no histic, not Terric
7-484 (2009)	(Endoaquoll)	mollic	coarse-loamy Fluvaquentic Endoaquoll	No established series
7-1000 (2009)	(Endoaquoll)	mollic	coarse-loamy Fluvaquentic Endoaquoll	No established series
7-1315 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	ochric	coarse-loamy Mollic Fluvaquent	No established series
7-1315 (2009)	(Fluvaquent)	ochric	coarse-loamy Typic Fluvaquent	No established series
7-1500 (2006)	(Fluvaquent)	ochric	coarse-loamy Typic Fluvaquent	No established series
7-1668 (2009)	(Fluvaquent)	ochric	coarse-loamy Typic Fluvaquent	No established series
7-1700 (2006)	(Fluvaquent)	ochric	coarse-loamy Typic Fluvaquent	No established series
7-1920 (2006)	**Anclote** (Sandy, Typic Endoaquoll)	mollic	Coarse-loamy Fluvaquentic Endoaquoll	No established series
7-2145 (2006)	**Pomona** (Sandy Ultic Alaquod)	albic, spodic, argillic	sandy Ultic Alaquods	Taxonomy fits **Pomona** series
9-10 (2006)	**Sparr** (loamy Grossarenic Paleudult)	ochric, argillic	loamy Grossarenic Paleudult	Taxonomy fits **Sparr** series
9-180 (2006)	**Jumper** (loamy Arenic Plinthaquic Paleudult)	ochric, argillic	loamy Arenic Plinthaquic Paleudult	Taxonomy fits **Jumper** series
9-325 (2006)	**Bluff** (fine-loamy, Typic Endoaquoll)	mollic	Thapto-Histic Endoaquoll	No established series
9-600 (2009)	**Bluff** (fine-loamy, Typic Endoaquoll)	mollic	fine-loamy Typic Endoaquoll	Taxonomy fits **Bluff** series
9-700 (2009)	Fluvaquentic Haplosaprist	mollic	Fluvaquentic Haplosaprist	Insufficient depth to determine series

Transect-Station (Year)	Initially Designated Series(Taxonomy)	RF Comments and Revisions		
		Diagnostic Horizons	Taxonomic Class	Soil Series
9-775 (2009)	**Terra Ceia** (Typic Haplosaprist)	mollic	Fluvaquentic Haplosaprist	**Terra Ceia** taxajunct - no histic; Fluvaquentic, not Typic
9-800 (2009)	Fluvaquentic Haplosaprist	mollic	Fluvaquentic Haplosaprist	Insufficient depth to determine series
9-825 (2009)	Fluvaquentic Haplosaprist	mollic	Fluvaquentic Haplosaprist	Insufficient depth to determine series
9-856 (2009)	Fluvaquentic Haplosaprist	mollic	Fluvaquentic Haplosaprist	Insufficient depth to determine series
9-858 (2009)	**Terra Ceia** (Typic Haplosaprist)	histic	Typic Haplosaprist	Taxonomy fits **Terra Ceia** series
9-884 (2009)	**Terra Ceia** (Typic Haplosaprist)	histic	Typic Haplosaprist	Taxonomy fits **Terra Ceia** series
9-1110 (2006)	**Terra Ceia** (Typic Haplosaprist)	histic	loamy Terric Haplosaprist	Taxonomy fits **Gator** series (silt layer atypical)
9-1210 (2006)	**Okeelanta** (sandy, Terric Haplosaprist)	histic	sandy, Terric Haplosaprist	Taxonomy fits **Okeelanta** series
9-1235 (2009)	**Okeelanta** (sandy, Terric Haplosaprist)	histic	sandy Terric Haplosaprist	Taxonomy fits **Okeelanta** series
9-1245 (2006)	**Anclote** (Sandy, Typic Endoaquoll)	mollic	sandy Fluvaquentic Endoaquoll	**Anclote** taxajunct – Fluvaquentic, not Typic
9-1275 (2006)	**Anclote** (Sandy, Typic Endoaquoll)	ochric	Typic Psammaquent	Taxonomy fits **Pompano** series
9-1365 (2006)	**Tavares** (Typic Quartzi-psamment)	ochric	Typic Quartzi-psamment	Taxonomy fits **Tavares** series

