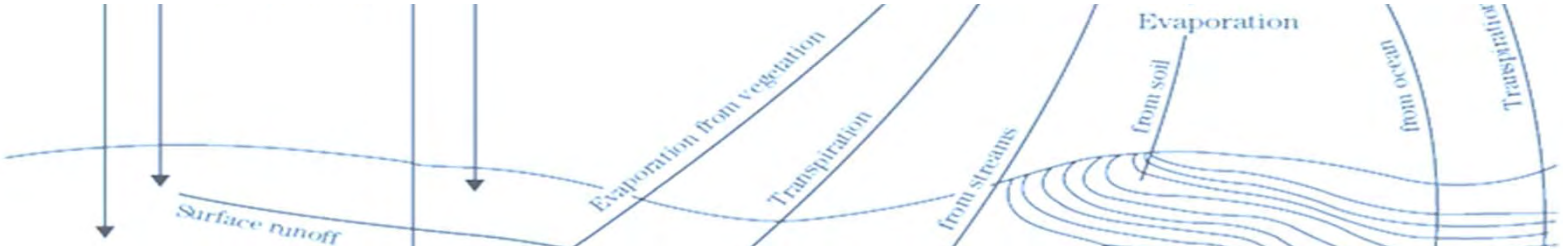
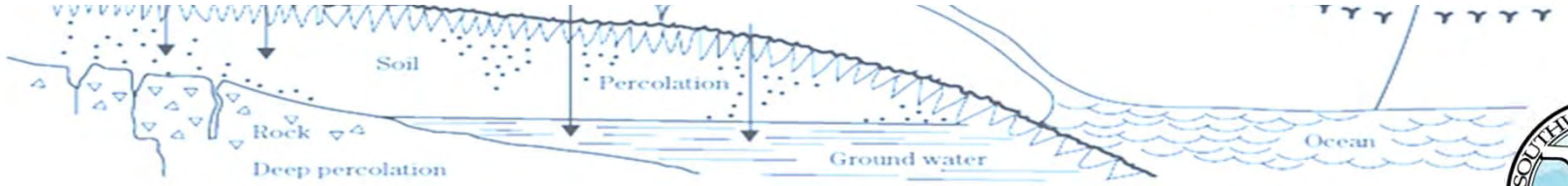
FSA 2019 Winter Conference

A Case Study to Determine Initial Water Table Conditions in the Soil Column and Water Bodies to Simulate Reasonable Flood Levels



Harry Downing, PE, Sr. Water Resources Engineer, Applied Sciences Consulting, Inc.

Nam Nguyen, PE, Professional Engineer, SWFWMD



AppliedSciences

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

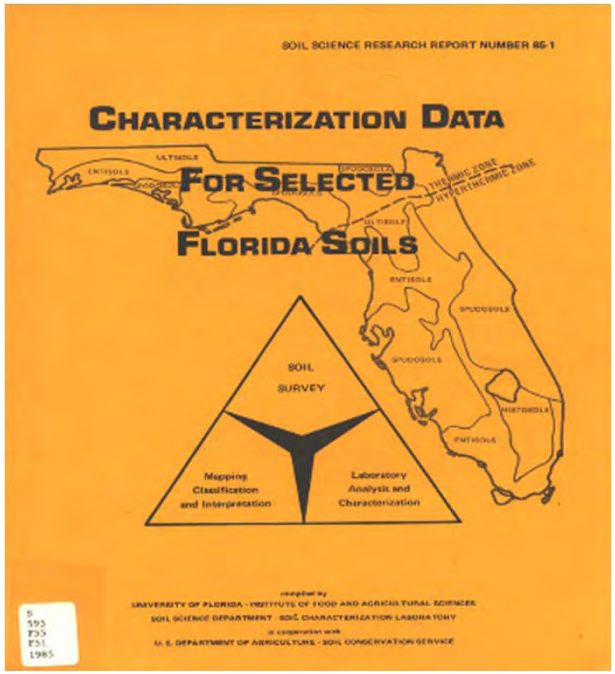
December 6, 2019

General Review Physically Based Soil Parameters for Rainfall Excess Determination

Soil Data Sources

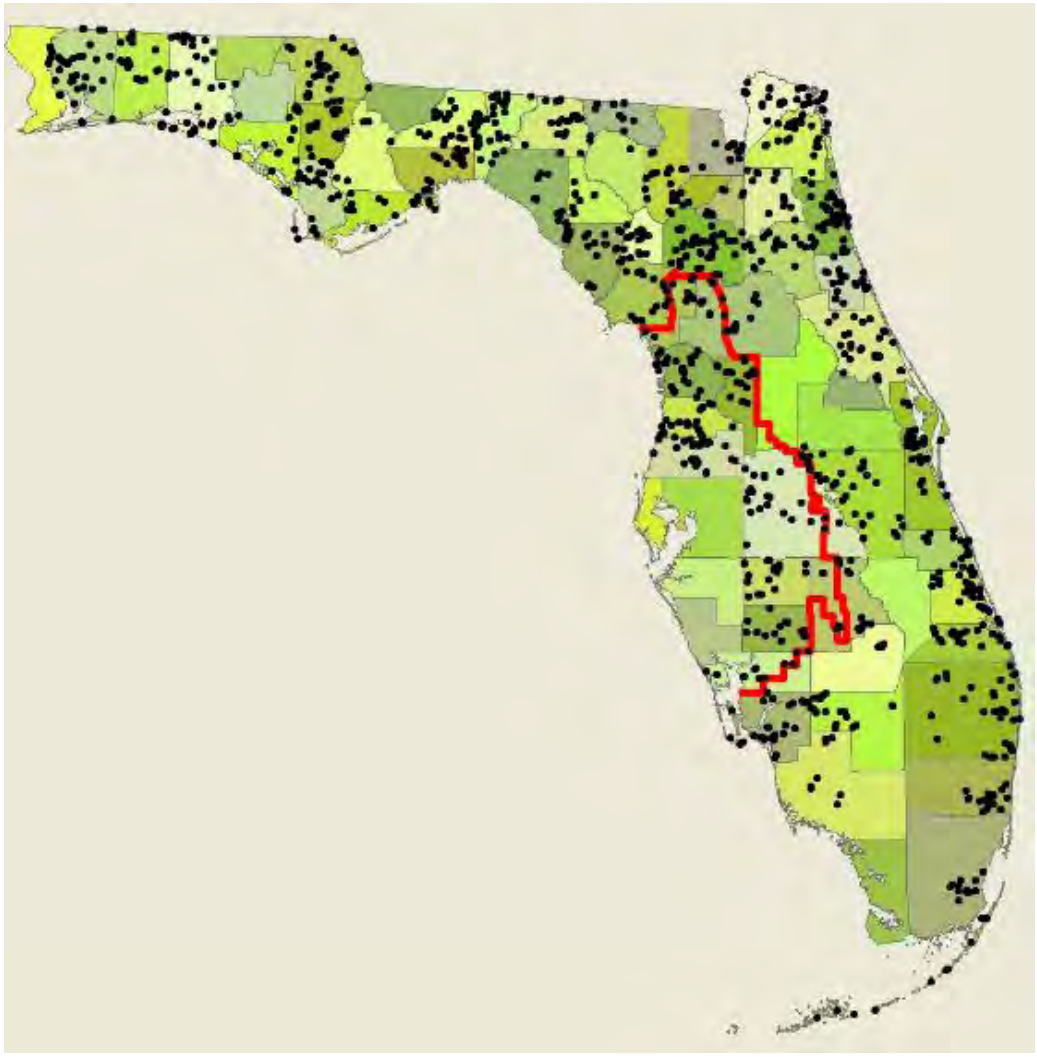
- **IFAS Soil Data**
  - Institute of Food and Agricultural Sciences
  - University of Florida Soils Department
    - Spreadsheet
    - Soil Manuals

- **SSURGO** (Soil Survey Geographic Database)
  - https://catalog.data.gov/dataset/soil-survey-geographic-ssurgo-database-for-various-soil-survey-areas-in-the-united-states-



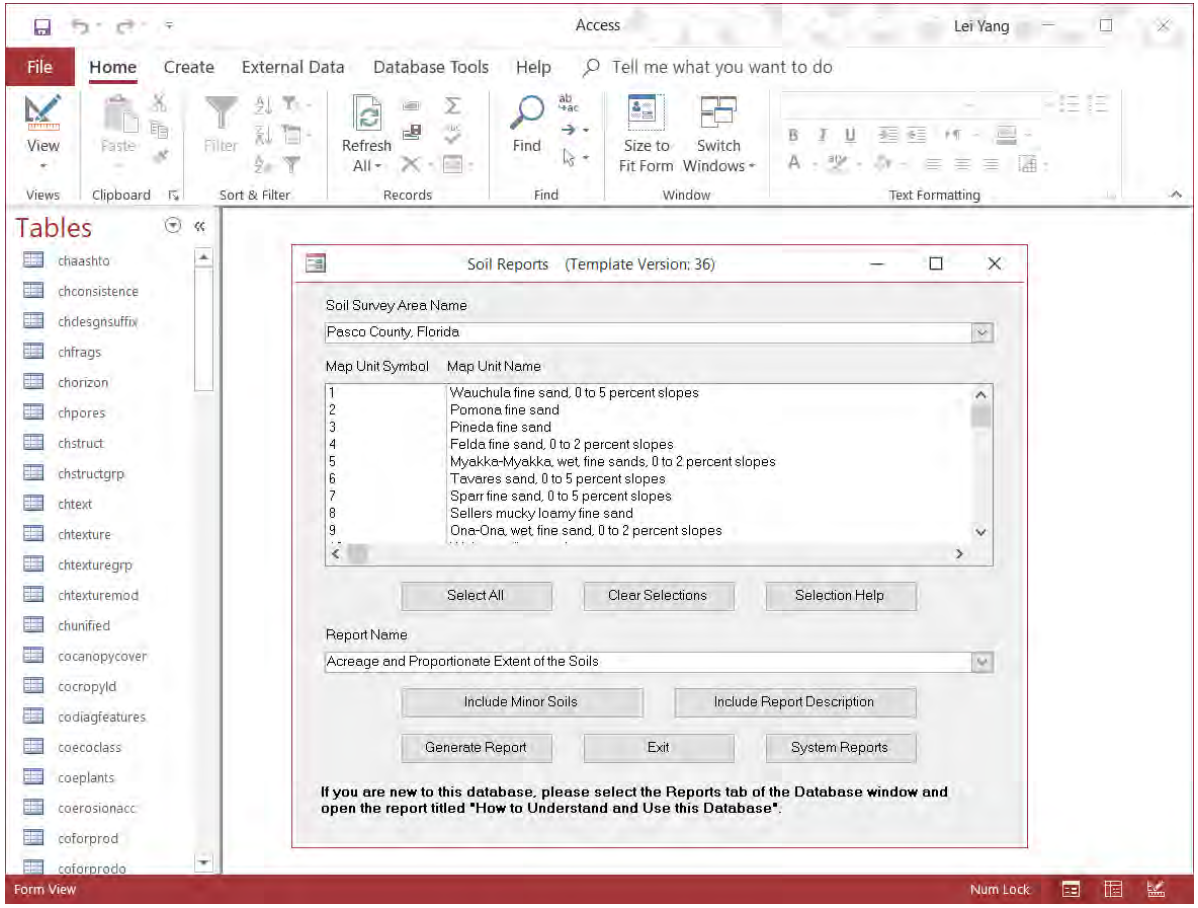
Location of IFAS Soil Bores

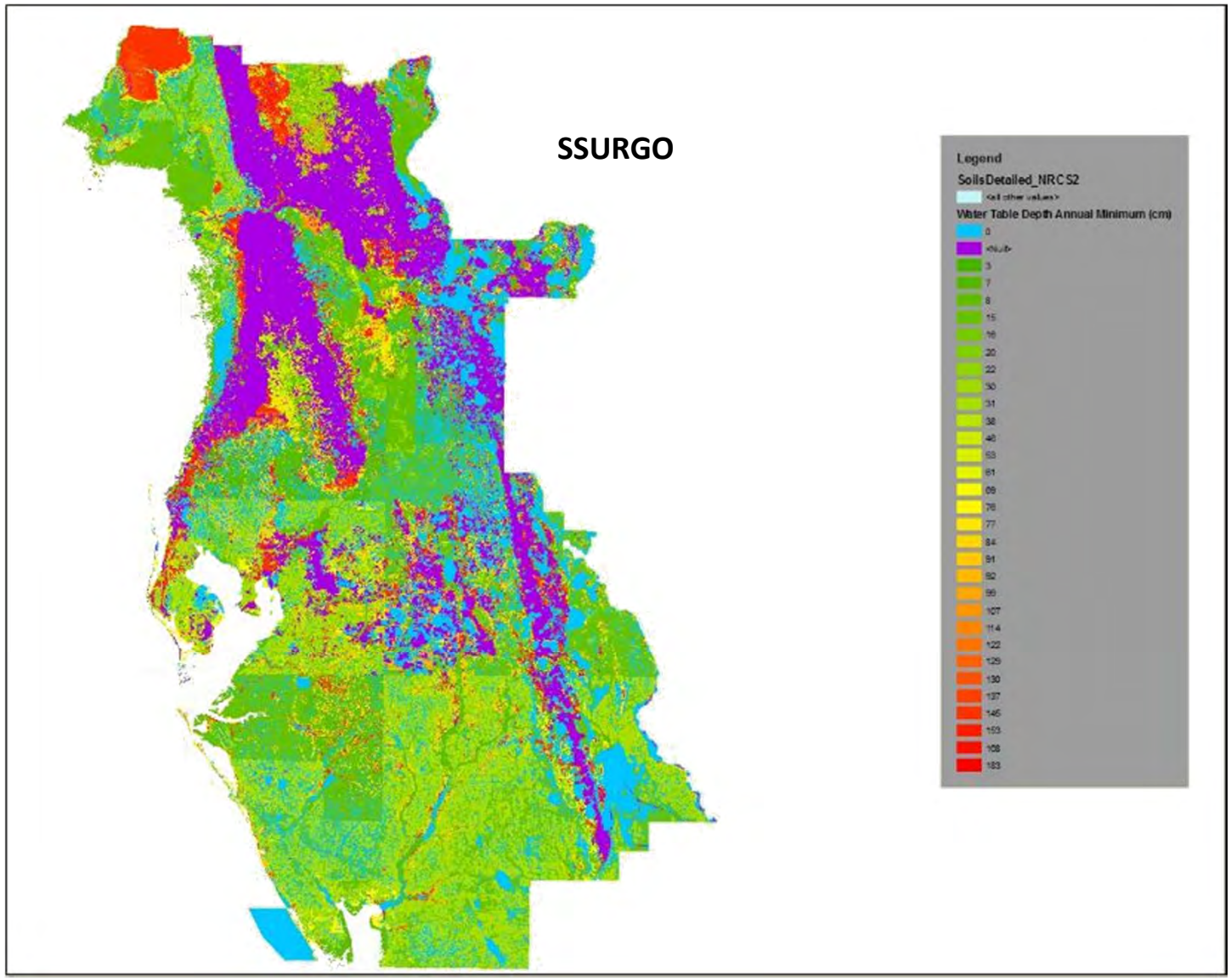
- Data Period (1965 - 1996)
- 58 out of 67 counties
- 1,290 soil profiles
- 2 to 13 soil horizons
- 144 physical and chemical properties
- Soil moisture retention curve



