

Status of Florida Springs

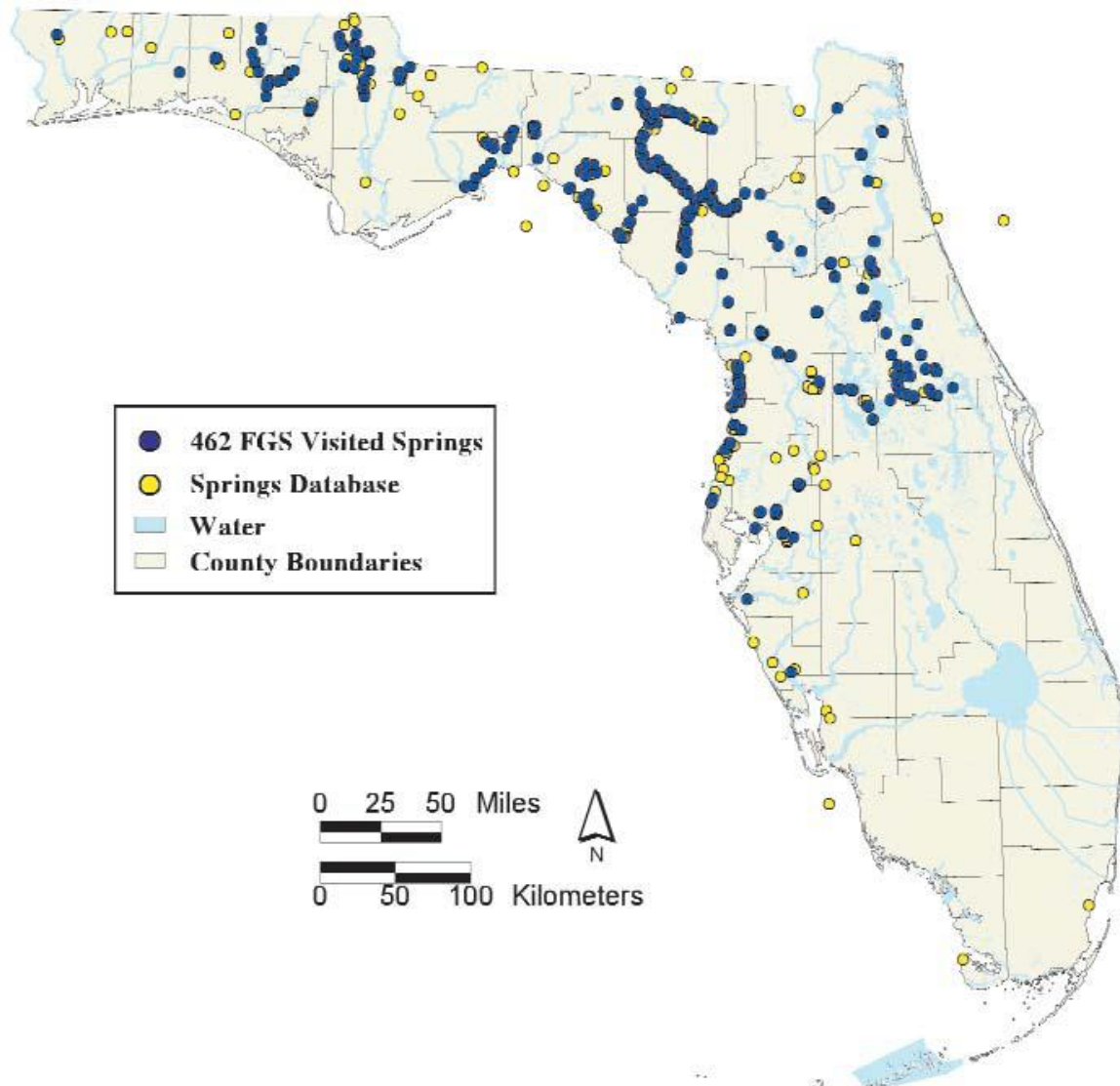
Veronica Craw, Manager

Springs and Environmental Flows
Southwest Florida Water Management District

www.WaterMatters.org/Springs



Springs in Florida



What Makes a Healthy Spring?



WATER QUALITY



FISH AND WILDLIFE HABITAT



FLOW AND DISCHARGE

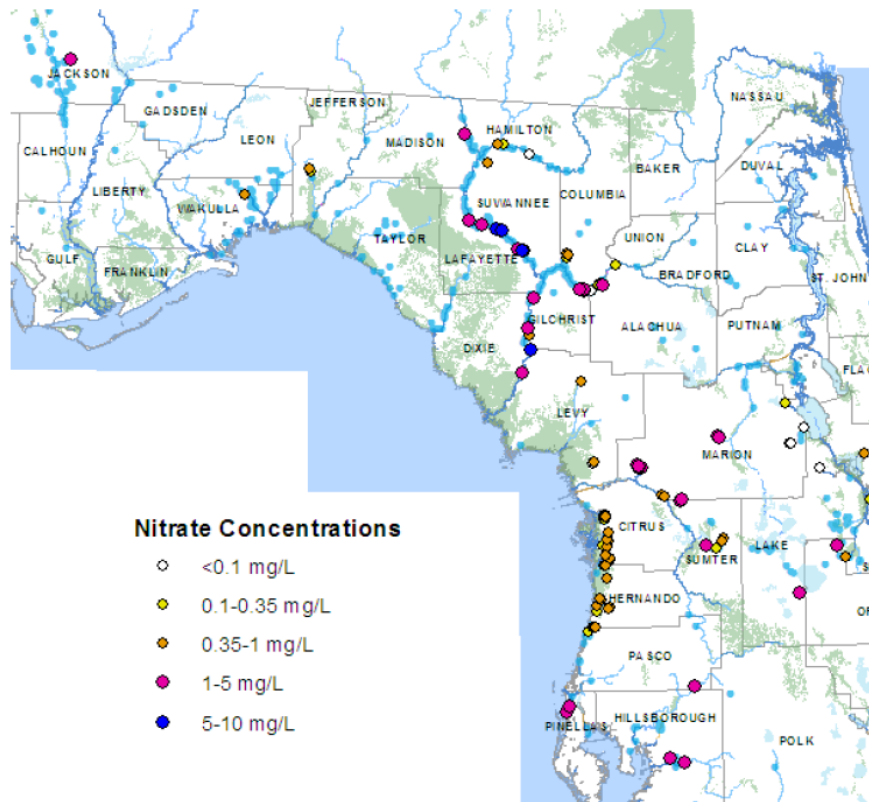


Issues & Drivers

- Reduced Clarity
- Elevated Nutrients
- Increased Salinity



How do our springs look?



