

The Interconnectedness Between Spring Creek Springs and Wakulla Spring and the Effects on Flow at Wakulla Spring

U.S. GEOLOGICAL SURVEY

In Cooperation With the
Florida Dept. of Environmental Protection-
Florida Springs Initiative

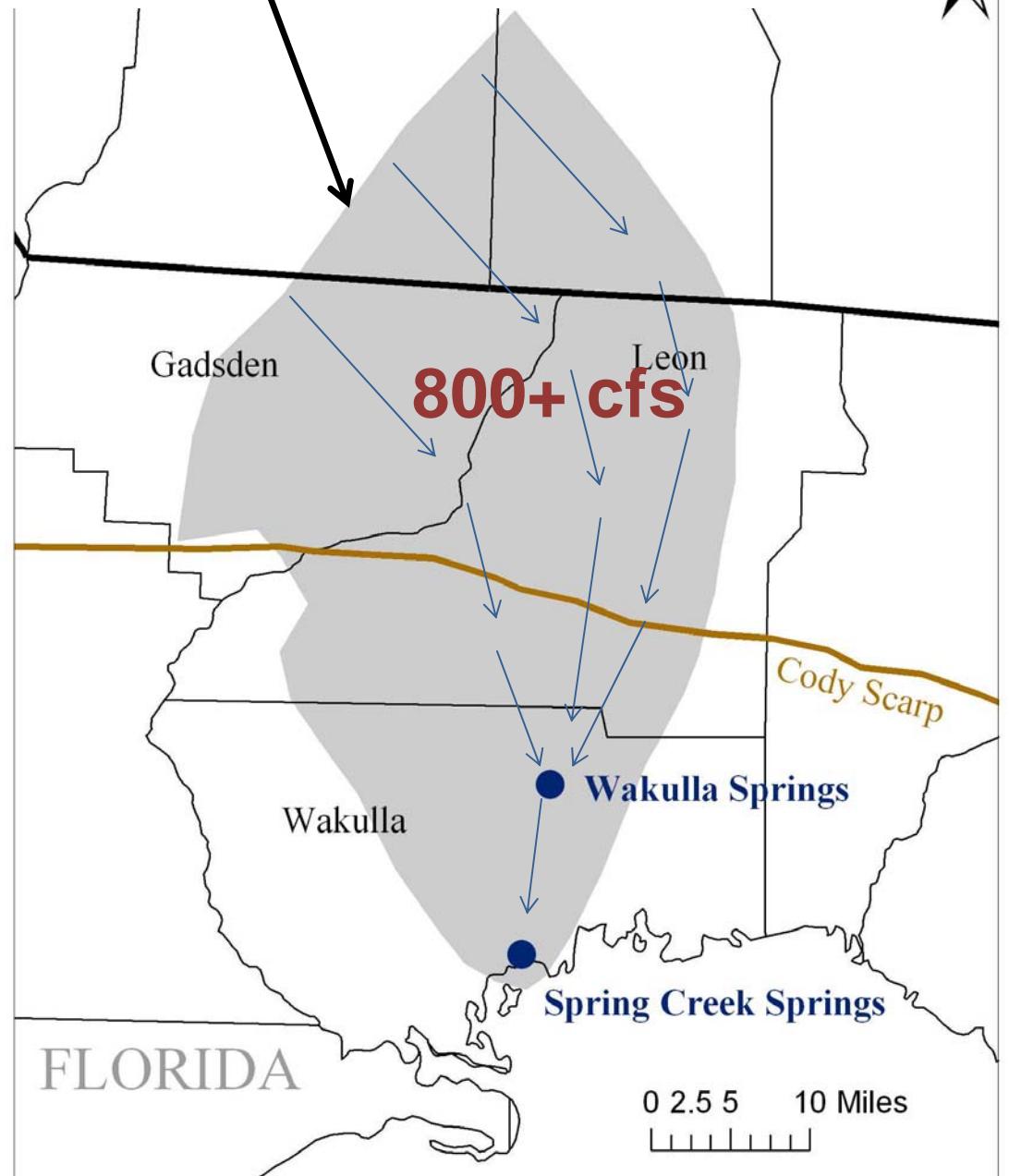
Tallahassee, Florida
2011

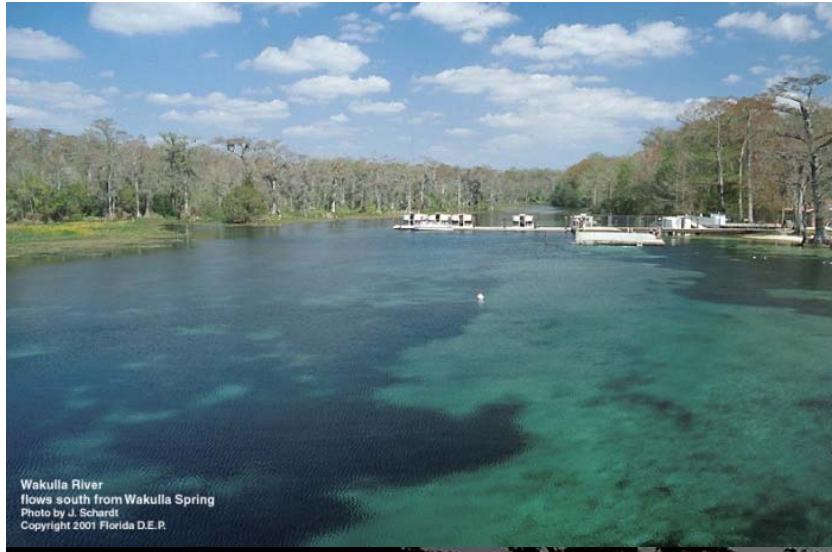
Where does the spring water come from?

Wakulla and Spring Creek Springs are both large first magnitude springs.

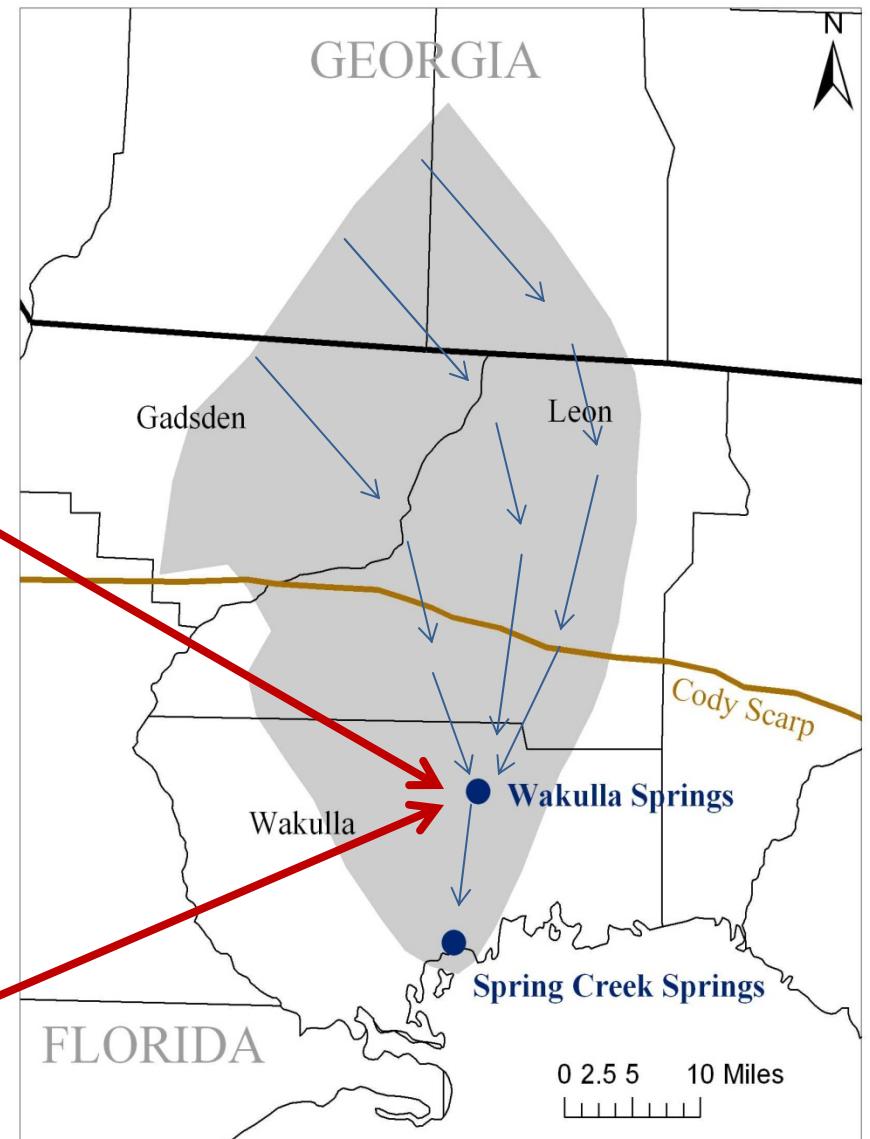
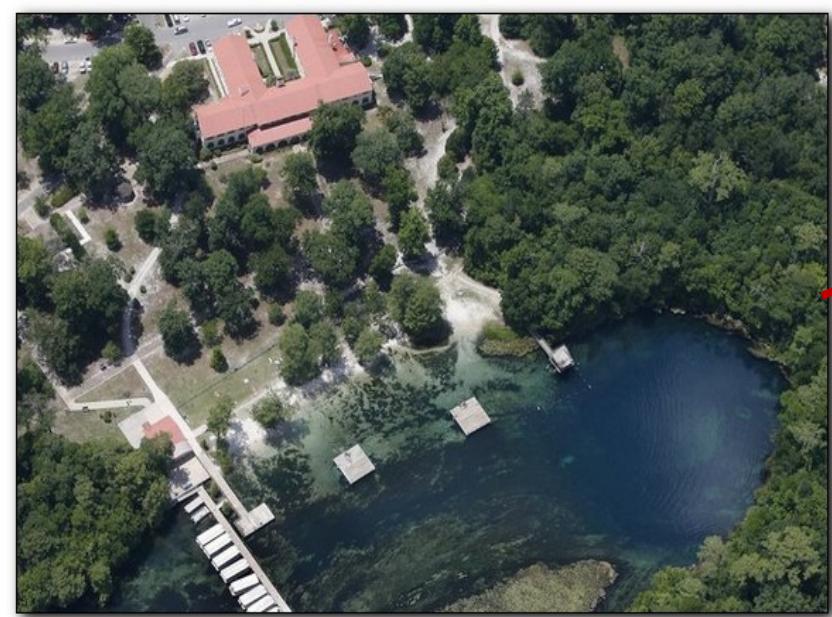


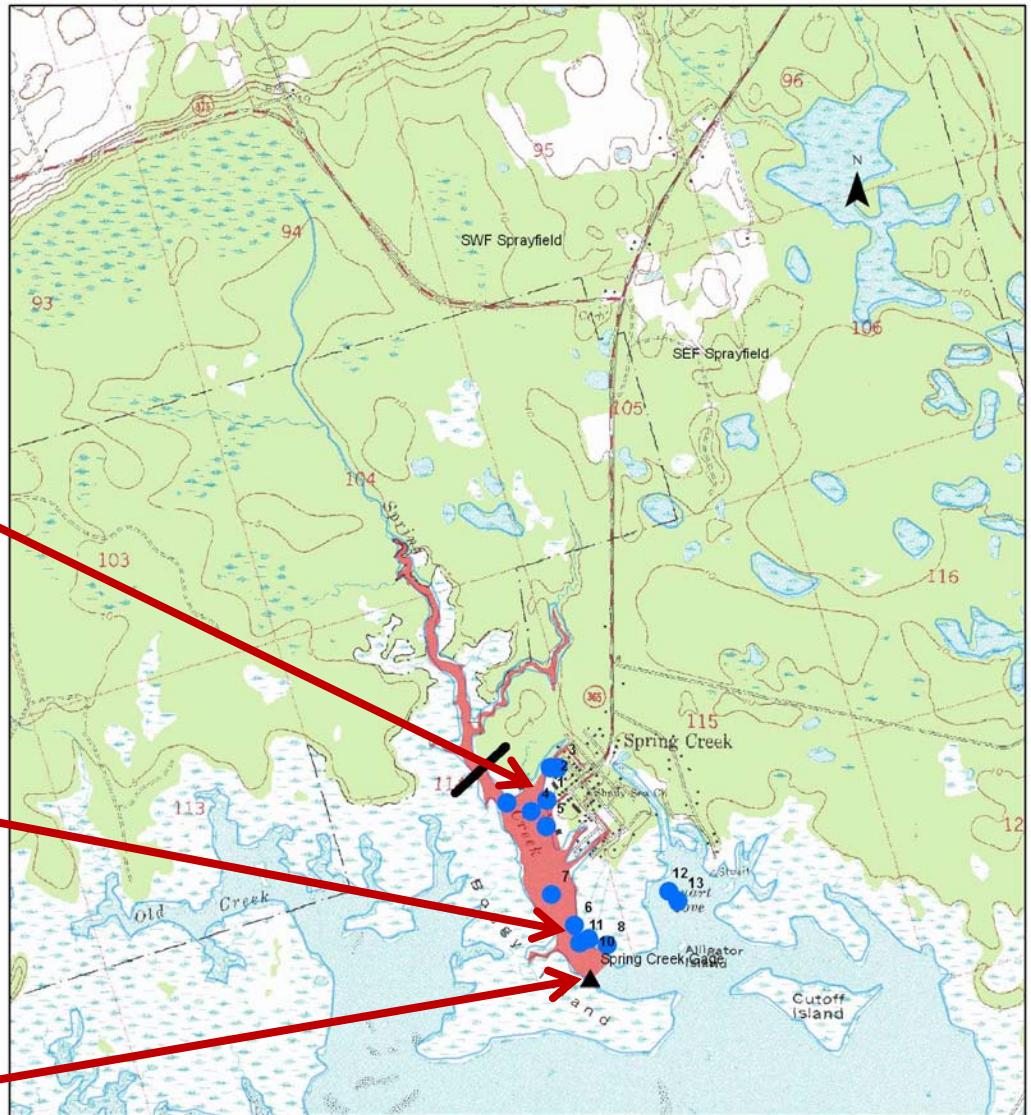
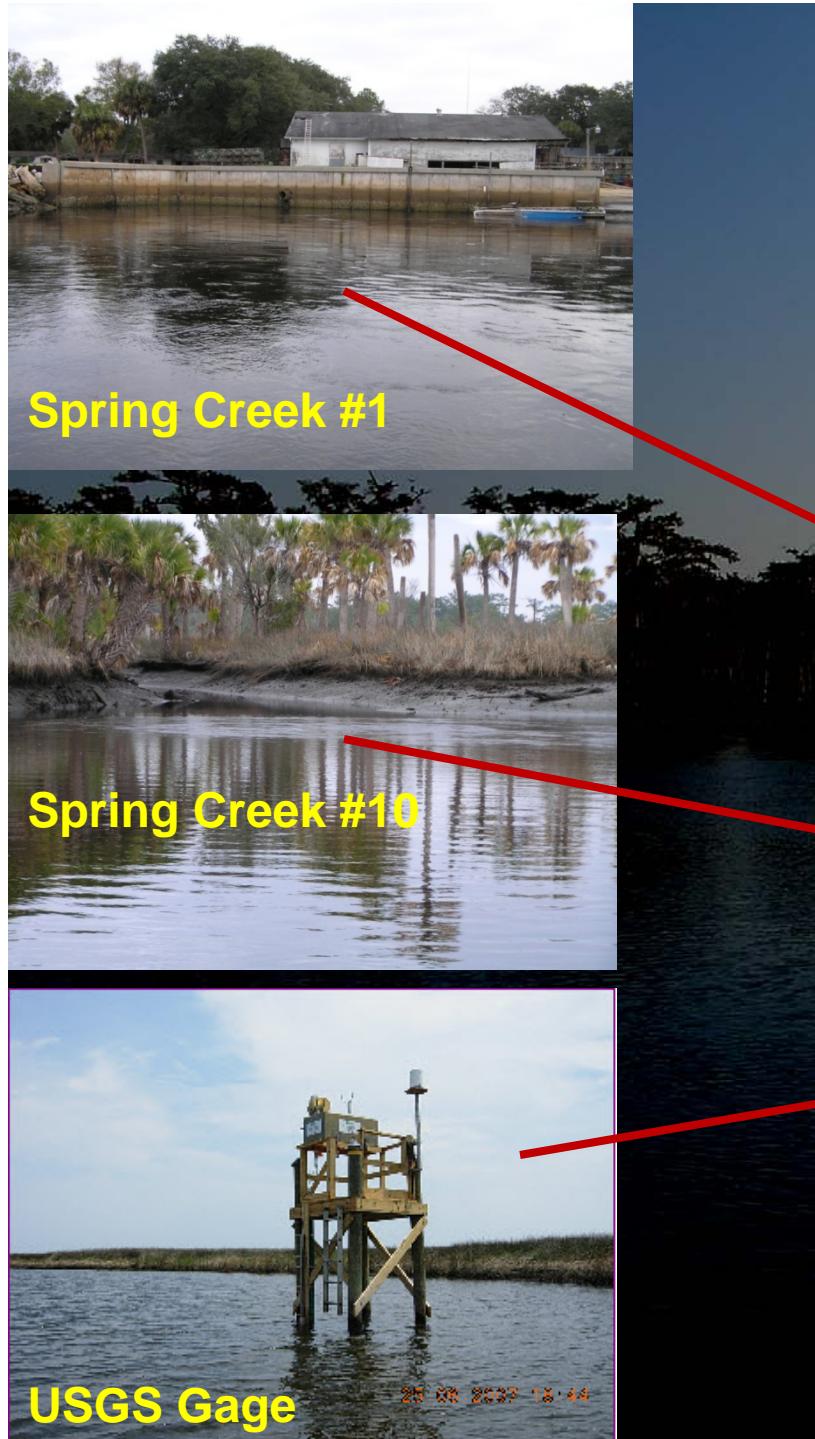
Wakulla Springs – Spring Creek Springs Springshed