SSURGO

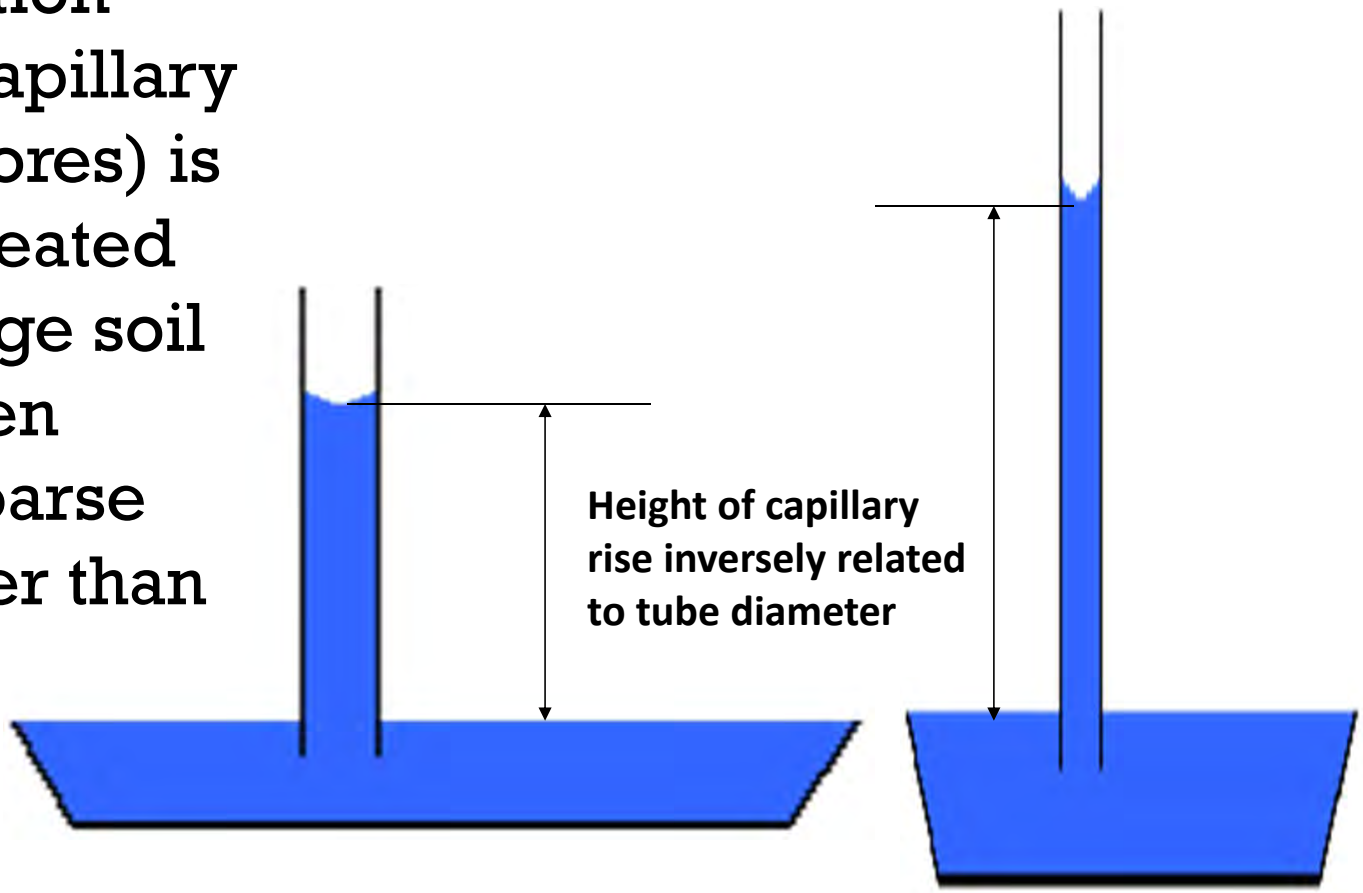
- Data retrieval and georeferenced through Data View
- 954 MUKEYs within SWFWMD
- Water table depth
- Hydraulic conductivity
- Other properties




SSURGO
Legend
SoilsDetailed_NRCS2
Water Table Depth Annual Minimum (cm)
0
3
7
8
15
20
22
30
31
38
46
61
69
77
84
91
99
107
114
122
129
130
137
145
153
168
183

Matric Potential and Soil Texture

The tension or suction created by small capillary tubes (small soil pores) is greater that that created by large tubes (large soil pores). At any given metric potential coarse soils hold less water than fine-textured soils.



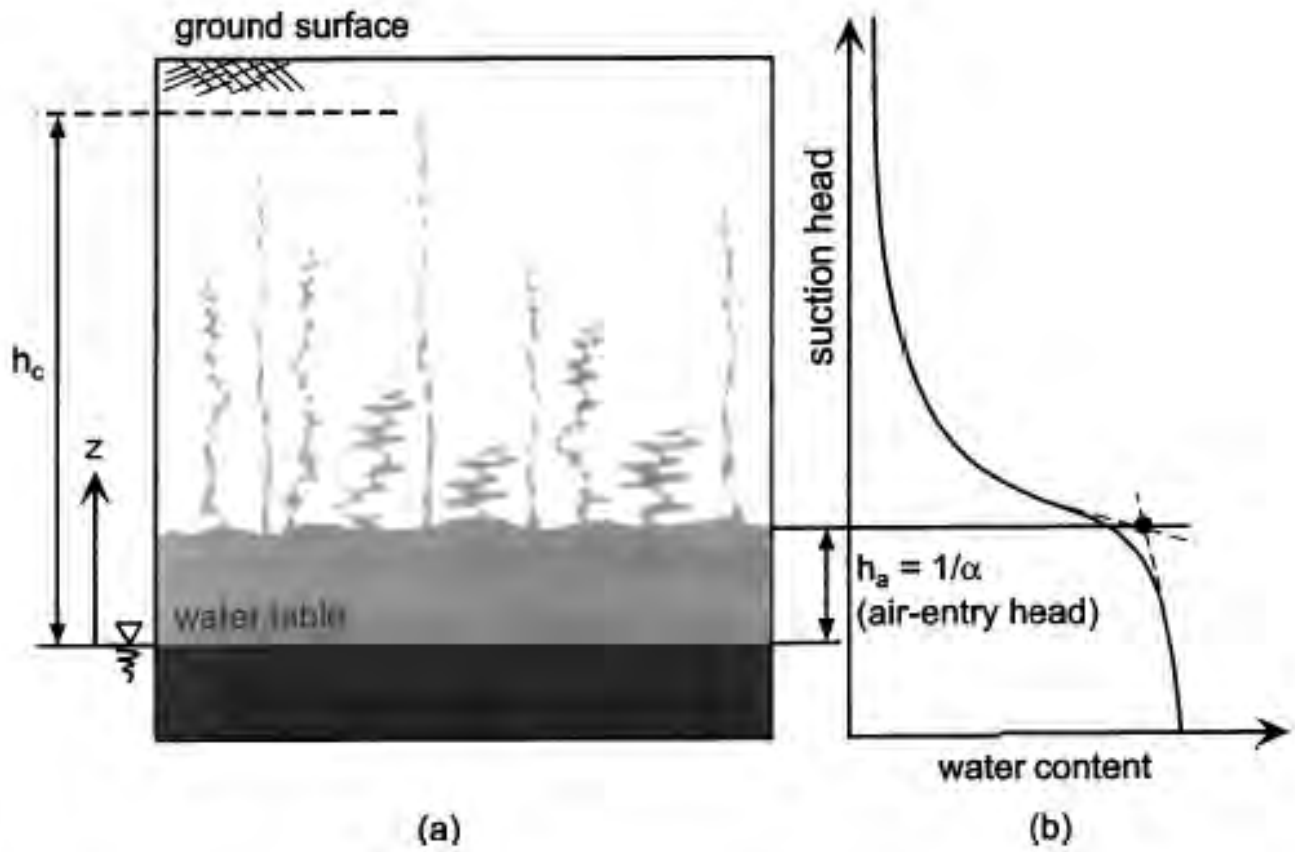
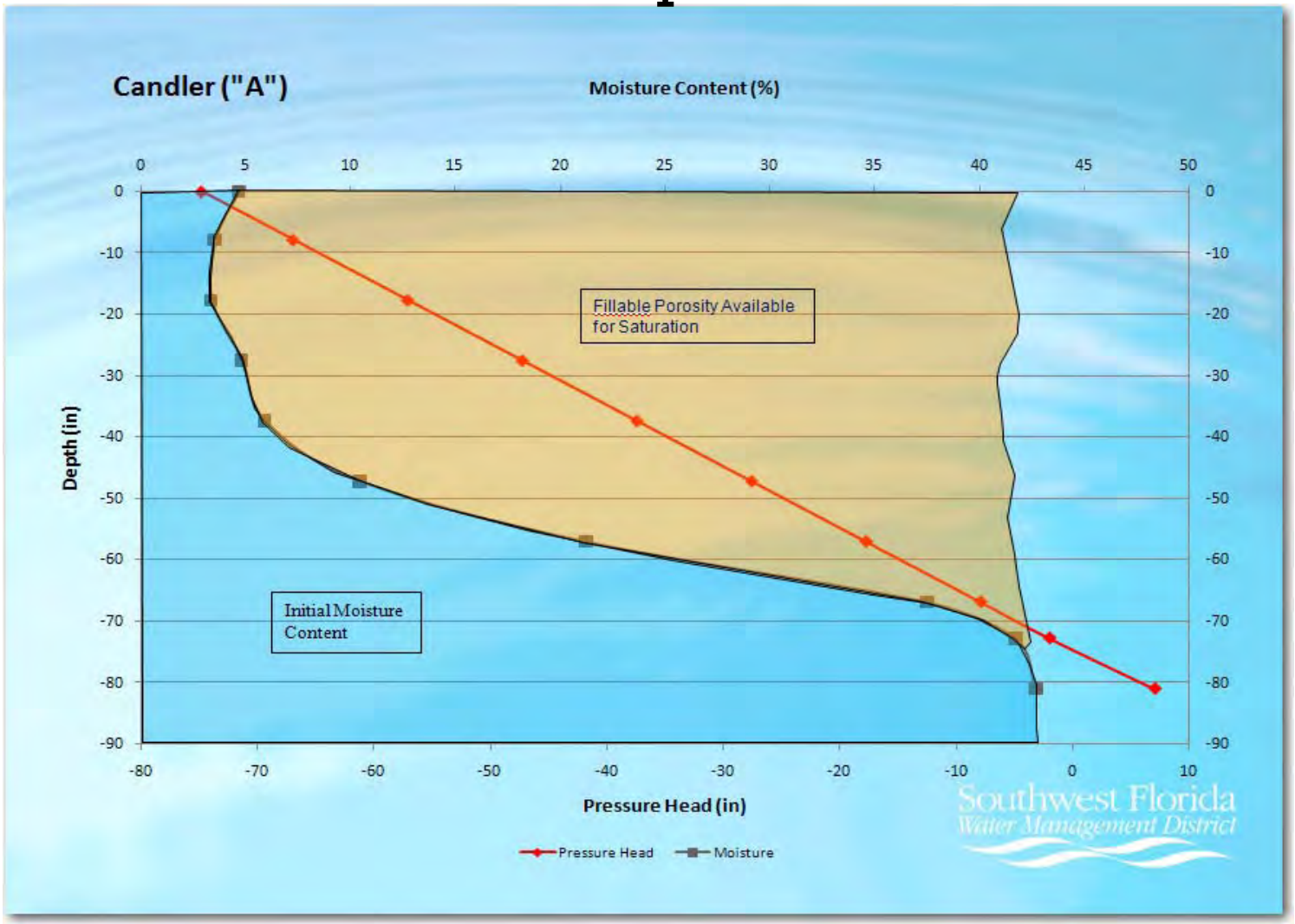


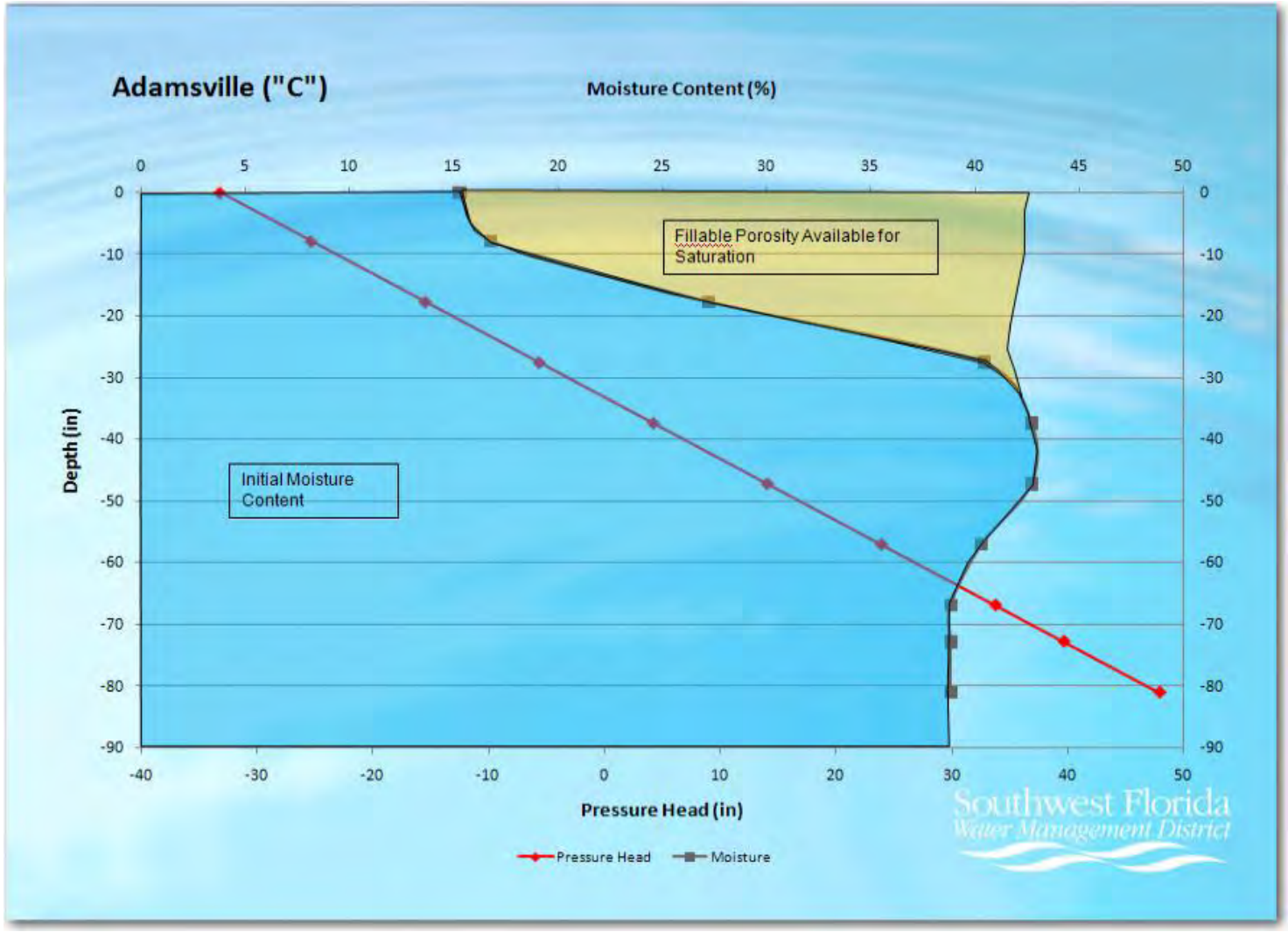
Fig. 1. Conceptual model for capillary rise and associated soil–water characteristic curve

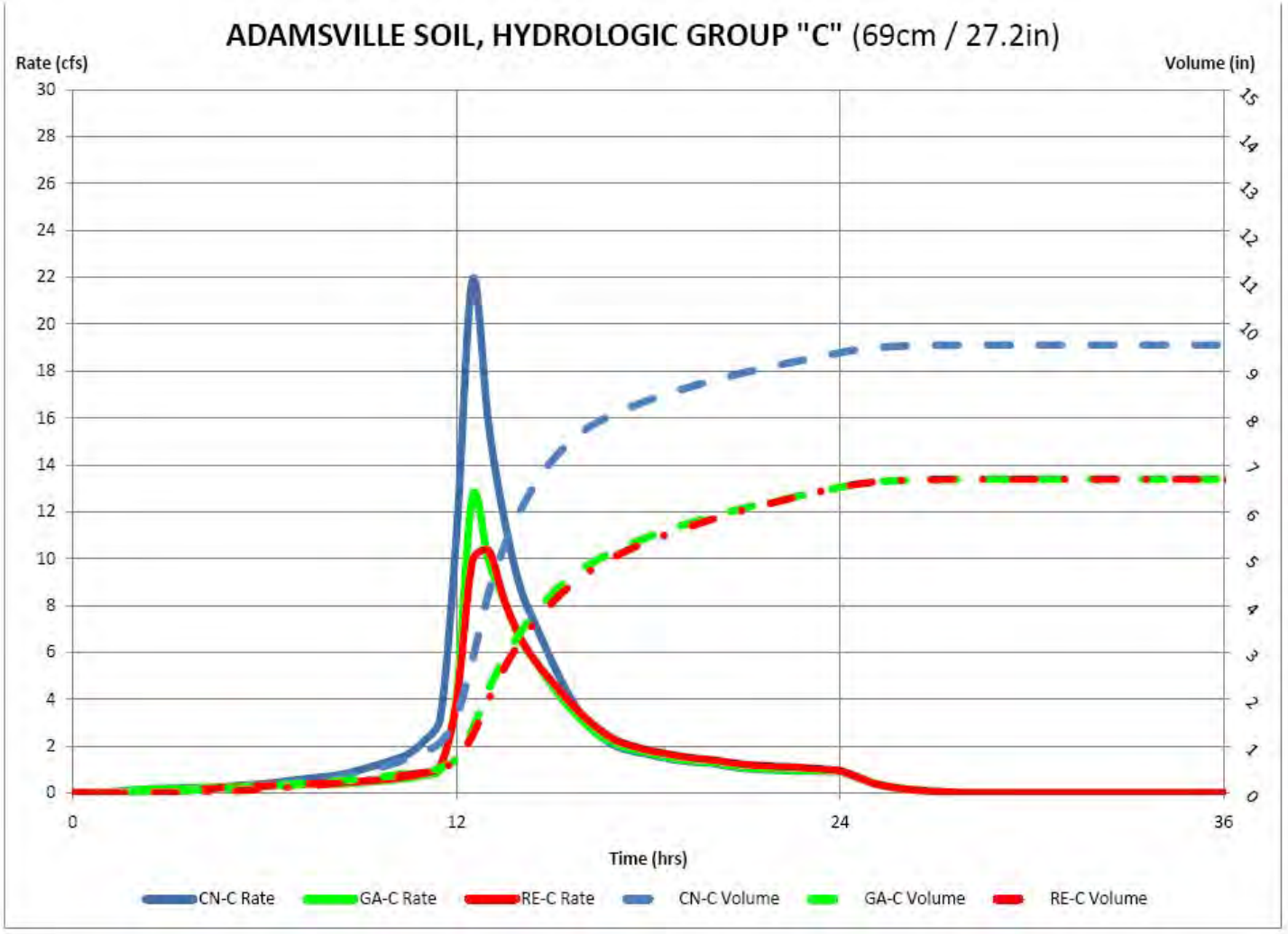
By: N. Lu and W.J. Likos

Soil Moisture Comparison - Candler



Soil Moisture Comparison - Adamsville




ADAMSVILLE SOIL, HYDROLOGIC GROUP "C" (69cm / 27.2in)
Rate (cfs)
Volume (in)
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
0
12
24
36
Time (hrs)
CN-C Rate
GA-C Rate
RE-C Rate
CN-C Volume
GA-C Volume
RE-C Volume

