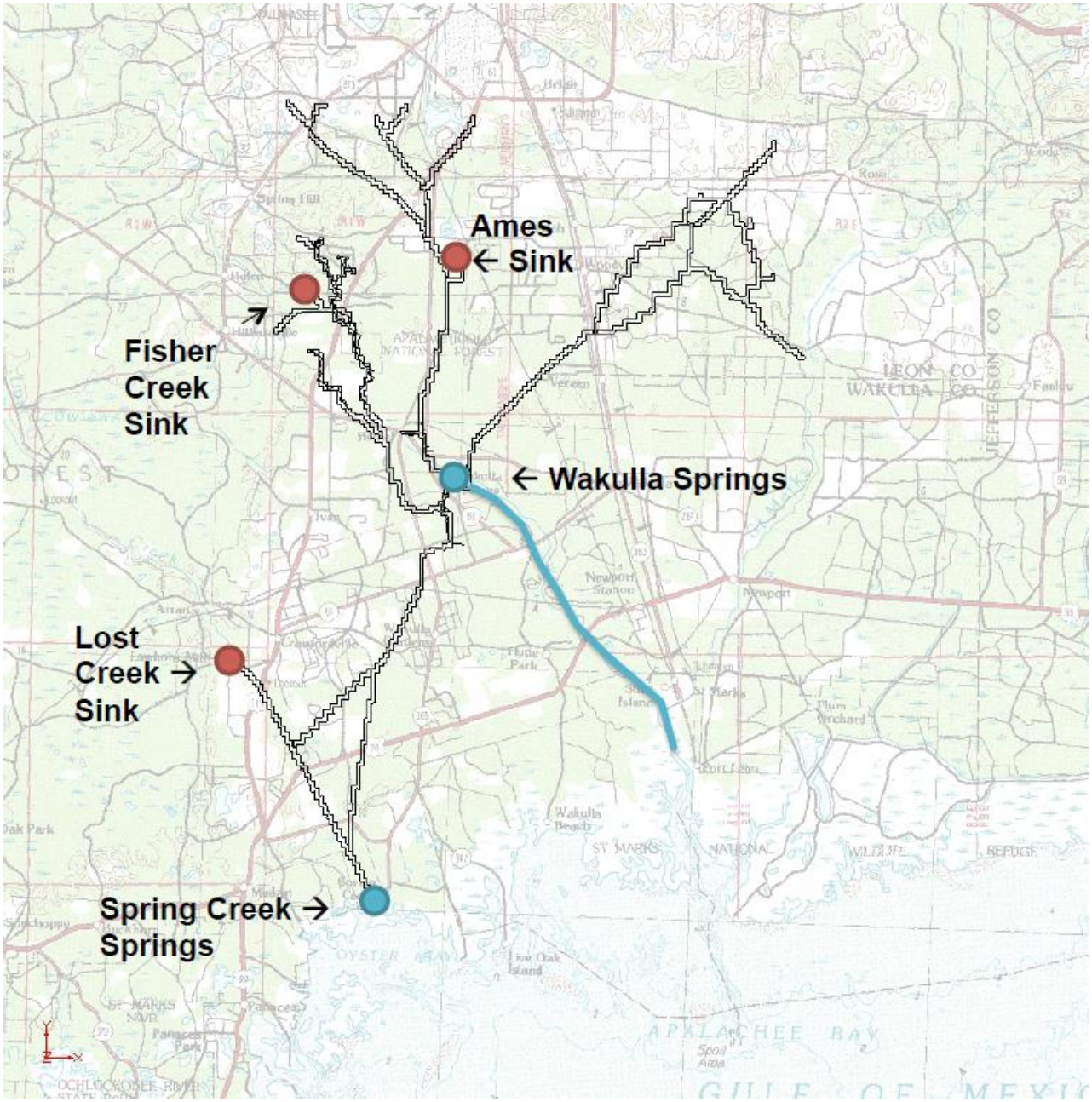
Wakulla Spring - Spring Creek Spring Group Analysis

