

Testing Wetland Hydrology Criteria Modeling with Long Term Water Table

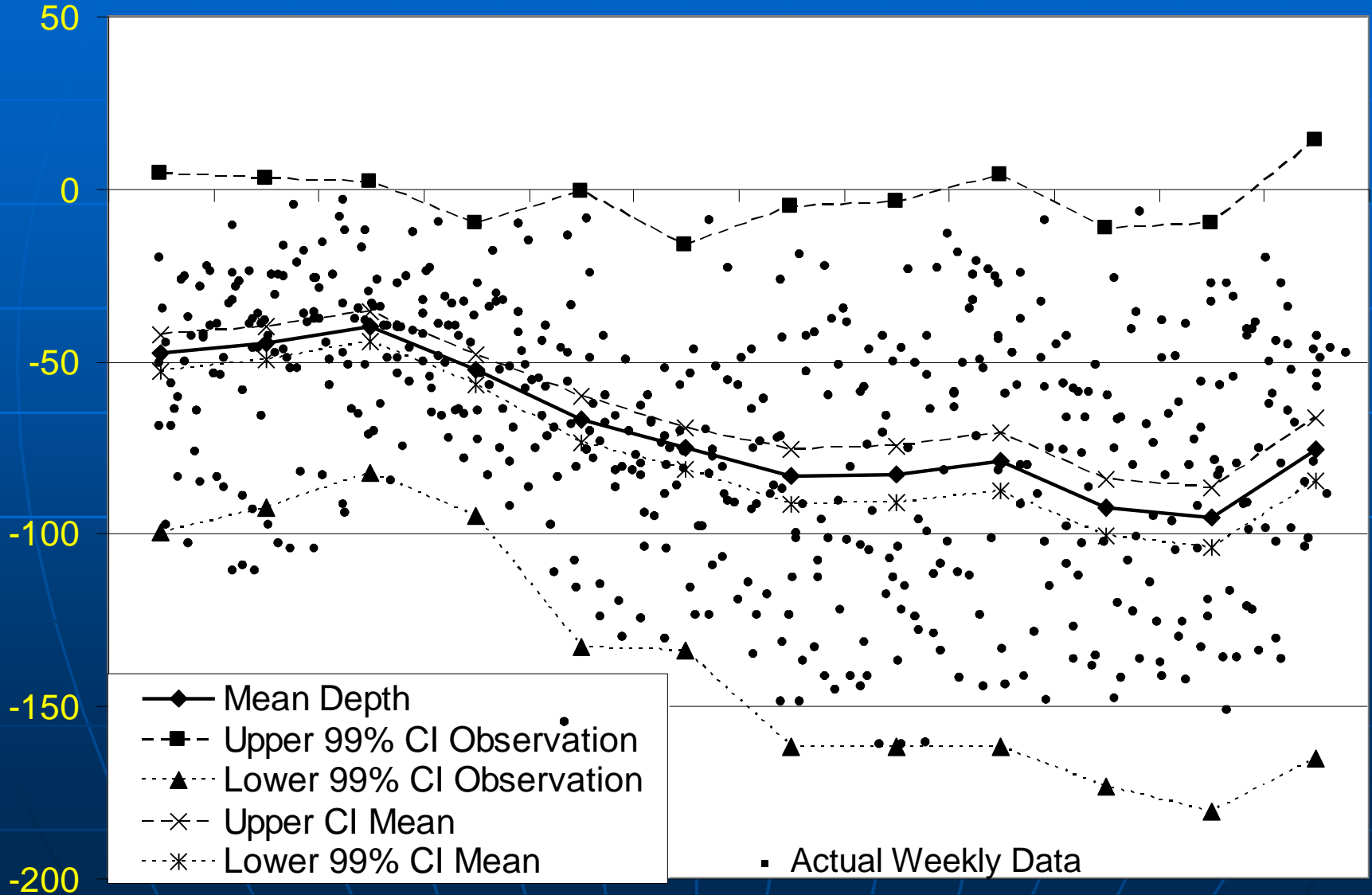
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Wetlands Hydrology Criteria must occur in 50% of years

- Surface Inundation 7 consecutive days in growing season.
- Soil Saturation for 14 consecutive days in growing season.
- Assume soil saturation if water table depth is within 6" for sands and 12" all other soil textures.
- Growing season- 50% of years air temp over 28° F
- Georgetown SC March 12- Nov 22
(1950-2010 data NOAA)

