

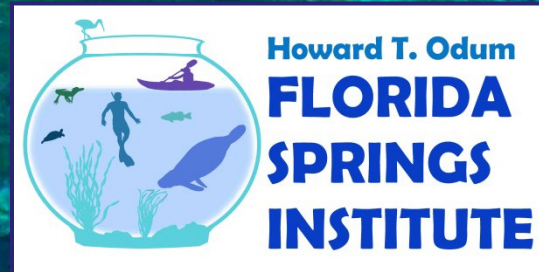
April 2021

*Hispanic Marketing & Public
Relations*

Make Our Springs Great Again!

Robert L. Knight, Ph.D.

John Crowe photo



John Crowe

Today's Speaker

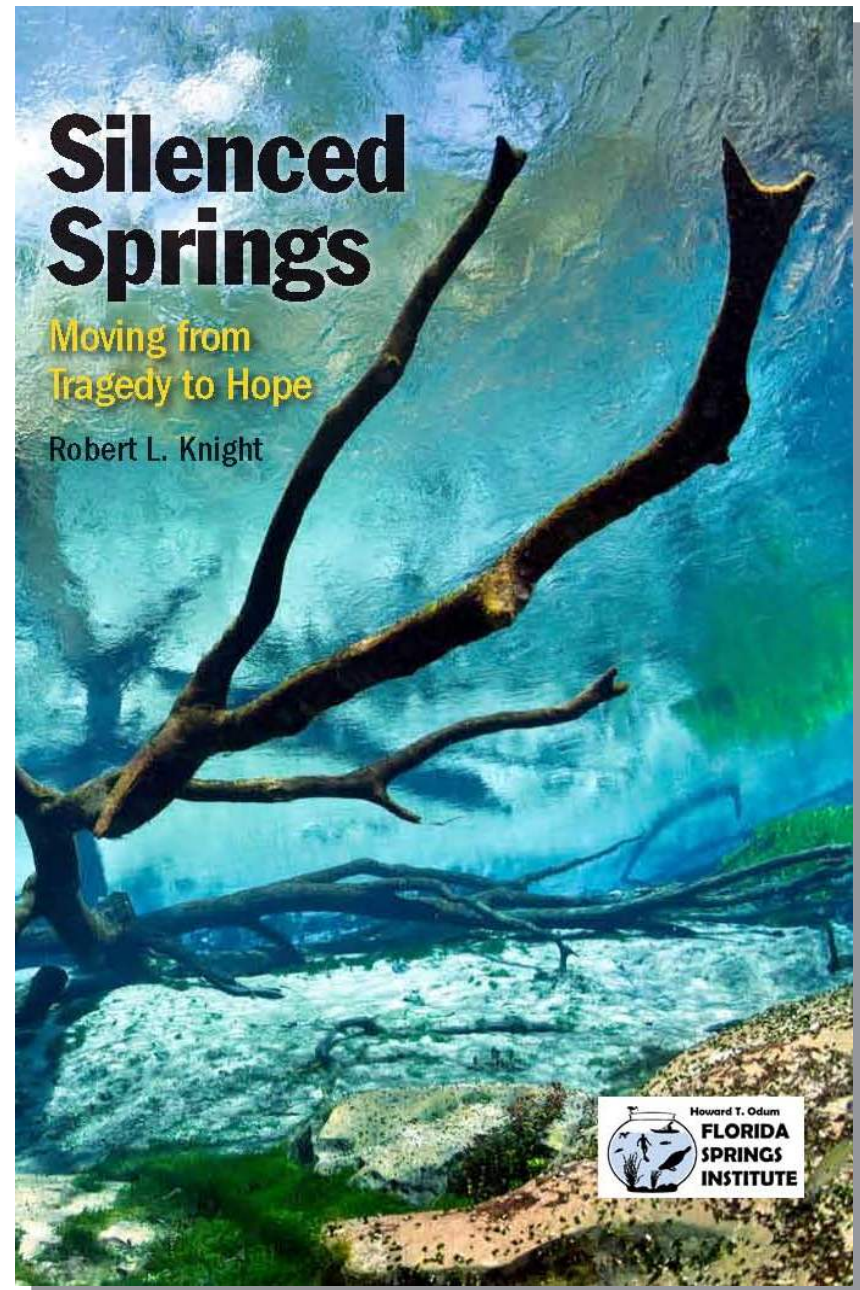
Robert L. Knight, Ph.D.