Average Flow in
Wakulla Springs ~ 500 cfs





Legend

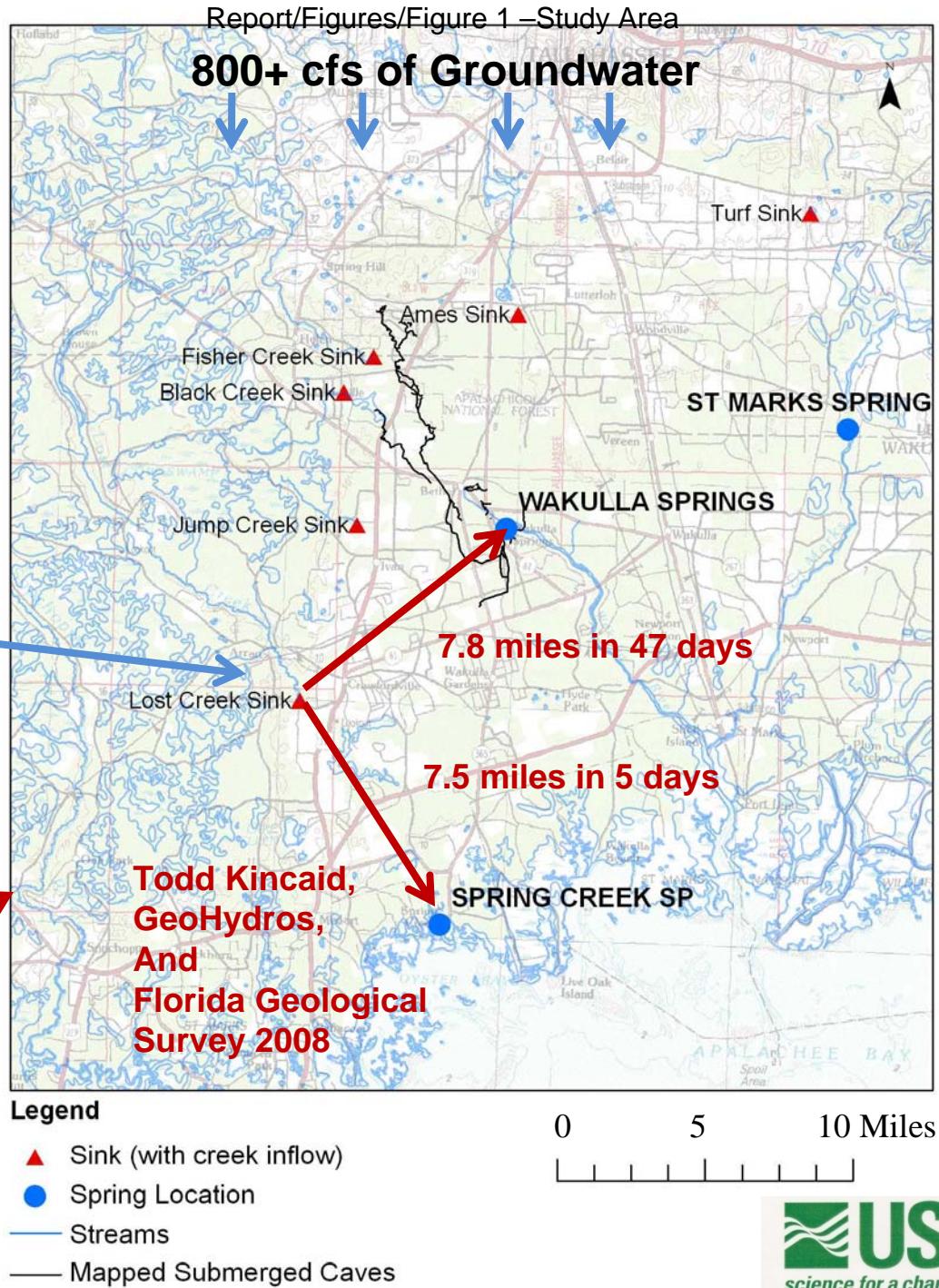
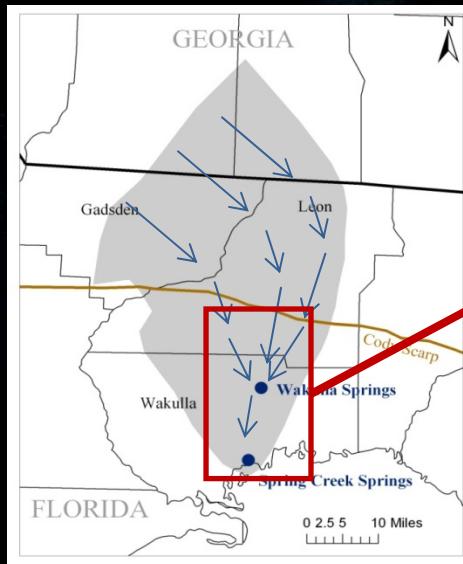
- Spring Creek Springs
- ▲ Gaging Stations
- Spring Creek Upstream Flow Line
- Spring Creek Open Water

0 0.15 0.3 0.6 Miles

There Are Two Major Sources of Water to the Springs:

1. Widespread Recharge in the Springshed
2. Intermittent Flow into Sinks (can range up to 3,000 cfs for short periods)

Lost Creek Sink is Especially Important



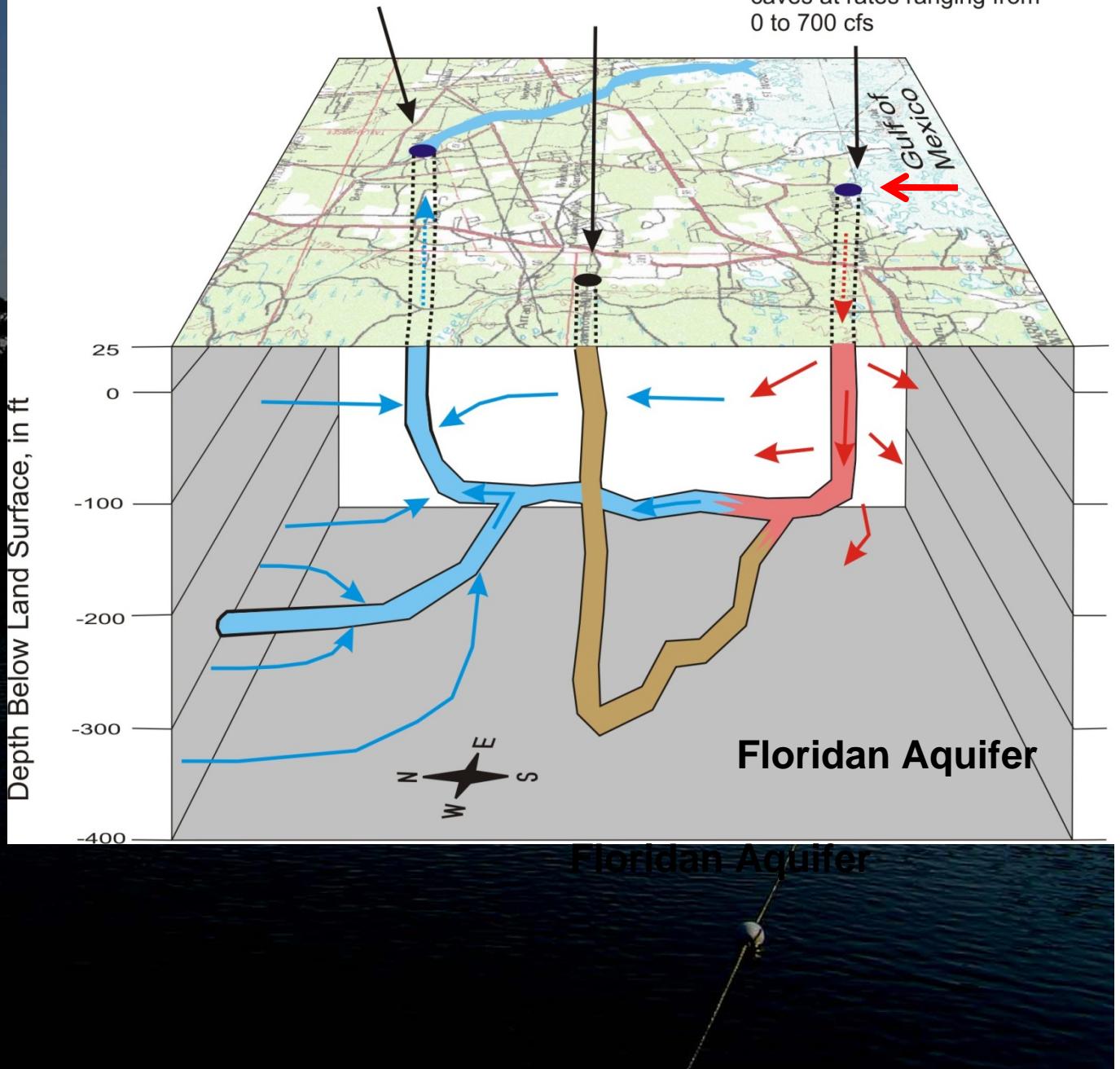
The Interaction of Wakulla Springs and Spring Creek Springs can be Explained in a 3-Cycle Process.

**This is Cycle 1:
Extended Low
Rainfall Conditions**

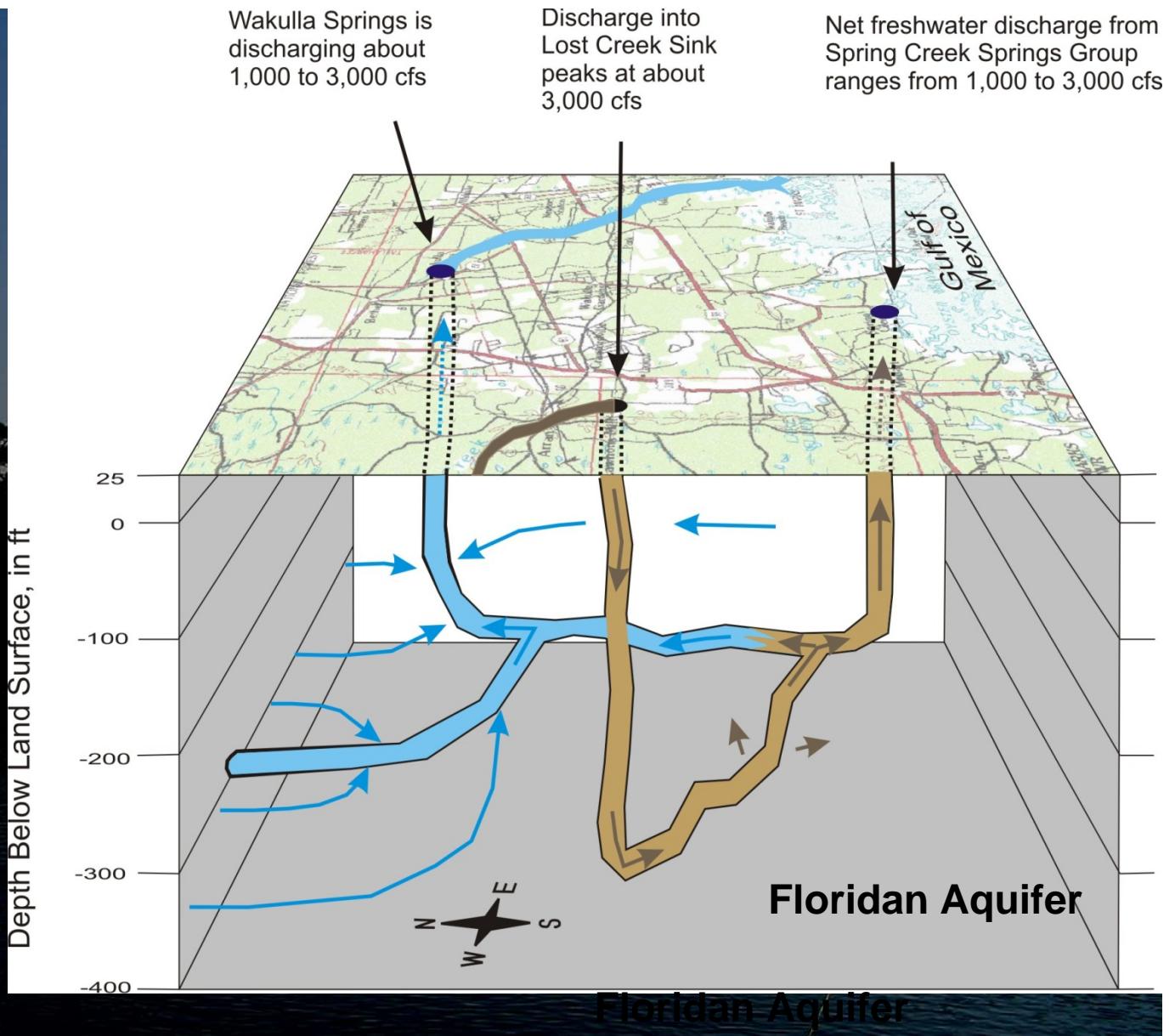
Wakulla Springs is discharging about 800 cfs