Soil Data Retrieving and Processing Program

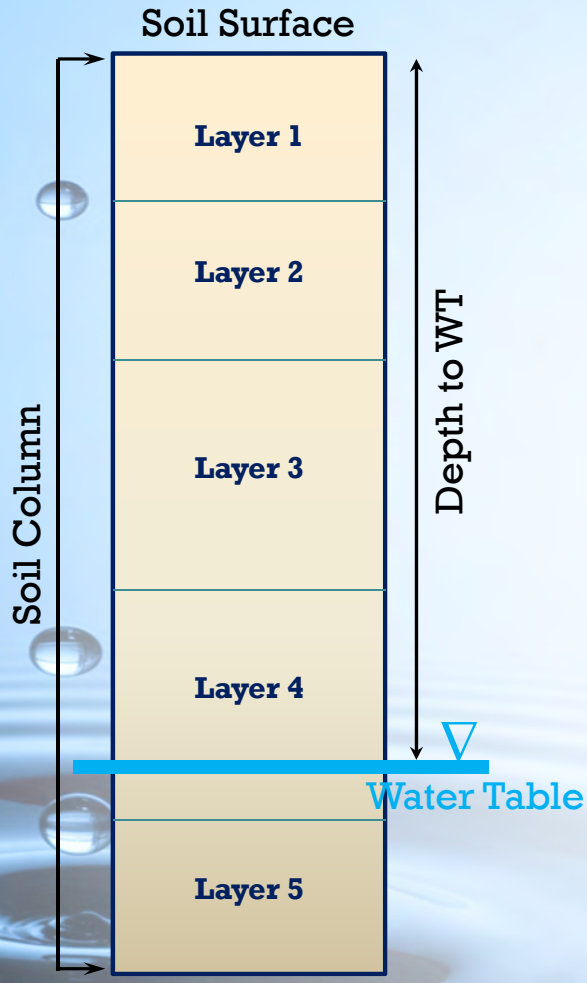
A Customized Tool Using Visual Basic Application

SWFWMD Soil Data Retrieval and Processing (Ver. 2.0)

Soil Input Parameters	ICPR4 Green-Ampt
Soil MUKEY(s)	Already have a tab containing a list of MUKEYs
Field Capacity Option	Use one-tenth bar for field capacity estimation
User Reference	What soil data should I retrieve?

Read Me

To retrieve/process soil data, select appropriate options on the above drop-down lists and then click on Execute. The texts near each drop-down list on the left self-explain the settings.
If you only need to retrieve data for one soil, consider providing MUKEY directly, otherwise load MUKEYs in a file or create a tab to hold MUKEYs (Column A only) may be more convenient and avoid errors.
If you desire to replace default initial water table depth, you can specify water table depth to associated soils in column B in the loaded file or tab.
Simply close the program and restart when you don't know how to deal with certain issues, or feel free contact the program developer.
The last and most important thing is DO NOT alter the GUI and other hidden tabs. You are free to delete any tabs generated during processing.
Acronym: MUKEY = Map Unit Key



Soil Parameters	Source or Method
Soil Zone	SSURGO
Initial Water Table Depth	NRCS or user specified
Kv Saturated	IFAS or SSURGO
MC Saturated	Calculated as function of bulk density
MC Residual	Regression equation
MC Initial	Calculated based on soil moisture retention curve
MC Field	Water content at 1/3 or 1/10 bar
MC Wilting	Water content at 15 bar
Pore Size Index	Regression equation
Bubble Pressure	Regression equation
Layer Thickness	IFAS

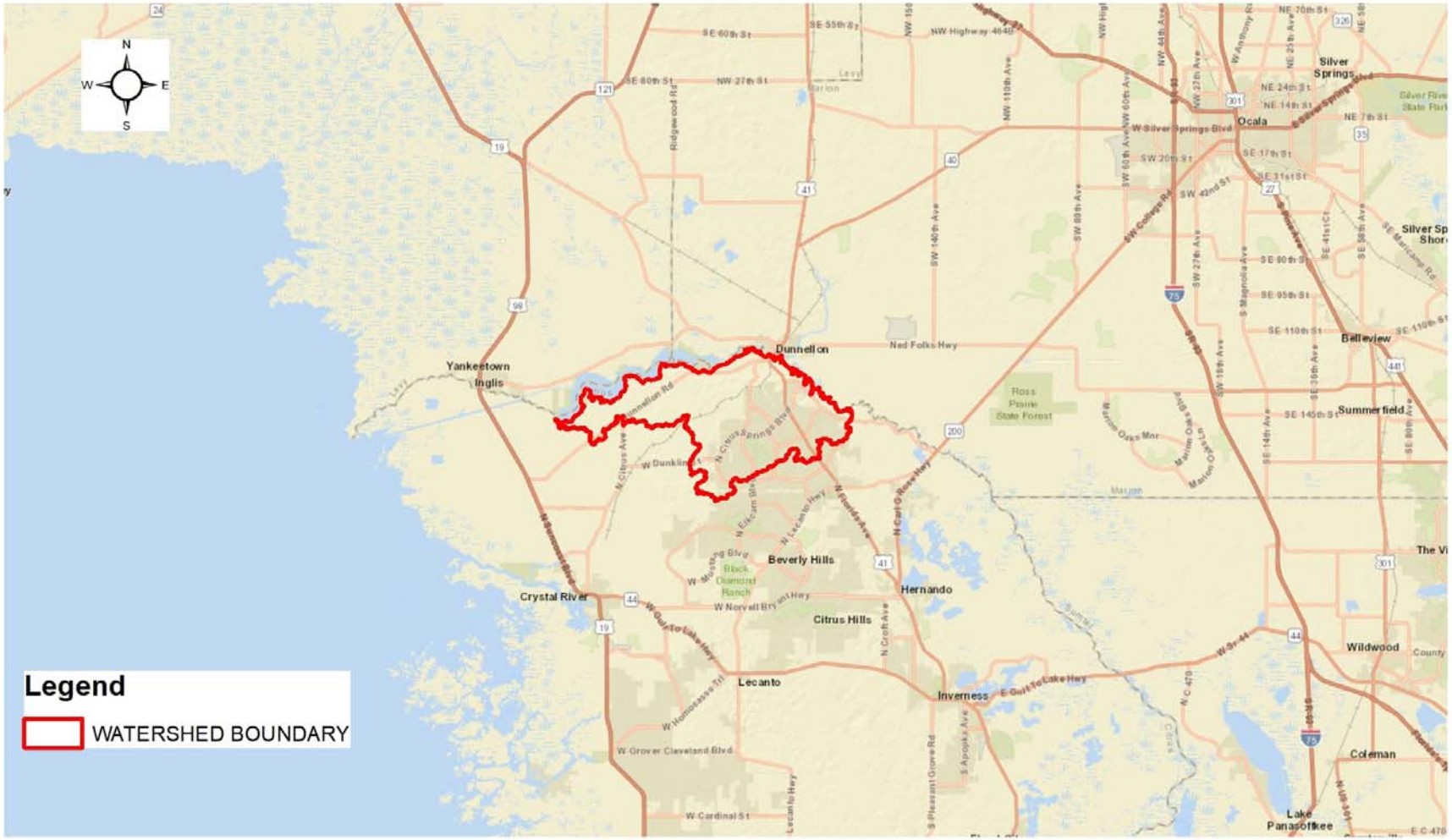
Variation in Potential Soil Storage Based on Depth to WT

SoilName	Mukey	Avg_Int_Mc	Avg_Sat_Mc	SST in Inche	Layer	D2WT	TP_Stor	LayThck
POMPANO FINE	321046	0.478	0.478	0.000	1	0		13
POMPANO FINE	321046	0.390	0.390	0.000	2	0		17
POMPANO FINE	321046	0.355	0.355	0.000	3	0		44
POMPANO FINE	321046	0.359	0.359	0.000	4	0		81
POMPANO FINE	321046	0.383	0.383	0.000	5	0	0.000	48
POMPANO FINE	321046	0.451	0.478	0.148	1	30		13
POMPANO FINE	321046	0.369	0.390	0.141	2	30		17
POMPANO FINE	321046	0.355	0.355	0.000	3	30		44
POMPANO FINE	321046	0.359	0.359	0.000	4	30		81
POMPANO FINE	321046	0.383	0.383	0.000	5	30	0.290	48
POMPANO FINE	321046	0.386	0.478	0.507	1	60		13
POMPANO FINE	321046	0.288	0.390	0.680	2	60		17
POMPANO FINE	321046	0.348	0.355	0.123	3	60		44
POMPANO FINE	321046	0.359	0.359	0.000	4	60		81
POMPANO FINE	321046	0.383	0.383	0.000	5	60	1.311	48
POMPANO FINE	321046	0.312	0.478	0.914	1	91		13
POMPANO FINE	321046	0.152	0.390	1.594	2	91		17
POMPANO FINE	321046	0.269	0.355	1.496	3	91		44
POMPANO FINE	321046	0.358	0.359	0.037	4	91		81
POMPANO FINE	321046	0.383	0.383	0.000	5	91	4.042	48
POMPANO FINE	321046	0.287	0.478	1.053	1	121		13
POMPANO FINE	321046	0.110	0.390	1.874	2	121		17
POMPANO FINE	321046	0.149	0.355	3.567	3	121		44
POMPANO FINE	321046	0.349	0.359	0.314	4	121		81
POMPANO FINE	321046	0.383	0.383	0.000	5	121	6.808	48

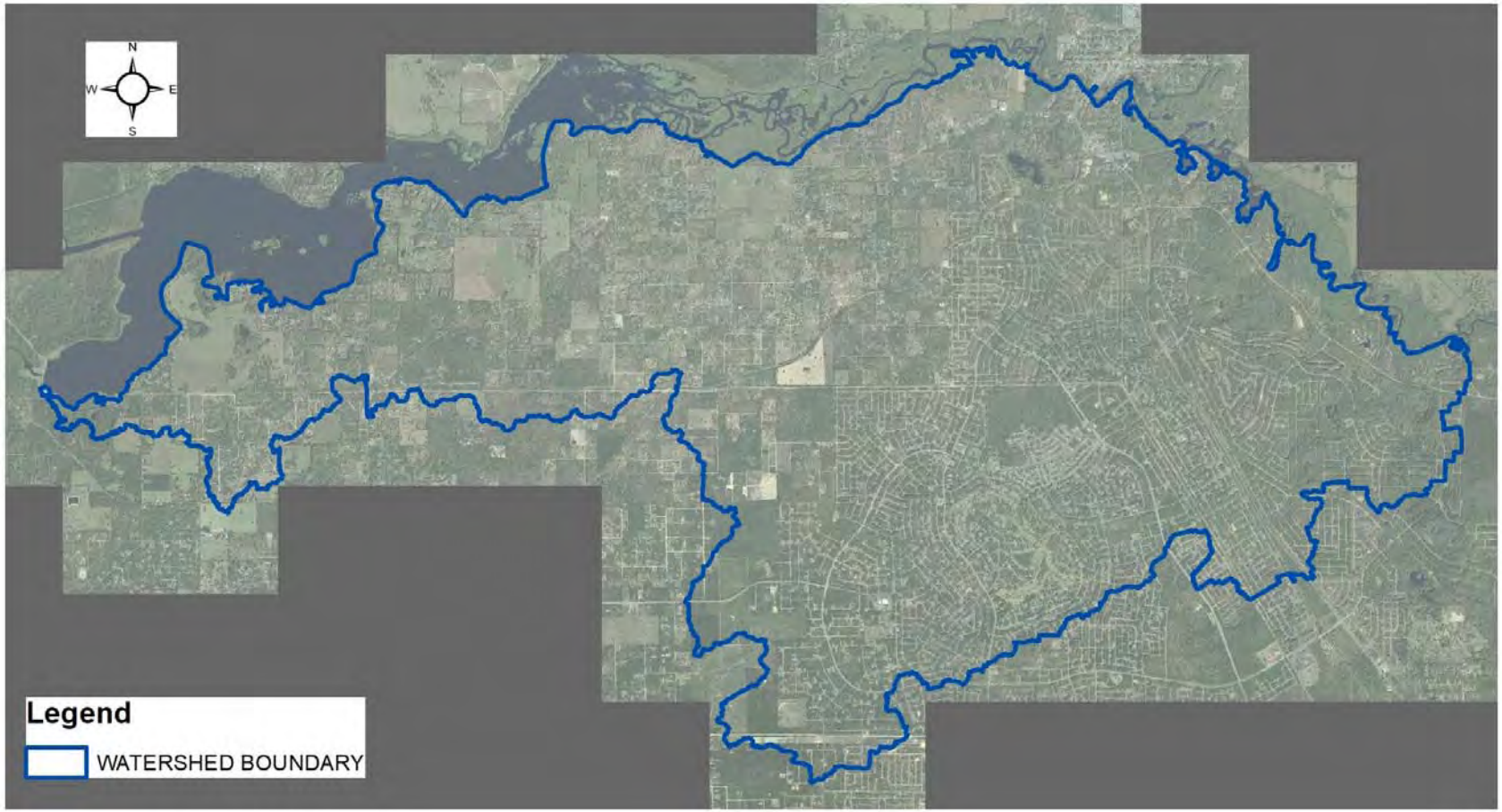
Learning Points

- Integration of NRCS Data and Depth to WT to define Soil Layer Characteristics
  - General Use of SWFWMD tool
  - Deep Soils compared with Perched or High WT Conditions
  - Use of Data to provide insights to Hydrology
- Simplification Process of Soil Zones for Referencing in ICPR4
- Use Example Case Study