Director - Howard T. Odum Florida Springs Institute and author of ***Silenced Springs – Moving from Tragedy to Hope***

- B.A. Zoology (1970) – Univ. of North Carolina
- M.S.P.H. Environmental Chemistry and Biology (1973) – Univ. of North Carolina
- Ph.D. Systems Ecology(1980) – Univ. of Florida



Howard T. Odum
**FLORIDA
SPRINGS
INSTITUTE**



Florida Springs Institute

GATEWAY
— TO THE —
SPRINGS
HIGH SPRINGS



ABOUT US

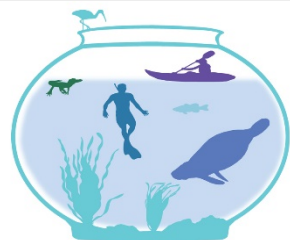
Promoting the protection, restoration, and celebration of Florida springs since 2010.

The mission of the Florida Springs Institute is to provide and communicate credible science to facilitate responsible stewardship of Florida's springs.



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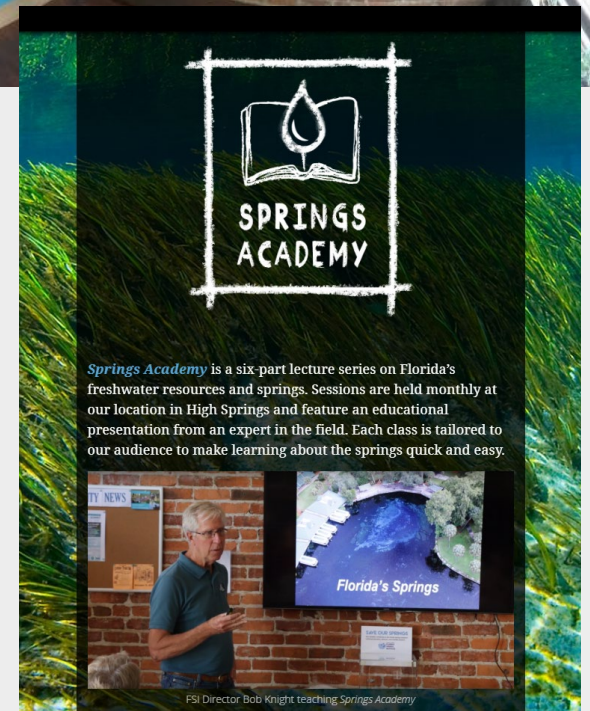
Photos by John Moran & Tessa Skiles