There is little or no flow into Lost Creek Sink

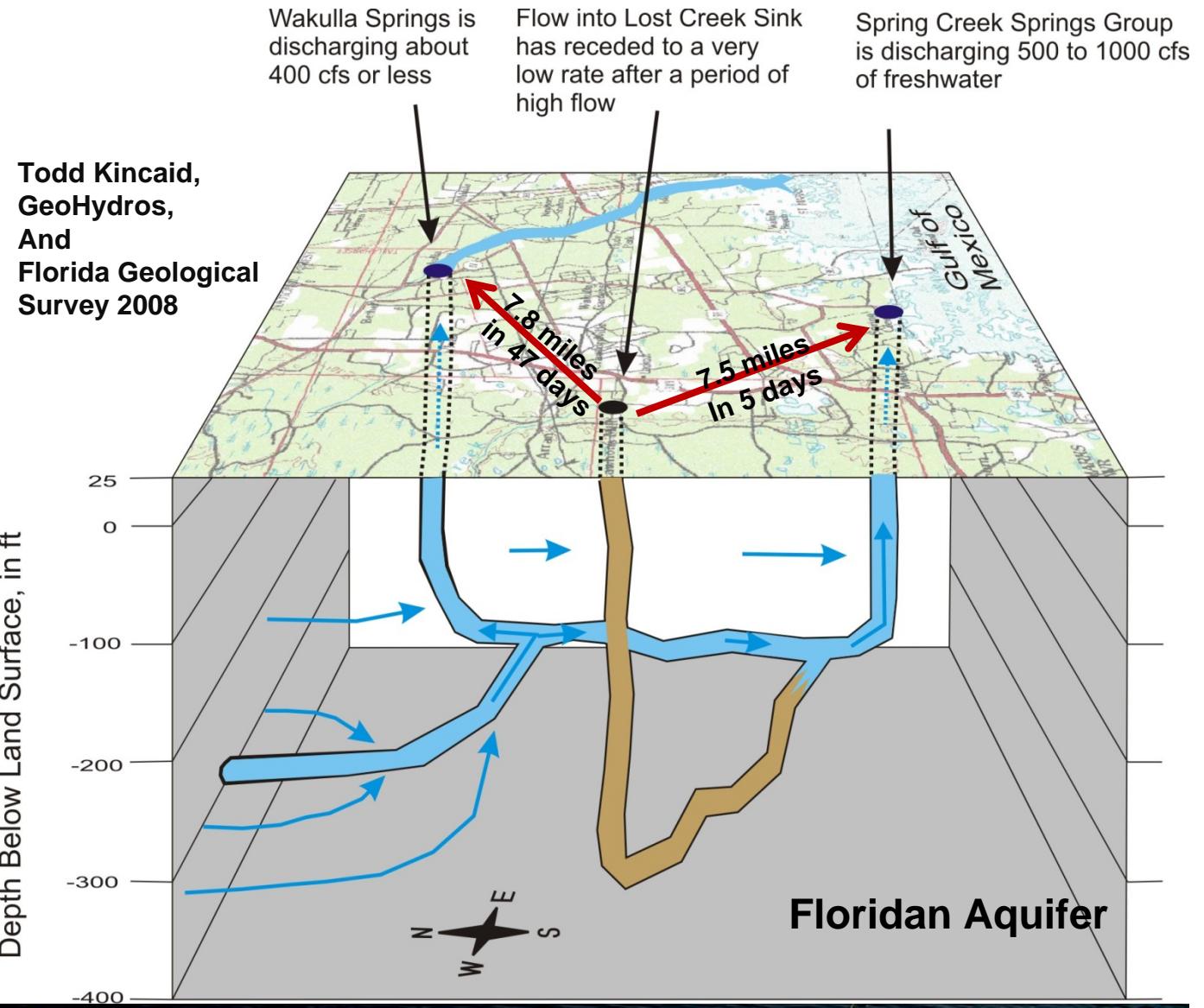
Seawater is flowing into the Upper Floridan aquifer through the Spring Creek Springs Group caves at rates ranging from 0 to 700 cfs



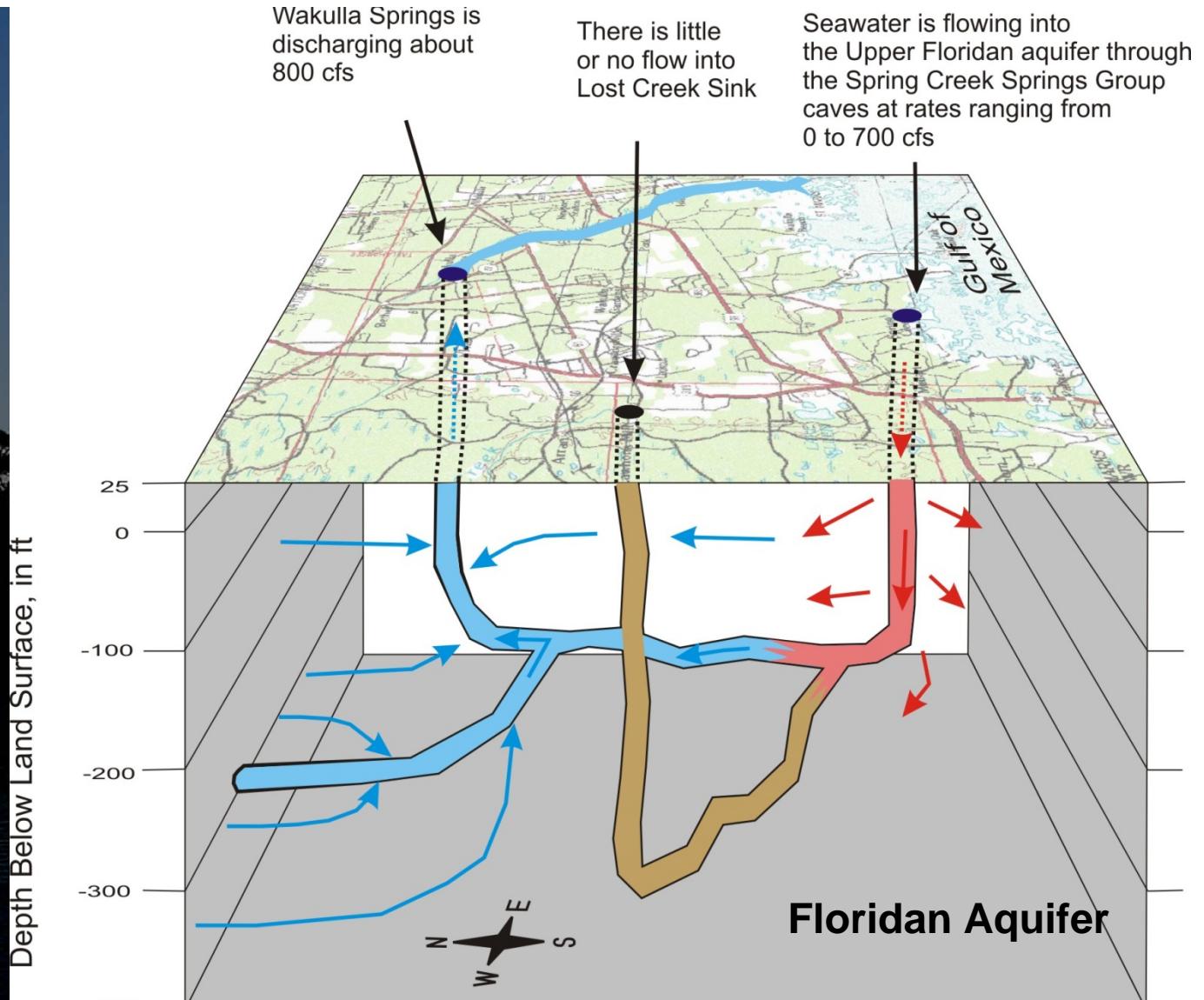
This is Cycle 2:
High Rainfall
Conditions



This is Cycle 3:
**Low Rainfall
Conditions
Following High
Rainfall**

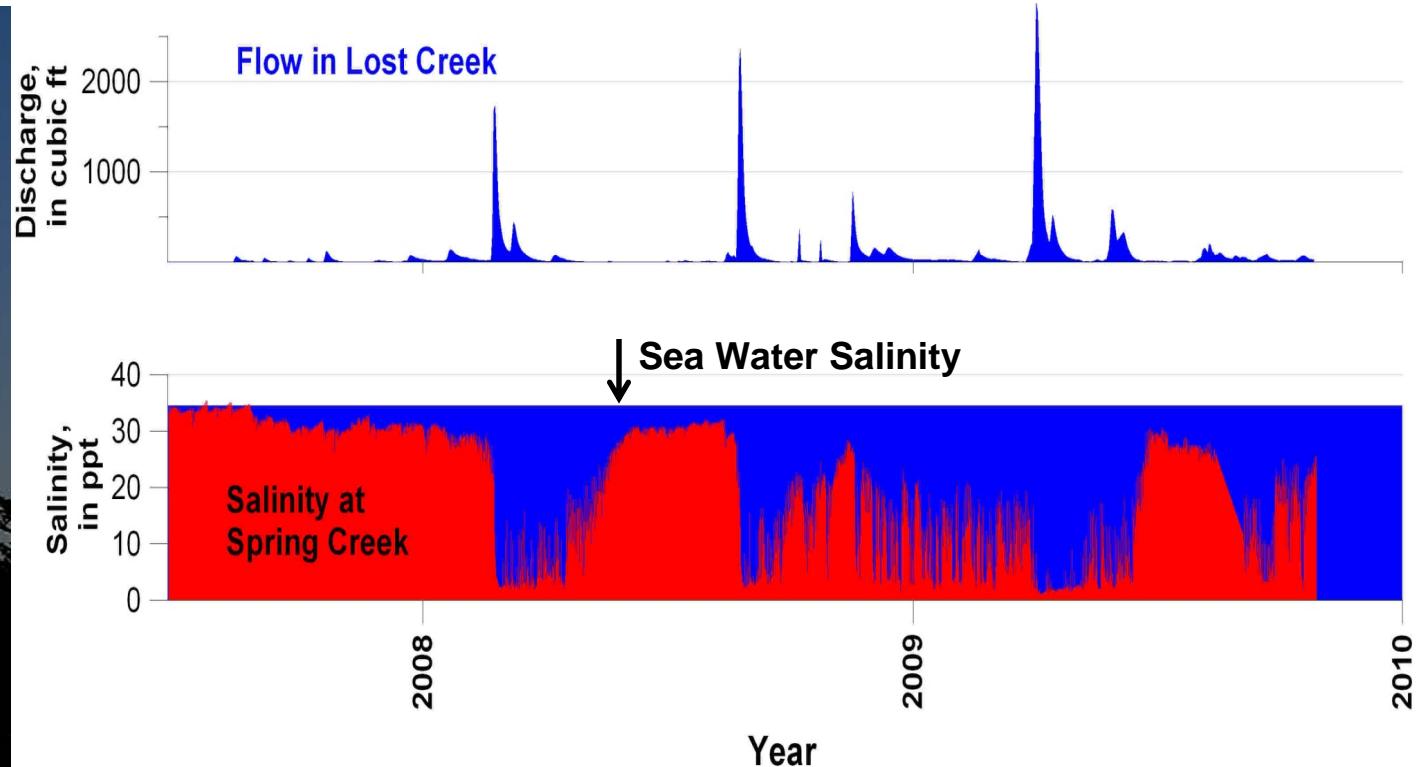


**Back to Cycle 1:
Extended Low
Rainfall Conditions**



Salinity in Spring Creek is Determined by Flow into Lost Creek Sink

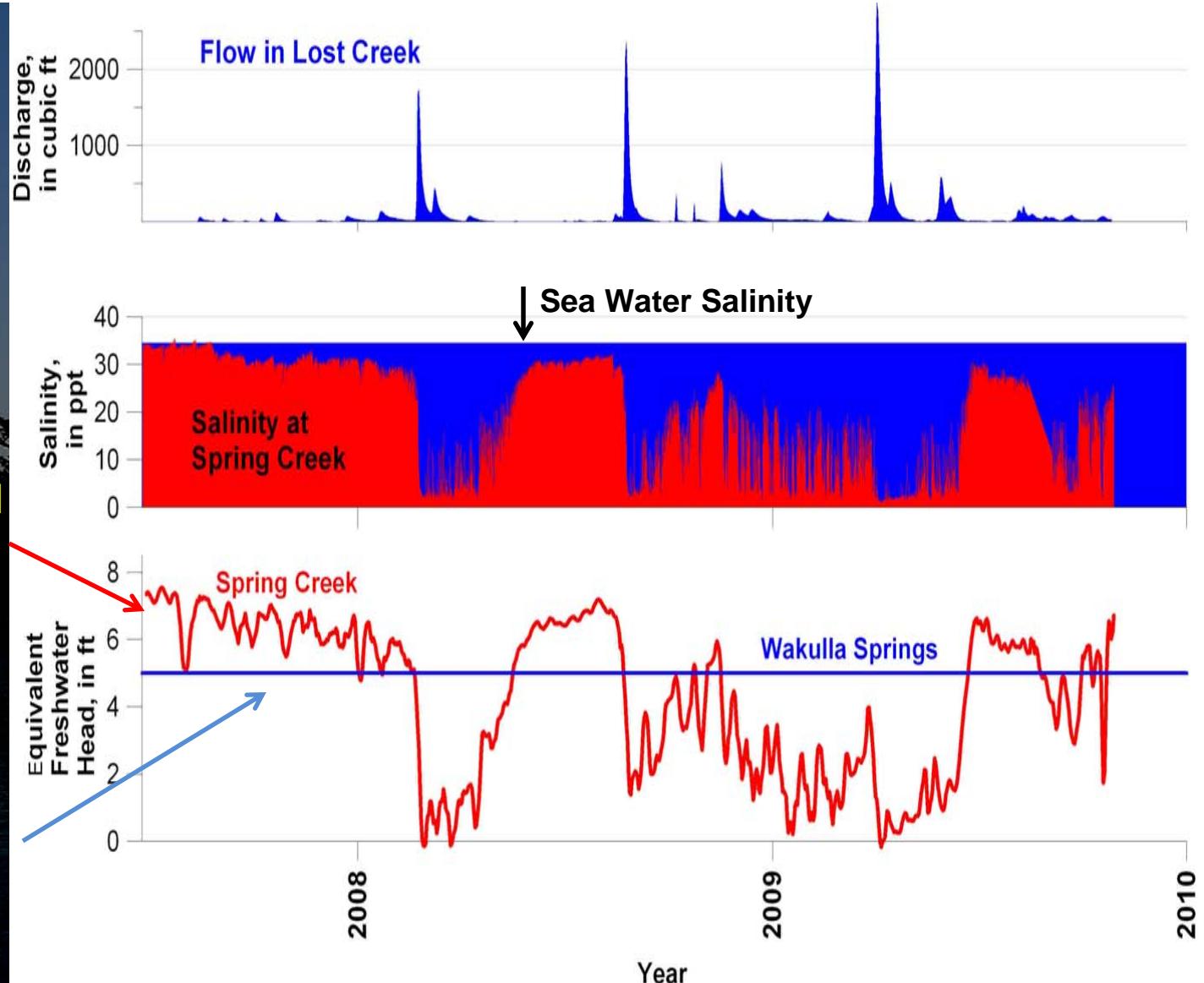
High Flows into Lost Creek Causes the Water in Spring Creek to Rapidly Freshen and It Will Remain Fresh Long After Lost Creek Flow Subsides