Case Study North Citrus Withlacoochee River



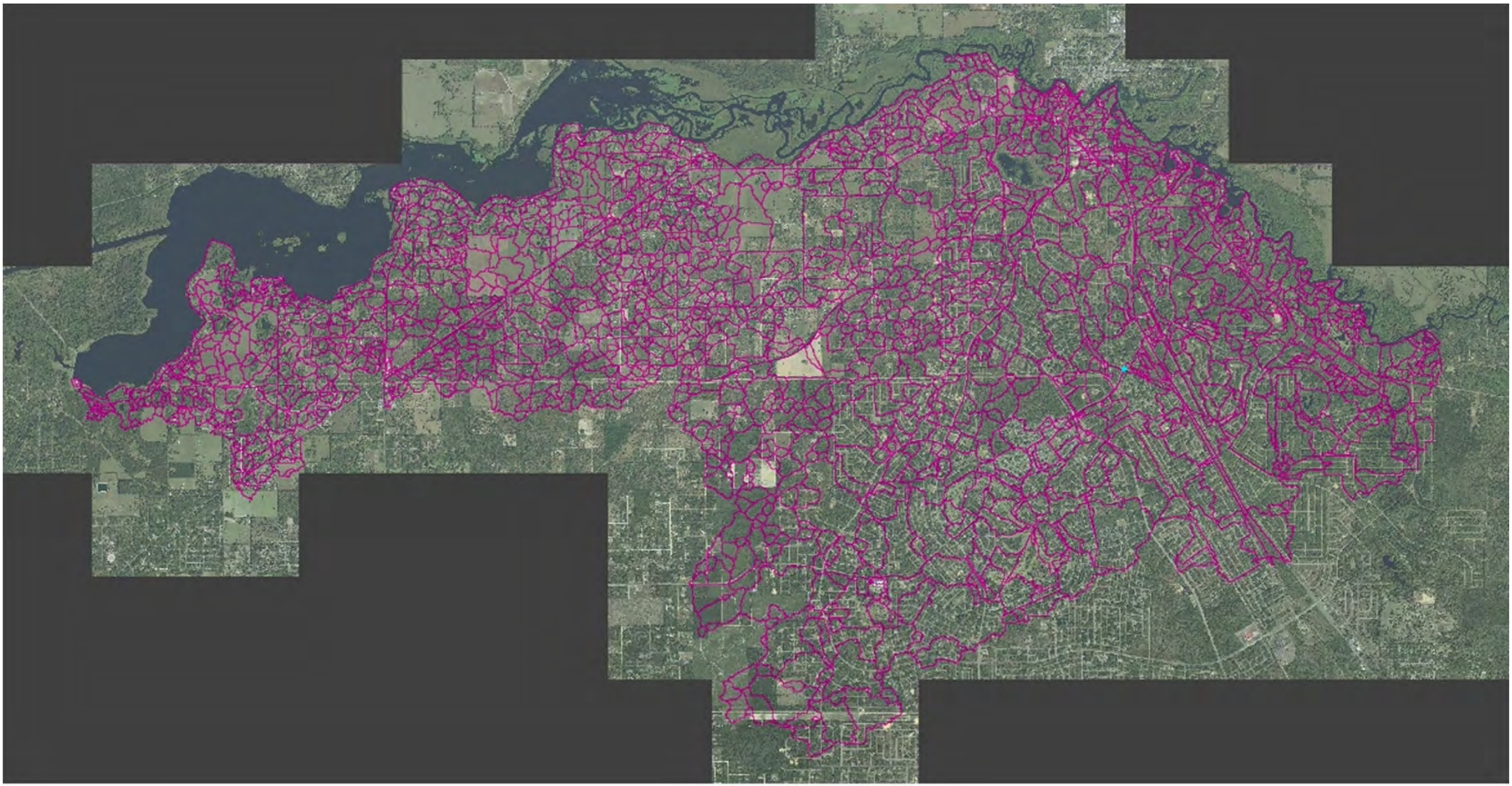
Watershed Location – Citrus County



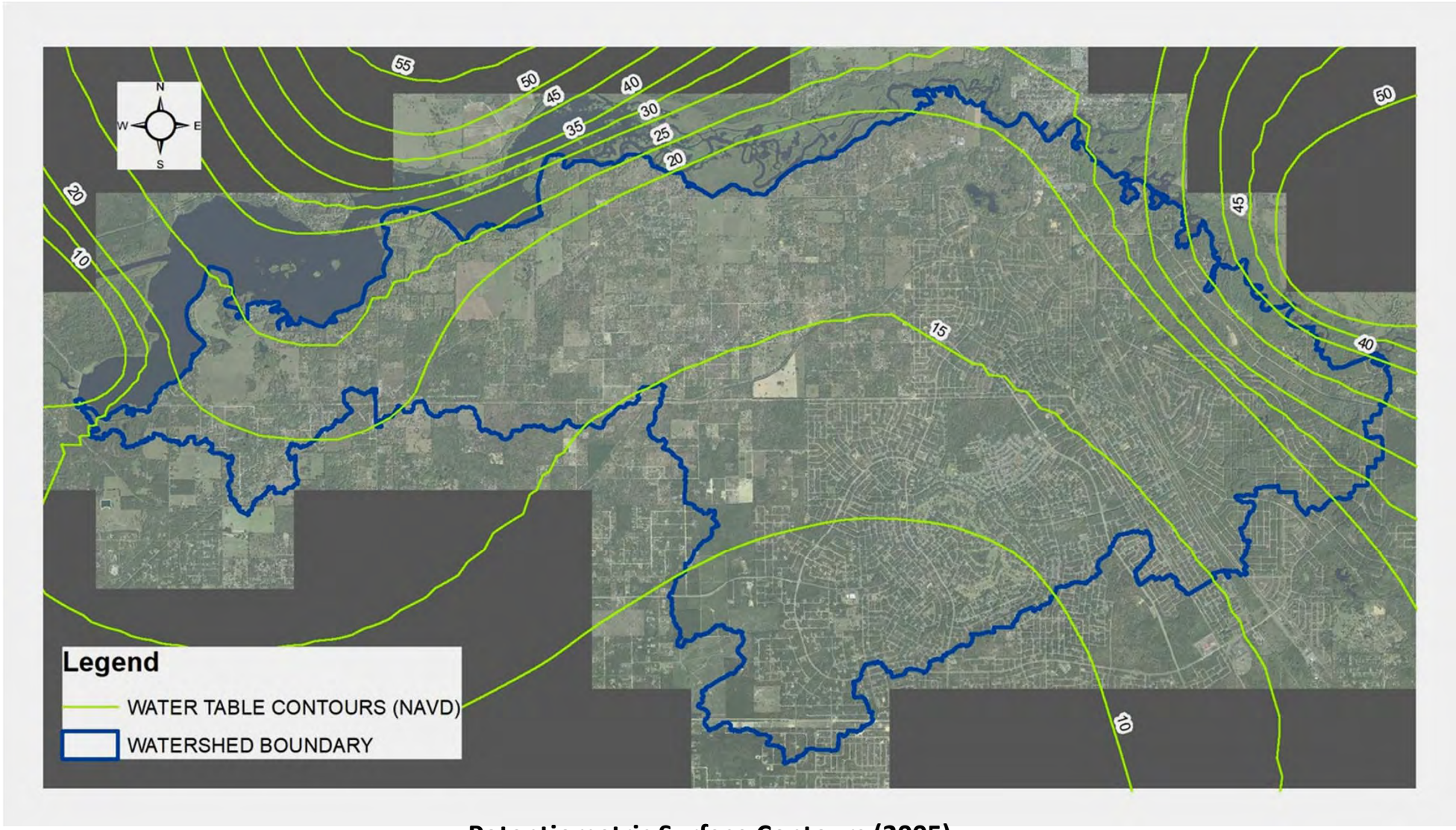
North Citrus Withlacoochee River Watershed

Watershed Model Characteristic

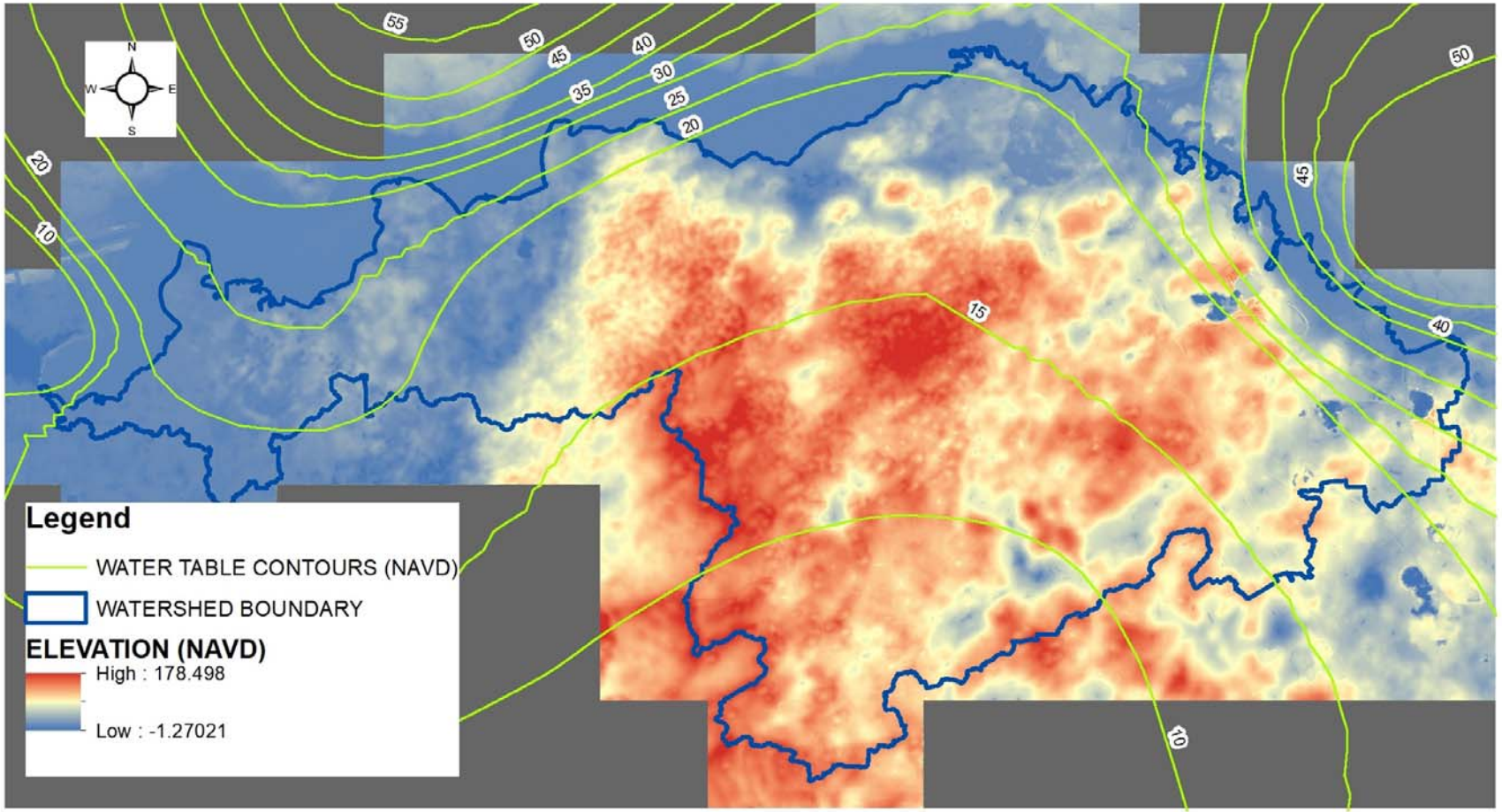
- 35.65 Sq. Miles (22,818 Acres)
- Bounded by Impounded River on the North
- 1924 Catchments (0.06 -226.0 acres, mean 11.8 ac.)
- Depth to WT (-24.0 to 144.7 ft. NGVD, mean of 43 ft.) some cases water above ground
- Karst (Sinks) – 4-5 that we have found
- Sandy Soils with Deep Water Tables
- 1130 Percolation Areas
- Generally Low Density Development



1924 Catchments

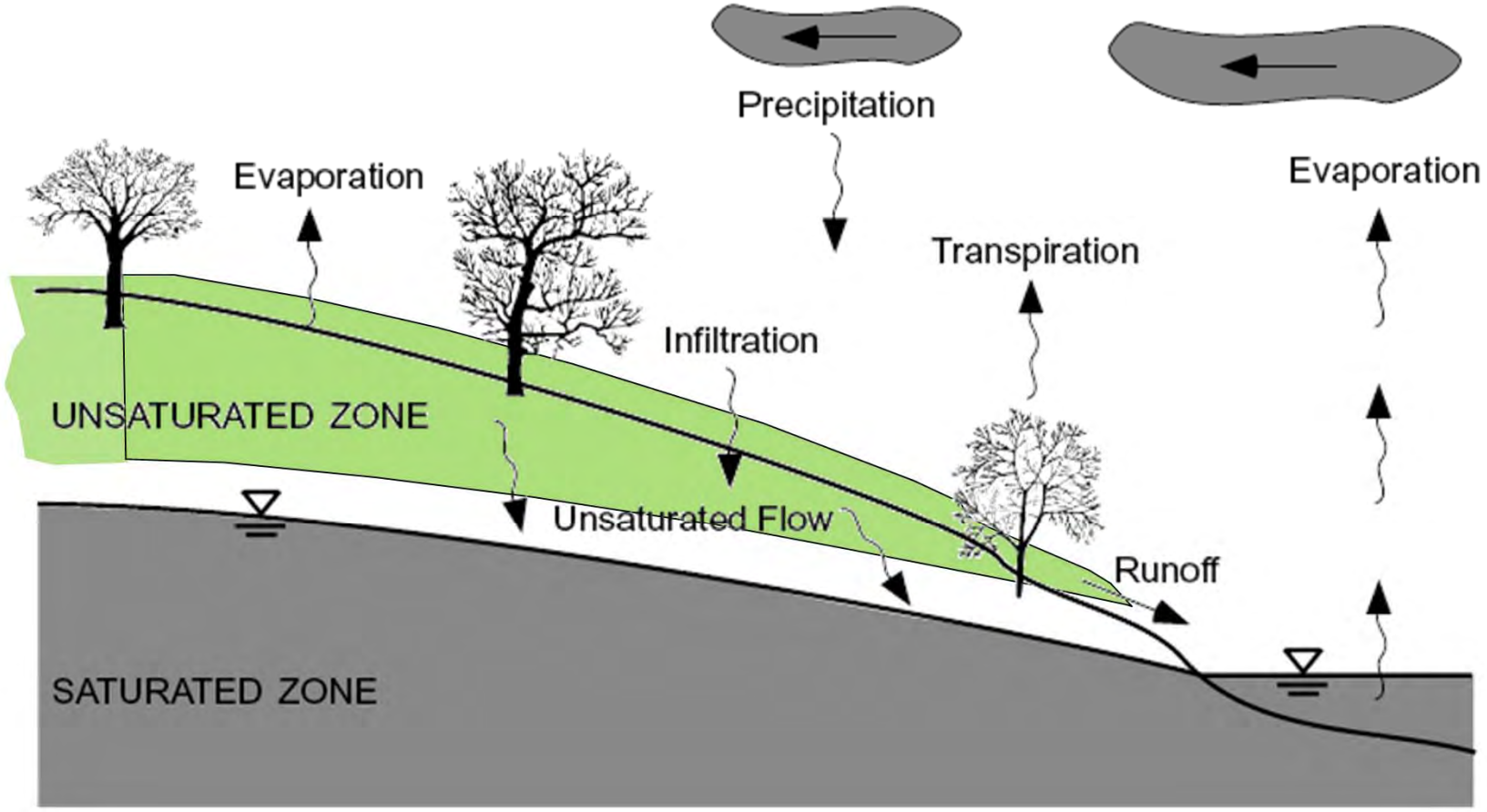


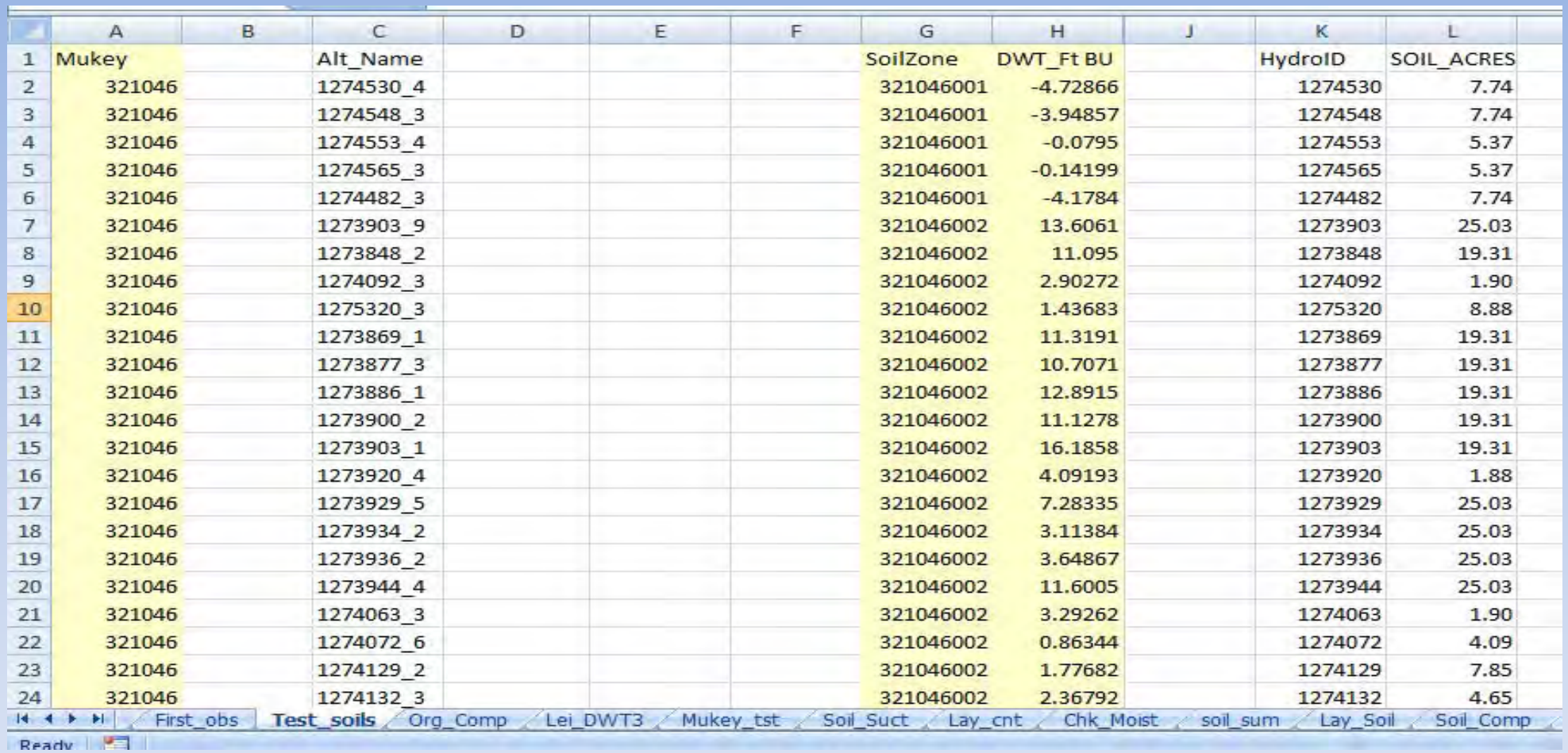
Potentiometric Surface Contours (2005)