Problem to solve by threshold method: shallow water table variability

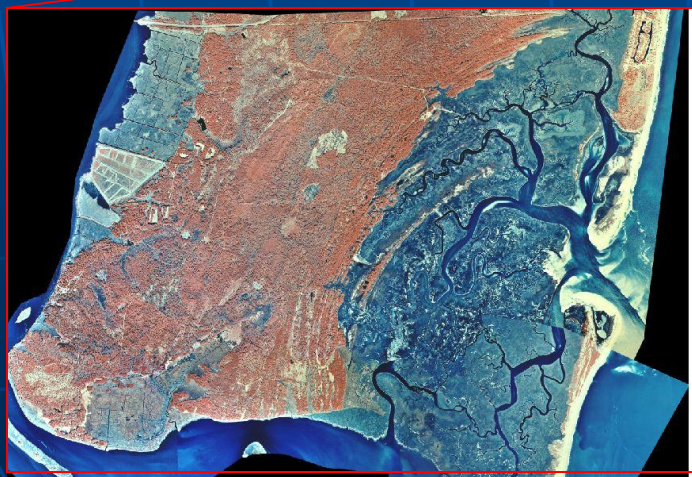
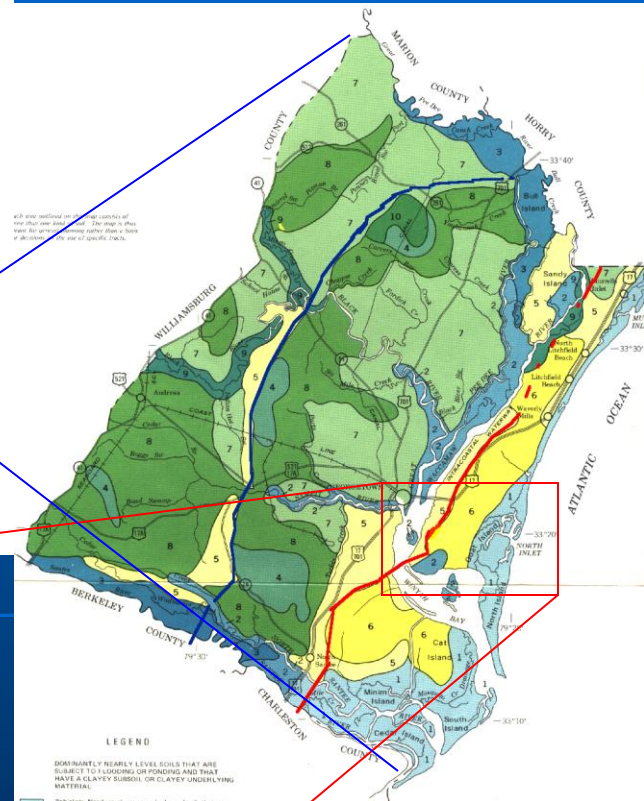
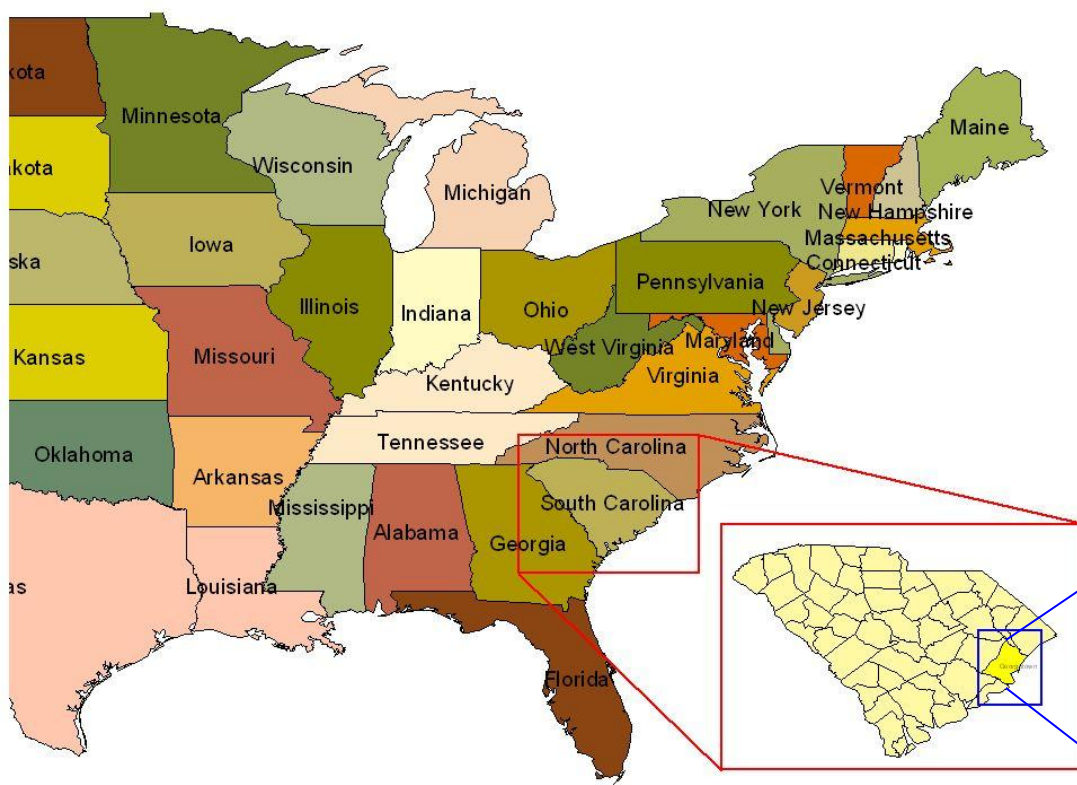
Depth (cm) Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec



Assumption of threshold method

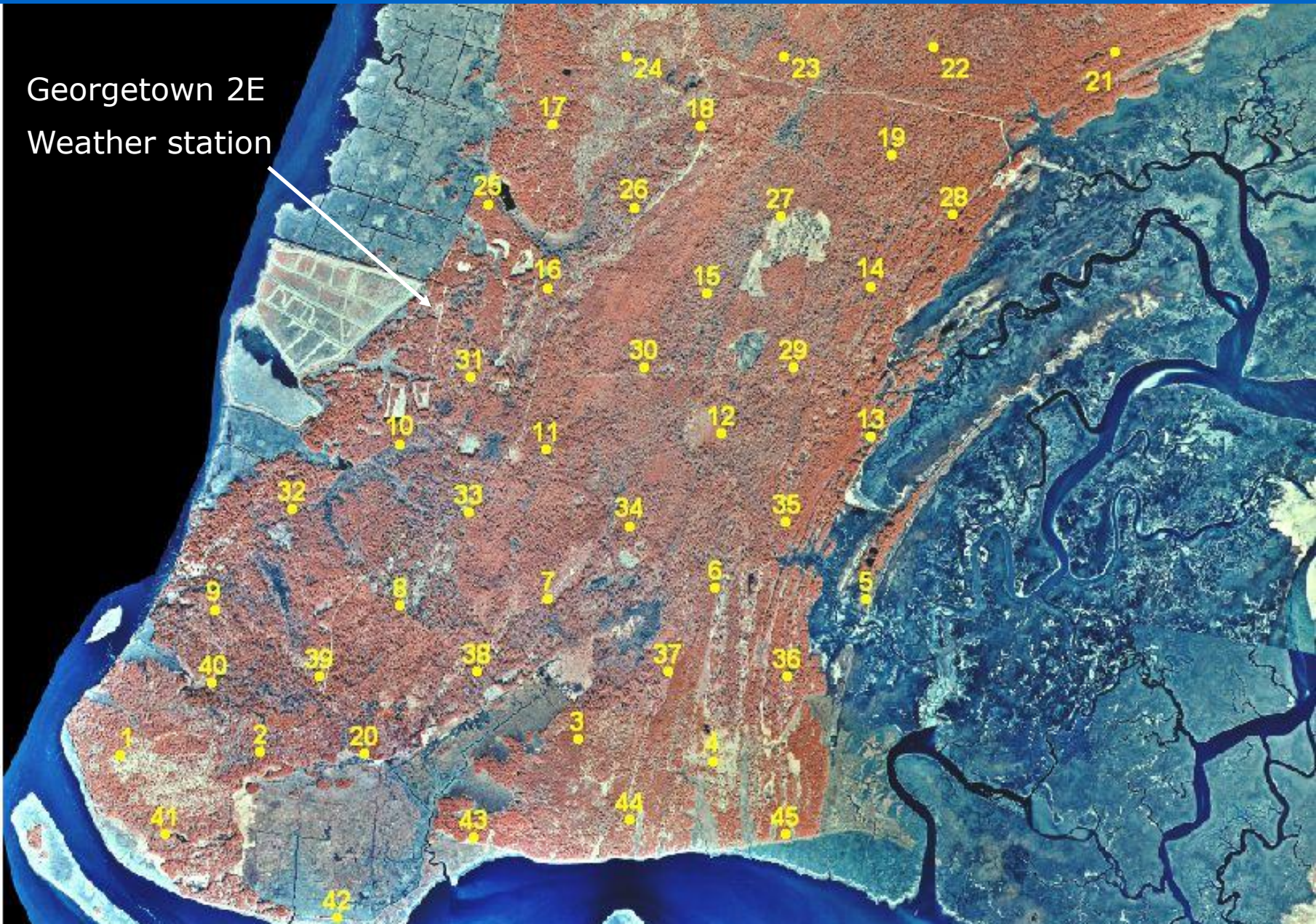
- Spatial variability of water table depth is independent of absolute depth (valid for shallow water tables)
- Depth well A at time $t = dA(t)$
- Depth well B at time $t = dB(t)$
- If $dA(t) = dB(t) + x$ and $dA(t+1) = dA(t) + y$
- Then $dB(t+1) = dA(t) + x + y$
- If $dA =$ wetland threshold
- then dB wetland character is determined by sign of x