About 75% of the springs routinely monitored have nitrate concentrations > 0.35 mg/L



Snapshot of NO₃ Concentrations in Select SWFWMD Springs (mg/L)

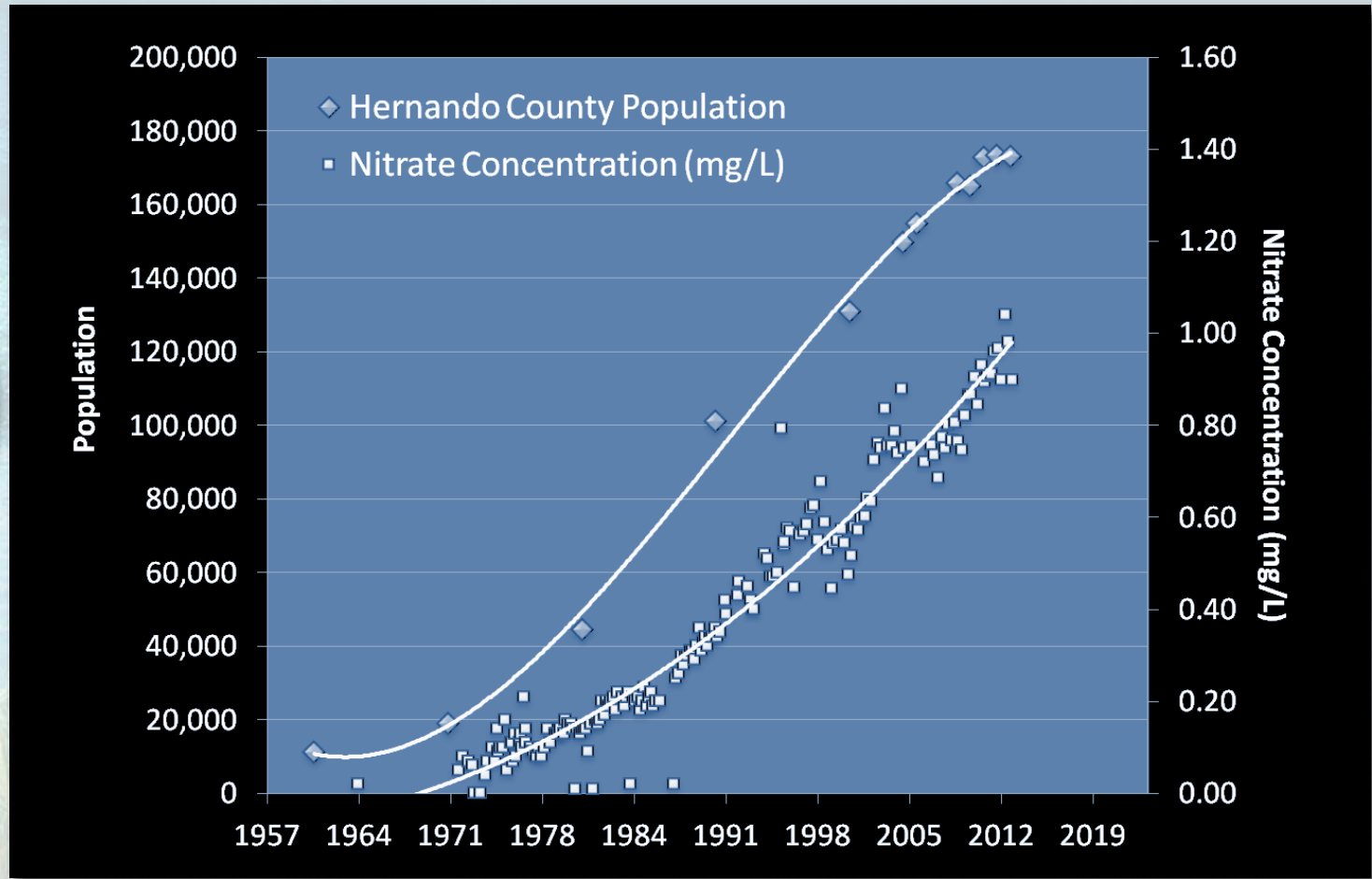


Numeric Nutrient Criteria

Nitrate = 0.35 mg/L

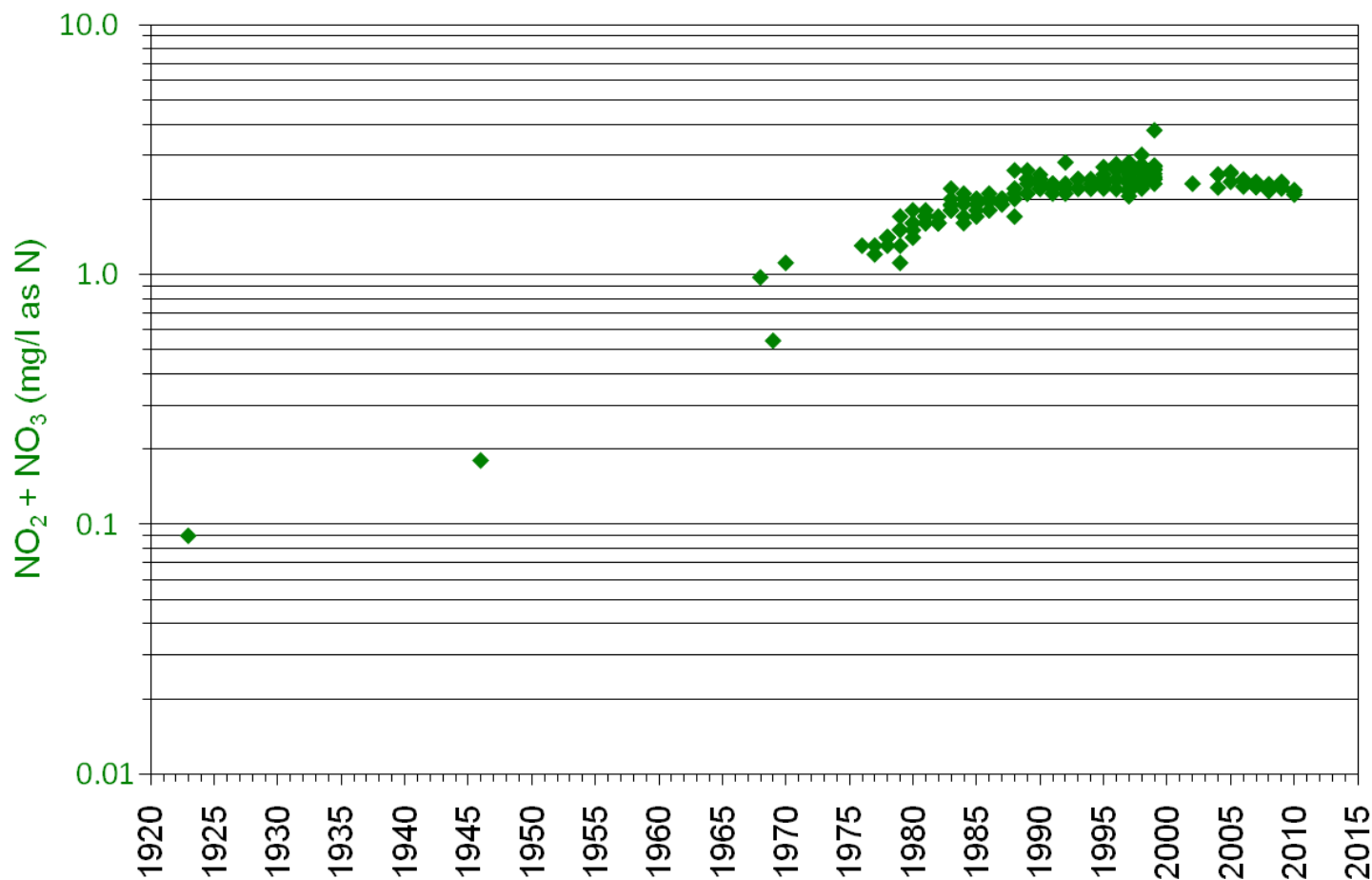


Nitrate Concentration and Population Growth

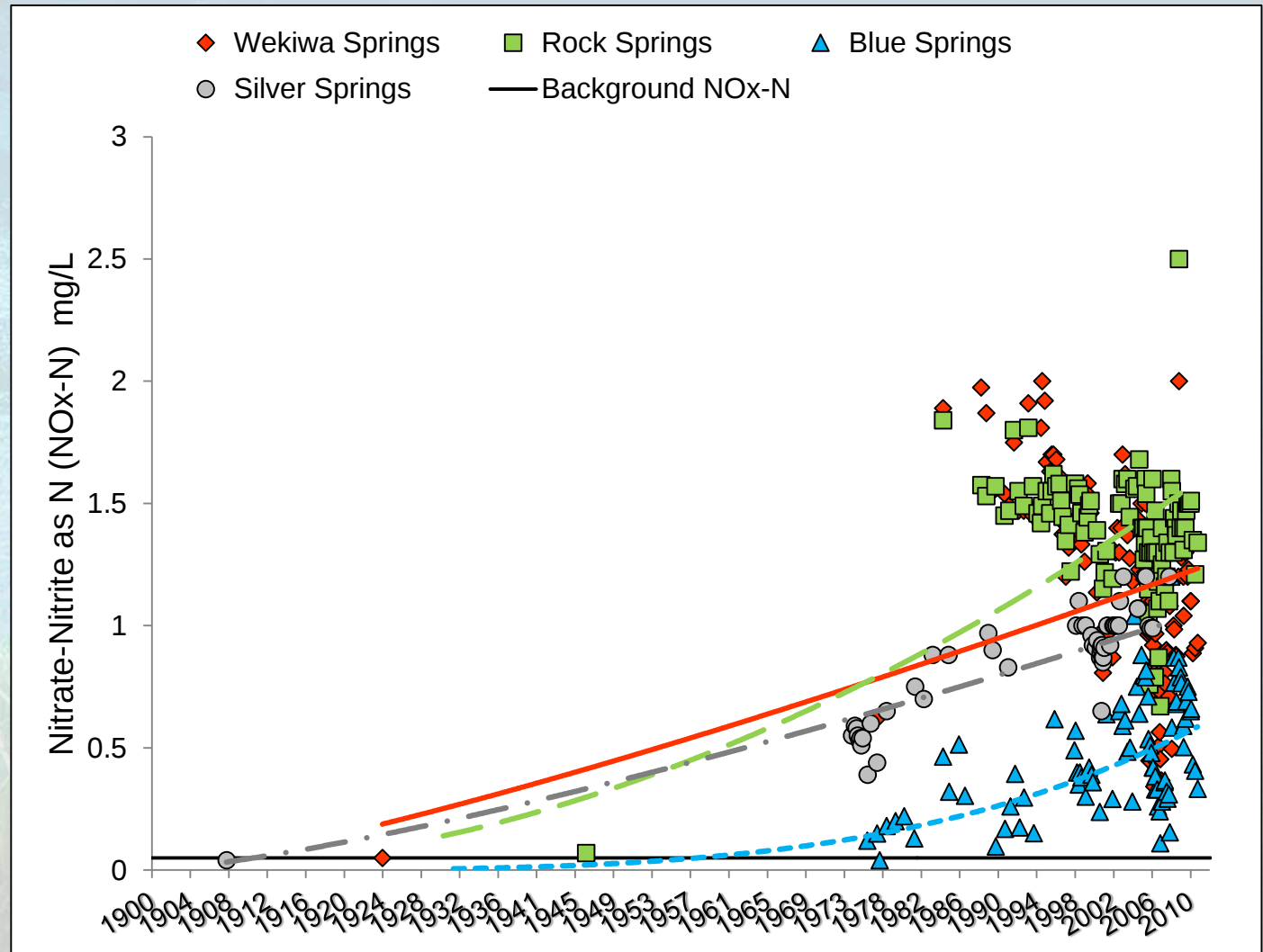