Figure 1. Silver River MFLs Transect Locations

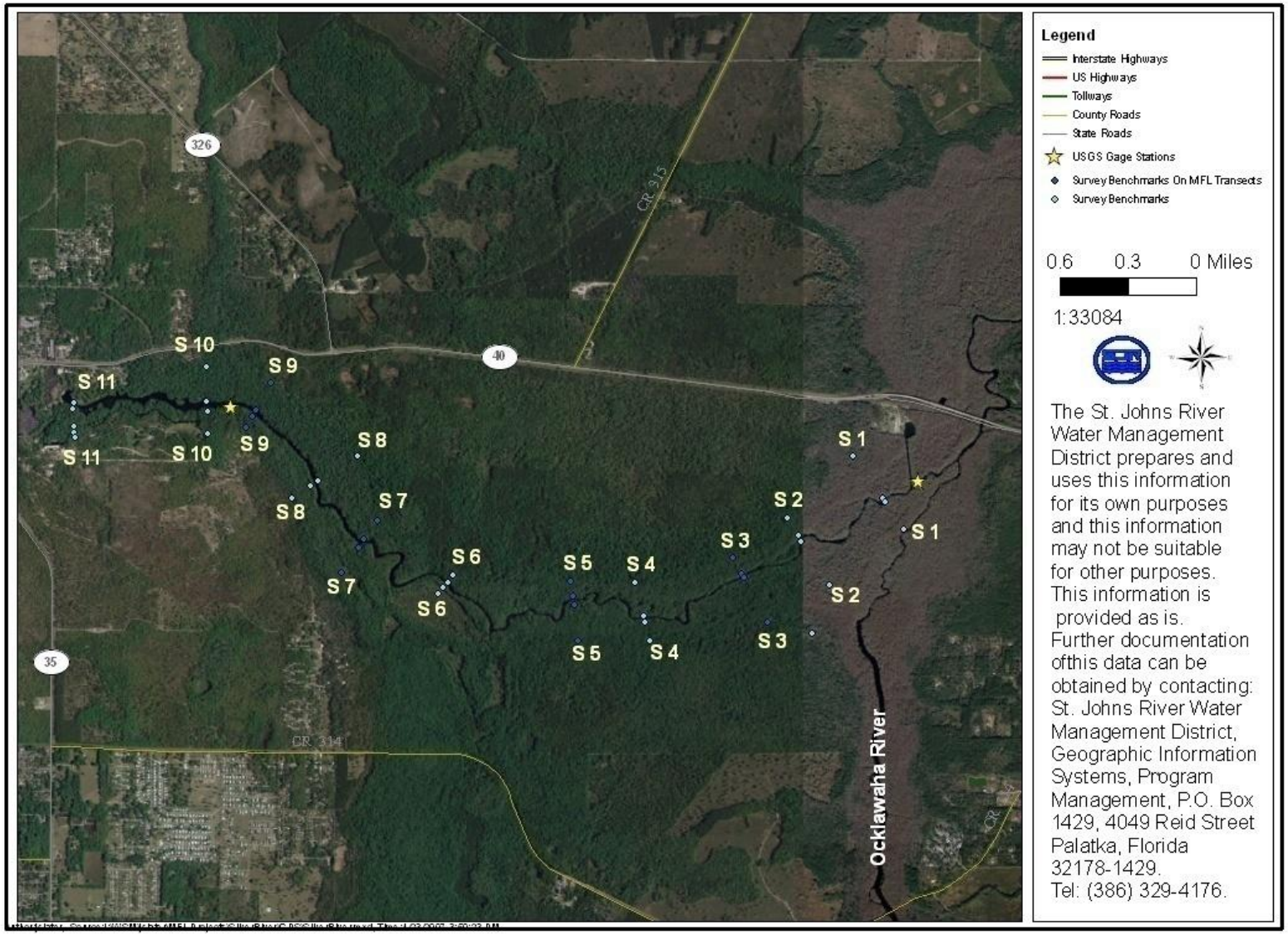

Figure 2. Transect 3: Estimated Distribution of Primary Hydric Soil Indicators.