Study site



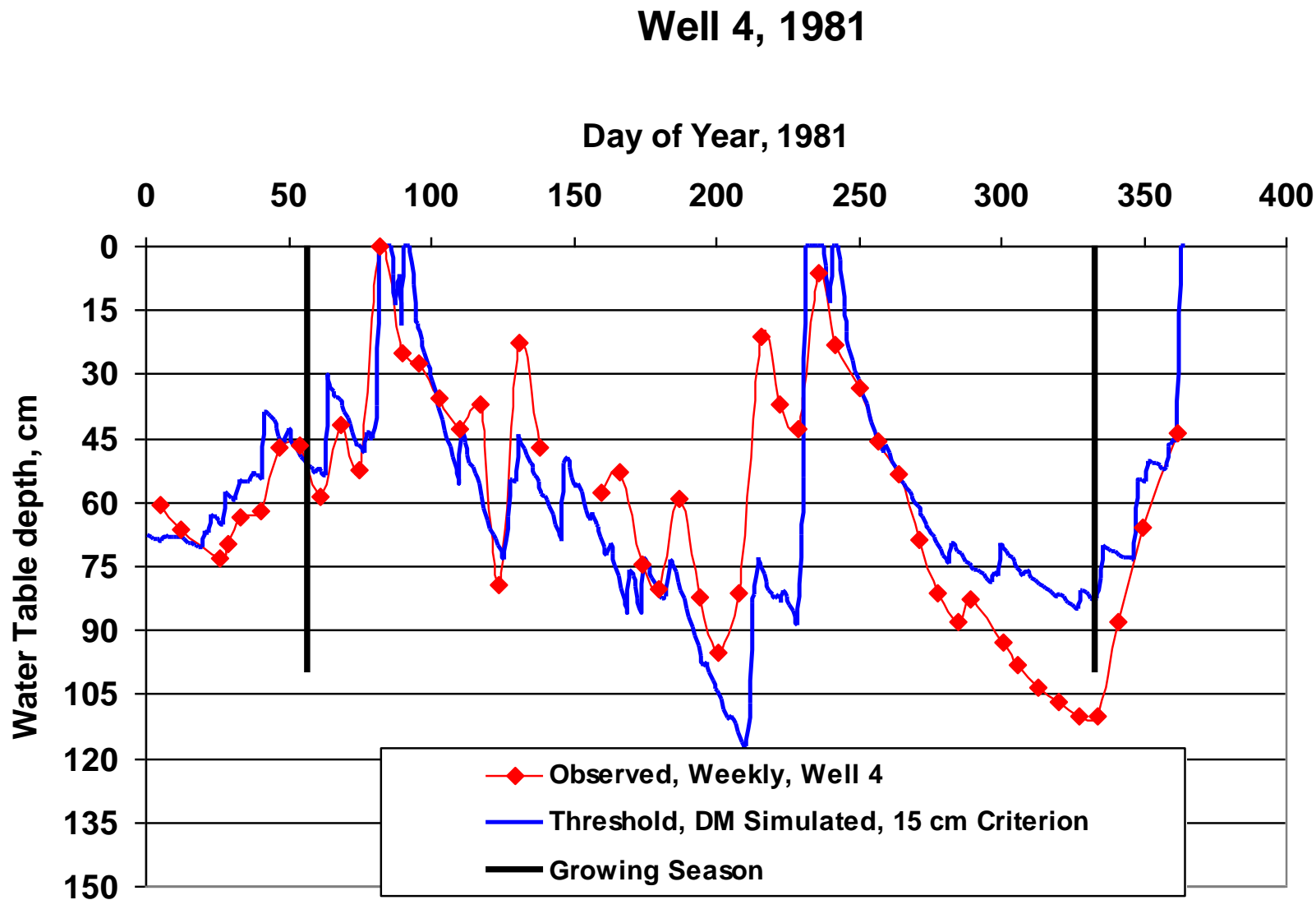
Test data collection

Georgetown 2E
Weather station

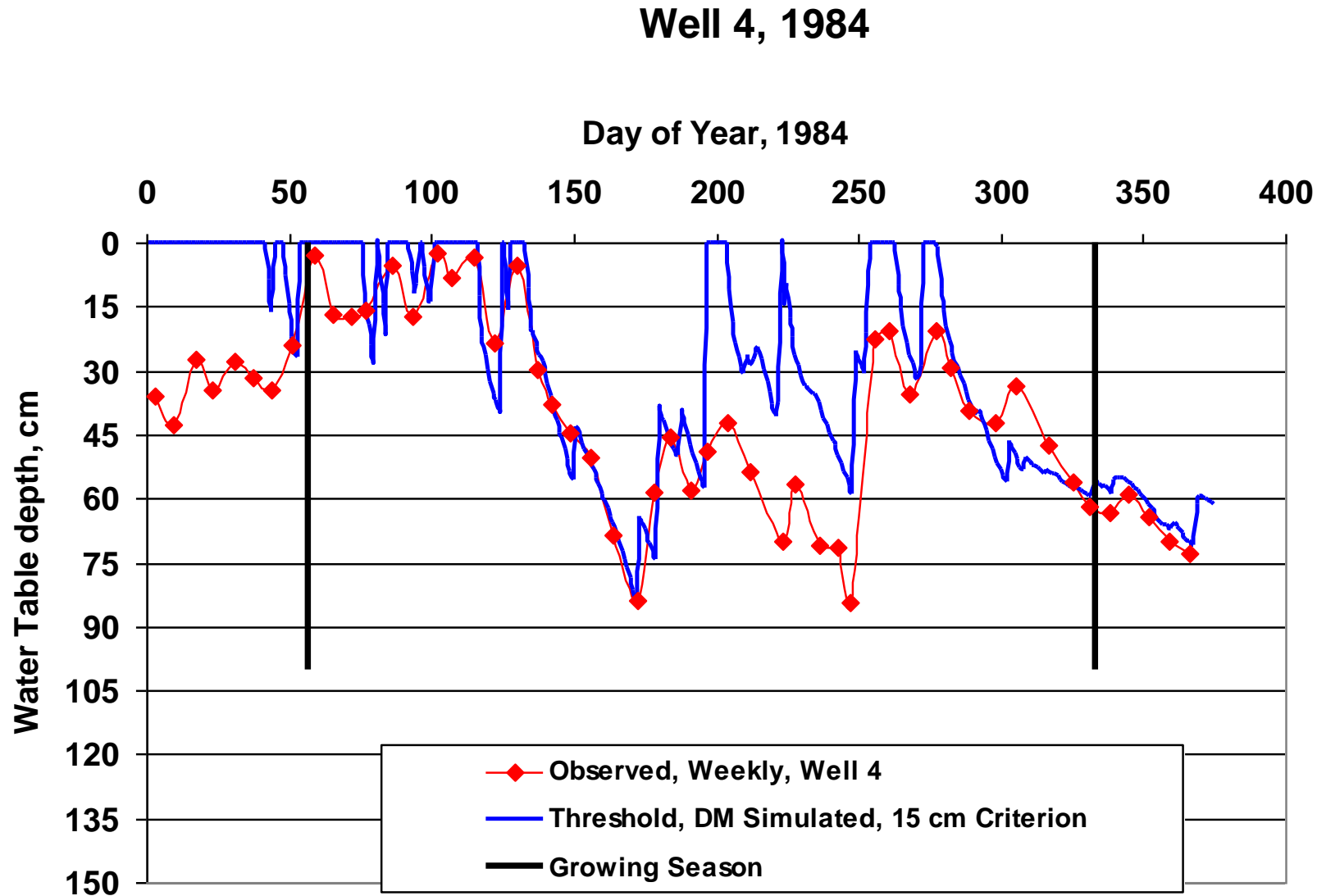


Soil Series	Taxonomy	Drainage Class	Well numbers
Centenary	Entic Grossarenic Alorthods	well drained	36
Chipley	Aquic Quartzipsamments	somewhat poorly drained	16, 38, 39 , 43
Echaw	Oxyaquic Alorthods	moderately well drained	7
Hobcaw	Typic Umbraquults	very poorly drained	2*, 10, 22, 40*
Lakeland	Typic Quartzipsamments	excessively well drained	1, 17, 20, 24, 26*