The Salinity in Spring Creek Springs Influences Where Groundwater Flows

The Freshwater Head in Spring Creek Springs (Corrected For Salinity) Ranges From Sea Level to About 8 ft

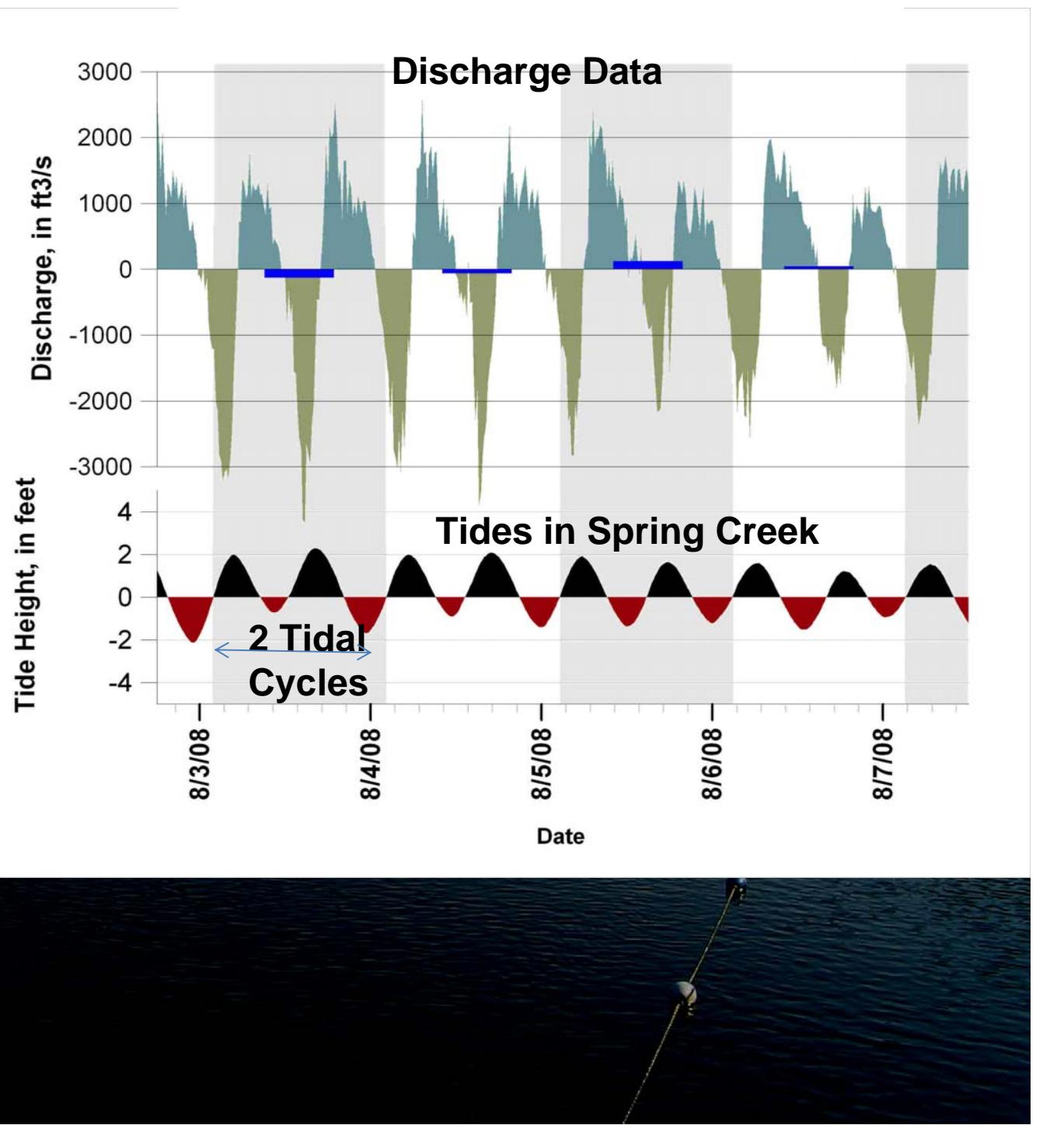
The Water Level in Wakulla Springs is a Relatively Constant 5 Feet



Discharge in Spring Creek Springs



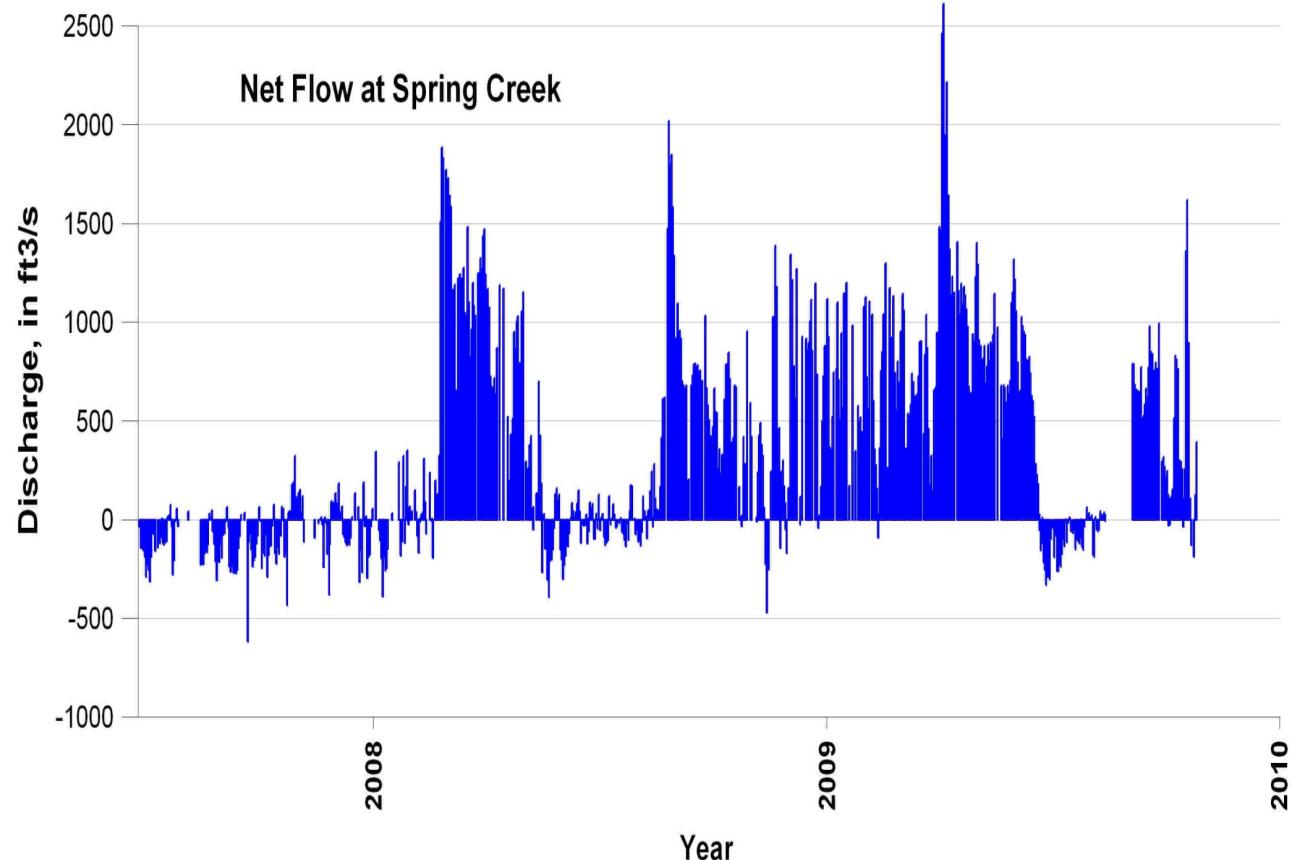
Examples of Discharge Data and Tide Data



**Net Discharge in
Spring Creek
Springs is Variable**

**Spring Creeks
Springs Has Periods
Little Net Outflow
And Periods of High
Net Outflow**

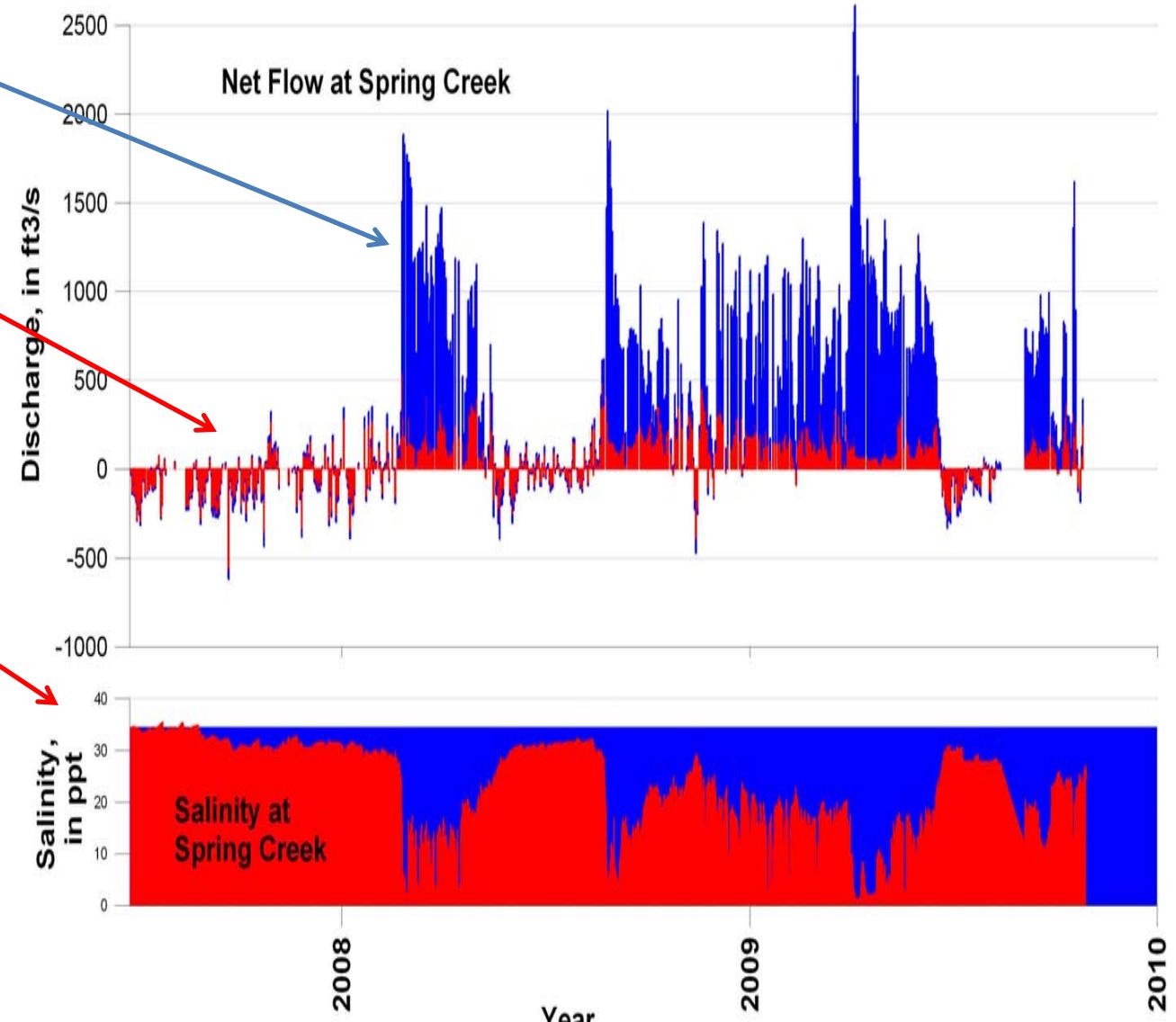
**This Flow is a
Mixture of
Fresh Groundwater
And Seawater**