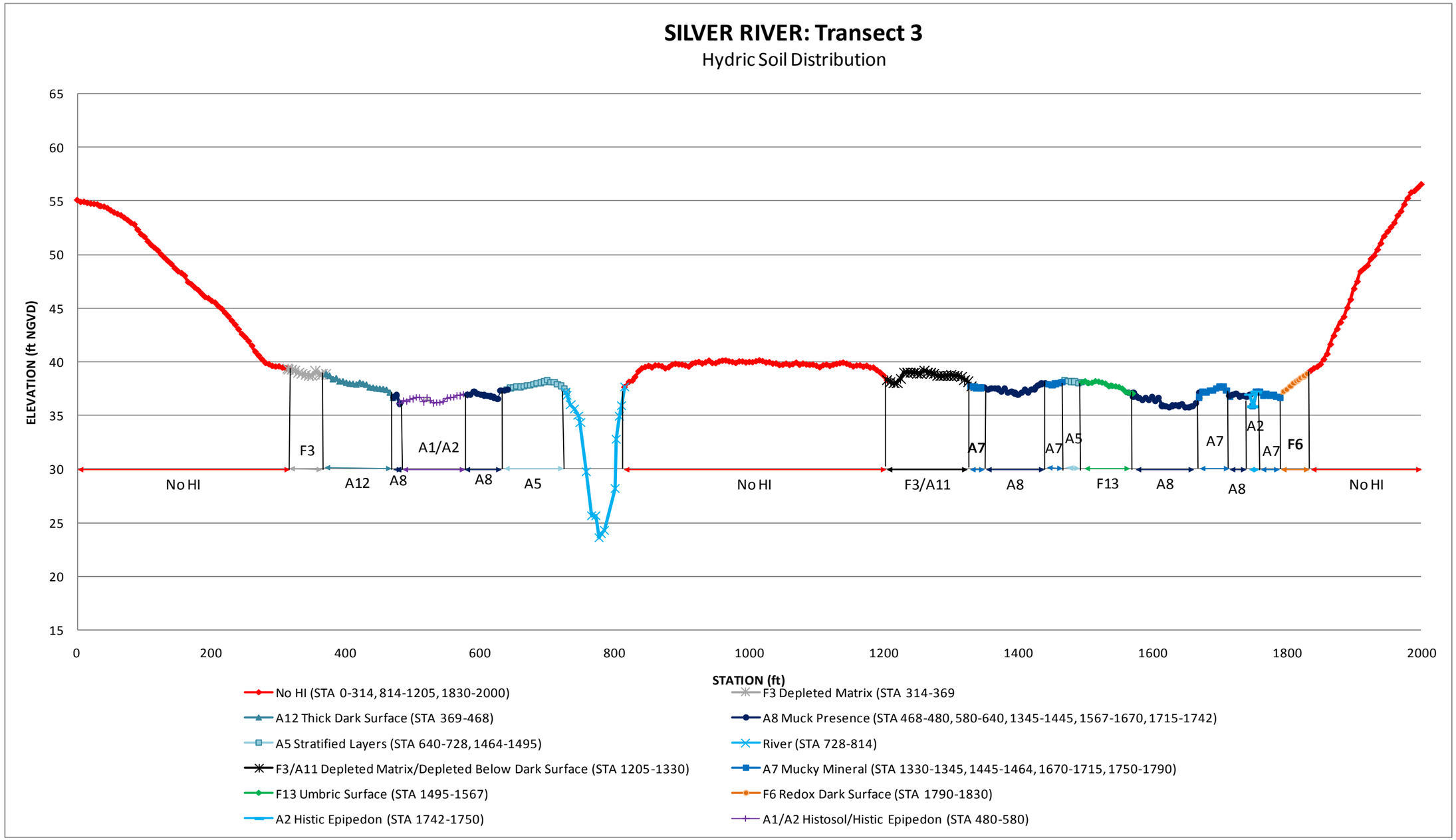

Figure 3. Transect 5: Estimated Distribution of Primary Hydric Soil Indicators.