Interactions with Spring Creek and

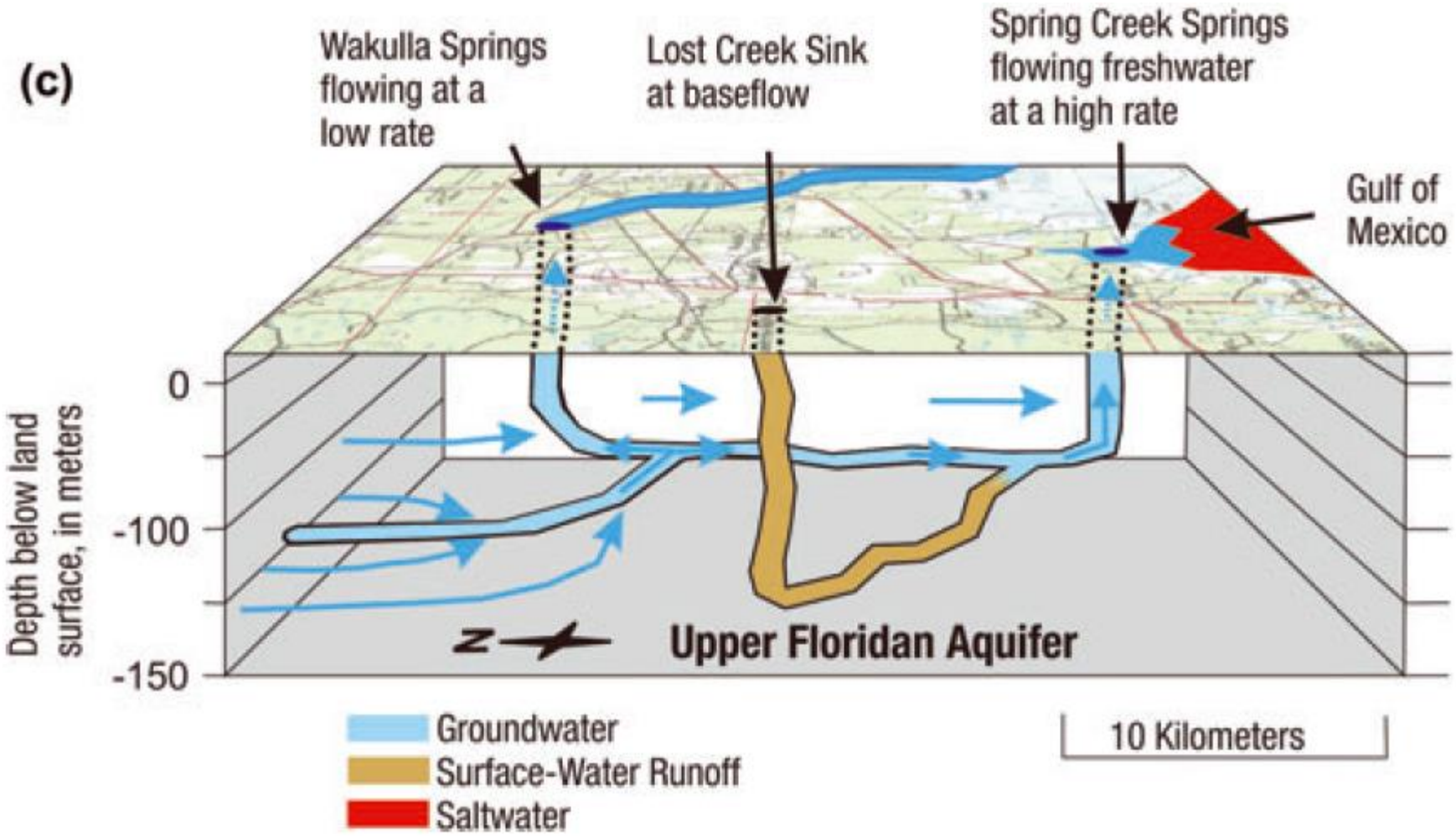
long-term trends in discharge

James Sutton

Hydrogeologist II

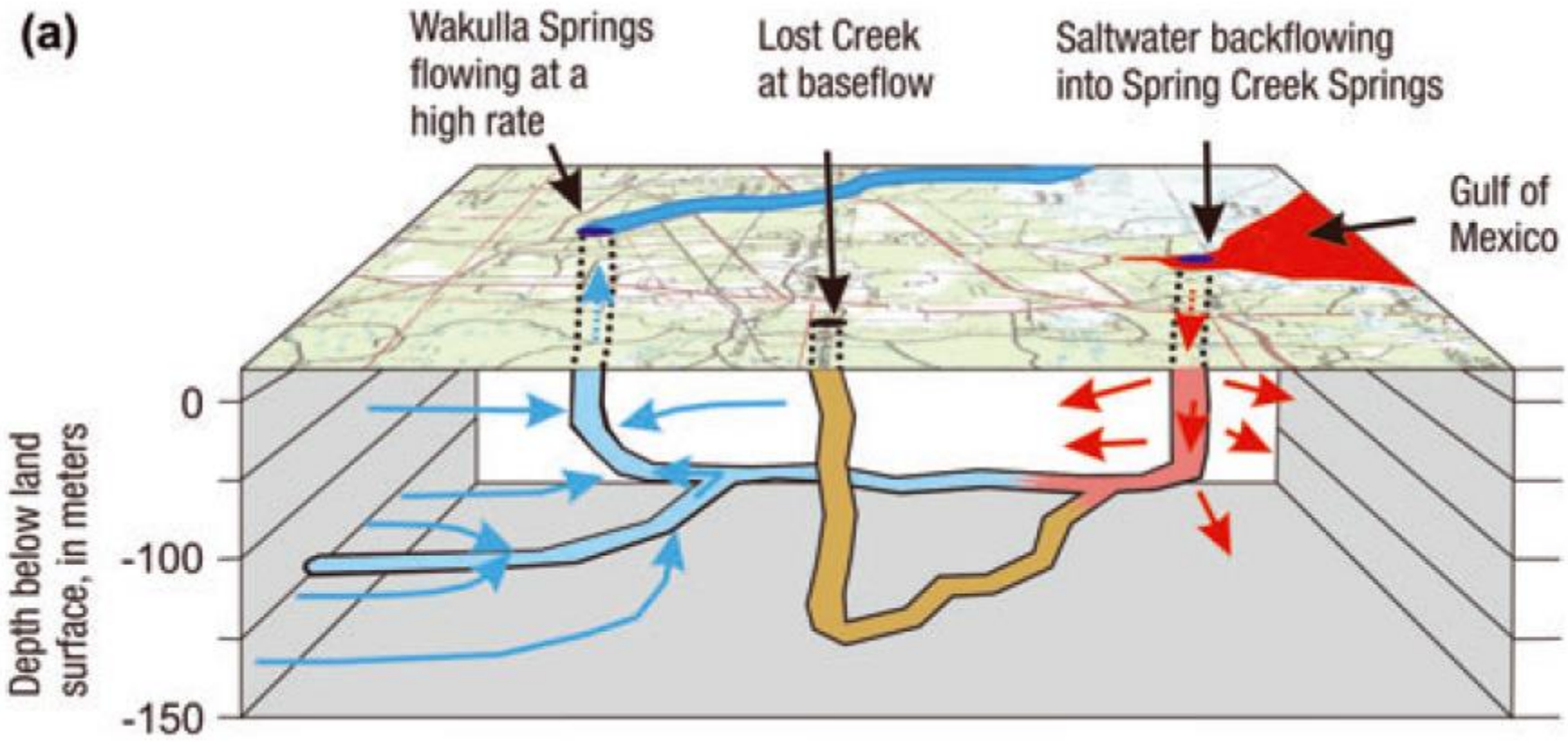

Ames
← Sink