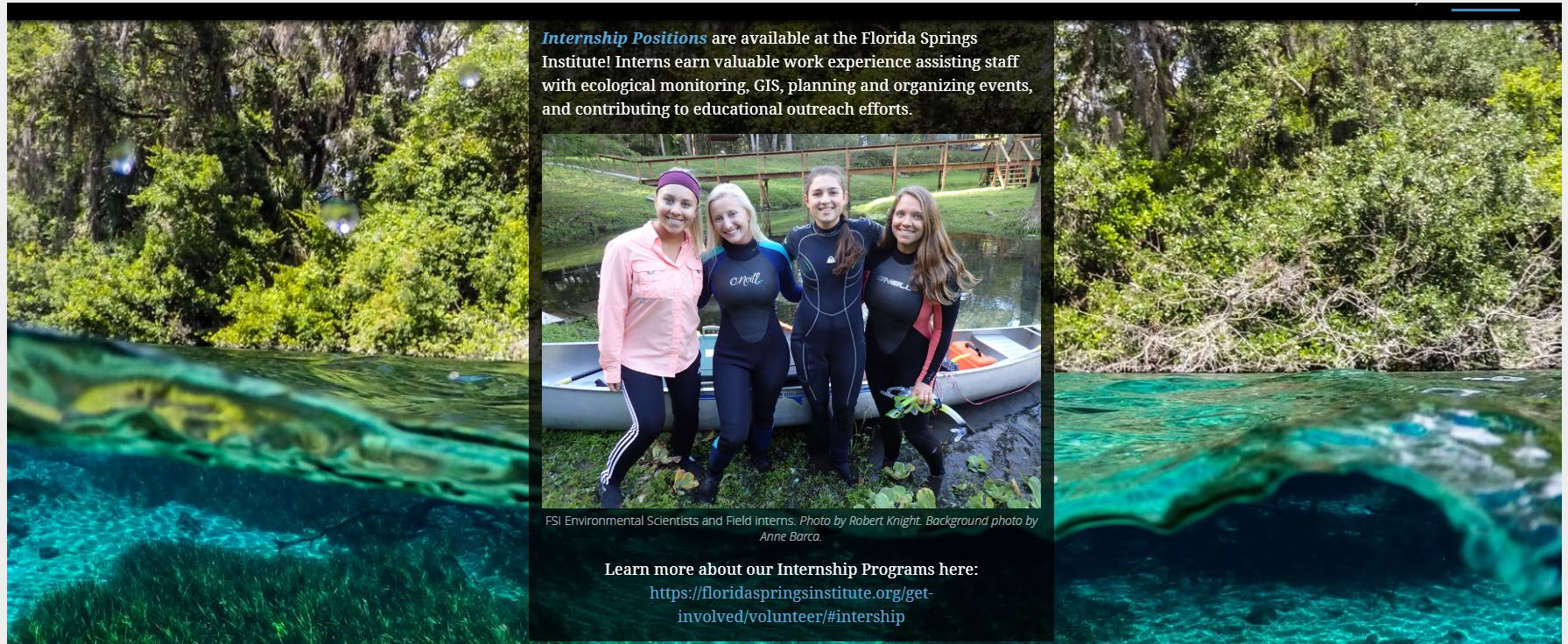
SPRINGS ACADEMY



- North Florida Springs Environmental Center in High Springs
- Monthly first Tuesday at 12 noon
- Six sessions twice each year
- Springs Hydrogeology/Chemistry/Biology/
- Impairments/Advocacy



STUDENT INTERNSHIPS

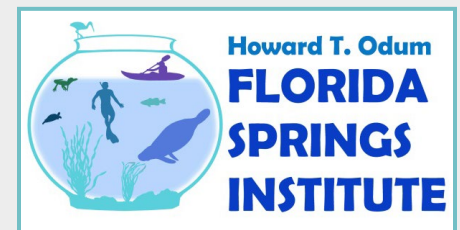


Internship Positions are available at the Florida Springs Institute! Interns earn valuable work experience assisting staff with ecological monitoring, GIS, planning and organizing events, and contributing to educational outreach efforts.

FSI Environmental Scientists and Field interns. Photo by Robert Knight. Background photo by Anne Barco.

Learn more about our Internship Programs here:
<https://floridaspringsinstitute.org/get-involved/volunteer/#internship>

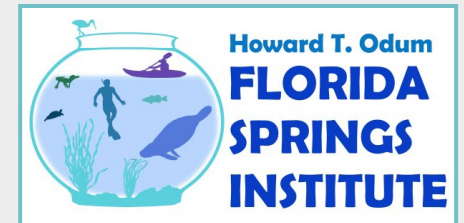
- Four three-month sessions per year – total of 12 interns per year
- Trained in field data collection, data entry and analysis, and springs ecology
- Raises awareness of springs impairments