Crystal Springs, Pasco Co. composite historical nitrate data (data sources: USGS, FGS and SWFWMD)

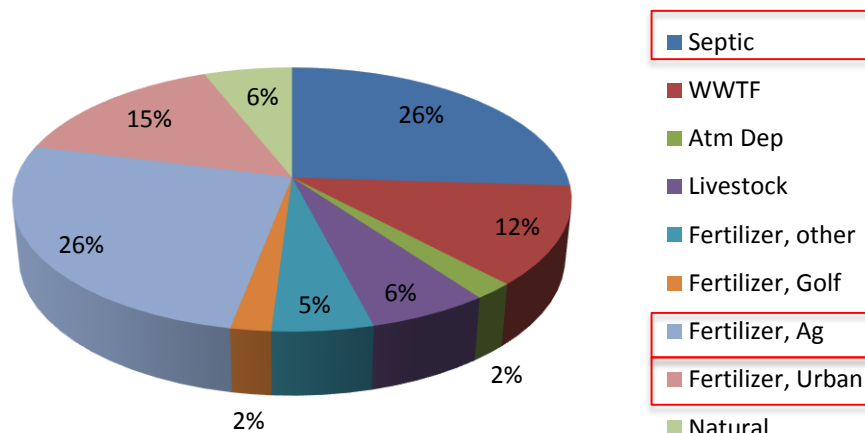


Time Series of N Concentrations in SJRWMD



Annual N Loading to Wekiva River Groundwater

Wekiva Basin (4,060,000 lb/yr)

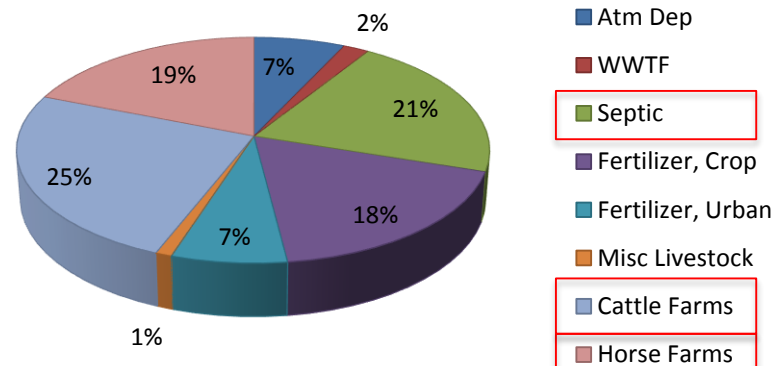


Source: MACTEC (Final Report – Wekiva River Basin Nitrate Sourcing Study – 2010)