Fisher
Creek
Sink
← Wakulla Springs
Lost
Creek →
Sink
Spring Creek →
Springs

Conceptual Reversal



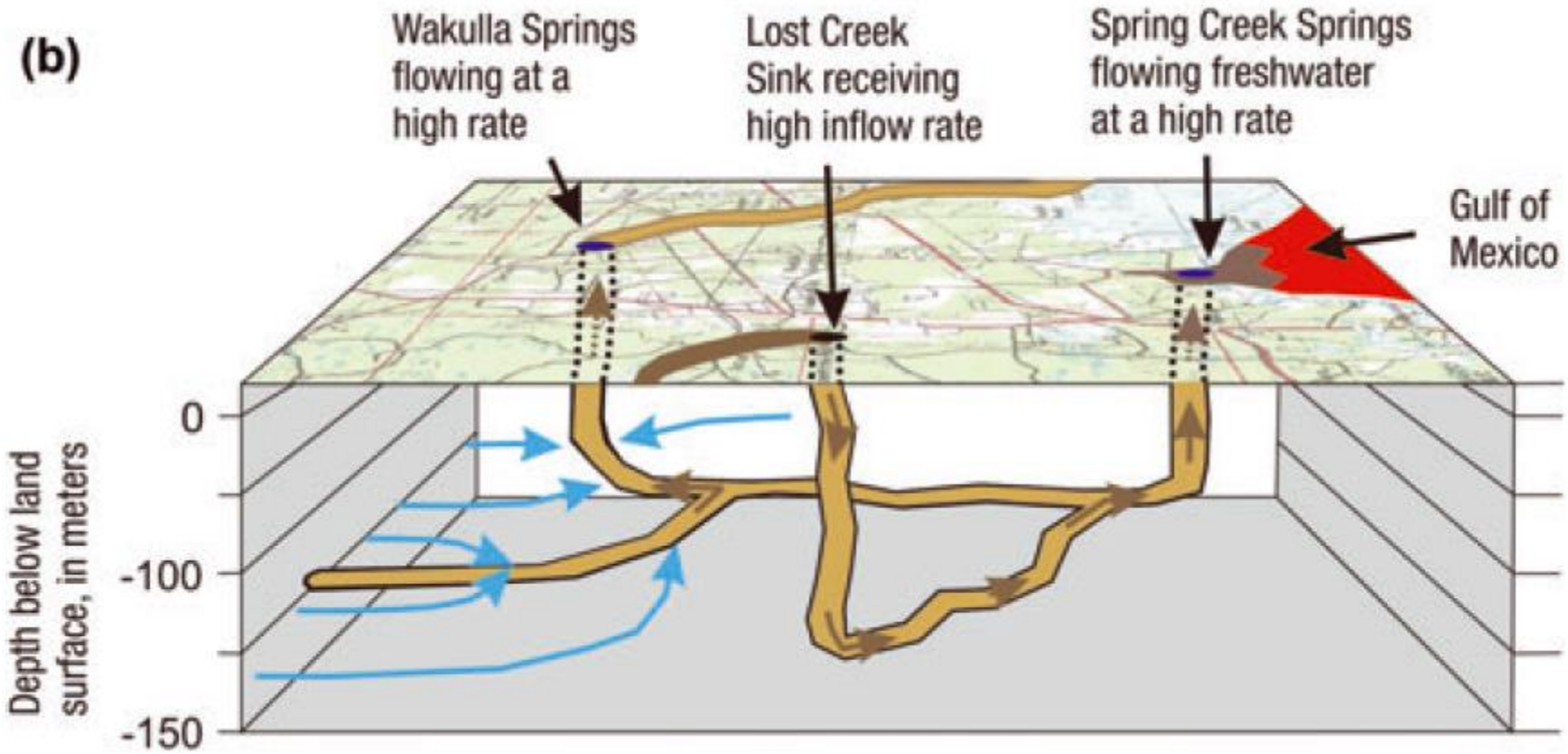
Phase 3: Groundwater outflow
Davis and Verdi, 2014