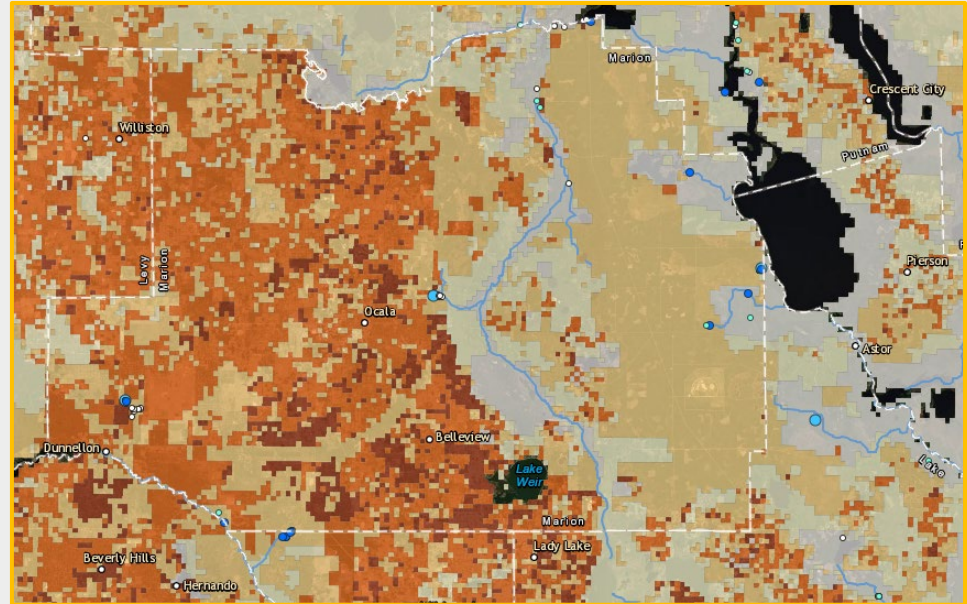
SPRINGS RUN



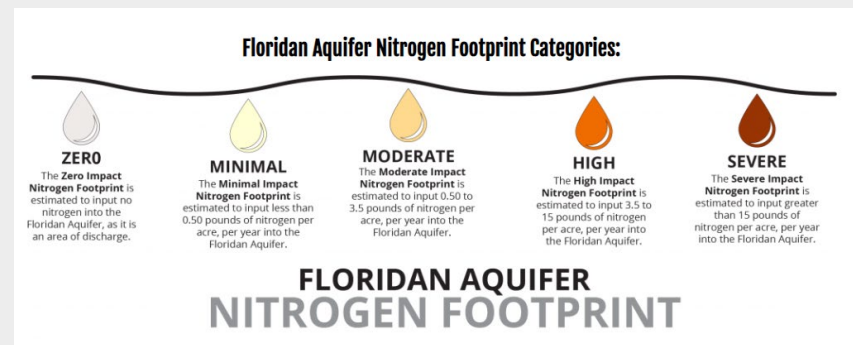
- Collaboration with First Magnitude Brewing Company in Gainesville
- 7.2K run for beginners and top athletes
- Over 700 participants in 2020
- Raises awareness of springs impairments



BLUE WATER AUDIT

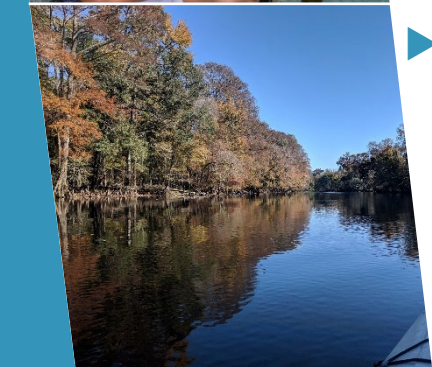


- GIS-based analytical and educational tool to assess impacts on the Floridan Aquifer
- Includes parcel-specific estimates of groundwater consumption and aquifer nitrogen loading rates
- Allows prioritization of most cost-effective springs' restoration actions



Lower Santa Fe River and Springs Environmental Analysis

- ▶ Multi-year ecosystem health assessment
- ▶ 61 spring and river stations on the Santa Fe River
- ▶ Water quality and quantity, vegetation, wildlife, and ecosystem function
- ▶ Focus on Santa Fe, Hornsby, Poe, Gilchrist Blue, Ginnie, and Ichetucknee Springs
- ▶ Restoration blueprint