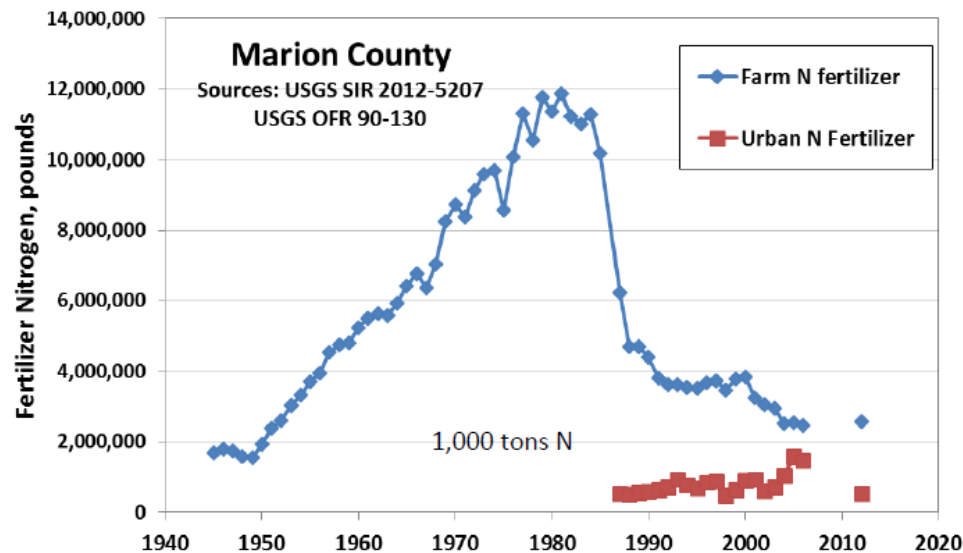


Annual N Loading to Rainbow Springs Groundwater

**Rainbow River – High Recharge
(987,000 lb/yr)**



Marion County Fertilizer Sales



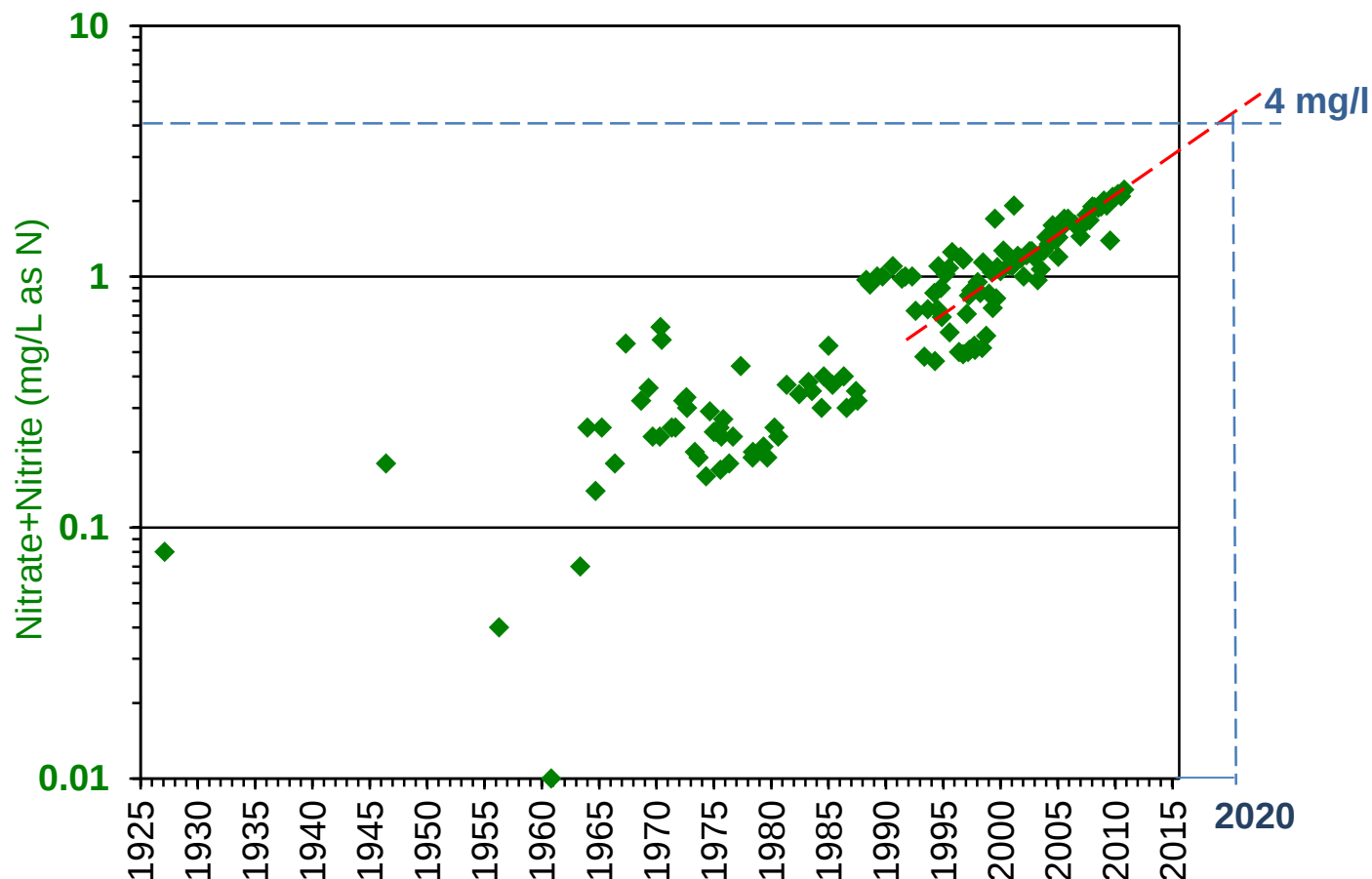
**** Legacy nitrate from commercial fertilizer applications several decades ago could still be in the subsurface and moving toward springs.**





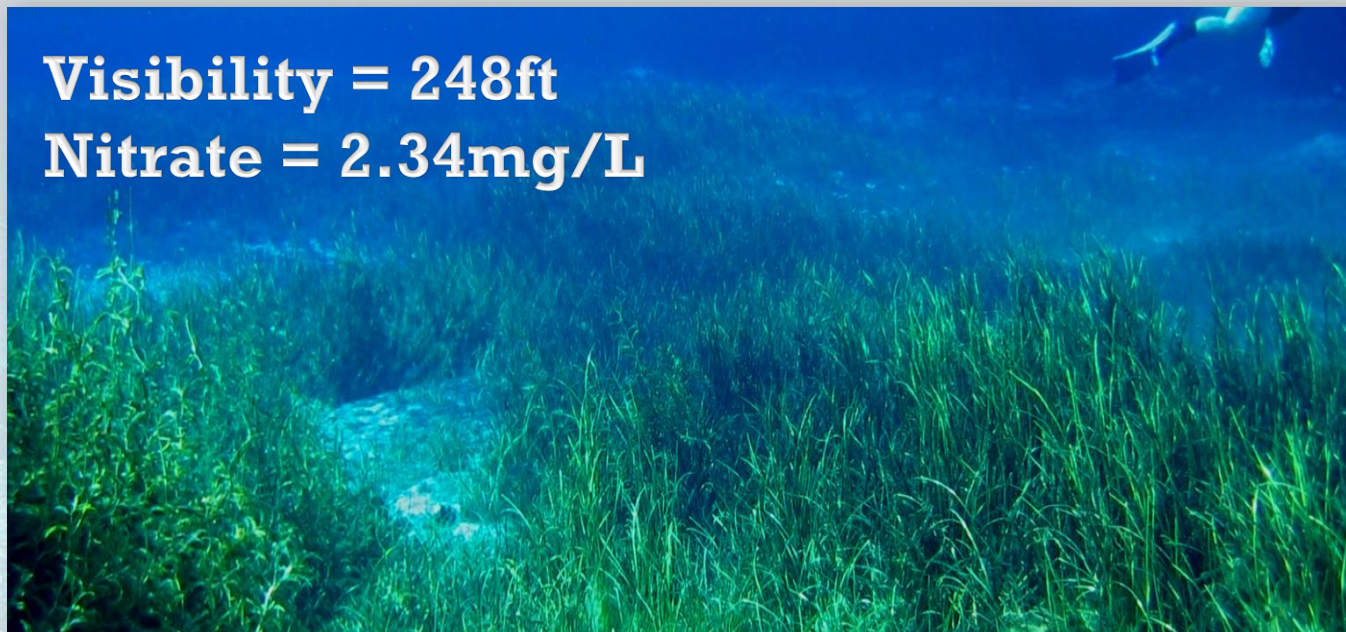
Rainbow Springs Nitrate Levels 1927-2010

(data sources: USGS, SWFWMD, FDEP)