Leon	Aeric Alaquods	poorly drained	<u>3, 4, 6, 8, 11, 13, 14,</u> <u>19, 21, 23, 27, 33, 34,</u> <u>37,41, 44, 45</u>
Lynn Haven	Typic Alaquods	poorly to very poorly drained	12*, 15, 18, 29, 30
Witherbee	Aeric Alaquods	somewhat poorly drained	28*, 35*
Yauhannah	Aquic Hapludults	moderately well drained	9, 25, 31 , 32*

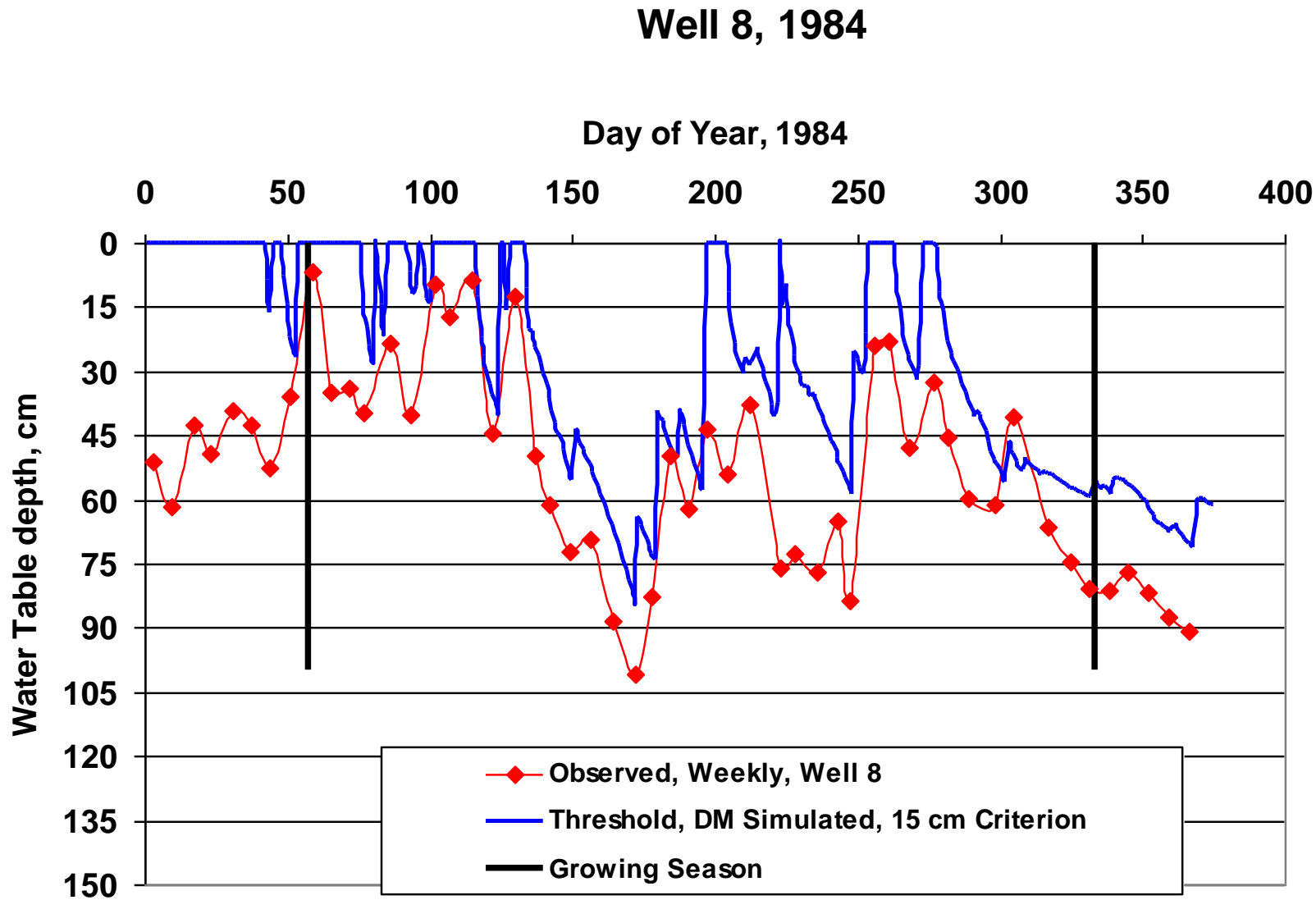
Well 4 approximately same as threshold wetland in dry year with tropical storm