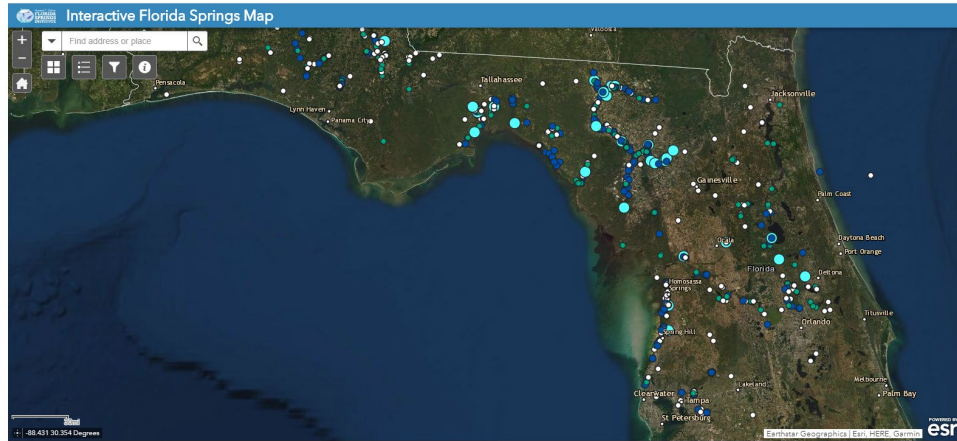
SPRINGSWATCH



- ▶ Volunteer based citizen-science
- ▶ Monitor water quality and ecology
- ▶ Silver Springs, Ichetucknee Springs, Homosassa Springs, Rainbow Springs, Weeki Wachee Springs, Santa Fe River, Wakulla, and Wekiva River.

FLORIDA SPRINGS MAP





















OVER 1,000 FLORIDA SPRINGS IN THE PALM OF YOUR HAND



EDUCATION & OUTREACH

Online Tools



				
ATLANTIC NEEDLEFISH <i>Strongyura marina</i>	LARGEMOUTH BASS <i>Micropterus salmoides</i>	SUNSHINE BASS <i>Morone chrysops</i> x <i>Morone saxatilis</i>	BLUE TILAPIA <i>Oreochromis aureus</i>	BOWFIN <i>Amia calva</i>
				
CHAIN PICKEREL <i>Esox niger</i>	COMMON SNOOK <i>Centropomus undecimalis</i>	CREVALLE JACK <i>Caranx hippos</i>	DARTERS <i>Etheostoma edwini</i> , <i>Percina nigrofasciata</i>	FLORIDA GAR <i>Lepisosteus platyrhincus</i>
				
LONGNOSE GAR <i>Lepisosteus osseus</i>	GOLDEN SHINER <i>Notemigonus crysoleucas</i>	HOGCHOKER <i>Trinectes maculatus</i>	BLUEFIN KILLIFISH <i>Lucania goodei</i>	RAINWATER KILLIFISH <i>Lucania parva</i>
				
SEMINOLE KILLIFISH <i>Fundulus seminolis</i>	LAKE CHUBSUCKER <i>Erimyzon sucetta</i>	MANGROVE SNAPPER <i>Lutjanus griseus</i>	MOJARRA <i>Eucinostomus harengulus</i>	MOSQUITOFISH <i>Gambusia holbrooki</i>

Extent of the Floridan Aquifer

The Floridan aquifer underlies an area that includes all of Florida and parts of neighboring states, about 100,000 sq. mi.