Conceptual Reversal



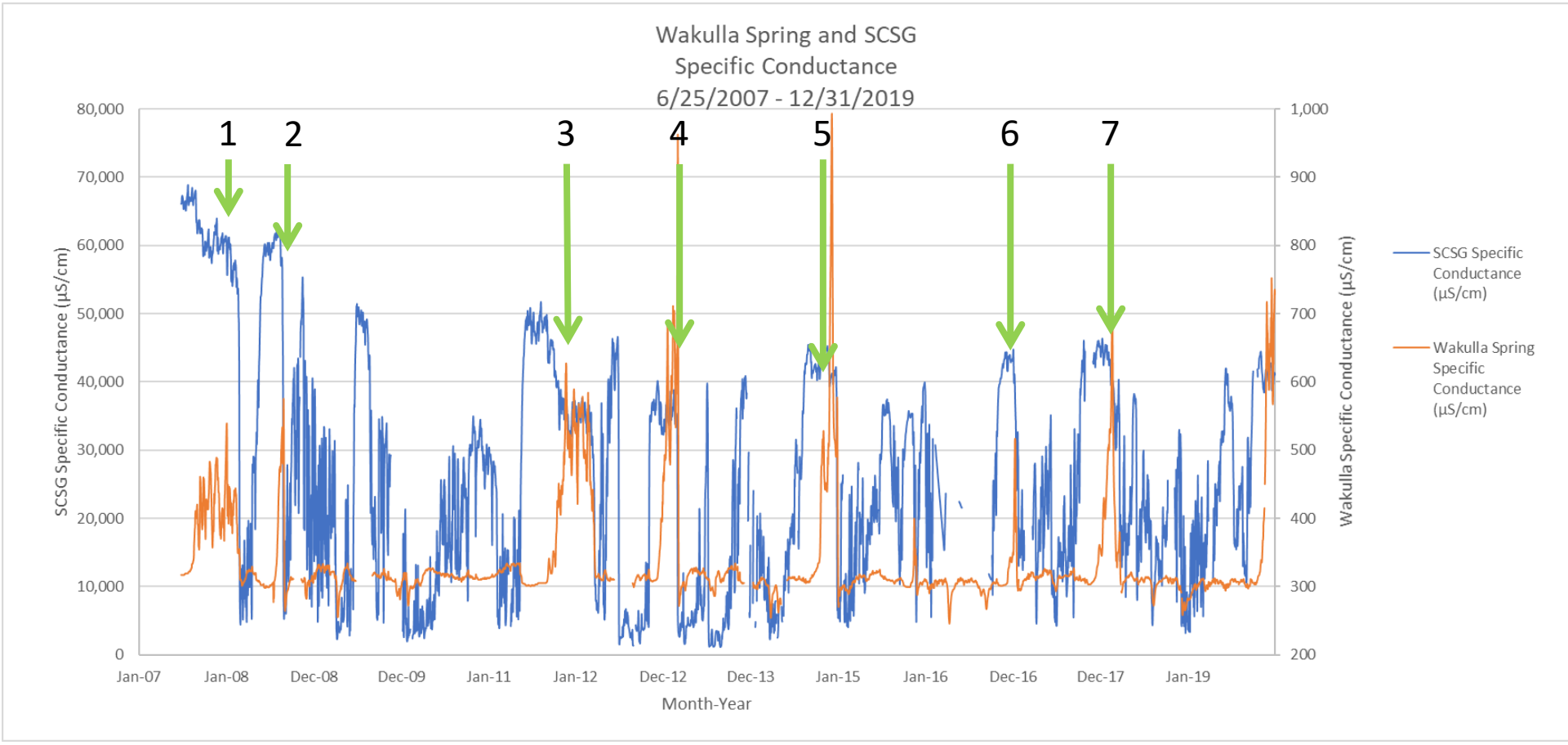
Phase 1: Sea water backflow
Davis and Verdi, 2014