Water Table Over Terrain Map

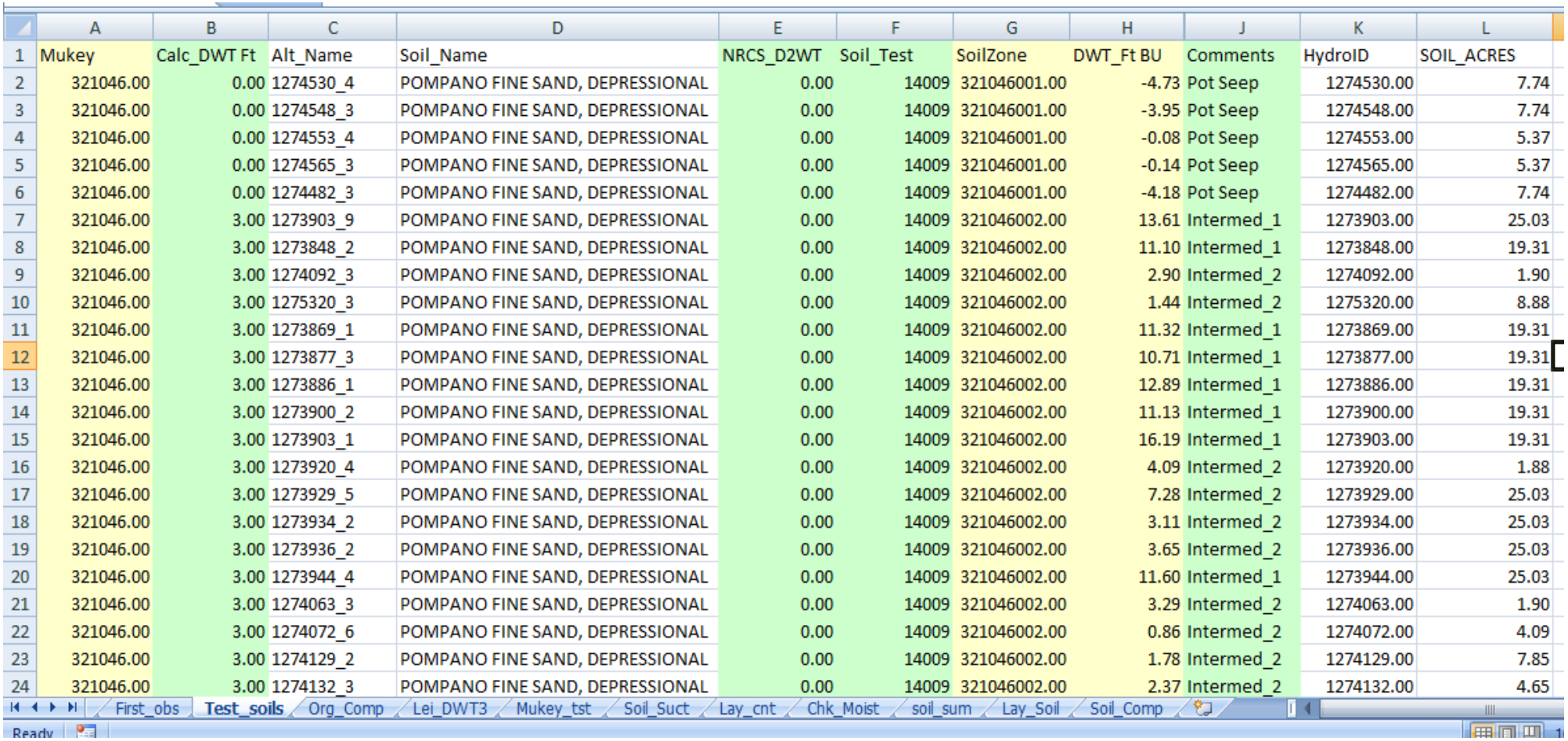
Runoff Process and Soil Characterization





	A	B	C	D	E	F	G	H	J	K	L
1	Mukey		Alt_Name				SoilZone	DWT_Ft BU		HydroID	SOIL_ACRES
2	321046		1274530_4				321046001	-4.72866		1274530	7.74
3	321046		1274548_3				321046001	-3.94857		1274548	7.74
4	321046		1274553_4				321046001	-0.0795		1274553	5.37
5	321046		1274565_3				321046001	-0.14199		1274565	5.37
6	321046		1274482_3				321046001	-4.1784		1274482	7.74
7	321046		1273903_9				321046002	13.6061		1273903	25.03
8	321046		1273848_2				321046002	11.095		1273848	19.31
9	321046		1274092_3				321046002	2.90272		1274092	1.90
10	321046		1275320_3				321046002	1.43683		1275320	8.88
11	321046		1273869_1				321046002	11.3191		1273869	19.31
12	321046		1273877_3				321046002	10.7071		1273877	19.31
13	321046		1273886_1				321046002	12.8915		1273886	19.31
14	321046		1273900_2				321046002	11.1278		1273900	19.31
15	321046		1273903_1				321046002	16.1858		1273903	19.31
16	321046		1273920_4				321046002	4.09193		1273920	1.88
17	321046		1273929_5				321046002	7.28335		1273929	25.03
18	321046		1273934_2				321046002	3.11384		1273934	25.03
19	321046		1273936_2				321046002	3.64867		1273936	25.03
20	321046		1273944_4				321046002	11.6005		1273944	25.03
21	321046		1274063_3				321046002	3.29262		1274063	1.90
22	321046		1274072_6				321046002	0.86344		1274072	4.09
23	321046		1274129_2				321046002	1.77682		1274129	7.85
24	321046		1274132_3				321046002	2.36792		1274132	4.65

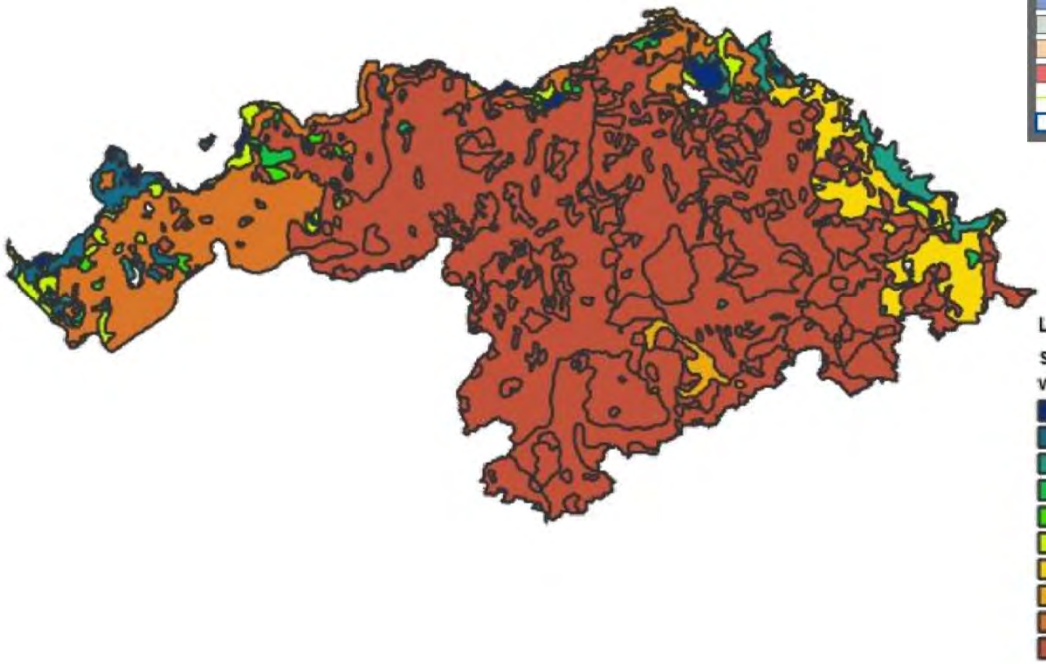
Input Information for the SWFWMD Soil Tool Preprocessing Utility

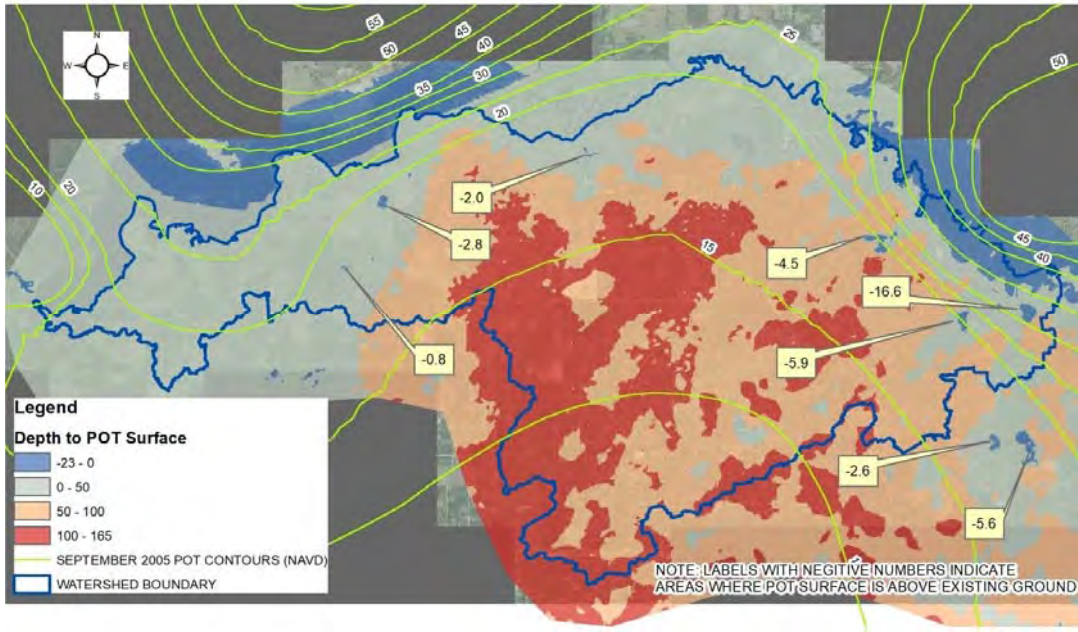


	A	B	C	D	E	F	G	H	J	K	L
1	Mukey	Calc_DWT Ft	Alt_Name	Soil_Name	NRCS_D2WT	Soil_Test	SoilZone	DWT_Ft BU	Comments	HydroID	SOIL_ACRES
2	321046.00	0.00	1274530_4	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046001.00	-4.73	Pot Seep	1274530.00	7.74
3	321046.00	0.00	1274548_3	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046001.00	-3.95	Pot Seep	1274548.00	7.74
4	321046.00	0.00	1274553_4	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046001.00	-0.08	Pot Seep	1274553.00	5.37
5	321046.00	0.00	1274565_3	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046001.00	-0.14	Pot Seep	1274565.00	5.37
6	321046.00	0.00	1274482_3	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046001.00	-4.18	Pot Seep	1274482.00	7.74
7	321046.00	3.00	1273903_9	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	13.61	Intermed_1	1273903.00	25.03
8	321046.00	3.00	1273848_2	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	11.10	Intermed_1	1273848.00	19.31
9	321046.00	3.00	1274092_3	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	2.90	Intermed_2	1274092.00	1.90
10	321046.00	3.00	1275320_3	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	1.44	Intermed_2	1275320.00	8.88
11	321046.00	3.00	1273869_1	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	11.32	Intermed_1	1273869.00	19.31
12	321046.00	3.00	1273877_3	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	10.71	Intermed_1	1273877.00	19.31
13	321046.00	3.00	1273886_1	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	12.89	Intermed_1	1273886.00	19.31
14	321046.00	3.00	1273900_2	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	11.13	Intermed_1	1273900.00	19.31
15	321046.00	3.00	1273903_1	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	16.19	Intermed_1	1273903.00	19.31
16	321046.00	3.00	1273920_4	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	4.09	Intermed_2	1273920.00	1.88
17	321046.00	3.00	1273929_5	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	7.28	Intermed_2	1273929.00	25.03
18	321046.00	3.00	1273934_2	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	3.11	Intermed_2	1273934.00	25.03
19	321046.00	3.00	1273936_2	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	3.65	Intermed_2	1273936.00	25.03
20	321046.00	3.00	1273944_4	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	11.60	Intermed_1	1273944.00	25.03
21	321046.00	3.00	1274063_3	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	3.29	Intermed_2	1274063.00	1.90
22	321046.00	3.00	1274072_6	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	0.86	Intermed_2	1274072.00	4.09
23	321046.00	3.00	1274129_2	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	1.78	Intermed_2	1274129.00	7.85
24	321046.00	3.00	1274132_3	POMPANO FINE SAND, DEPRESSIONAL	0.00	14009	321046002.00	2.37	Intermed_2	1274132.00	4.65

Information Generated from the SWFWMD Tool Routines

Water Table Information from SSURGO





Depth to Water Table based on Potentiometric Surface

	A	B	C	D	E	F	G	H	I	J	K	L
1	Mukey	Calc_DWT Ft	Alt_Name	Soil_Name	NRCS_D2WT	Soil_Test	SoilZone	DWT_Ft BU		Comments	HydroID	SOIL_ACRES
4094	321102	3.262	1274972_1	POMPANO FINE SAND	0.262	36014	321102001	9.33		Intermed_2	1274972	16.23
4095	321102	3.262	1274973_2	POMPANO FINE SAND	0.262	36014	321102001	6.81		Intermed_2	1274973	11.79
4096	321102	3.262	1274976_2	POMPANO FINE SAND	0.262	36014	321102001	11.41		Intermed_1	1274976	16.23
4097	321102	3.262	1274978_2	POMPANO FINE SAND	0.262	36014	321102001	11.44		Intermed_1	1274978	16.23
4098	321102	3.262	1274980_4	POMPANO FINE SAND	0.262	36014	321102001	8.25		Intermed_2	1274980	241.92
4099	321102	3.262	1274982_2	POMPANO FINE SAND	0.262	36014	321102001	10.86		Intermed_1	1274982	16.23
4100	321102	3.262	1275003_2	POMPANO FINE SAND	0.262	36014	321102001	6.19		Intermed_2	1275003	11.79
4101	321102	3.262	1275340_2	POMPANO FINE SAND	0.262	36014	321102001	9.51		Intermed_2	1275340	10.50
4102	321102	3.262	1275370_3	POMPANO FINE SAND	0.262	36014	321102001	3.38		Intermed_2	1275370	5.35
4103	321102	3.262	1275407_1	POMPANO FINE SAND	0.262	36014	321102001	4.14		Intermed_2	1275407	241.92
4104	321102	3.262	1275414_2	POMPANO FINE SAND	0.262	36014	321102001	5.14		Intermed_2	1275414	241.92
4105	321102	3.262	1275417_4	POMPANO FINE SAND	0.262	36014	321102001	3.76		Intermed_2	1275417	0.55
4106	321102	3.262	1275417_5	POMPANO FINE SAND	0.262	36014	321102001	4.07		Intermed_2	1275417	0.12
4107	321102	3.262	1275423_3	POMPANO FINE SAND	0.262	36014	321102001	5.40		Intermed_2	1275423	241.92
4108	321102	3.262	1275424_1	POMPANO FINE SAND	0.262	36014	321102001	7.24		Intermed_2	1275424	241.92
4109	321102	3.262	1275430_1	POMPANO FINE SAND	0.262	36014	321102001	5.84		Intermed_2	1275430	241.92
4110	321102	3.262	1275433_1	POMPANO FINE SAND	0.262	36014	321102001	7.59		Intermed_2	1275433	241.92
4111	321102	3.262	1275496_2	POMPANO FINE SAND	0.262	36014	321102001	10.05		Intermed_1	1275496	241.92
4112	321102	3.262	1275522_2	POMPANO FINE SAND	0.262	36014	321102001	9.99		Intermed_2	1275522	241.92
4113	321102	3.262	1275525_1	POMPANO FINE SAND	0.262	36014	321102001	8.72		Intermed_2	1275525	241.92
4114	321102	3.262	1275526_2	POMPANO FINE SAND	0.262	36014	321102001	8.50		Intermed_2	1275526	241.92
4115	321102	3.262	1275550_1	POMPANO FINE SAND	0.262	36014	321102001	8.11		Intermed_2	1275550	28.53
4116	321102	3.262	1275551_3	POMPANO FINE SAND	0.262	36014	321102001	5.64		Intermed_2	1275551	28.53