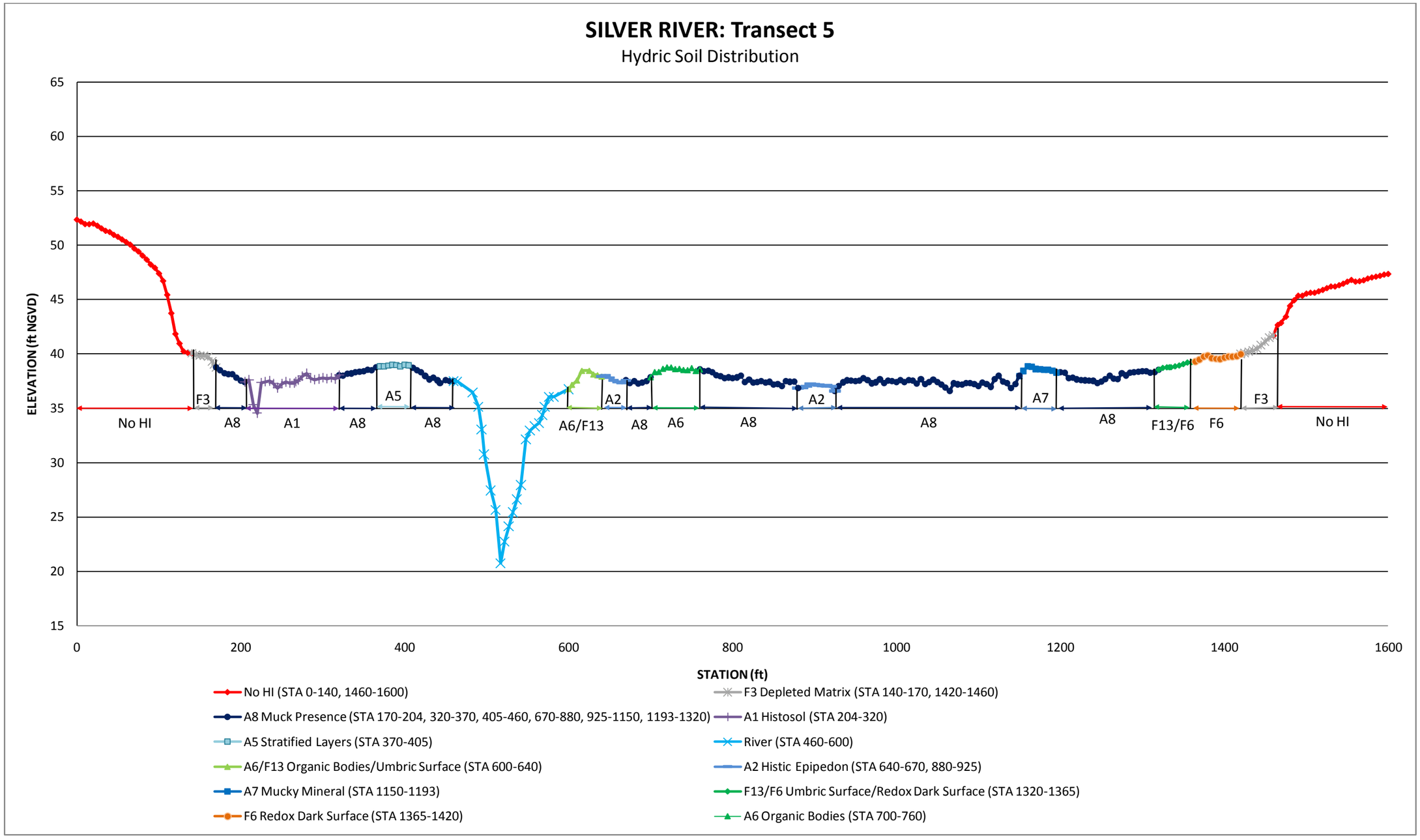

Figure 4. Transect 7: Estimated Distribution of Primary Hydric Soil Indicators.