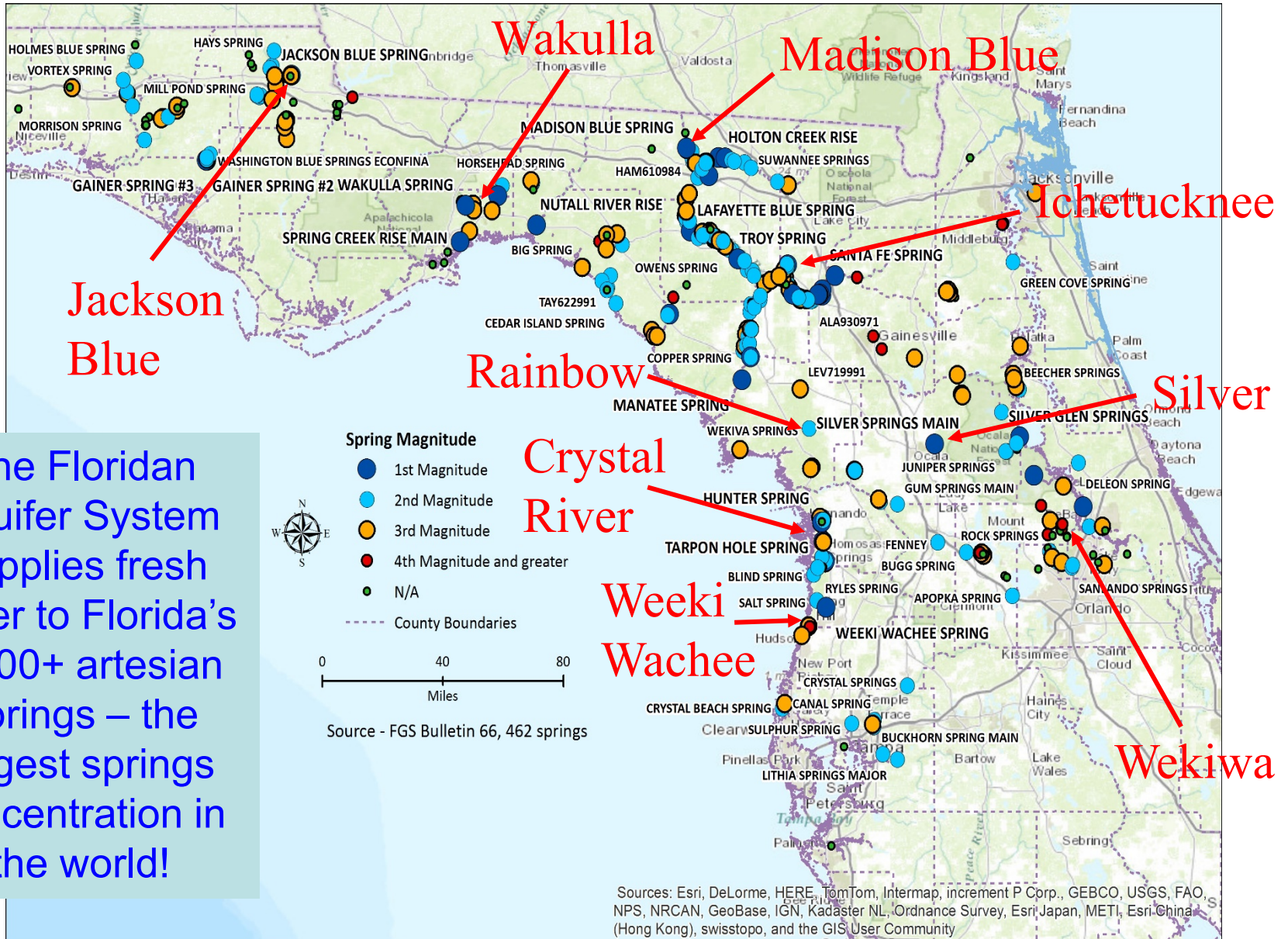
What is a spring?

Where groundwater comes to
the land surface.