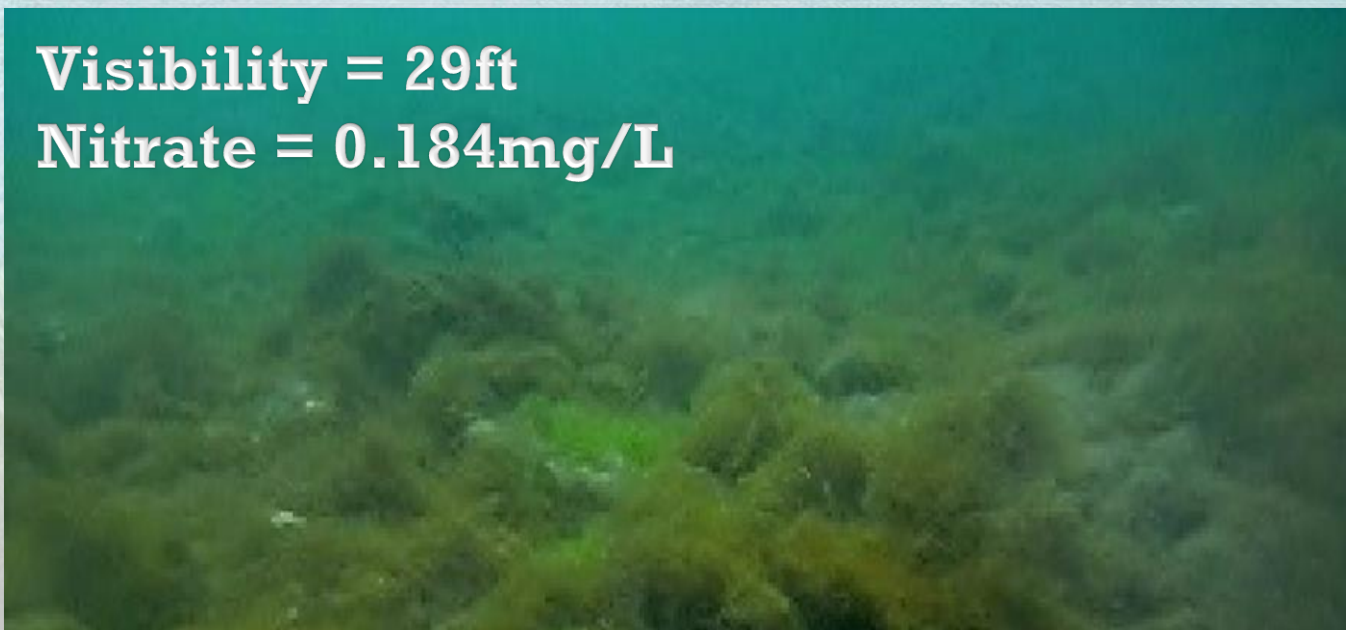




Visibility = 248ft
Nitrate = 2.34mg/L

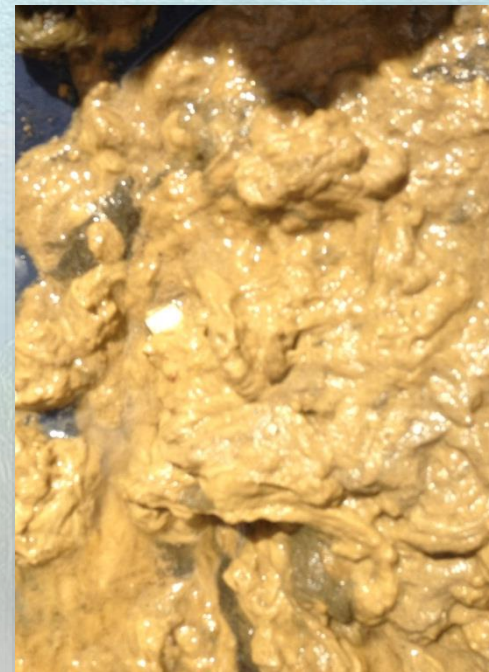


Visibility = 29ft
Nitrate = 0.184mg/L

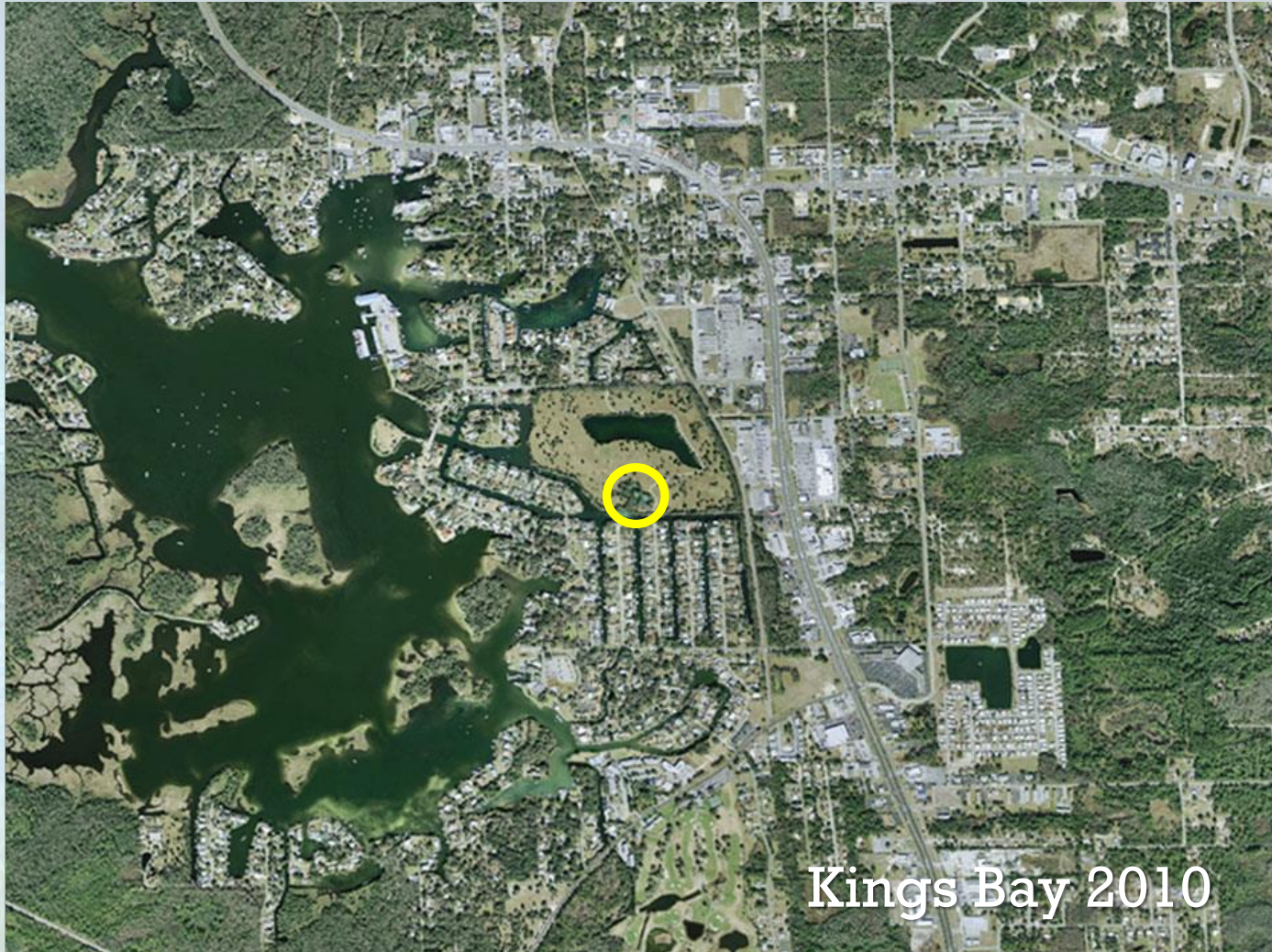


Issues & Drivers

- Loss of Beneficial Habitats
- Invasive Species
- Muck Accumulation



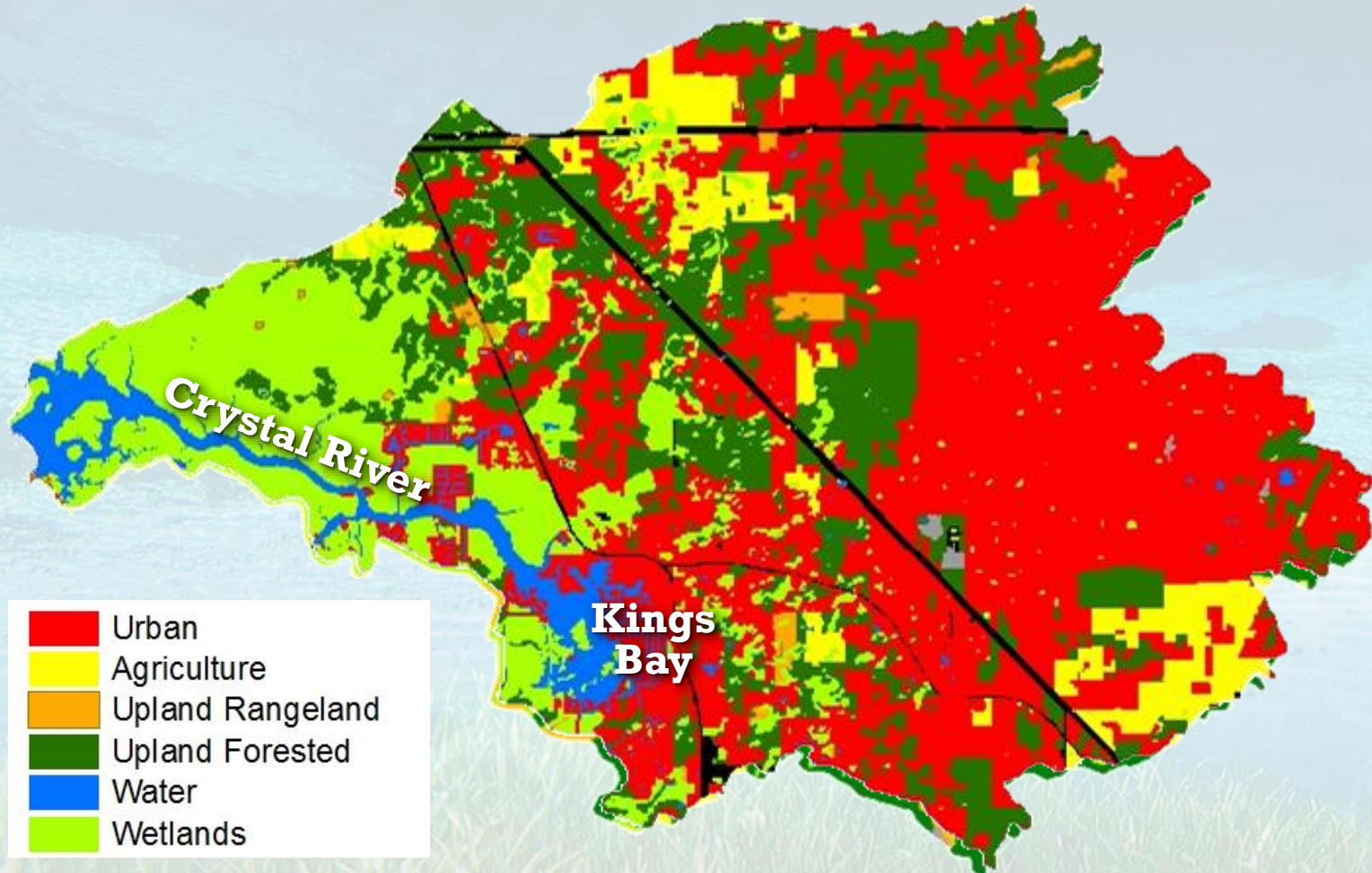
Habitat Loss



Kings Bay 2010

Land-Use Change

2010 Crystal River Watershed Landuse



Invasive Aquatic Plants

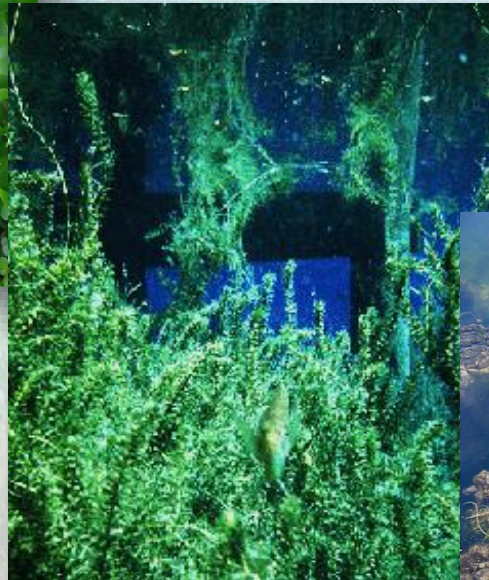
1940s-1950s

Hyacinth



1960s-1970s

Hydrilla -
Milfoil



1980s-1990s

Filamentous
Algae



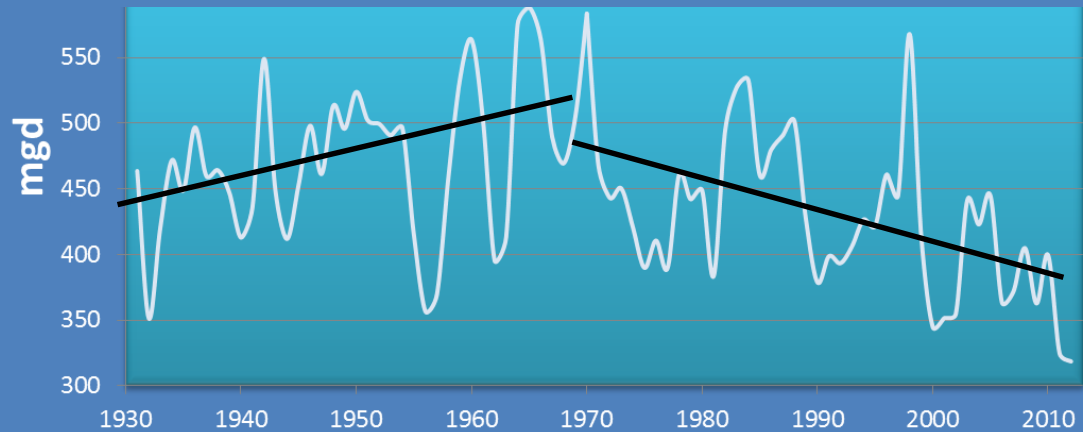
Issues & Drivers

- Reduced Rainfall
- Spring Flow Reductions
- Longer Residence “Cook” Times

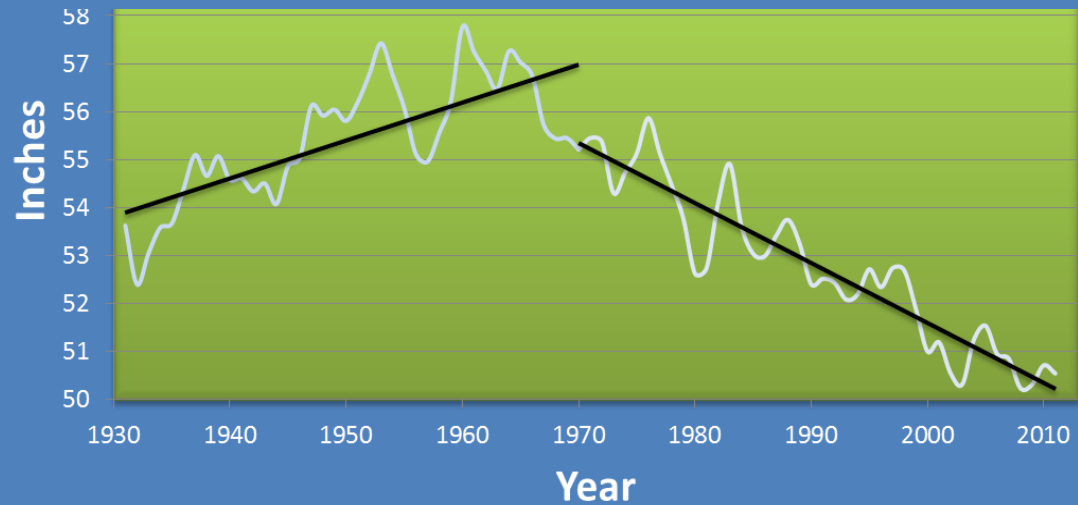


Rainbow River

Flow



Rainfall



Flow Change from Consumptive Use

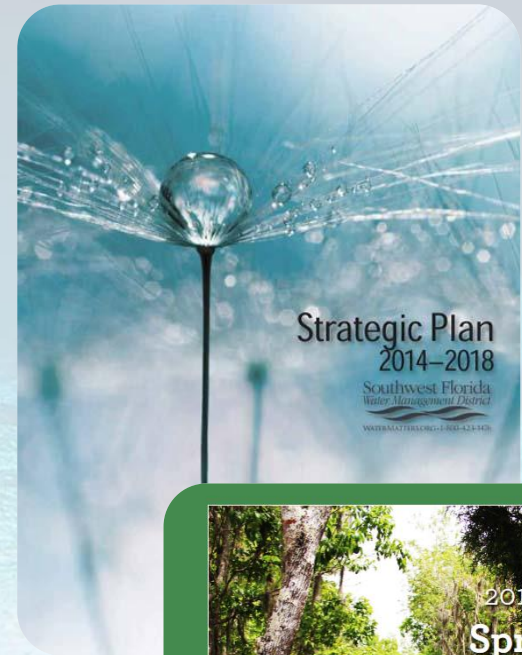
Spring	County	Change in Average Annual Flow Attributable to Consumptive Use	
		Change	Total Flow Change*
Rainbow	Marion	-1%	-7.3 cfs
Kings Bay Group	Citrus	-0.9%	-3.9 cfs
Homosassa No. 1	Citrus	-0.9%	-0.7 cfs
Chassahowitzka Main	Citrus	-1%	-0.7 cfs
Weeki Wachee	Hernando	-6%	-11.0 cfs