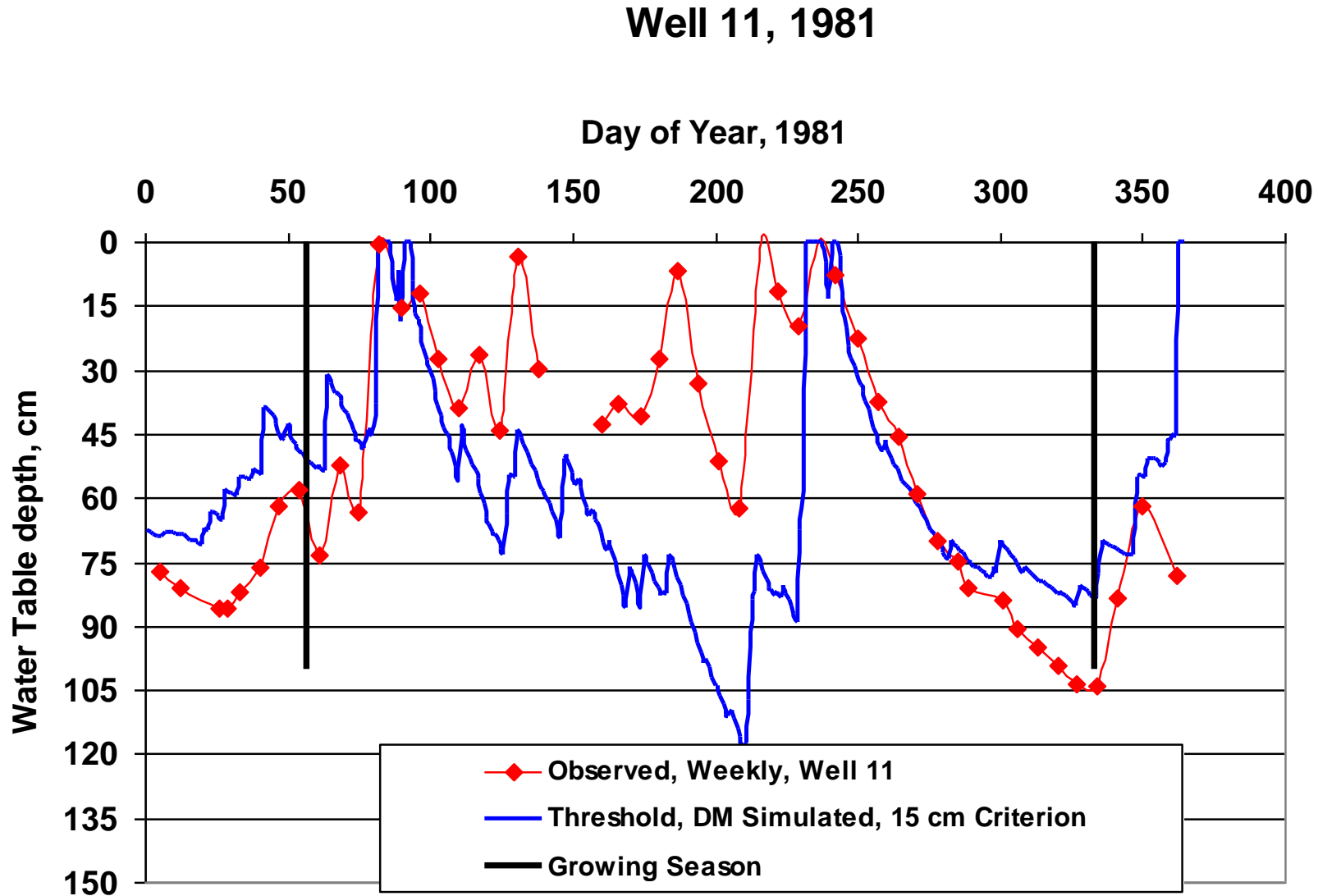
In 1984 well 4 is similar to threshold in early but slightly drier in during the heavy rains of late summer and fall