John Moran photo

Florida: *“Land of a Thousand Springs”*



Springs Commerce



Silver Springs 1880s
Florida Archives

Human Recreational Uses



Wildlife Habitat



Silver Glen Springs
John Moran photo

Endangered Species



Three Sisters Springs
John Moran photo

Exploration

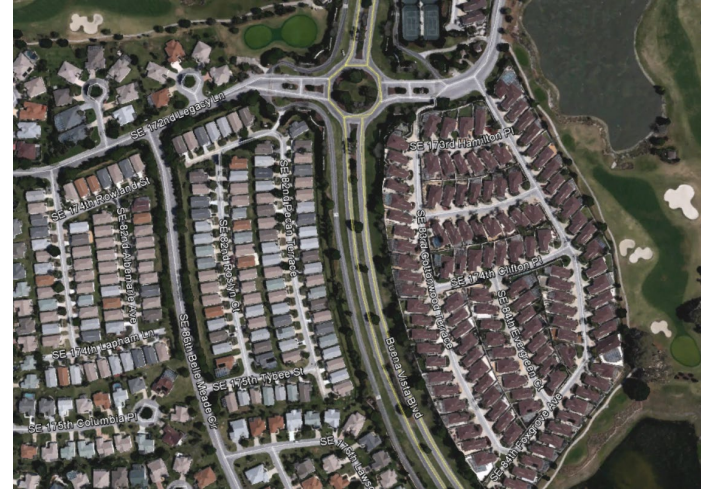


Ichetucknee Blue Hole
John Moran photo

Springs Problem – Part I

Groundwater resources are stressed:

- Groundwater consumption is very high
- Groundwater levels have fallen
- Spring flows are lower