* Consumptive use impact based on Northern District Model



Overall Approach

- ✓ Education & Outreach
- ✓ Minimum Flows and Levels
- ✓ Monitoring & Research
- ✓ Promote Conservation
- ✓ Restoration Projects
- ✓ Land Acquisition



[Springs Intro](#)

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[Events](#)

[Springs Resources](#)



Crystal River/Kings Bay



Weeki Wachee Springs



Chassahowitzka Springs



Crystal River/Kings Bay



Rainbow Springs



Homosassa Springs

Springs in West-Central Florida

Florida has more than 1,000 springs — the largest concentration in the world. Within the Southwest Florida Water Management District, there are more than 150 springs.

They are the liquid jewels that flow through Florida. They are home to mullet, manatees and even mermaids. They are Florida's springs and they need our help.

Over time, these natural treasures have become threatened by human activities, climate change and other factors. But there are solutions and steps we can all take to restore our springs, which support the local economy and quality of life.

To lead this effort, the District put together a team of **springs experts** to conserve and restore our spring



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Springs Dashboards



Weeki Wachee Springs



Chassahowitzke Springs



Crystal River/Kings Bay



Rainbow Springs



Homosassa Springs

Weeki Wachee Springs

Springshed Dashboard

An at-a-glance view of recent water quality and flows, and contributing factors affecting the spring and downstream

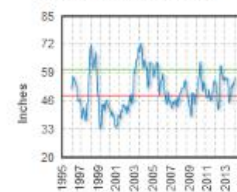
Weeki Wachee River

Current Conditions

Historical Average Rainfall
for April: **2.71 in**

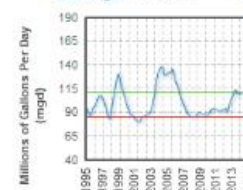
Actual Rainfall Received
for April: **0.00 in**

Springshed Region Rainfall



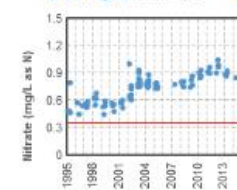
Data source: SWFWMD

Weeki Wachee River Stream Flow:
112 mgd (March 31)



Data source: USGS

Nitrate Concentration:
0.85 mg/L (January 6)



Data source: SWFWMD

Clarity at Headsprings:
147 feet (January 14)

Location



Underwater view of Weeki Wachee River looking upriver within Weeki Wachee Springs State Park. (Inset: State of Florida counties and Weeki Wachee Springshed location)

Weeki Wachee Springs



Data source: SWFWMD, Esri

Characteristics

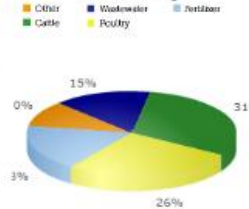
Springshed Water Use

(Hover to pause; click to advance.)