Blue Indicates Freshwater Flow

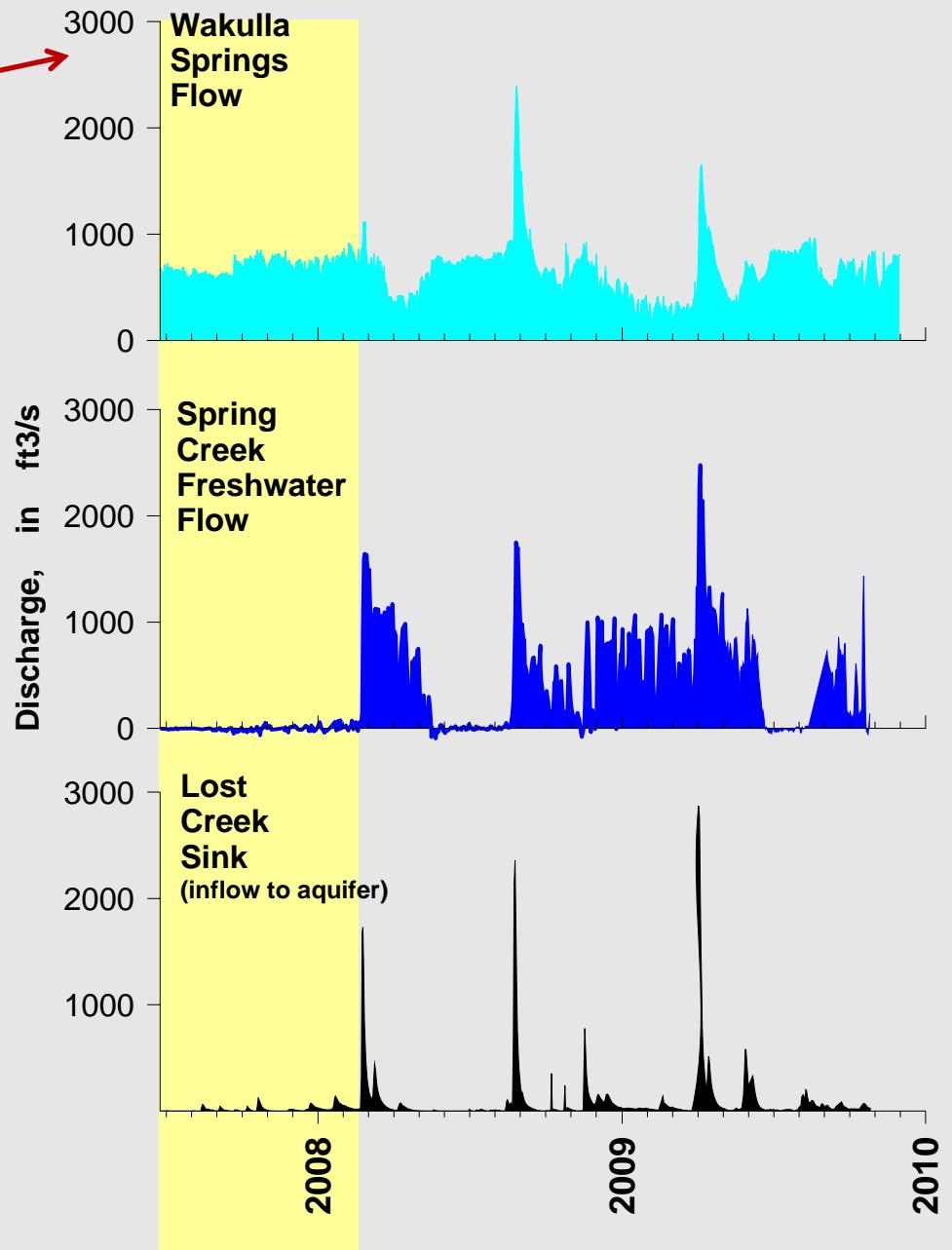
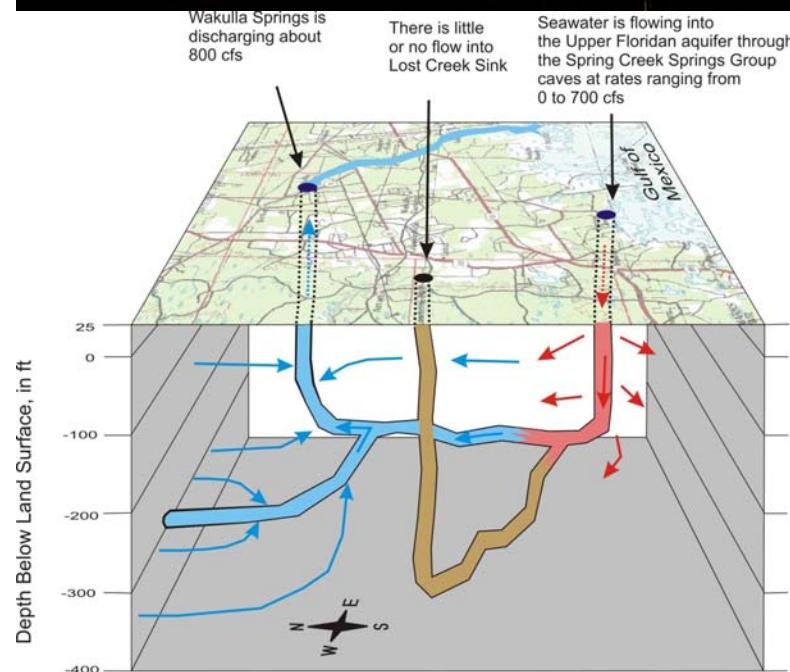
Red Indicates Sea Water Flow

Knowing Salinity Allows Us To Divide Spring Creek Flow into the Freshwater and Seawater Components



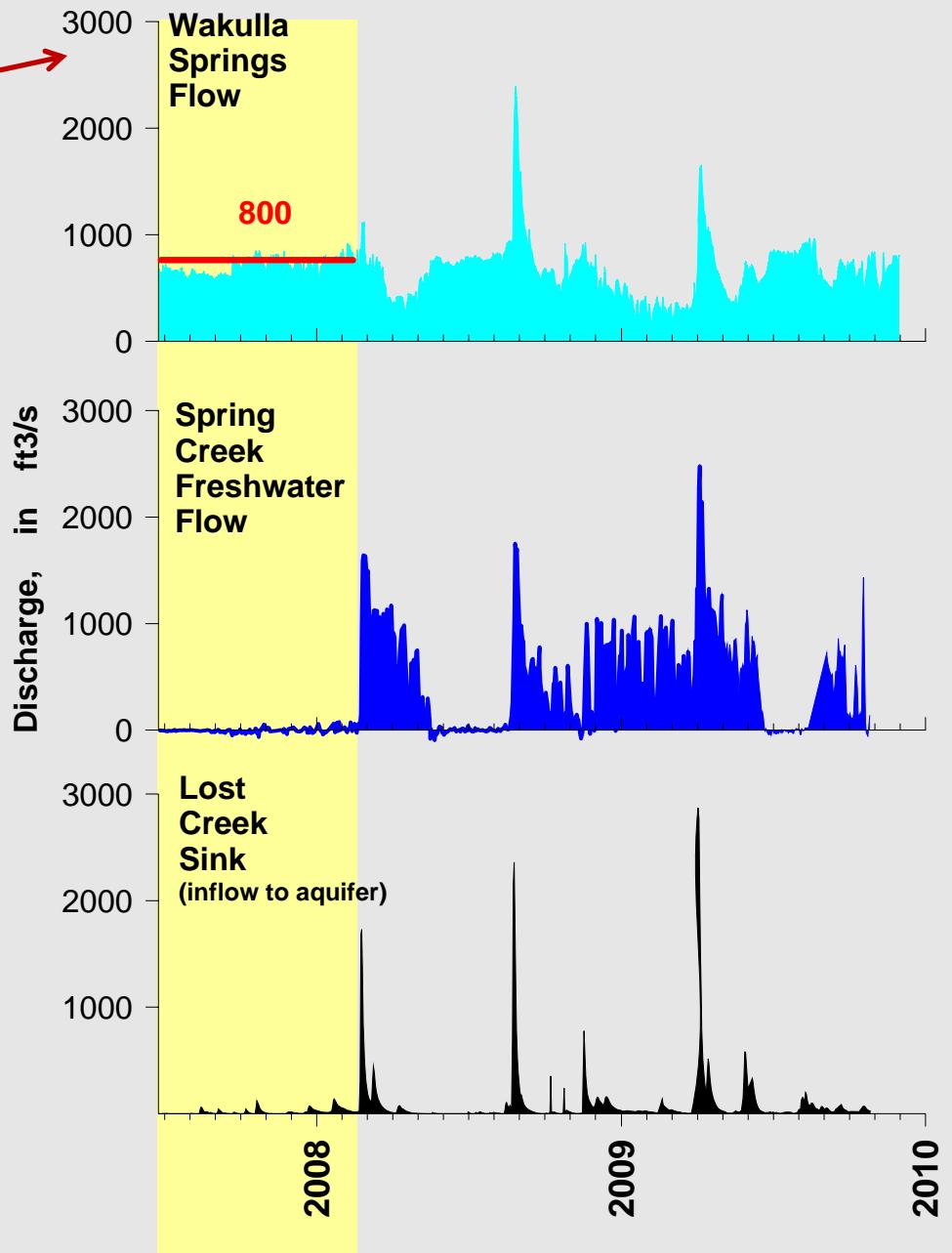
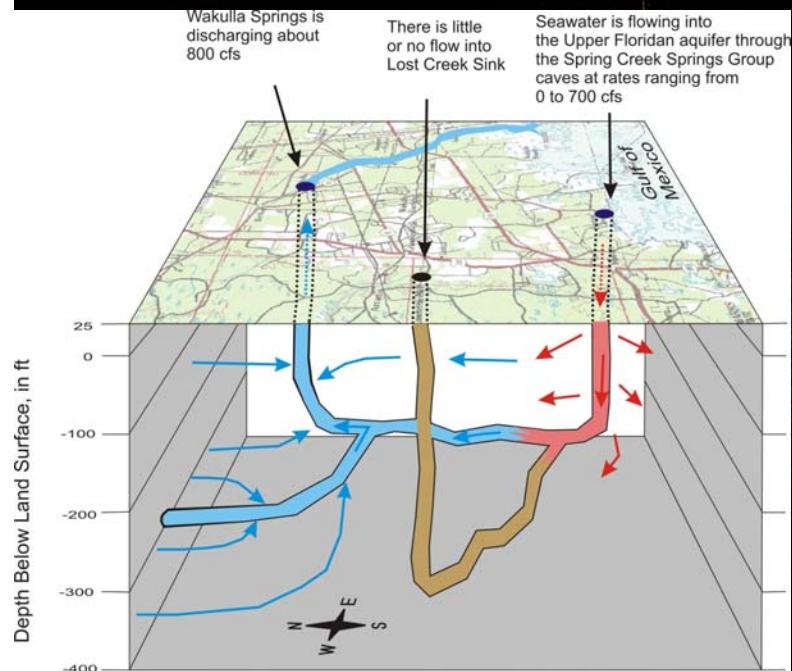
Finally we get to the flow in Wakulla Springs