First_obs | Test_soils | Org_Comp | Lei_DWT3 | Mukey_tst | Soil_Suct | Lay_cnt | Chk_Moist | soil_sum | Lay_Soil | Soil_Comp

Ready

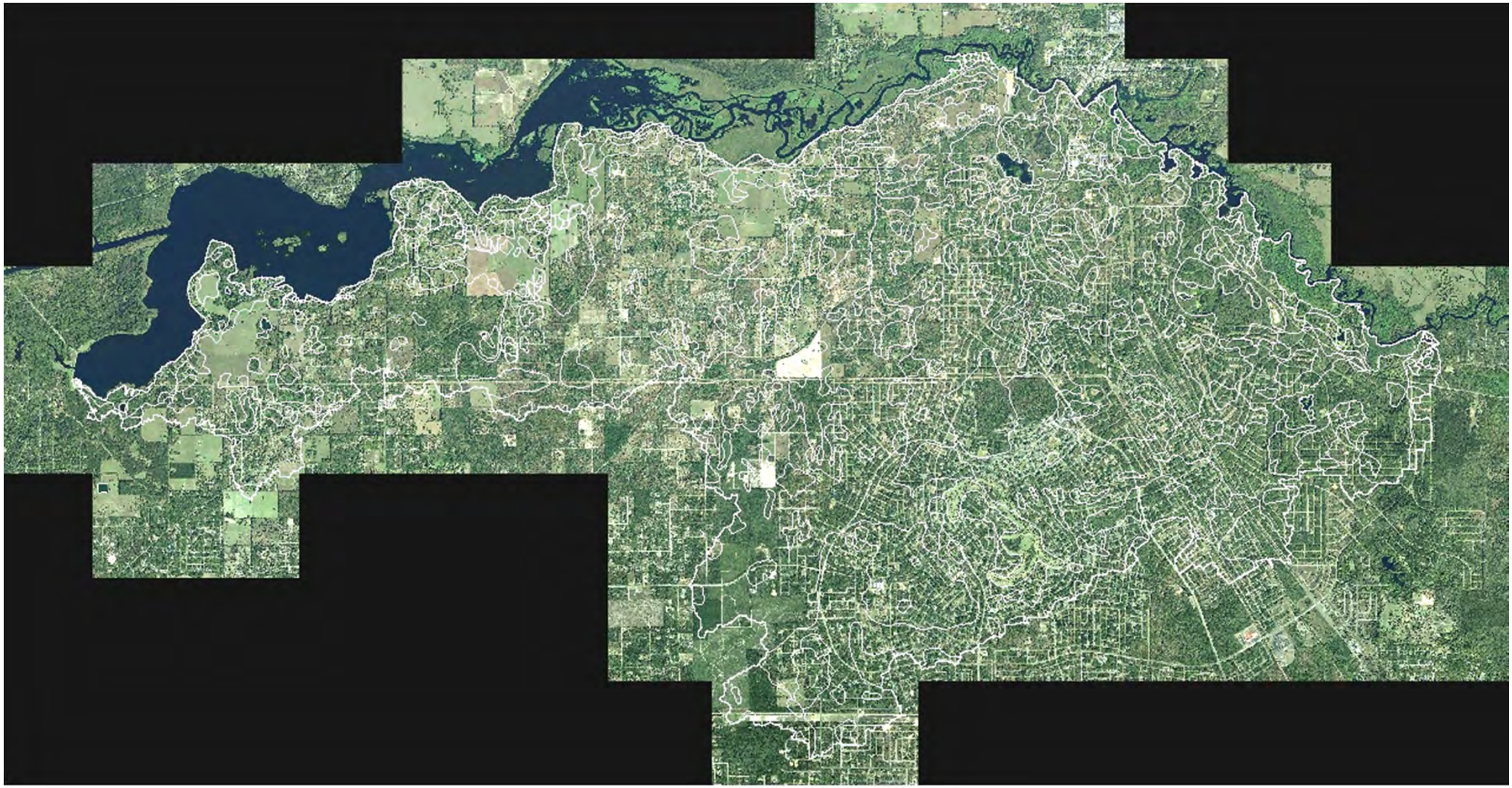
Original Soil Breakout by Unique MuKey, Basin, and WT: 4600

	A	B	C	D	E	F	G
1	Mukey	Name	D2WT	Soil_Test	Alt_Name	Count	SoilZone
2	321046	POMPANO FINE SAND, DEPRESSIONAL	0	14009	1274482_3	5	321046001
3	321046	POMPANO FINE SAND, DEPRESSIONAL	3	14009	1275563_1	48	321046002
4	321047	TAVARES FINE SAND, 0 TO 5 PERCENT SLOPES	0	9012	1275507_1	3	321047001
5	321047	TAVARES FINE SAND, 0 TO 5 PERCENT SLOPES	7.757	9012	1275551_7	602	321047002
6	321048	IMMOKALEE FINE SAND	3.23	51035	1273944_3	4	321048001
7	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	2.58019	9005	1275521_1	1	321050001
8	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	3.2984	9005	1274148_3	1	321050002
9	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	4.38283	9005	1274147_3	1	321050003
10	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	4.69309	9005	1273789_3	1	321050004
11	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	4.74001	9005	1274665_1	1	321050005
12	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	5.05392	9005	1274038_1	1	321050006
13	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	5.92082	9005	1274063_1	1	321050007
14	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	6.25355	9005	1274464_1	1	321050008
15	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	6.50195	9005	1274028_1	1	321050009
16	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	6.83885	9005	1274060_1	1	321050010
17	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	7.04049	9005	1275369_1	1	321050011
18	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	7.38807	9005	1274653_1	1	321050012
19	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	7.72235	9005	1274031_1	1	321050013
20	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	8.04188	9005	1274071_1	1	321050014
21	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	8.04697	9005	1274109_1	1	321050015
22	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	8.05431	9005	1273827_1	1	321050016
23	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	8.11776	9005	1274717_2	1	321050017
24	321050	LAKE FINE SAND, 0 TO 5 PERCENT SLOPES	8.12475	9005	1274132_1	1	321050018

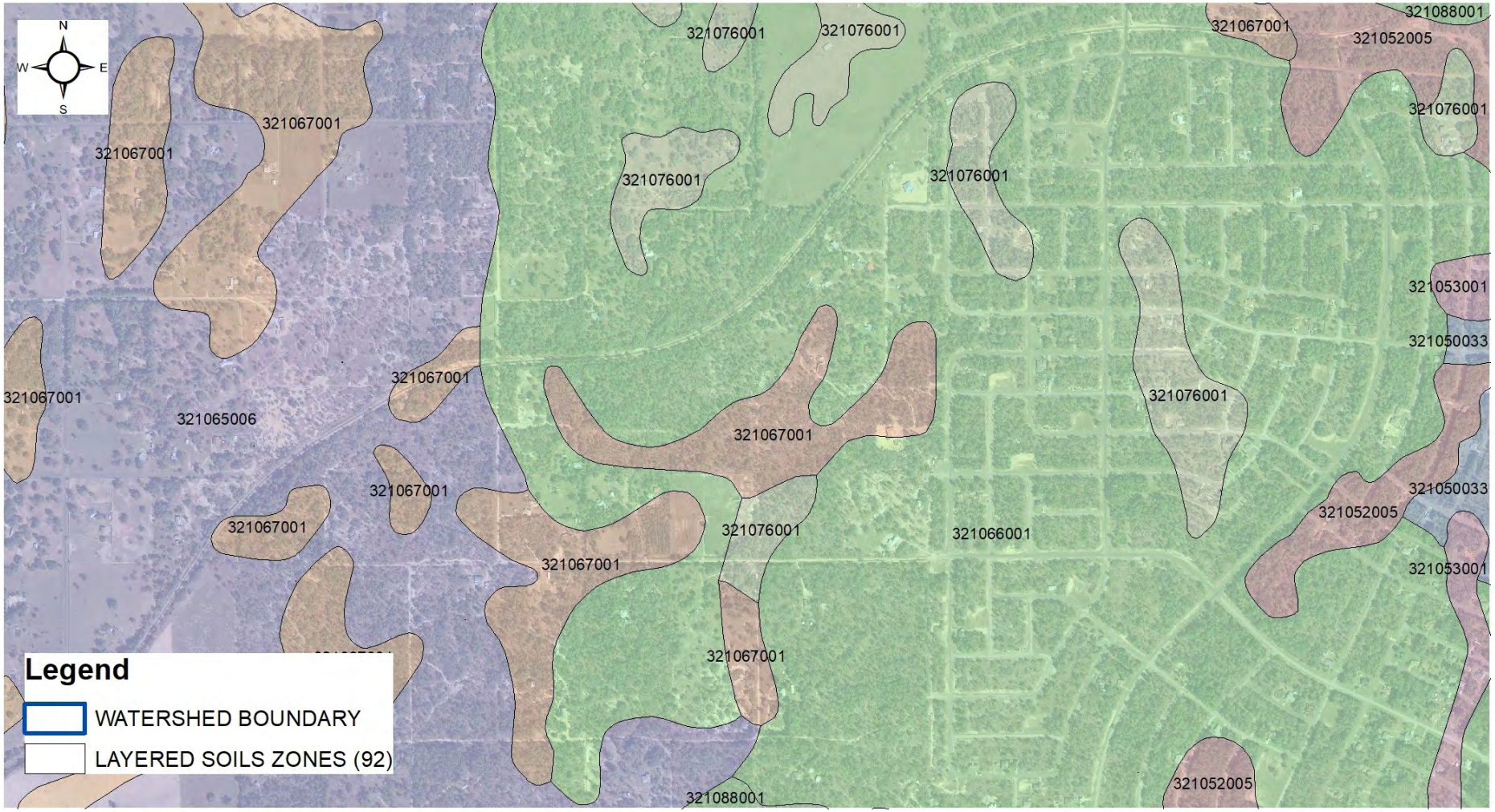
First_obs | Test_soils | Org_Comp | Lei_DWT3 | Mukey_tst | Soil_Suct | Lay_cnt | Chk_Moist | soil_sum | Lay_S

Ready

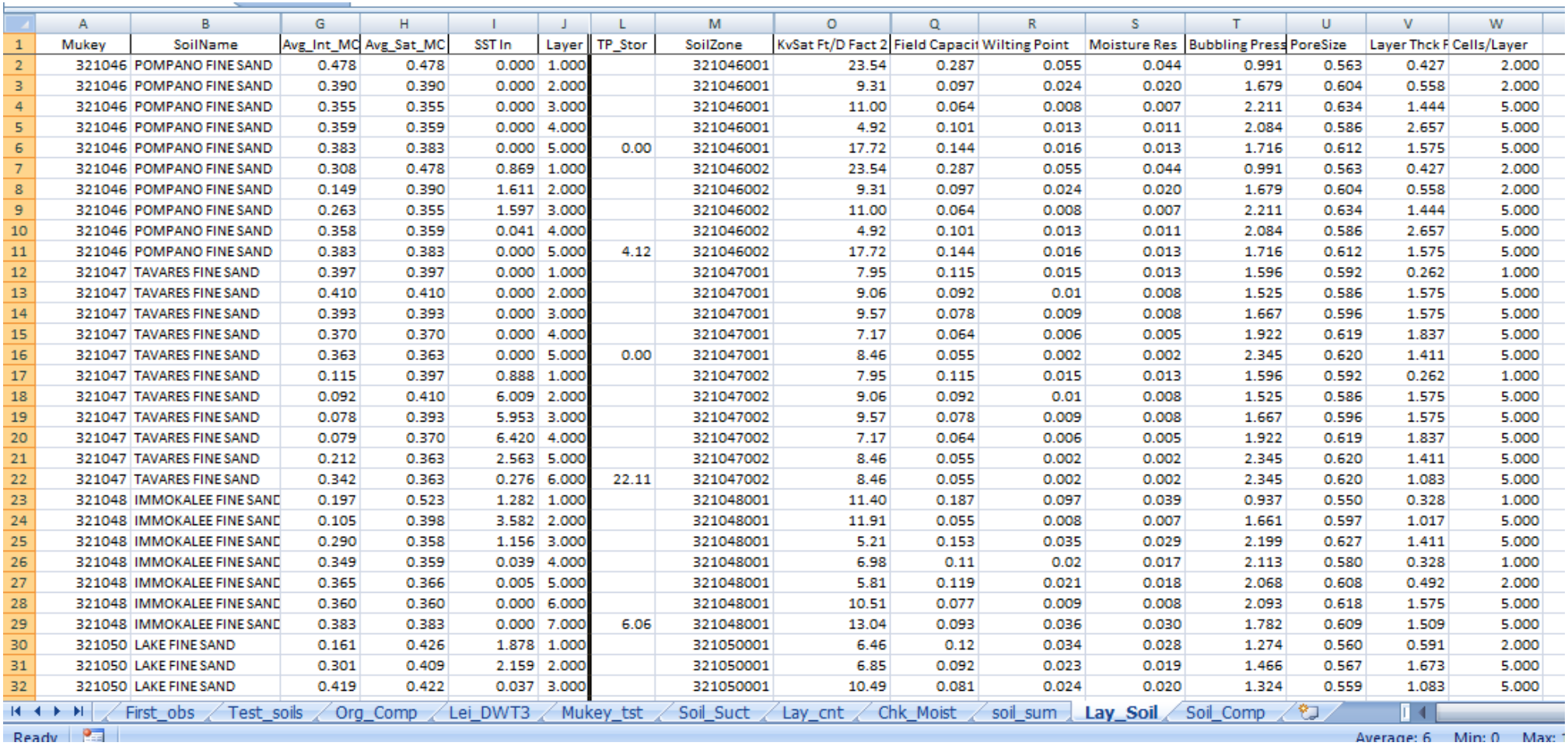
General Classification Based on WT Depth and Mukey 92