Conceptual Reversal

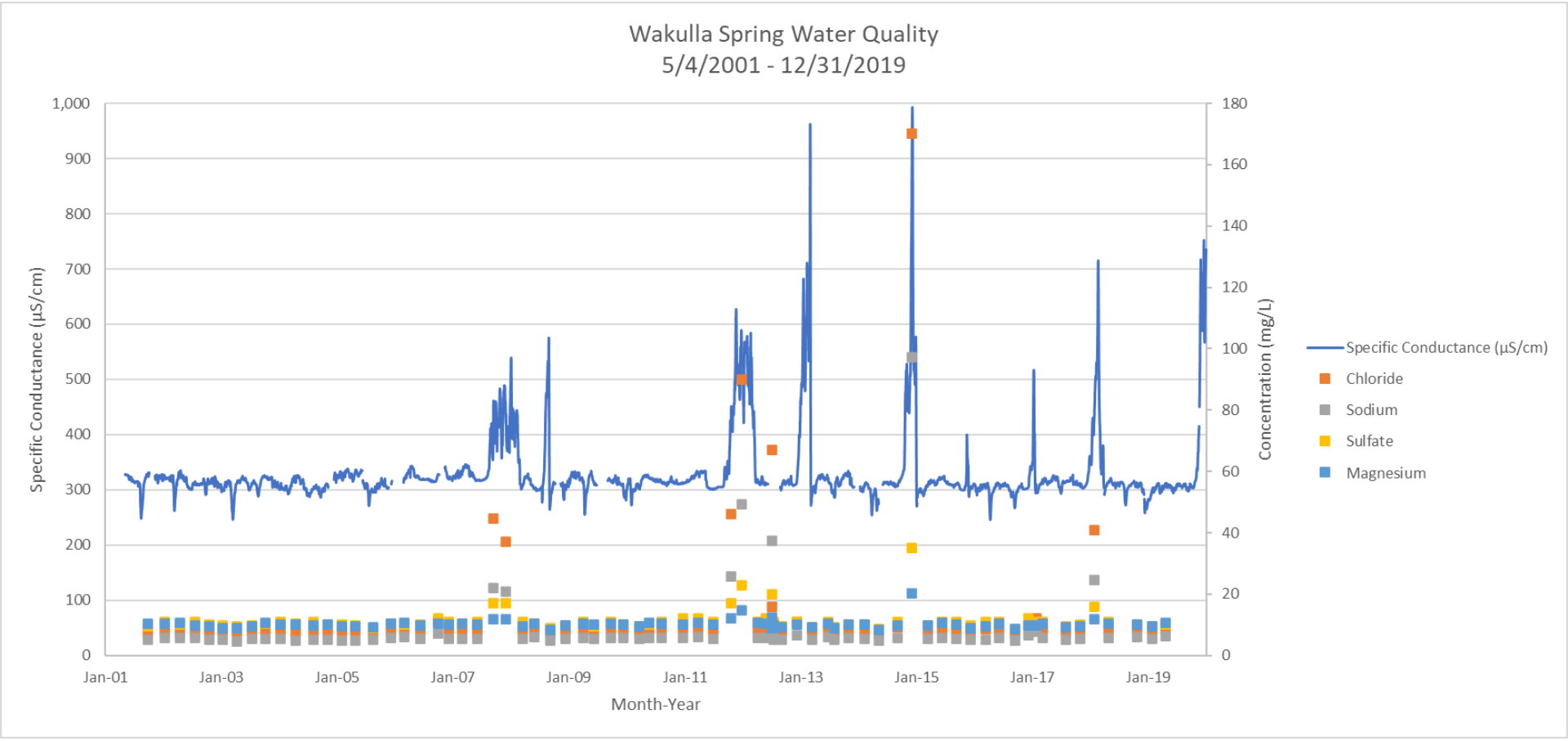


Phase 2: Surface water inflow
Davis and Verdi, 2014

Period of Record Evaluated

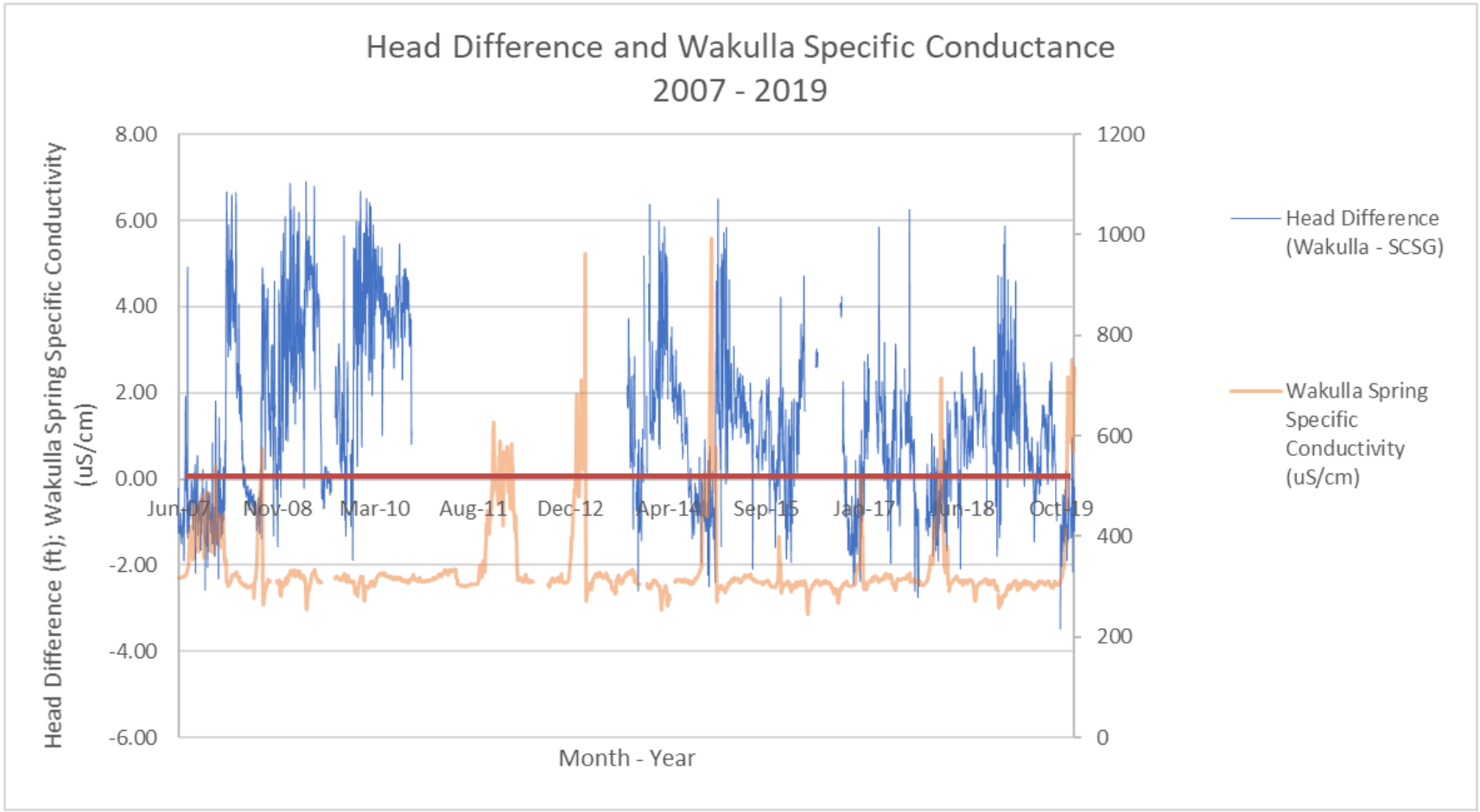


1,000 uS/cm ≈ 0.5 PPT salinity



Average Wakulla Spring Conductivity= 330 uS/cm

Reversals and Head Gradients

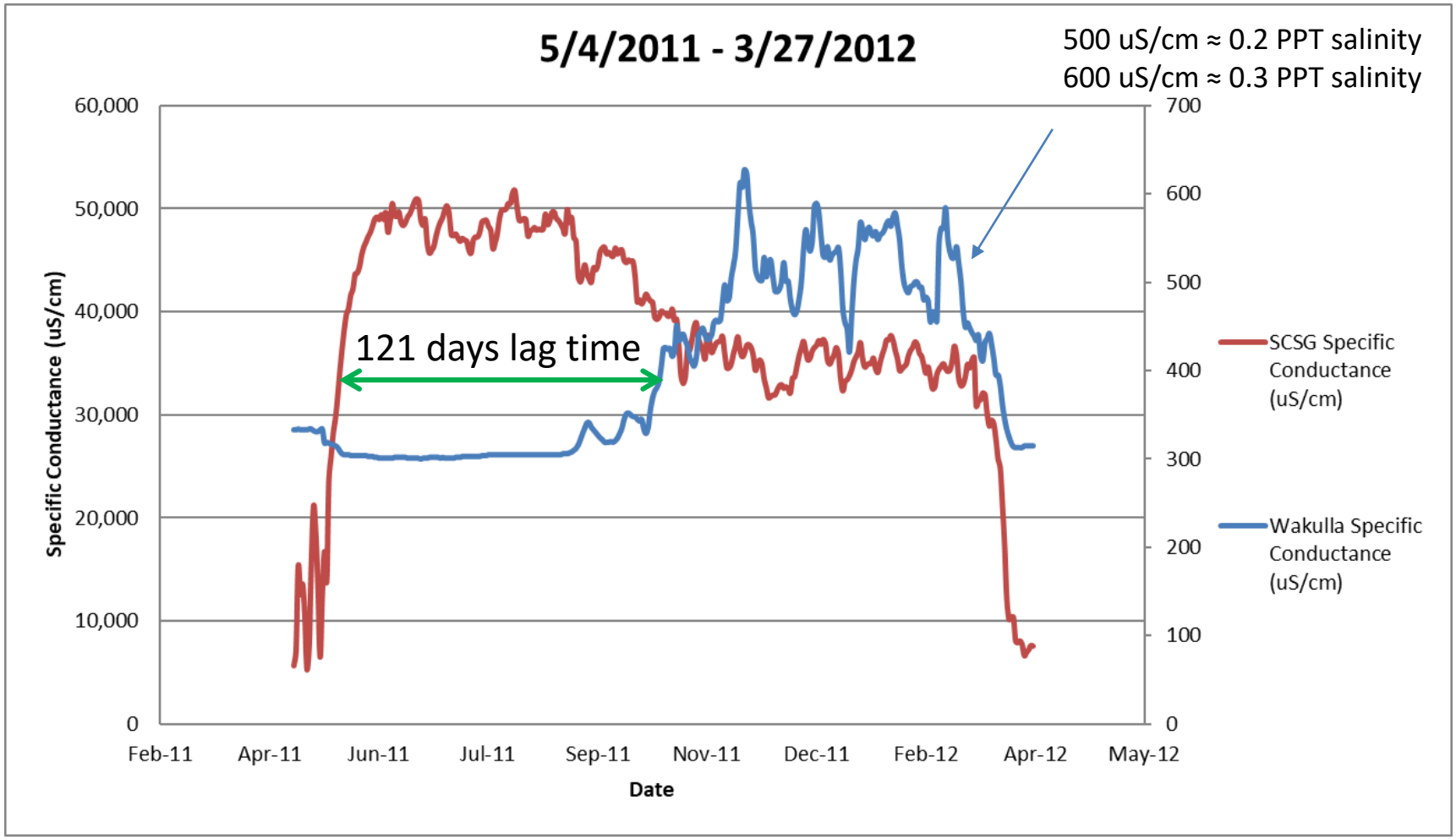


- Water from SCSG flows north towards Wakulla Spring because the “normal” head gradient between the two have reversed
- This is the physical process that determines flow direction and magnitude
- Followed methods from Davis and Verdi, 2014

SCSG Reversal Events

Event	Date of beginning of reversal event at SCSG	Date of end of reversal at Wakulla Spring	SCSG under reversal conditions (Approximate # of Days)	Wakulla Spring with elevated specific conductance (Approximate # of Days)
1	5/7/2007	2/27/2008	296	203
2	4/15/2008	8/31/2008	138	42
3	5/4/2011	3/27/2012	328	207
4	10/27/2012	3/3/2013	127	87
5	4/22/2014	12/30/2014	252	116
6	9/25/2016	1/17/2017	114	42
7	9/10/2017	3/26/2018	197	105
Average			207 days	115 days