and Spring Creek Springs



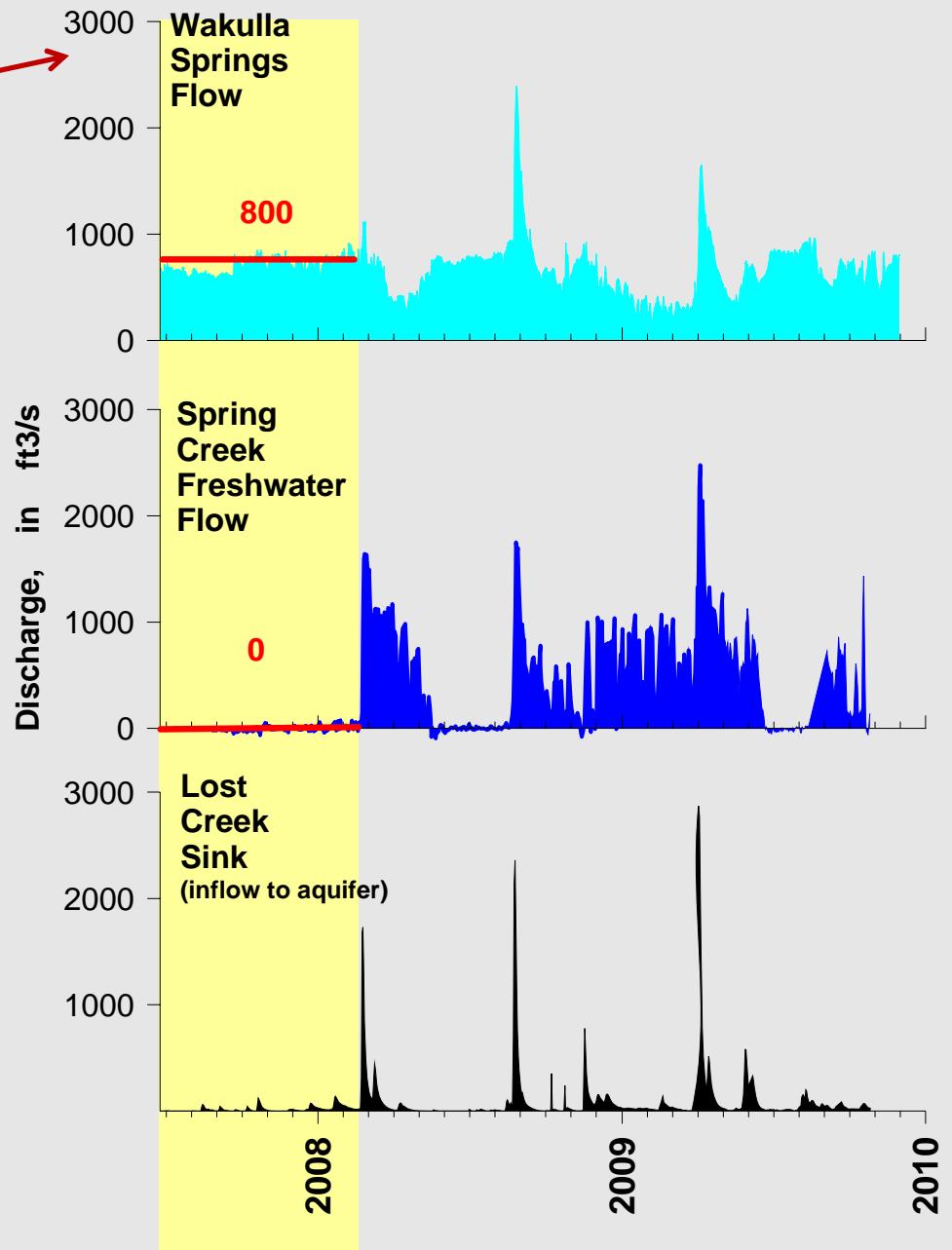
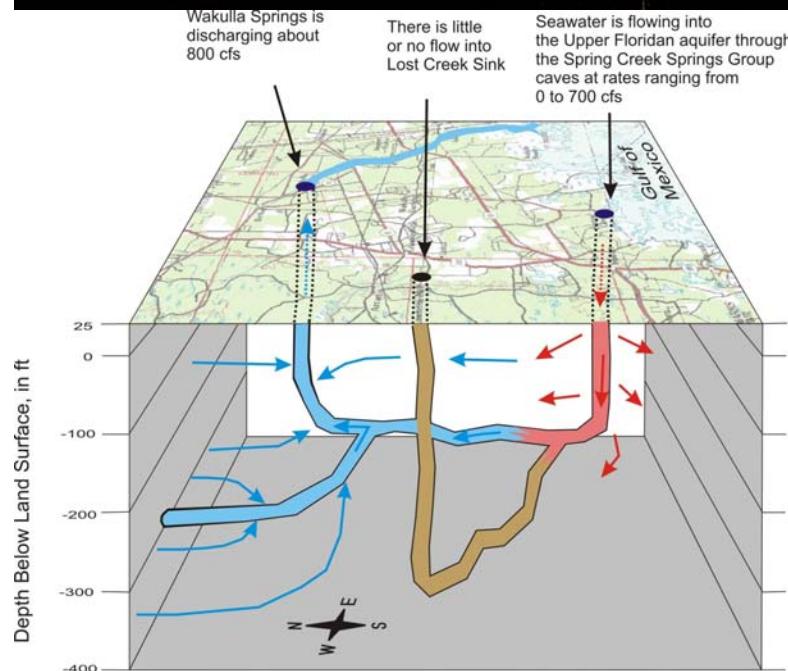
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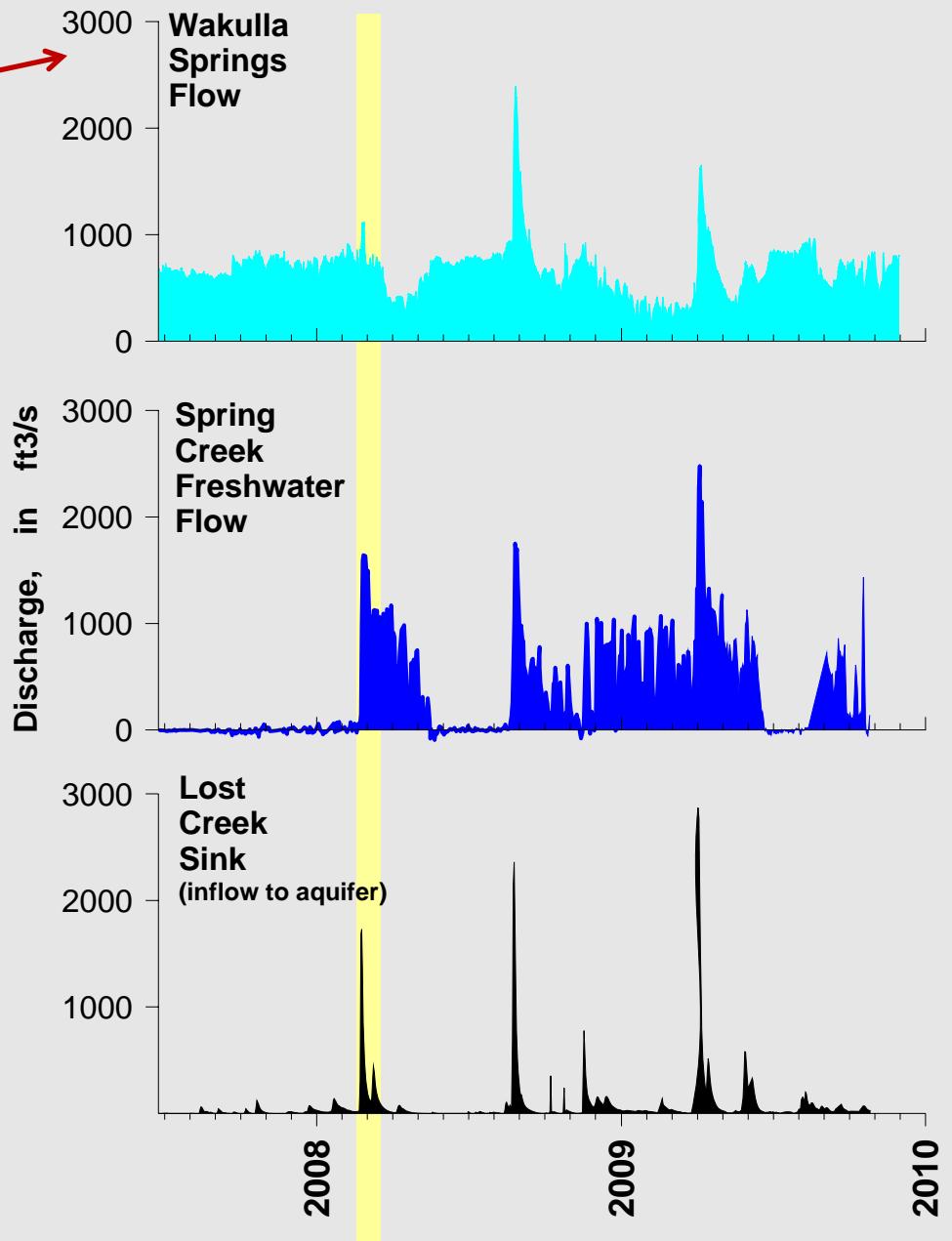
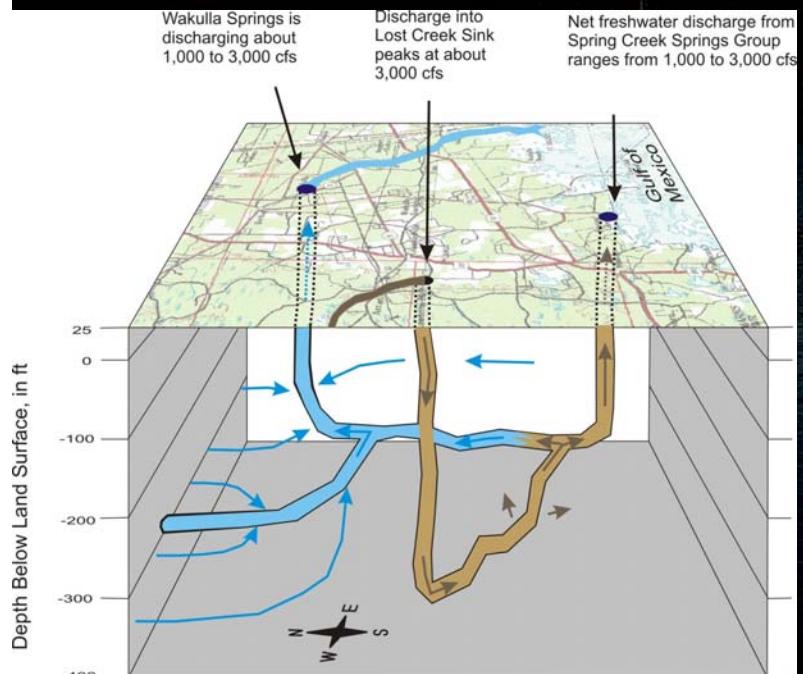
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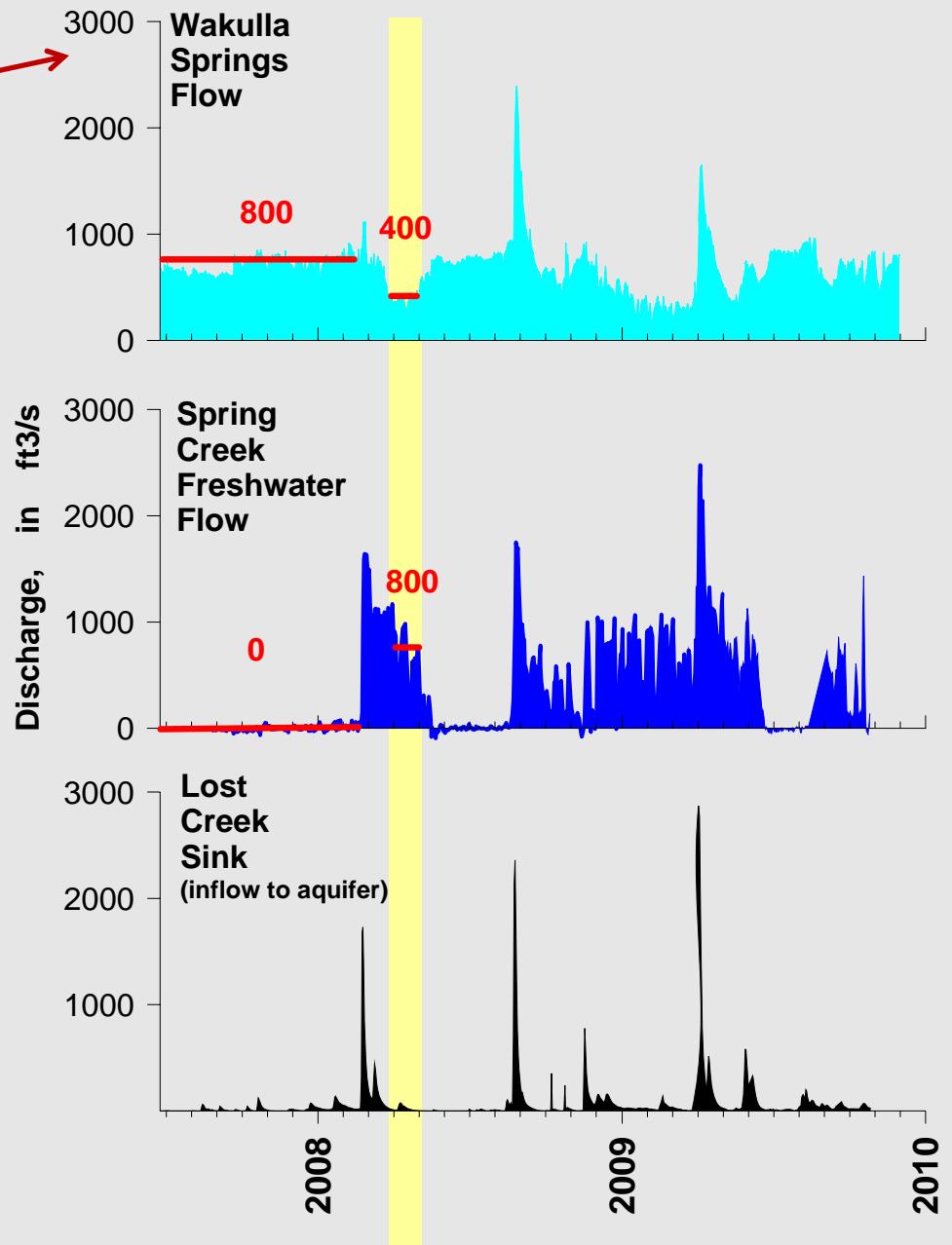
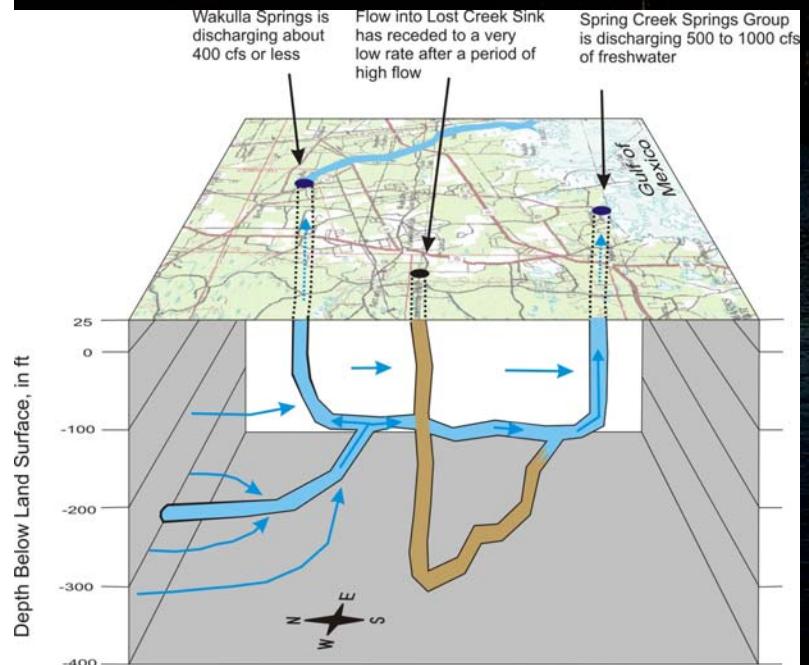
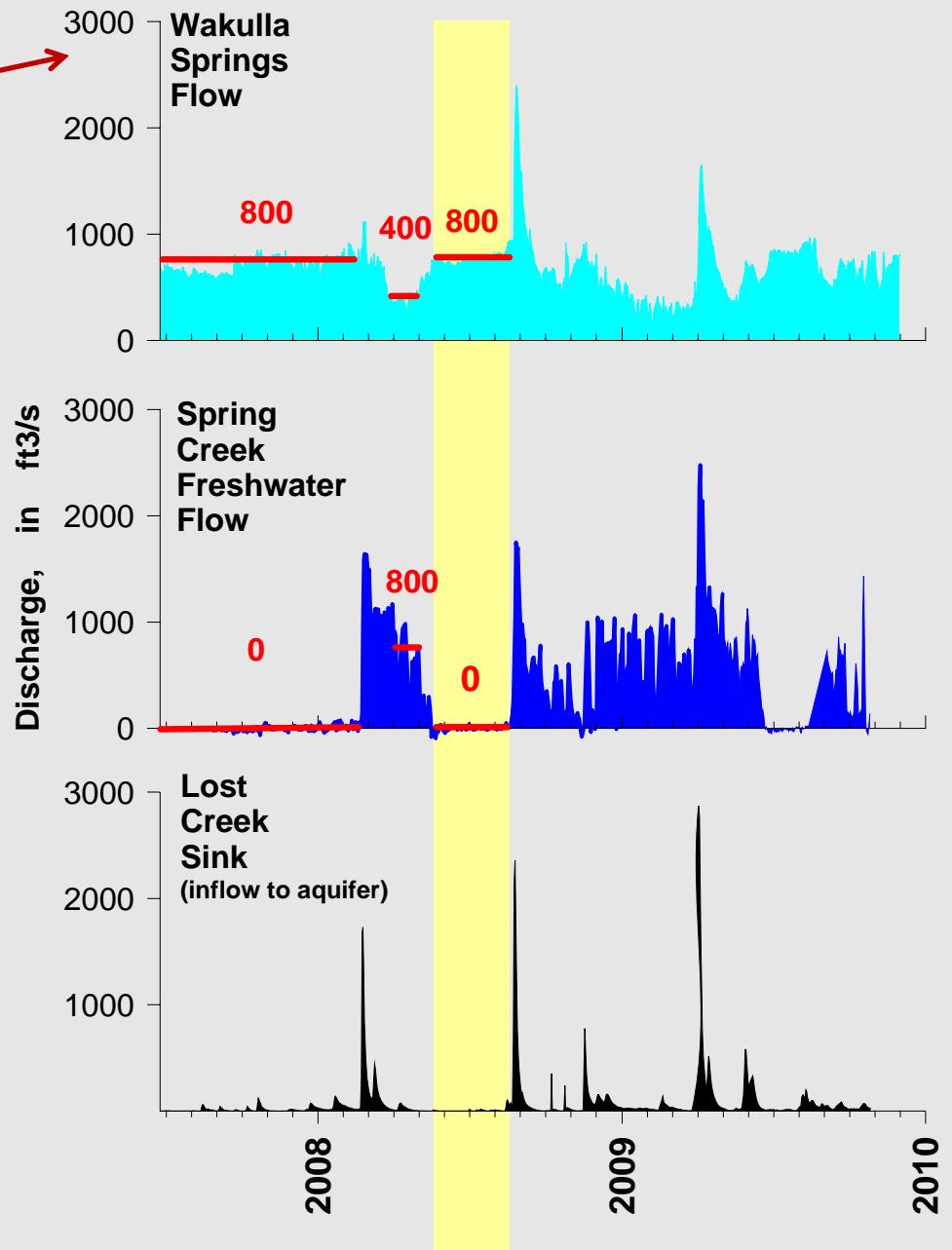
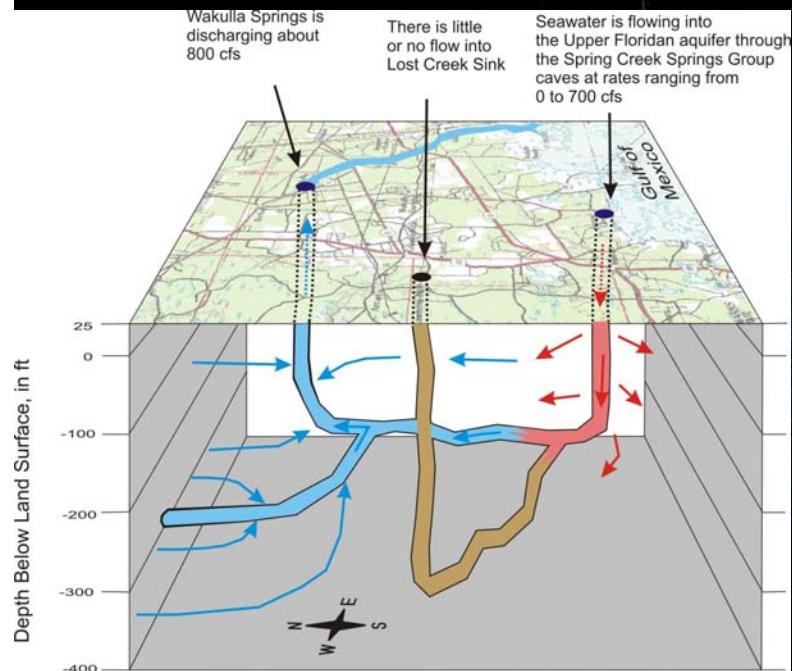