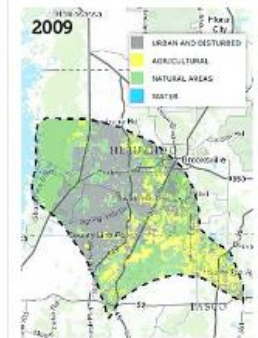
Data source: SWFWMD

Nitrate Loading



Data source: SWFWMD, 1997

Interactive Land Use Map

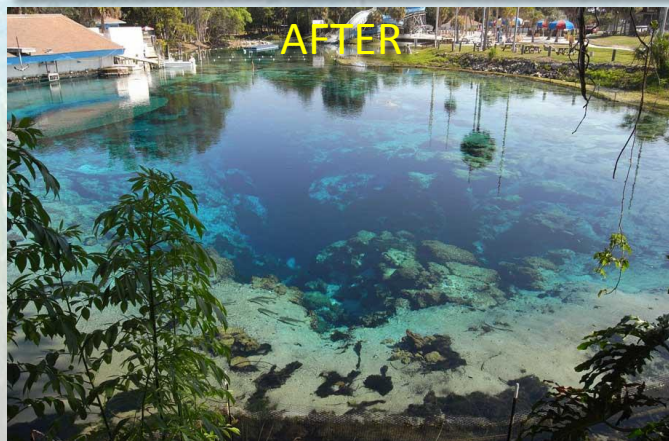


Data source: SWFWMD, Esri

Weeki Wachee Sediment Removal and Revegetation Project



BEFORE



AFTER



BEFORE



AFTER



Weeki Wachee Volunteer Lyngbya Removal Event

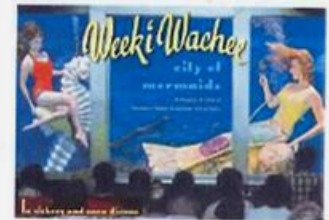


Before



After

Save Weeki Wachee Springs



A Water Project of the
Rotary Clubs of Hernando County



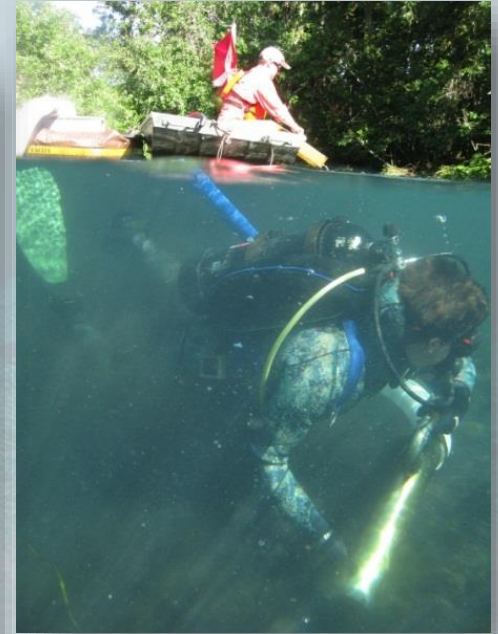
Rotary Club of Spring Hill Central

Rotary Club of Spring Hill

Rotary Club of Brooksville



Chassahowitzka Sediment Removal Project



Chassahowitzka Archaeology

Unknown



1941



100 AD



1800's



6,000 – 3,000 BC



Weeki Wachee at Night



Curt Bower
Photo by Curt Bower © 2009

Photo by: Curt Bower, © 2009

**Join us in the
effort to restore
our springs!**

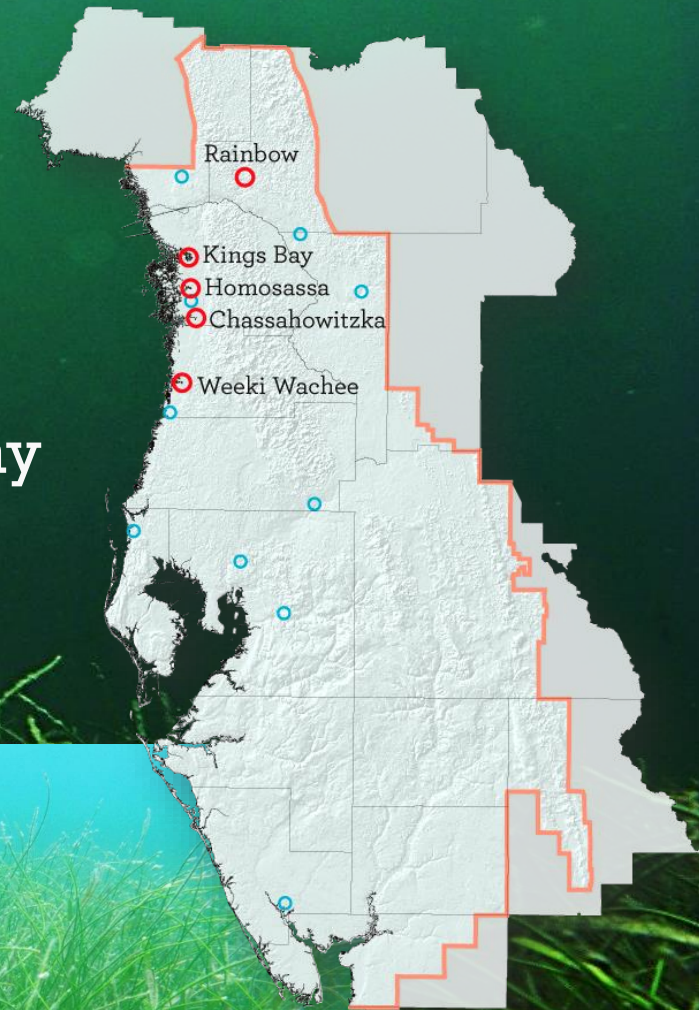


Southwest Florida
Water Management District

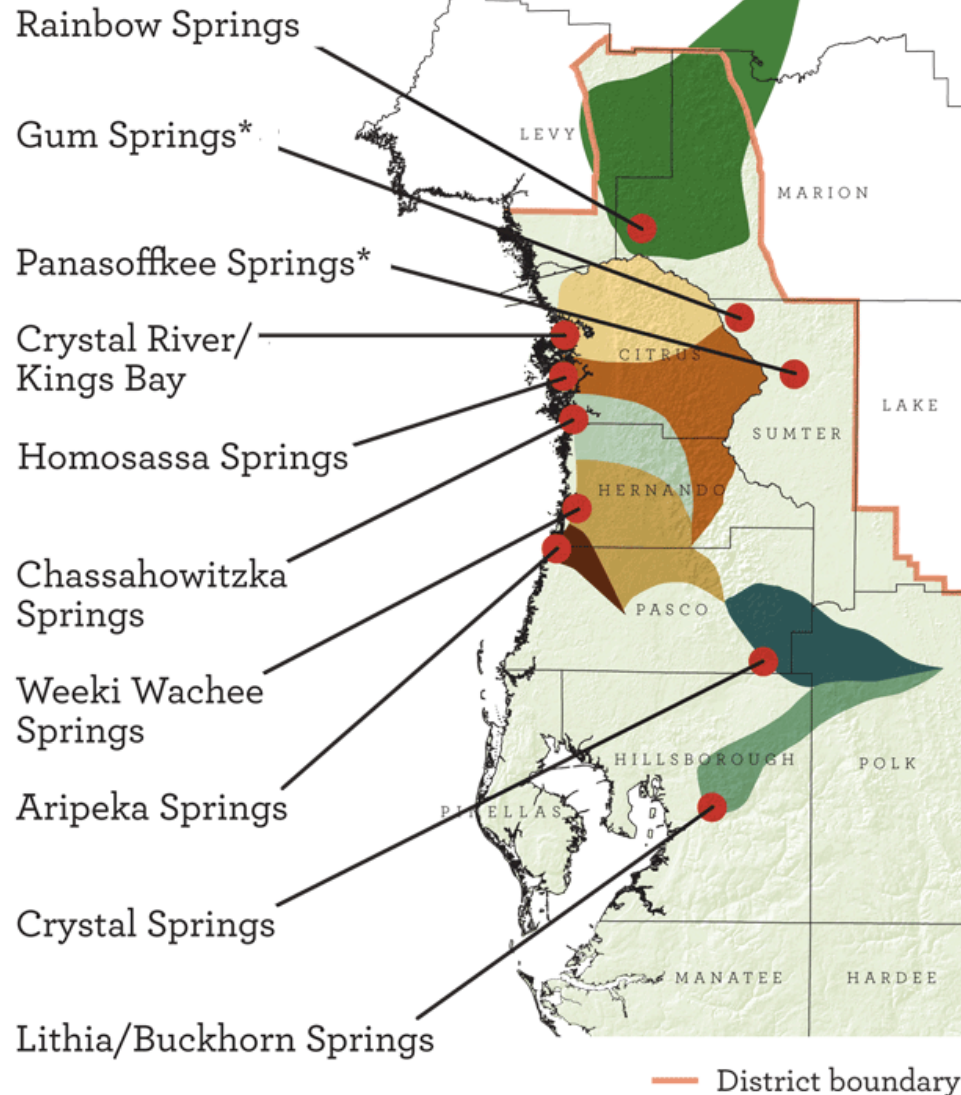


District Springs and Spring Groups

- **Over 150 springs**
- **16 Spring Groups**
- **5 First-magnitude groups**
 - Approximately 1 billion gallons/day
 - Springs Coast — 2nd largest seagrass area in the nation



Generalized Springshed Boundaries of Major Springs



*The springsheds for the Gum Springs and Panasoffkee Springs groups have not yet been determined.