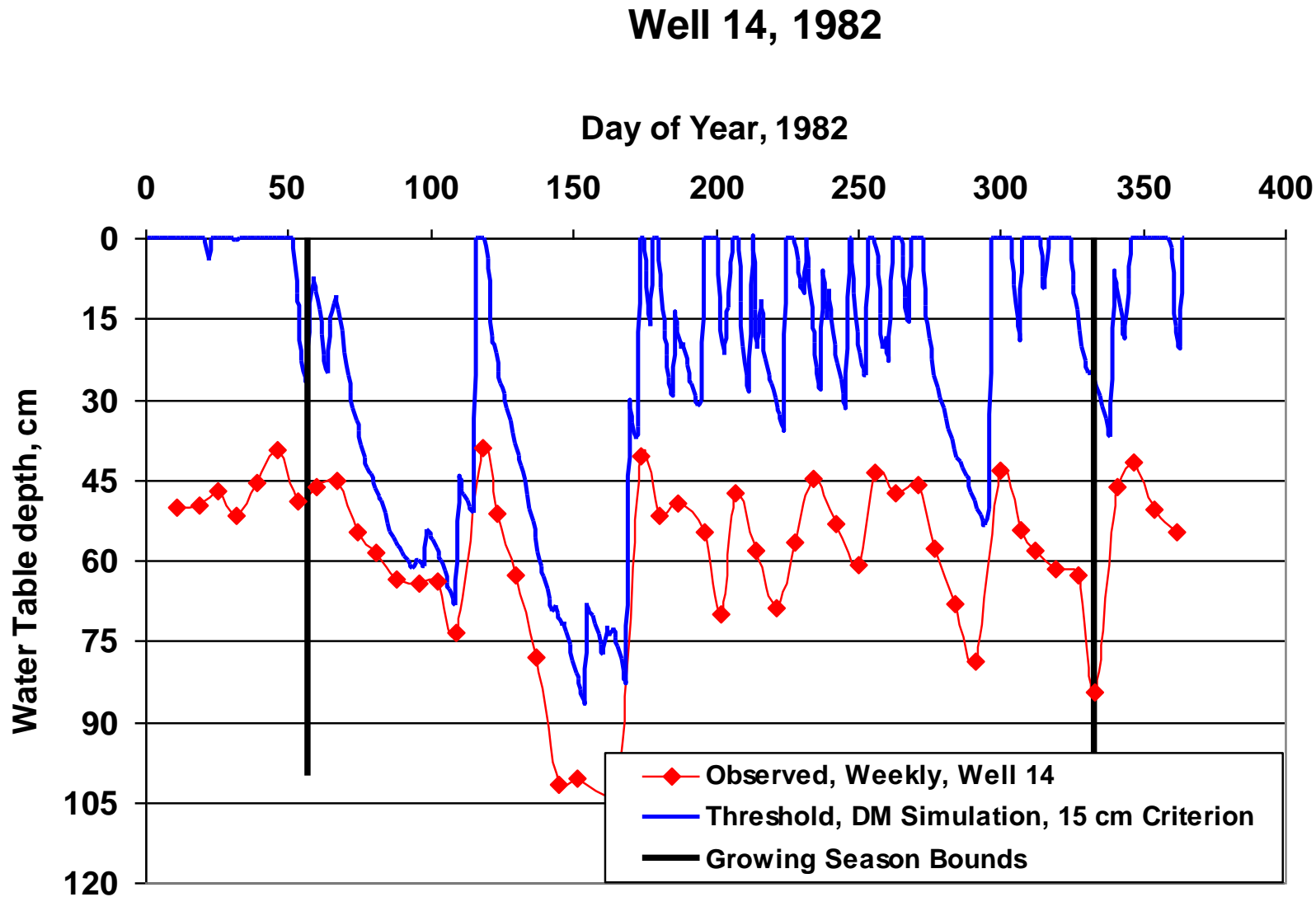
Well 8 is clearly drier



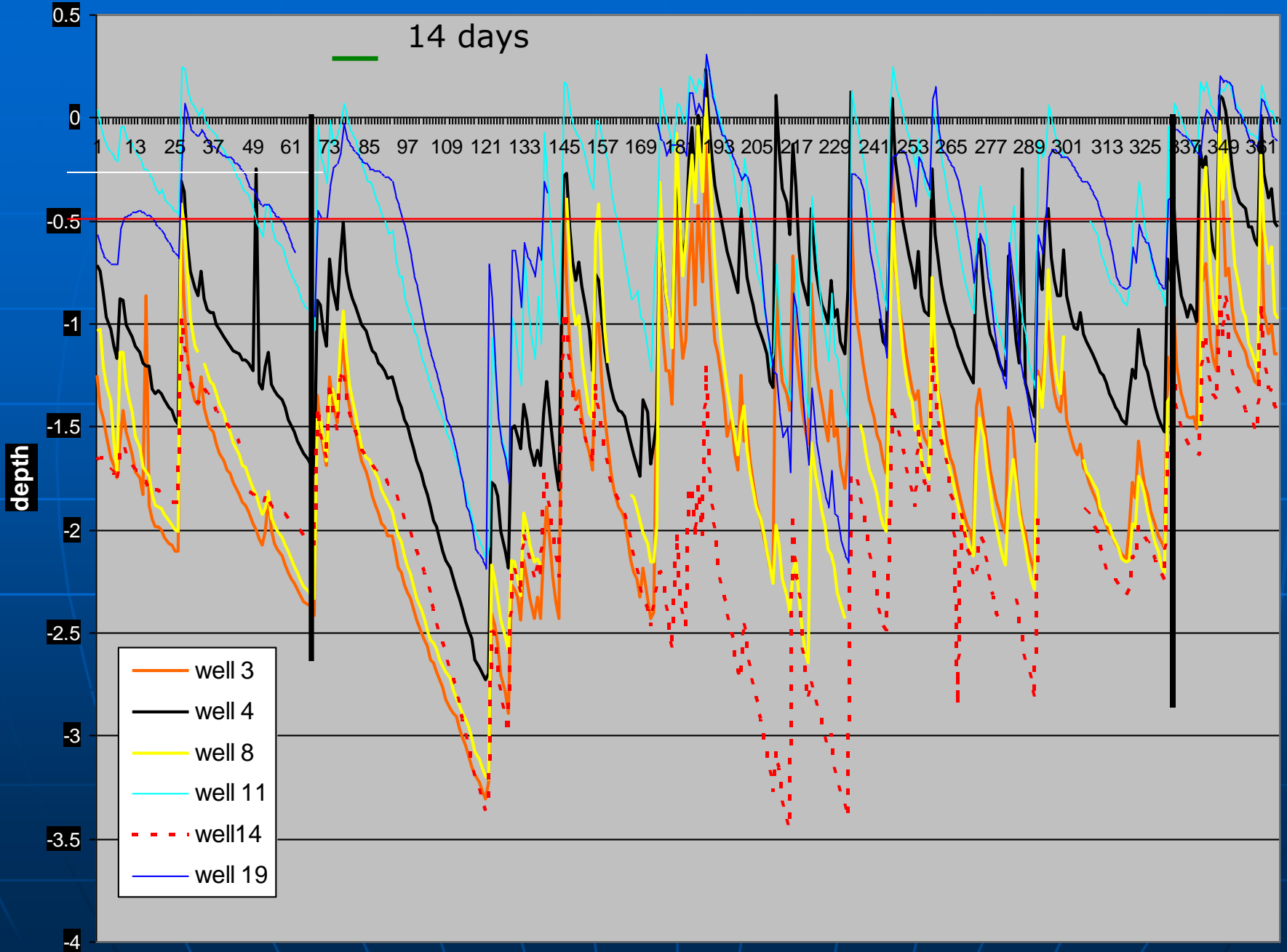
Well 11 clearly wetter than threshold



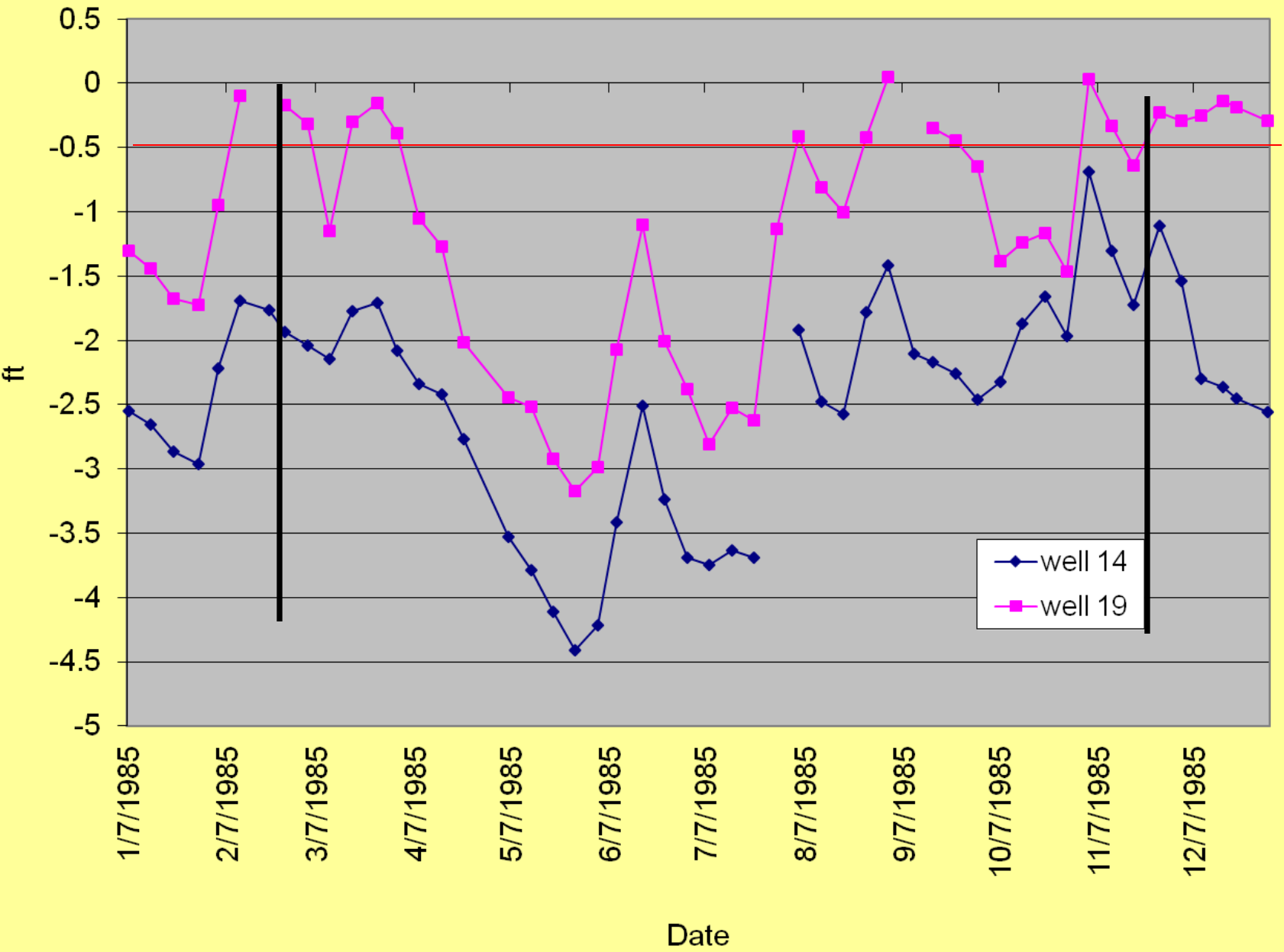
Well 14 drier in wettest year



Daily data for 1976 shows suggests similar relation to threshold methods



Example wetland determination for wells 14 and 19 in 1985



Results of actual 14 year data collection confirm results

Well	3	4	8	11	14	19
1976	No	No	Yes	Yes	No	Yes
1977	No	No	No	Yes	No	Yes
1978	No	No	No	Yes	No	No
1979	No	Yes	No	Yes	No	Yes
1980	No	Yes	No	Yes	No	Yes
1981	No	No	No	Yes	No	Yes
1982	No	Yes	No	Yes	No	Yes
1983	No	Yes	No	Yes	No	Yes
1984	No	Yes	No	Yes	No	Yes
1985	No	No	No	Yes	No	Yes
1986	No	No	No	Yes	No	Yes
1987	No	Yes	Yes	Yes	No	Yes
1988	No	No	No	Yes	No	Yes

Conclusion

- For shallow depths, relative depth differences between wells were the same for periods of 60 days to 14 years.
- Threshold method produced valid evaluation of wetland hydrologic criterion that was confirmed long term water table measures.

Test was done on Leon sand and within 10 km of weather station