Figure xxx -Total Flow + Both Springs.grf

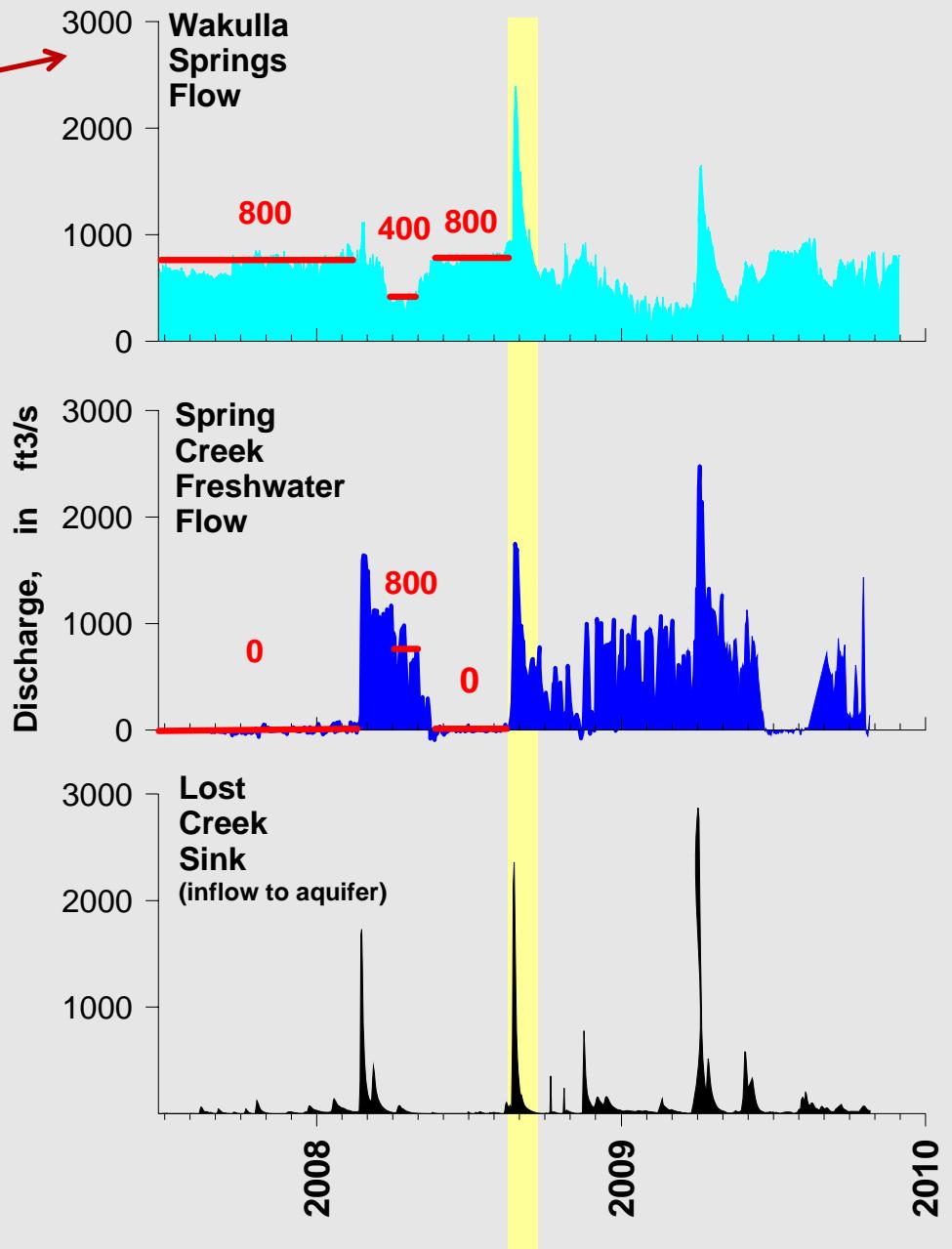
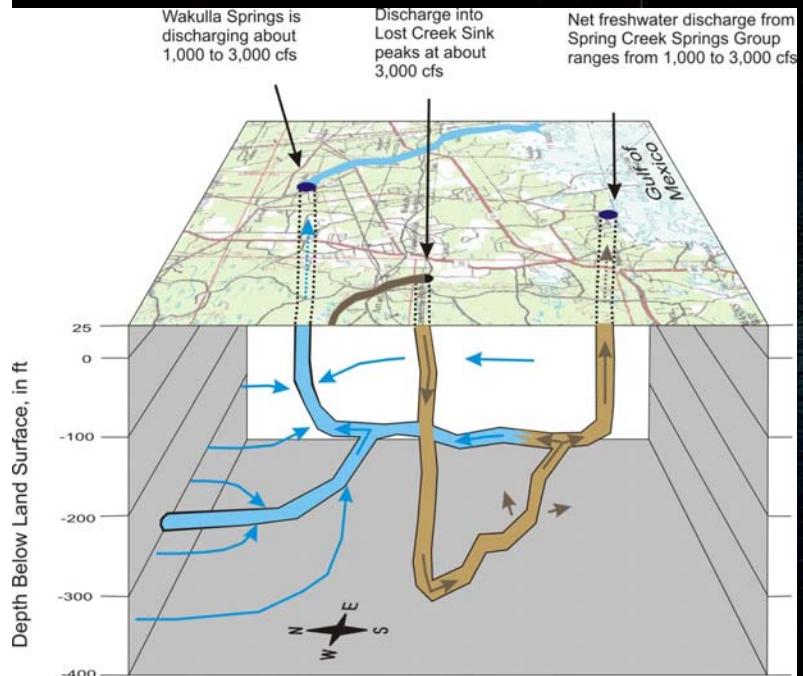
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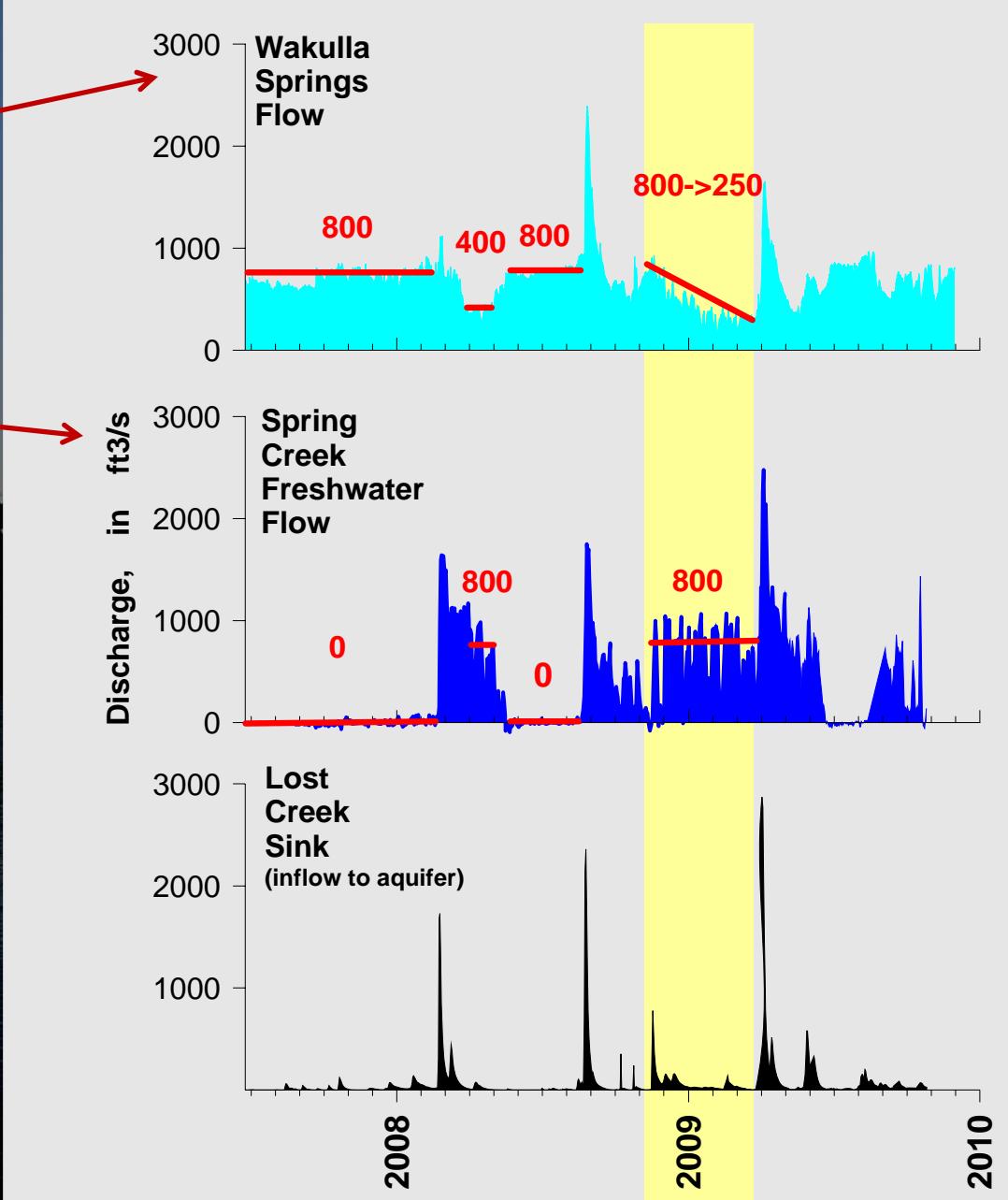
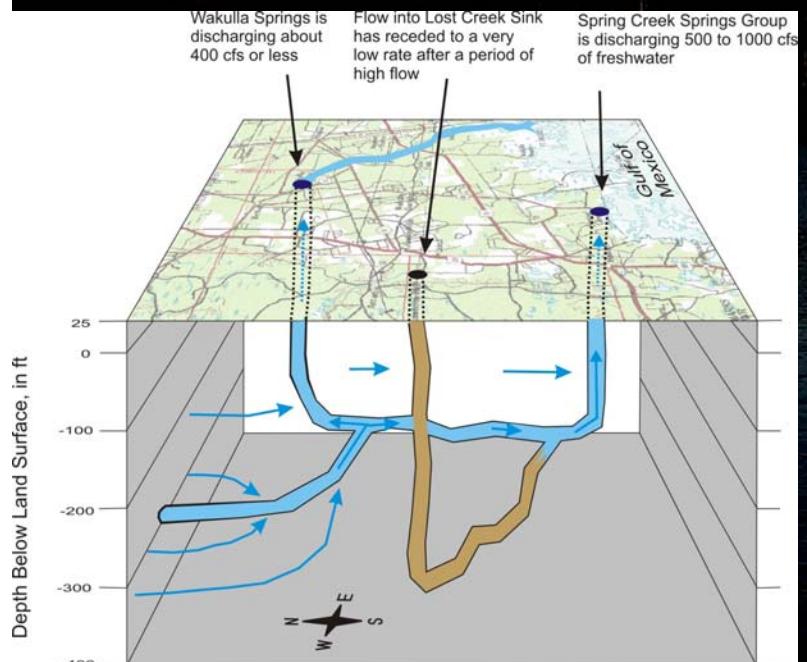
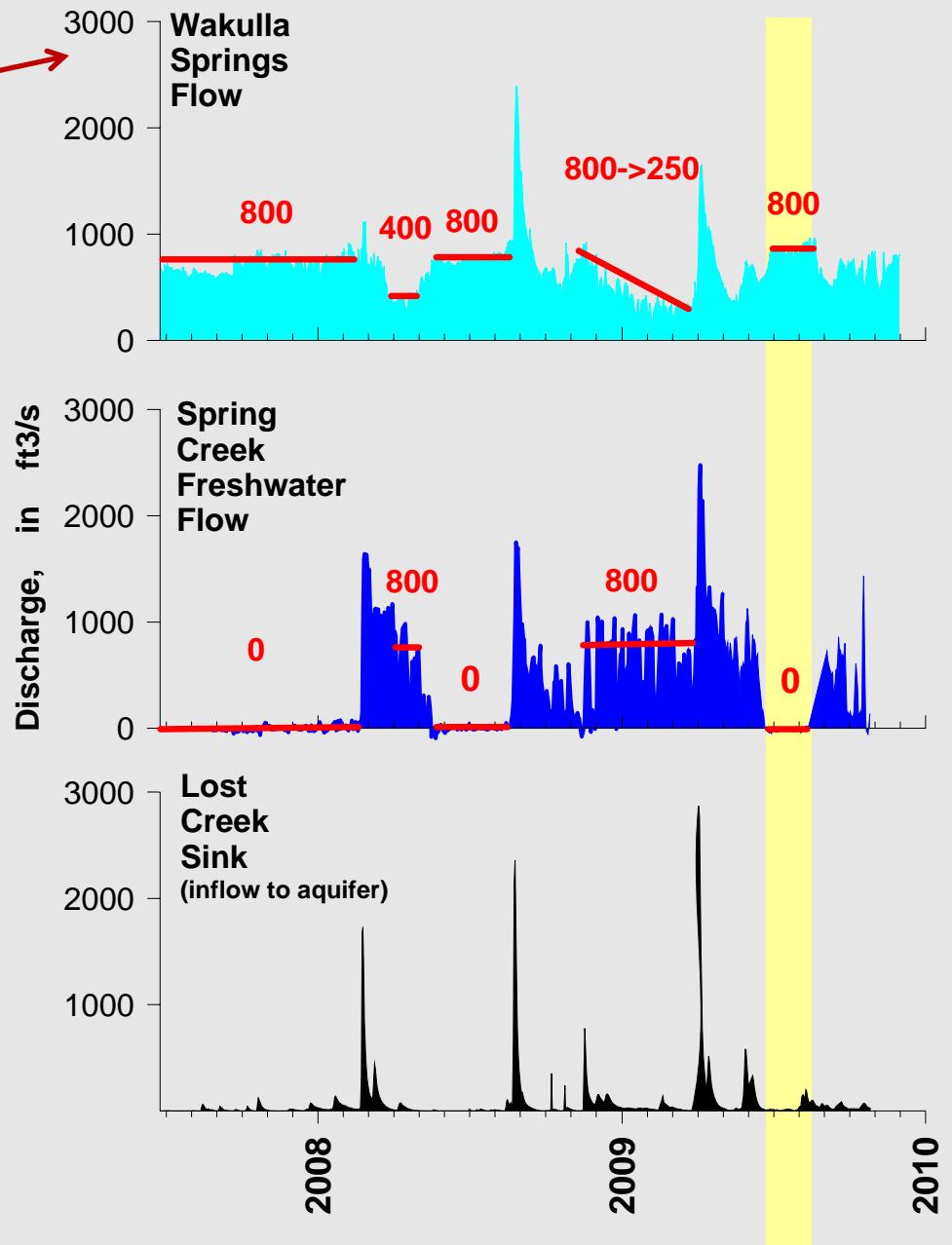
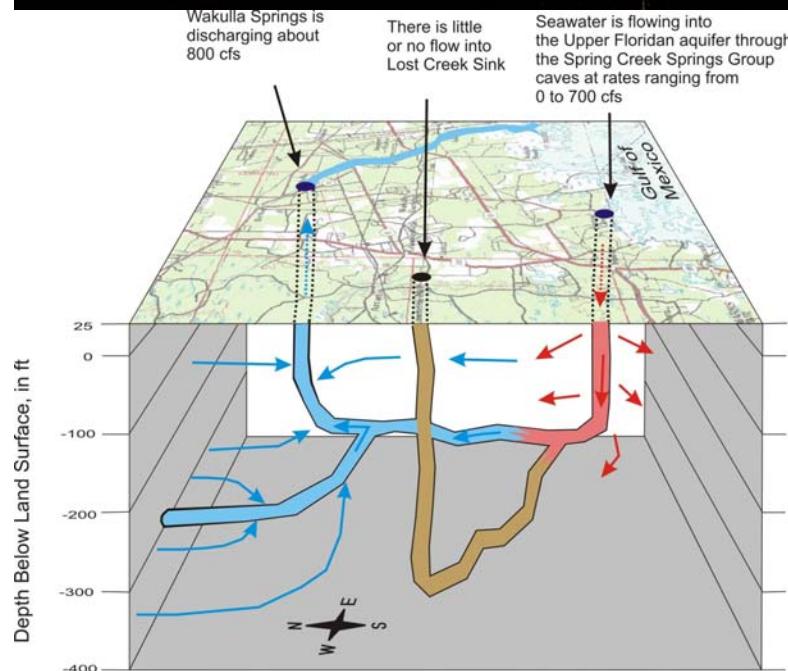
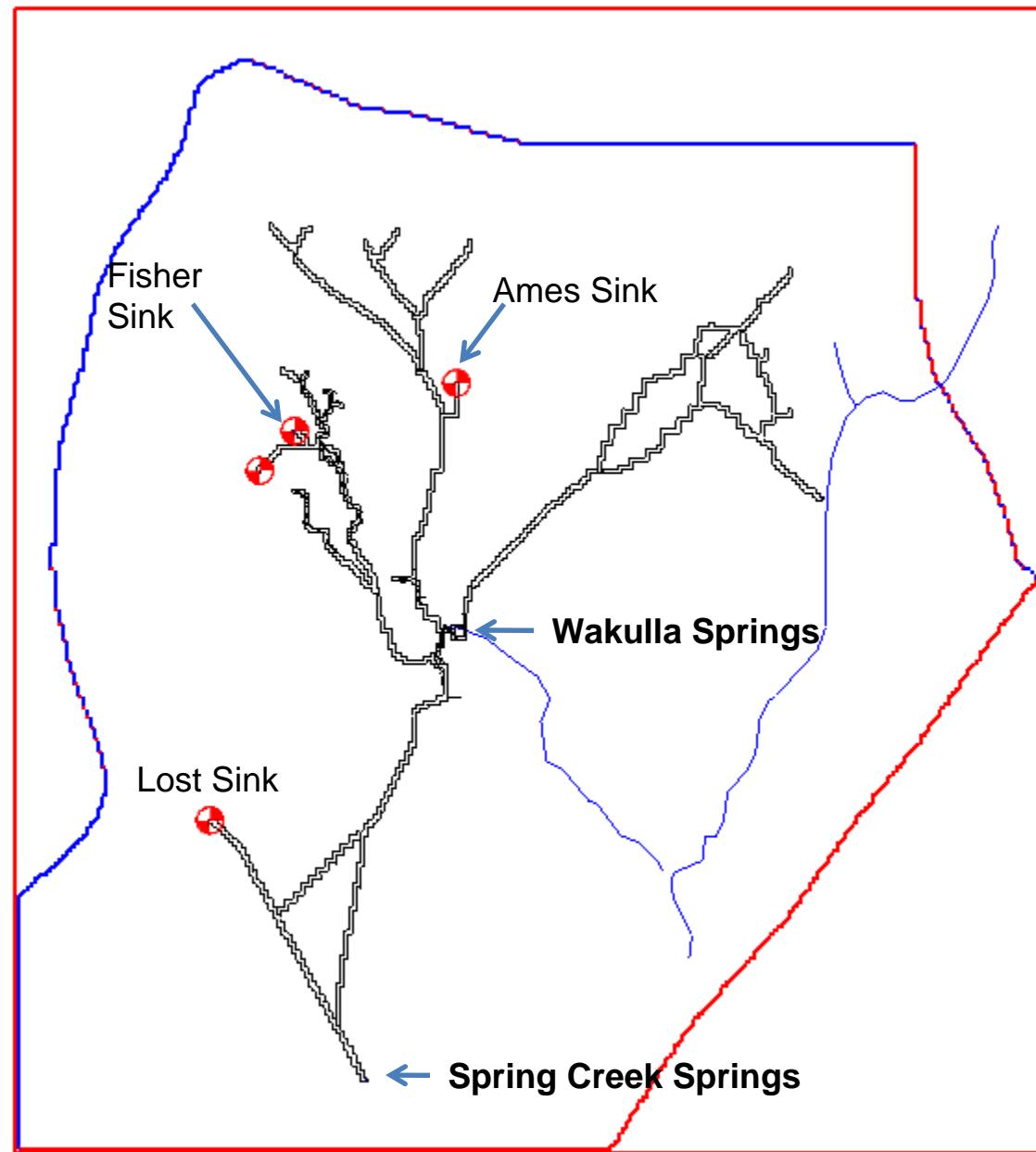
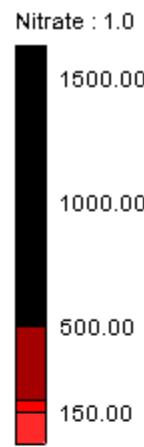
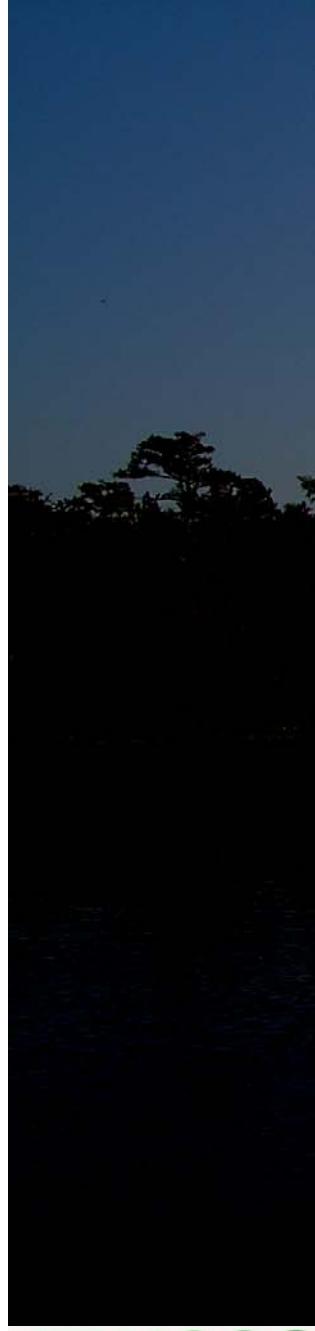