4,600 Individual Soil Zones Reduced to 92

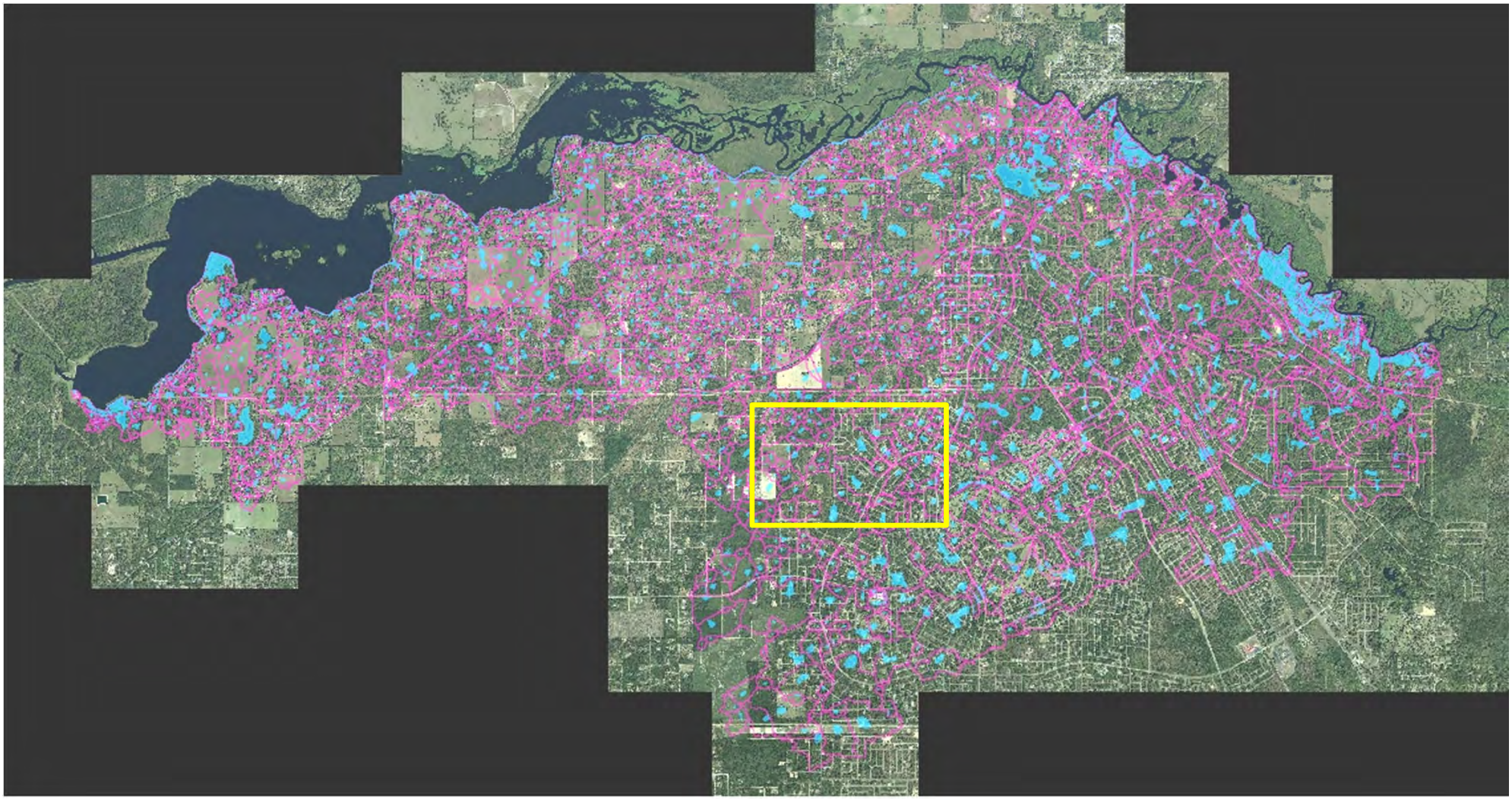


Zoomed Area of Soil Zones

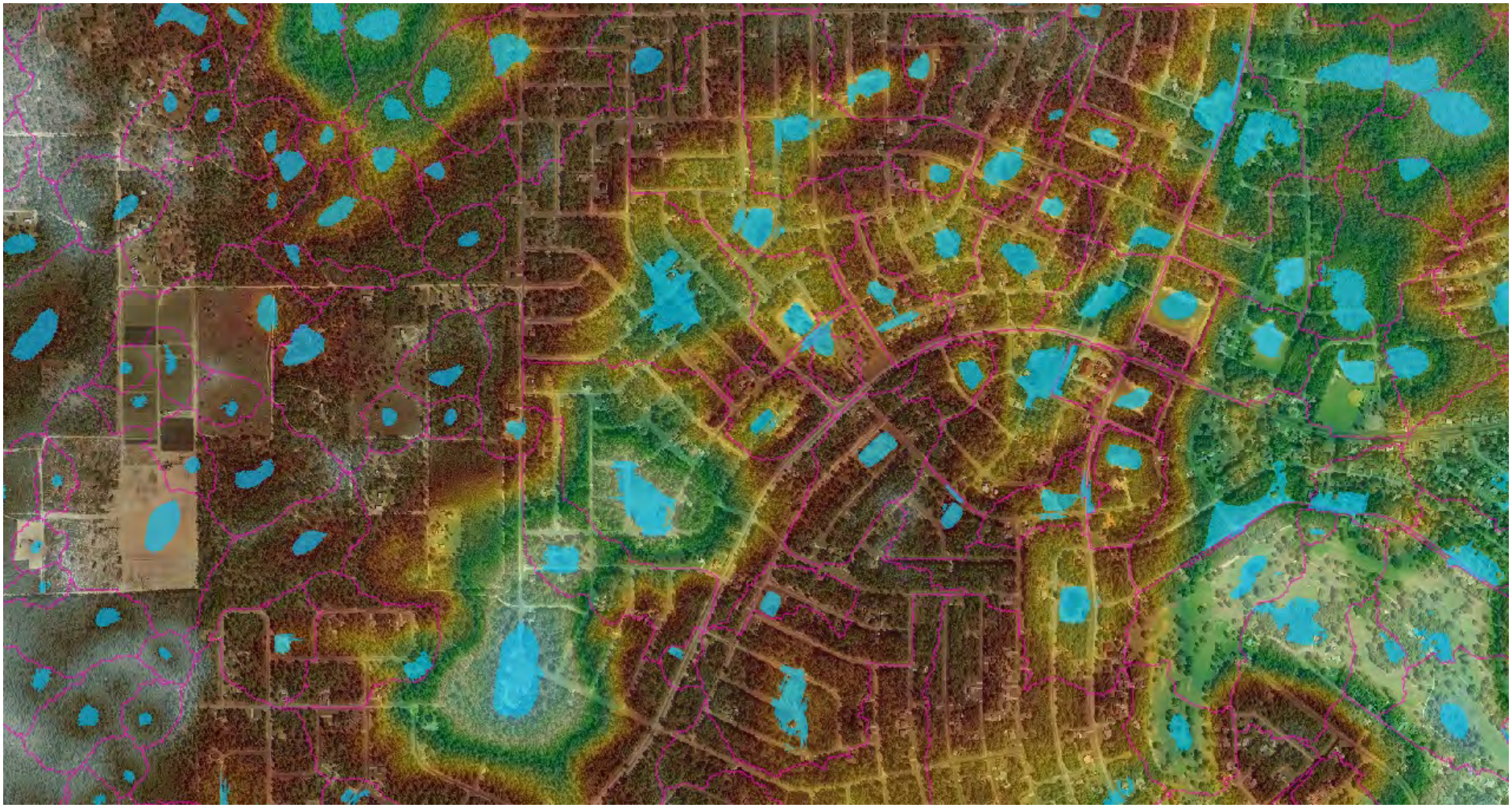


	A	B	G	H	I	J	L	M	O	Q	R	S	T	U	V	W
1	Mukey	SoilName	Avg_Int_MC	Avg_Sat_MC	SST In	Layer	TP_Stor	SoilZone	KvSat Ft/D Fact 2	Field Capaci	Wilting Point	Moisture Res	Bubbling Press	PoreSize	Layer Thck F	Cells/Layer
2	321046	POMPANO FINE SAND	0.478	0.478	0.000	1.000		321046001	23.54	0.287	0.055	0.044	0.991	0.563	0.427	2.000
3	321046	POMPANO FINE SAND	0.390	0.390	0.000	2.000		321046001	9.31	0.097	0.024	0.020	1.679	0.604	0.558	2.000
4	321046	POMPANO FINE SAND	0.355	0.355	0.000	3.000		321046001	11.00	0.064	0.008	0.007	2.211	0.634	1.444	5.000
5	321046	POMPANO FINE SAND	0.359	0.359	0.000	4.000		321046001	4.92	0.101	0.013	0.011	2.084	0.586	2.657	5.000
6	321046	POMPANO FINE SAND	0.383	0.383	0.000	5.000	0.00	321046001	17.72	0.144	0.016	0.013	1.716	0.612	1.575	5.000
7	321046	POMPANO FINE SAND	0.308	0.478	0.869	1.000		321046002	23.54	0.287	0.055	0.044	0.991	0.563	0.427	2.000
8	321046	POMPANO FINE SAND	0.149	0.390	1.611	2.000		321046002	9.31	0.097	0.024	0.020	1.679	0.604	0.558	2.000
9	321046	POMPANO FINE SAND	0.263	0.355	1.597	3.000		321046002	11.00	0.064	0.008	0.007	2.211	0.634	1.444	5.000
10	321046	POMPANO FINE SAND	0.358	0.359	0.041	4.000		321046002	4.92	0.101	0.013	0.011	2.084	0.586	2.657	5.000
11	321046	POMPANO FINE SAND	0.383	0.383	0.000	5.000	4.12	321046002	17.72	0.144	0.016	0.013	1.716	0.612	1.575	5.000
12	321047	TAVARES FINE SAND	0.397	0.397	0.000	1.000		321047001	7.95	0.115	0.015	0.013	1.596	0.592	0.262	1.000
13	321047	TAVARES FINE SAND	0.410	0.410	0.000	2.000		321047001	9.06	0.092	0.01	0.008	1.525	0.586	1.575	5.000
14	321047	TAVARES FINE SAND	0.393	0.393	0.000	3.000		321047001	9.57	0.078	0.009	0.008	1.667	0.596	1.575	5.000
15	321047	TAVARES FINE SAND	0.370	0.370	0.000	4.000		321047001	7.17	0.064	0.006	0.005	1.922	0.619	1.837	5.000
16	321047	TAVARES FINE SAND	0.363	0.363	0.000	5.000	0.00	321047001	8.46	0.055	0.002	0.002	2.345	0.620	1.411	5.000
17	321047	TAVARES FINE SAND	0.115	0.397	0.888	1.000		321047002	7.95	0.115	0.015	0.013	1.596	0.592	0.262	1.000
18	321047	TAVARES FINE SAND	0.092	0.410	6.009	2.000		321047002	9.06	0.092	0.01	0.008	1.525	0.586	1.575	5.000
19	321047	TAVARES FINE SAND	0.078	0.393	5.953	3.000		321047002	9.57	0.078	0.009	0.008	1.667	0.596	1.575	5.000
20	321047	TAVARES FINE SAND	0.079	0.370	6.420	4.000		321047002	7.17	0.064	0.006	0.005	1.922	0.619	1.837	5.000
21	321047	TAVARES FINE SAND	0.212	0.363	2.563	5.000		321047002	8.46	0.055	0.002	0.002	2.345	0.620	1.411	5.000
22	321047	TAVARES FINE SAND	0.342	0.363	0.276	6.000	22.11	321047002	8.46	0.055	0.002	0.002	2.345	0.620	1.083	5.000
23	321048	IMMOKALEE FINE SANC	0.197	0.523	1.282	1.000		321048001	11.40	0.187	0.097	0.039	0.937	0.550	0.328	1.000
24	321048	IMMOKALEE FINE SANC	0.105	0.398	3.582	2.000		321048001	11.91	0.055	0.008	0.007	1.661	0.597	1.017	5.000
25	321048	IMMOKALEE FINE SANC	0.290	0.358	1.156	3.000		321048001	5.21	0.153	0.035	0.029	2.199	0.627	1.411	5.000
26	321048	IMMOKALEE FINE SANC	0.349	0.359	0.039	4.000		321048001	6.98	0.11	0.02	0.017	2.113	0.580	0.328	1.000
27	321048	IMMOKALEE FINE SANC	0.365	0.366	0.005	5.000		321048001	5.81	0.119	0.021	0.018	2.068	0.608	0.492	2.000
28	321048	IMMOKALEE FINE SANC	0.360	0.360	0.000	6.000		321048001	10.51	0.077	0.009	0.008	2.093	0.618	1.575	5.000
29	321048	IMMOKALEE FINE SANC	0.383	0.383	0.000	7.000	6.06	321048001	13.04	0.093	0.036	0.030	1.782	0.609	1.509	5.000
30	321050	LAKE FINE SAND	0.161	0.426	1.878	1.000		321050001	6.46	0.12	0.034	0.028	1.274	0.560	0.591	2.000
31	321050	LAKE FINE SAND	0.301	0.409	2.159	2.000		321050001	6.85	0.092	0.023	0.019	1.466	0.567	1.673	5.000
32	321050	LAKE FINE SAND	0.419	0.422	0.037	3.000		321050001	10.49	0.081	0.024	0.020	1.324	0.559	1.083	5.000

ICPR4 Layered Soil Input



Basin Boundaries with Floodplain Using Layered Soil Computations



Zoomed In Flood Areas

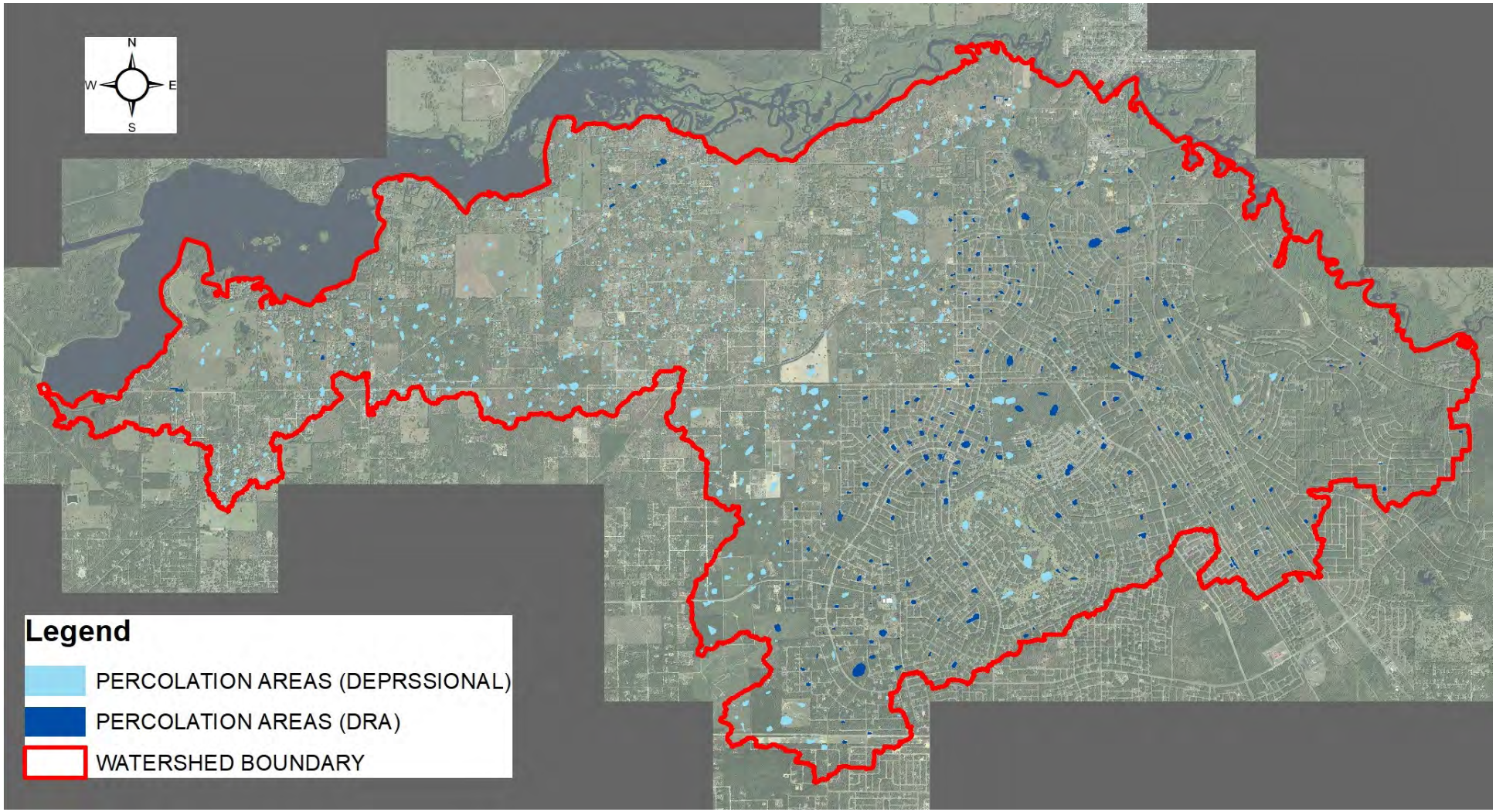
The Tool Can Also Be Used for Percolation Parameters

- Green-Ampt Parameters will be required
- Provide a depth to the Water Table
  - Typically will Extend Soil Profile below End of Bore
- Adjust based on ERP Information, or Observed Conditions
- Surface Area Driven