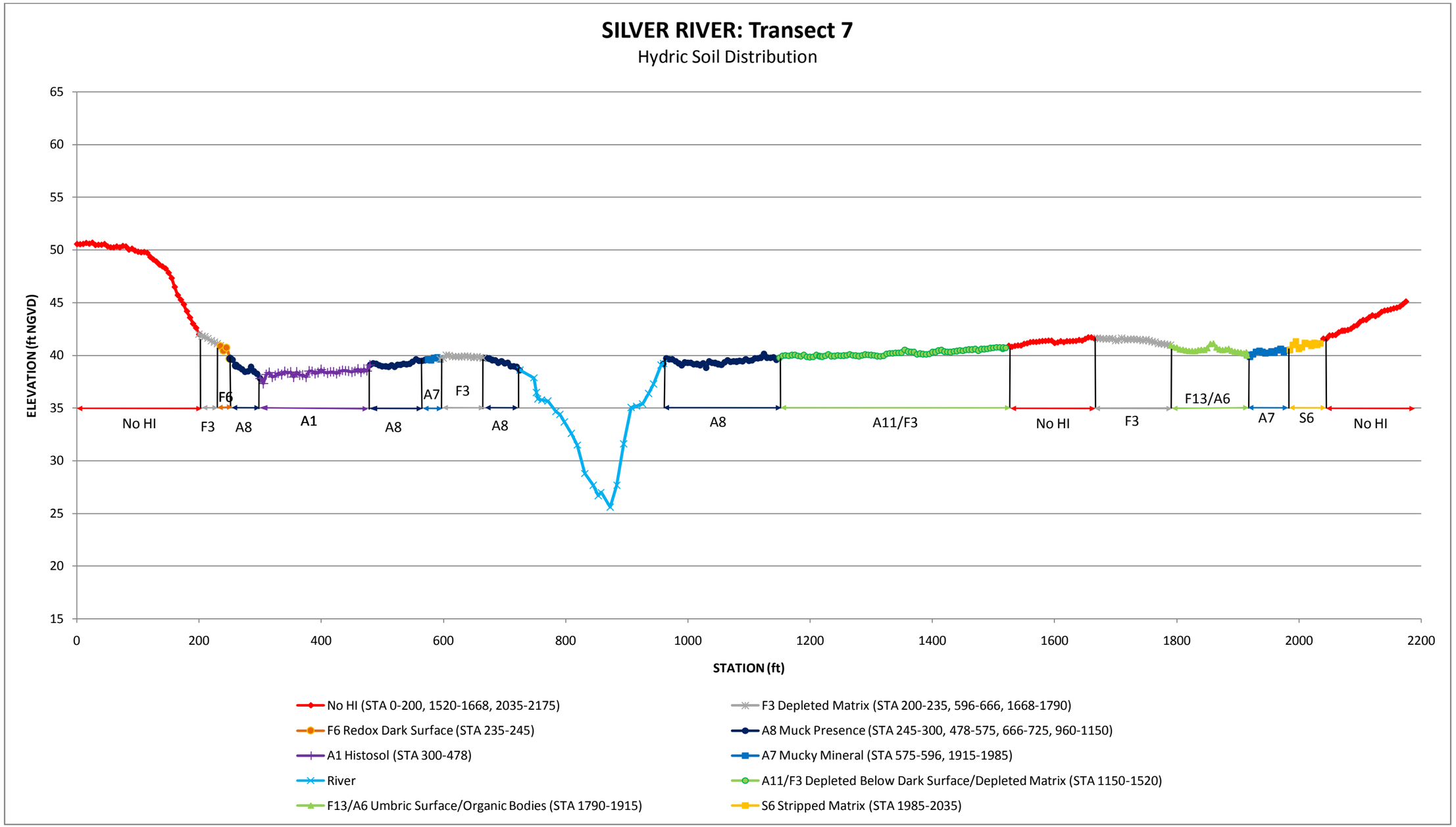

Figure 5. Transect 9: Estimated Distribution of Primary Hydric Soil Indicators.