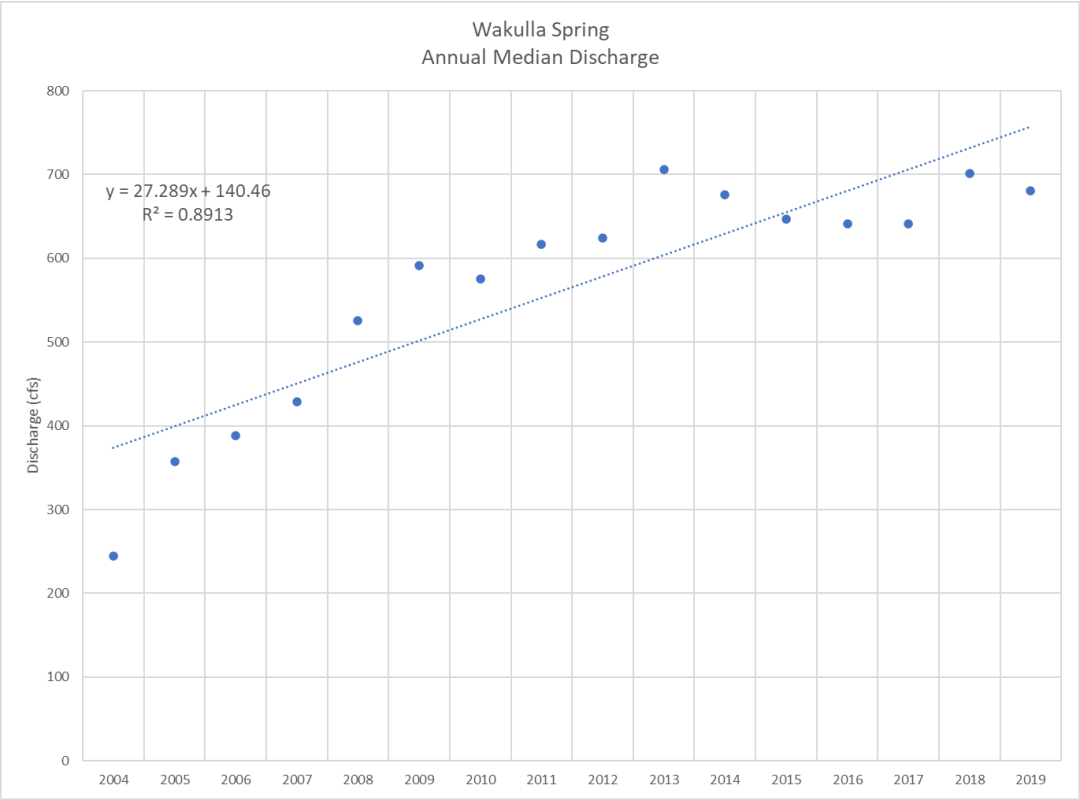
Event #3



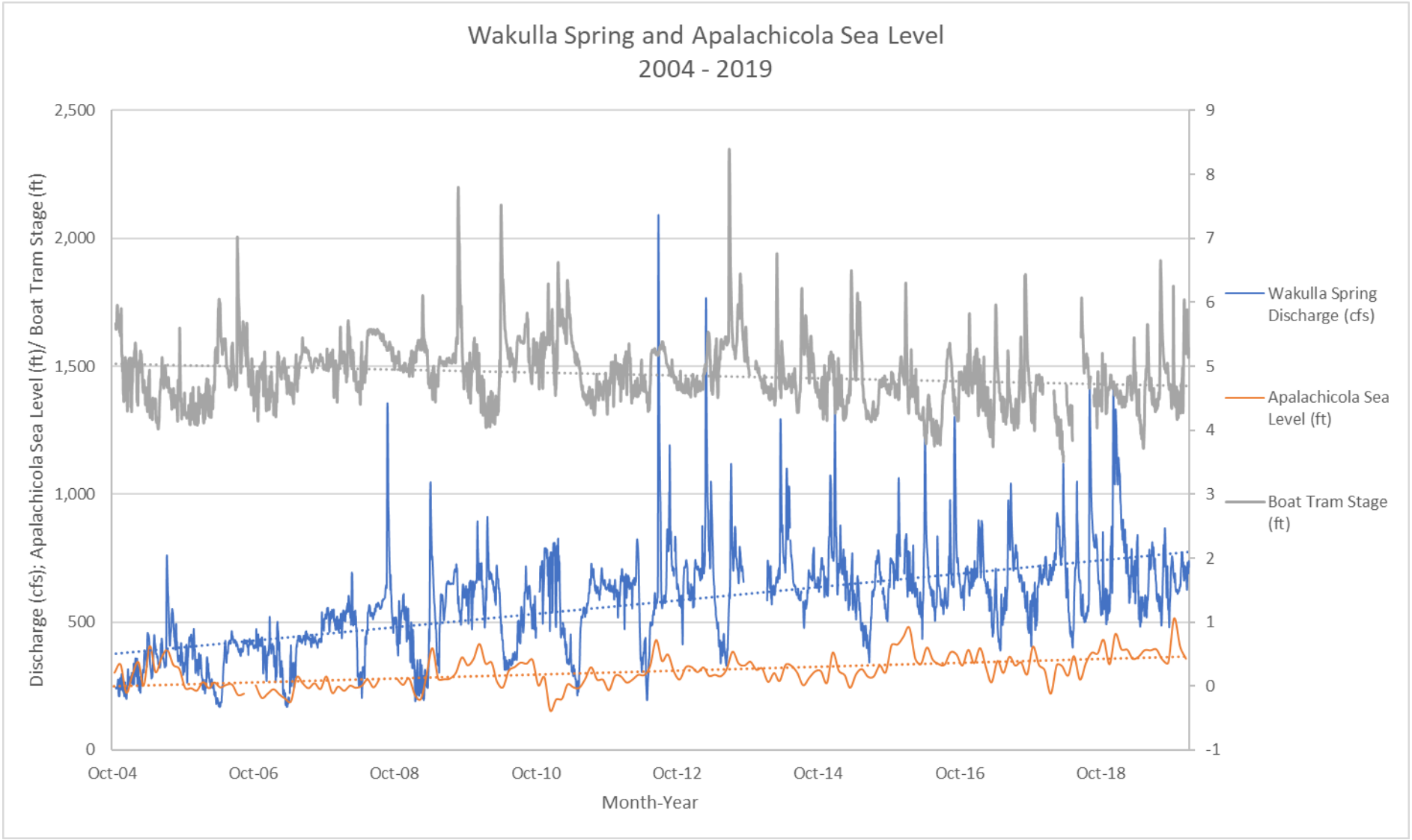
35 PPT salinity ≈ 53,000 uS/cm

Trends in Wakulla Spring Discharge

- Annual average discharge at Wakulla Spring has increased approximately 176% from 2004 – 2019
  - Annual median discharge has increased ~178%
  - Annual minimum discharge has increased ~140%



Sea Level Trends



Summary

- There area multiple factors that influence discharge at Wakulla Spring
- The relationship between short-term Spring Creek Springs Group reversal events and long-term sea level changes appear to have an effect on changes in discharge at Wakulla Spring
- Further investigations into these processes and other factors may provide more insight into additional drivers of Wakulla Spring discharge

Questions?