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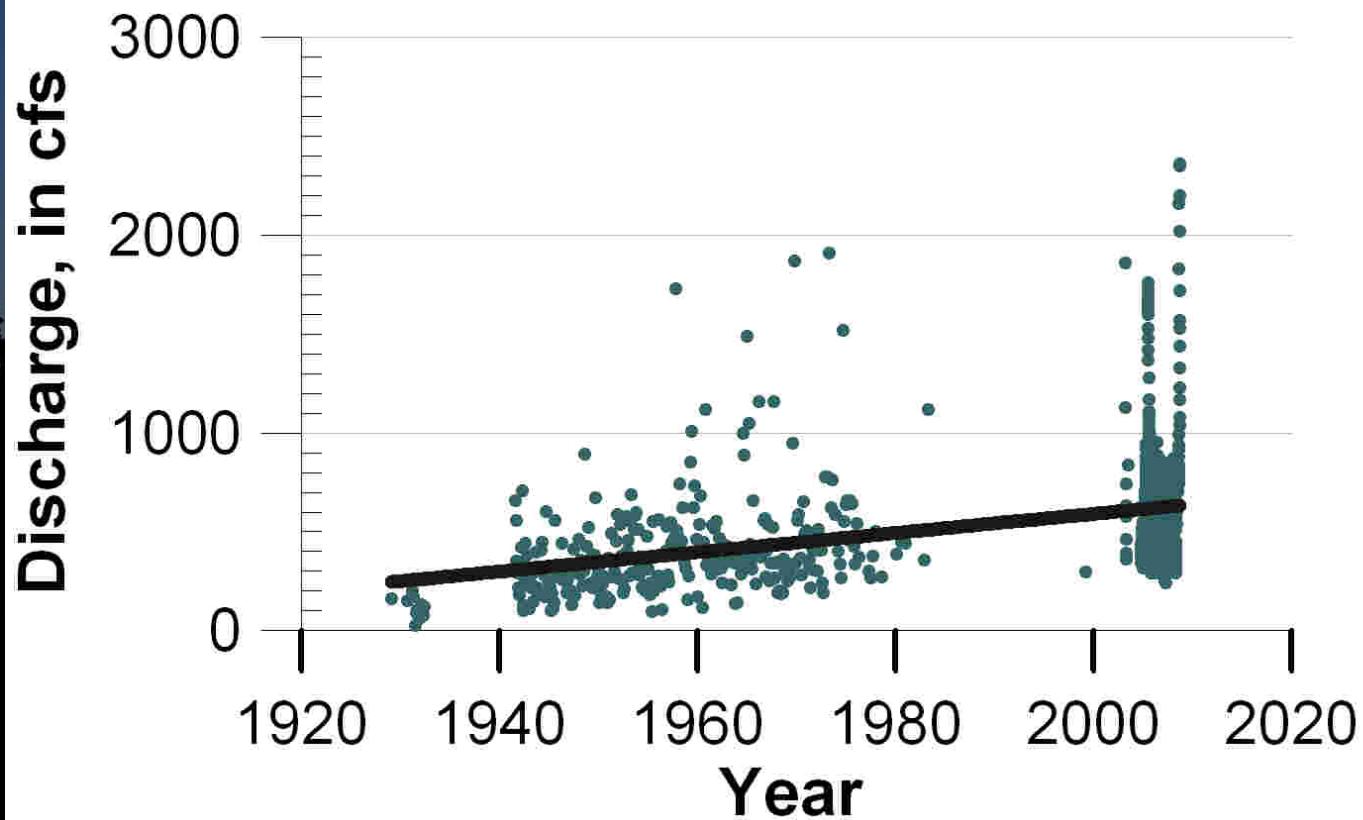
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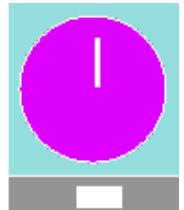
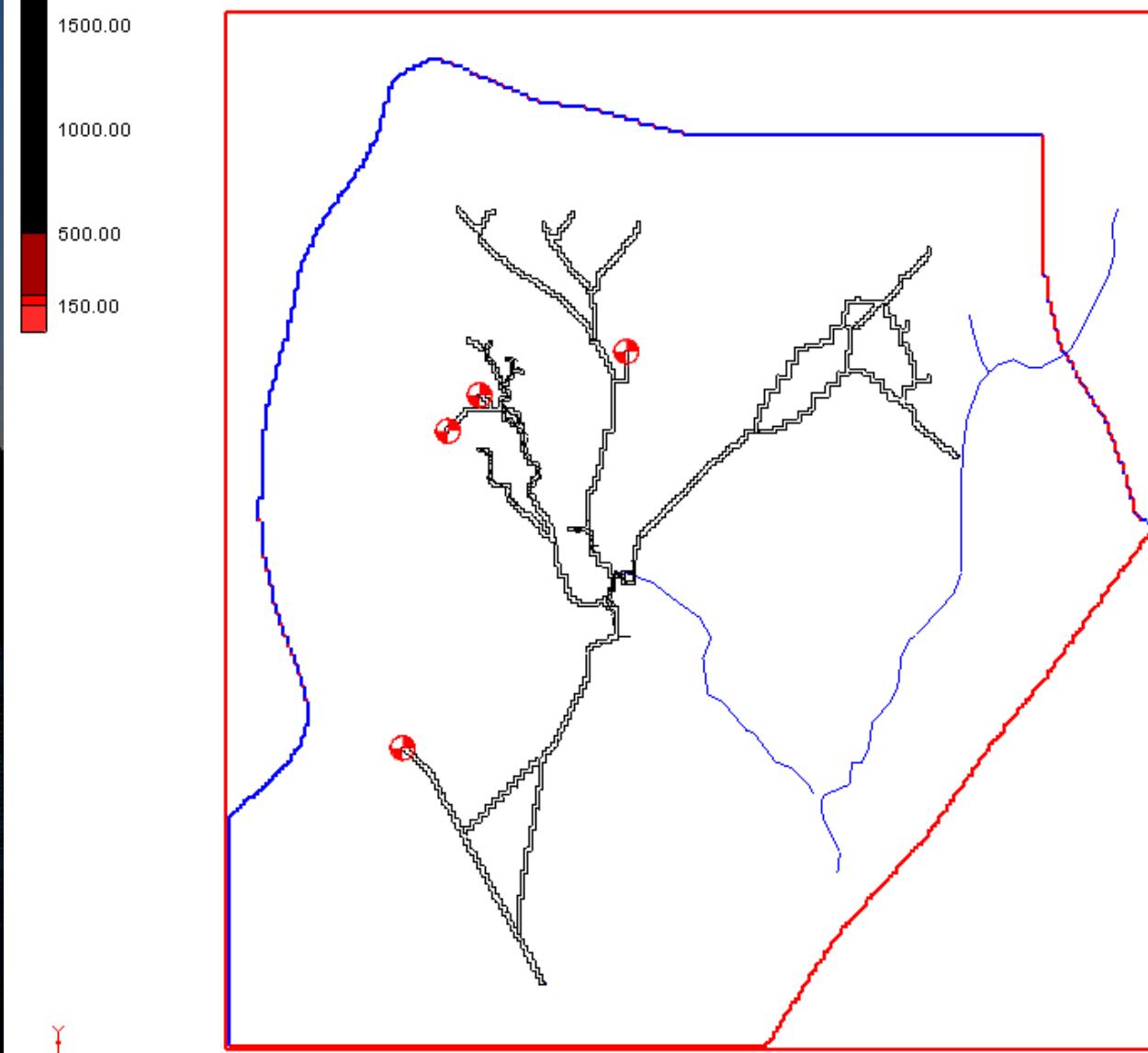
Long Term Discharge in Wakulla Springs



Legend

- Wakulla Spring Discharge
- Linear Regression

Questions ?



Interconnection of Flow at Spring Creek Springs Group and Wakulla Springs, Wakulla County, Florida

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Florida Dept. of Environmental Protection-
Florida Springs Initiative

Hal Davis

2010