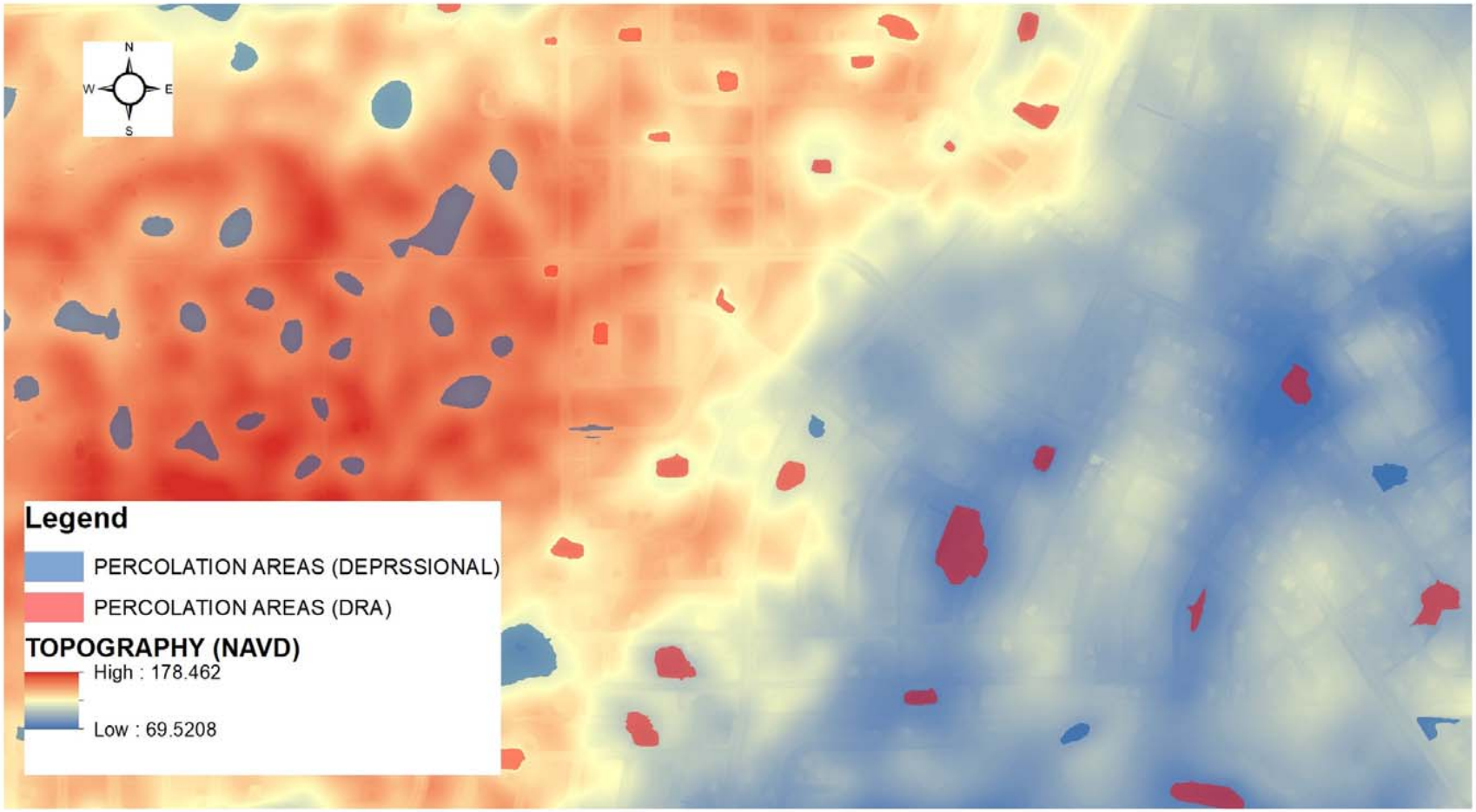
B	E	F	G	H	I	J	K	L	M	N	O	P	Q	S	T	V	W
ID	SoilZone	Mukey	Soil_Name	MC_Init	MC_Sat	Avg_Kv	Avg_Kh	Porosity	LayerThckness	SST Inches	Wt_Elev	Bot_Elev	Org_Wt_Elev	Low Elev	Mean Elev	P1_Area	P1_Perimeter
273739	321047002	321047	TAVARES FINE S	29.811	57.260	8.570	17.141	0.188	9.76	10.81	37.90	32.90	19.82	42.66	43.55	41569	85
273754	321047002	321047	TAVARES FINE S	29.811	57.260	8.570	17.141	0.188	9.76	10.81	31.95	26.95	19.14	36.71	38.22	32889	74
273760	321047002	321047	TAVARES FINE S	29.811	57.260	8.570	17.141	0.188	9.76	10.81	33.92	28.92	19.43	38.68	40.00	44253	82
273768	321066001	321066	CANDLER FINE S	55.284	229.890	10.821	21.642	0.286	25.01	68.74	19.28	14.28	19.02	39.29	39.94	8724	35
273782	321047002	321047	TAVARES FINE S	29.811	57.260	8.570	17.141	0.188	9.76	10.81	33.03	28.03	18.97	37.79	38.91	87671	138
273783	321066001	321066	CANDLER FINE S	55.284	229.890	10.821	21.642	0.286	25.01	68.74	23.79	18.79	18.77	43.81	44.90	45559	79
273793	321047002	321047	TAVARES FINE S	29.811	57.260	8.570	17.141	0.188	9.76	10.81	37.72	32.72	19.50	42.48	43.56	85452	155
273795	321047002	321047	TAVARES FINE S	29.811	57.260	8.570	17.141	0.188	9.76	10.81	36.33	31.33	17.66	41.09	43.88	90061	138
273799	321076001	321076	CANDLER FINE S	53.545	218.234	10.770	21.540	0.284	24.00	64.84	18.51	13.51	18.53	37.50	39.56	15510	50
273805	321067001	321067	ASTATULA FINE	63.326	238.238	9.461	18.921	0.287	25.01	68.86	30.57	25.57	23.90	50.58	51.75	7615	32
273813	321066001	321066	CANDLER FINE S	50.544	198.306	10.669	21.338	0.281	22.26	58.17	18.54	13.54	18.54	35.80	37.01	5697	50
273815	321066001	321066	CANDLER FINE S	55.284	229.890	10.821	21.642	0.286	25.01	68.74	41.37	36.37	18.54	61.39	61.83	20033	59
273820	321050033	321050	LAKE FINE SAND	26.267	49.219	8.193	16.386	0.193	8.87	9.04	28.31	23.31	28.34	32.19	32.98	39222	74
273822	321066001	321066	CANDLER FINE S	55.284	229.890	10.821	21.642	0.286	25.01	68.74	29.96	24.96	18.42	49.97	51.60	55068	91
273824	321050033	321050	LAKE FINE SAND	39.397	120.702	9.482	18.963	0.272	14.81	32.01	25.31	20.31	25.32	35.12	36.58	12151	45
273830	321065006	321065	ASTATULA FINE	63.326	238.238	9.461	18.921	0.287	25.01	68.86	24.68	19.68	20.75	44.69	46.02	11918	42
273833	321047002	321047	TAVARES FINE S	29.811	57.260	8.570	17.141	0.188	9.76	10.81	36.38	31.38	18.72	41.14	42.42	47303	86
273834	321047002	321047	TAVARES FINE S	29.811	57.260	8.570	17.141	0.188	9.76	10.81	33.47	28.47	18.64	38.22	38.61	3440	30
273835	321067001	321067	ASTATULA FINE	63.326	238.238	9.461	18.921	0.287	25.01	68.86	45.38	40.38	22.46	65.39	65.85	10125	45
273836	321066001	321066	CANDLER FINE S	44.397	158.826	10.394	20.789	0.272	18.81	45.05	18.00	13.00	18.02	31.81	33.20	54589	88
273842	321065006	321065	ASTATULA FINE	63.326	238.238	9.461	18.921	0.287	25.01	68.86	25.42	20.42	19.84	45.43	46.55	20119	61
273852	321050033	321050	LAKE FINE SAND	48.372	159.608	9.697	19.394	0.280	18.02	43.79	27.30	22.30	27.32	40.32	41.01	17092	49
273858	321050033	321050	LAKE FINE SAND	66.009	244.169	9.927	19.853	0.292	25.01	70.14	46.99	41.99	22.09	67.00	69.22	21565	101
273859	321066001	321066	CANDLER FINE S	44.031	156.570	10.374	20.749	0.271	18.62	44.31	18.37	13.37	18.37	31.99	34.29	43821	125
273862	321067001	321067	ASTATULA FINE	63.326	238.238	9.461	18.921	0.287	25.01	68.86	42.88	37.88	19.70	62.90	63.73	6584	32
273870	321066001	321066	CANDLER FINE S	55.284	229.890	10.821	21.642	0.286	25.01	68.74	24.72	19.72	17.75	44.73	46.76	71591	167
273928	321065006	321065	ASTATULA FINE	63.326	238.238	9.461	18.921	0.287	25.01	68.86	29.85	24.85	18.88	49.86	50.97	21419	57
273931	321050033	321050	LAKE FINE SAND	40.478	125.069	9.513	19.025	0.273	15.17	33.30	22.07	17.07	22.10	32.24	32.82	41502	112
273938	321050033	321050	LAKE FINE SAND	66.009	244.169	9.927	19.853	0.292	25.01	70.14	24.29	19.29	19.69	44.30	47.90	55536	126
273949	321065006	321065	ASTATULA FINE	63.326	238.238	9.461	18.921	0.287	25.01	68.86	61.91	56.91	19.19	81.93	82.58	23208	74
273959	321065006	321065	ASTATULA FINE	63.326	238.238	9.461	18.921	0.287	25.01	68.86	23.46	18.46	18.19	43.47	44.39	37292	72

Sheet1 Sheet2 Sheet3

ICPR4 Input Parameters for Percolation Areas



Over 1100 Percolation Areas of Which 250+ DRAs



DRAs with Respect to Topo and WT Depth (not shown)

SWFWMD PRESENTATION

Current Status

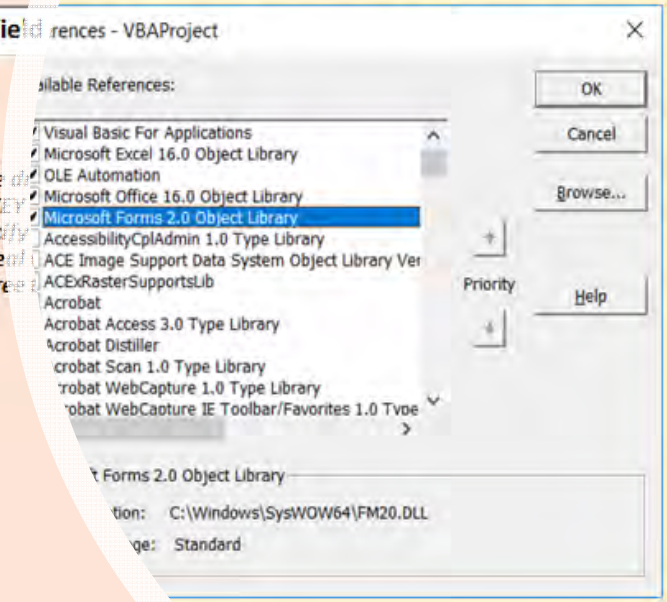
- Draft version
- Basic User Guidance
- Testing
  - North Citrus Withlacoochee River WMP
  - Little Jones Creek WMP
- Feedbacks
  - Initial water table depth to use when data undefined in SSURGO
  - Physical examination of results should be performed
  - Compare vs. observed field conditions

SWFWMD Soil Data Retrieval ar

risdiction of SWFWMD. The MUKEYs are based on the 2018 NRCS soil datab
es. Please contact your PM @SWFWMD if you can not find certain soil data.

tab, but you can remove any other tabs generated from executing the program, or the program will
in users' computer. The output file(s) will always be generated in the same folder as the program.
roperly show up or you have run issues, there are something you could do to change the situation
puter.
following References are checked in Excel (open the window below by selecting Developer → Visual Basic → Too

Soil Input Parameters	**ICPR4 Vertical Layers**
Soil MUKEY(s)	**Load file (csv, Excel or text**
Field Capacity Option	**Use one-tenth bar for fie**



Read Me

To retrieve/process soil data, select appropriate options on the above
If you only need to retrieve data for one soil, consider providing MUK
If you desire to replace default initial water table depth, you can spec
Simply close the program and restart when you don't know how to de
The last and most important thing is DO NOT alter the GUI. You are fre
Acronym: MUKEY = Map Unit Key

e., Excel, CSV or text delimited, and saved in any folder.
to save input information, but note that it will be removed when the pro

UserGuidance | GUI

Moving Forward

- White Paper
- Best available for WMP studies
- Further adjustments (case by case) based on experience & professional judgment
- Additional feedbacks
- Potential location for tool
  ftp://ftp.swfwmd.state.fl.us/pub/GWIS/

  Username: anonymous

  Password: enter your email address

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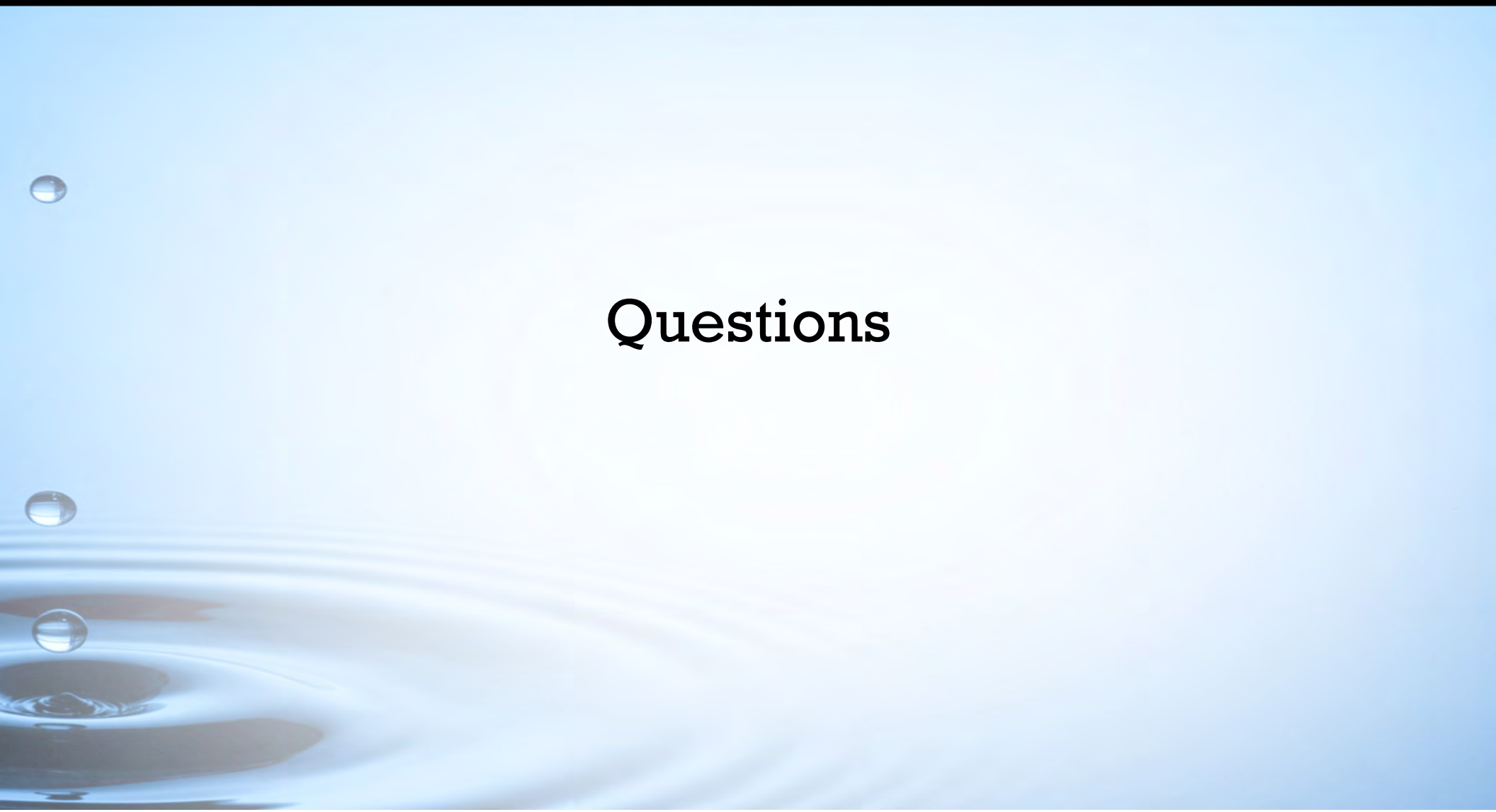
Q & A



Questions