The Villages

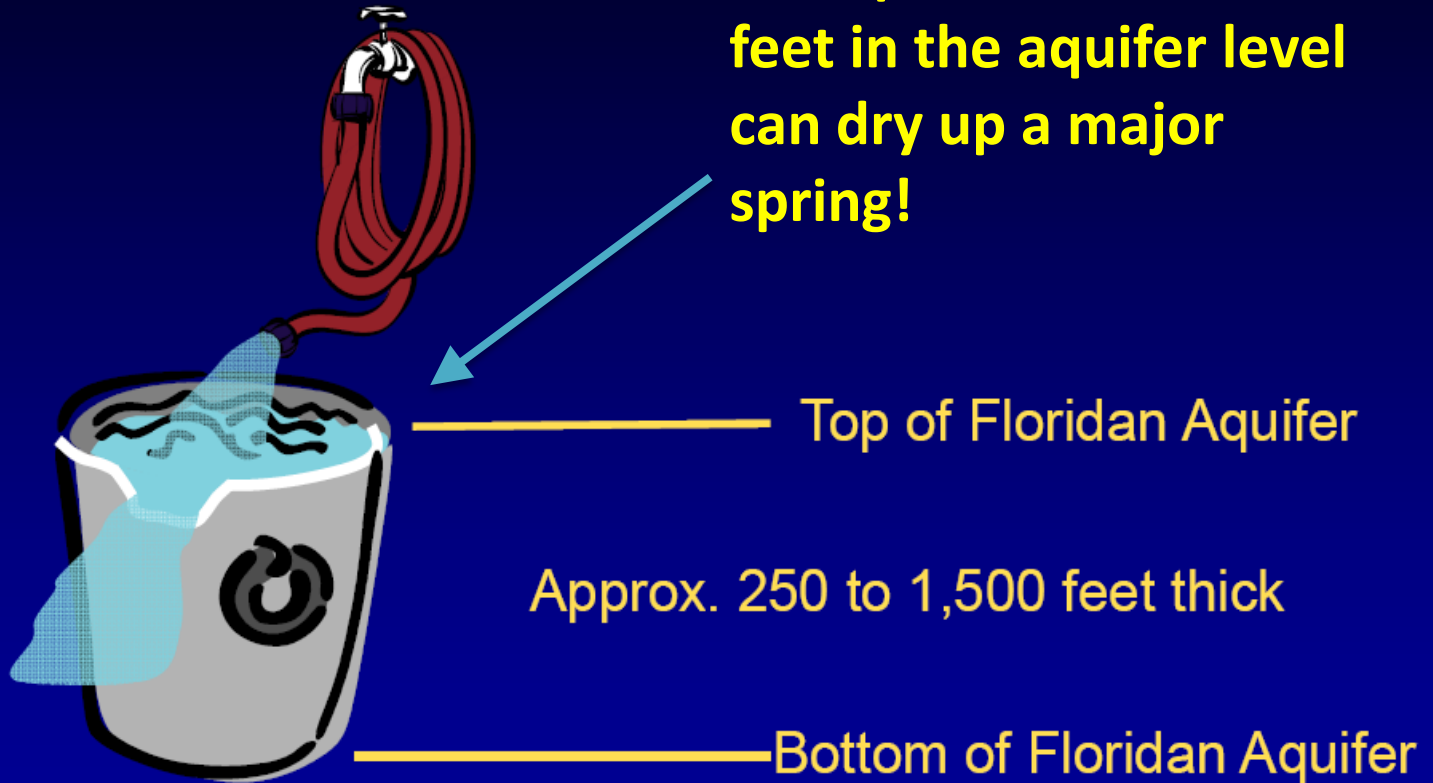


Agriculture

Springs Flow From the Top of the Aquifer

The “Bucket”

A drop of less than 10 feet in the aquifer level can dry up a major spring!

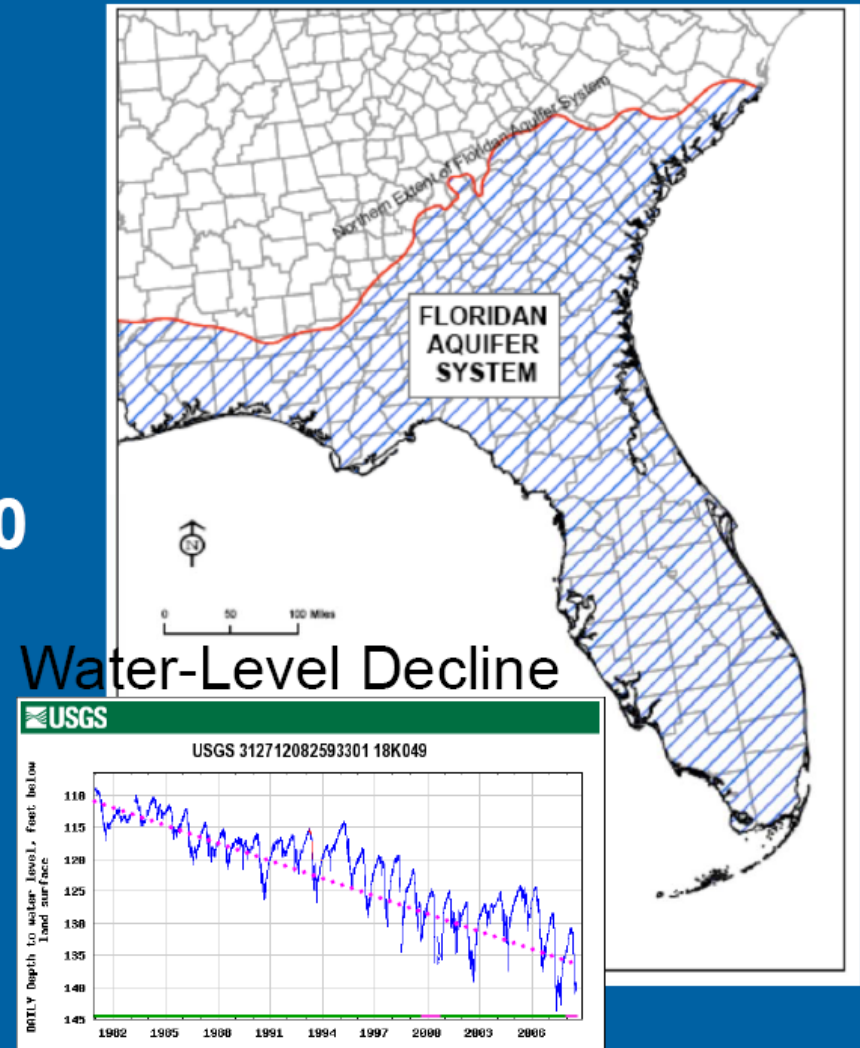


Floridan Aquifer System

- Underlies an area of about 100,000 square miles
- Groundwater pumpage averaged 3,640 Mgal/day in 2000
- Regional water-level decline is a concern

3.6 BGD = 30% of entire discharge from FAS!

Williams *et al.* 2011

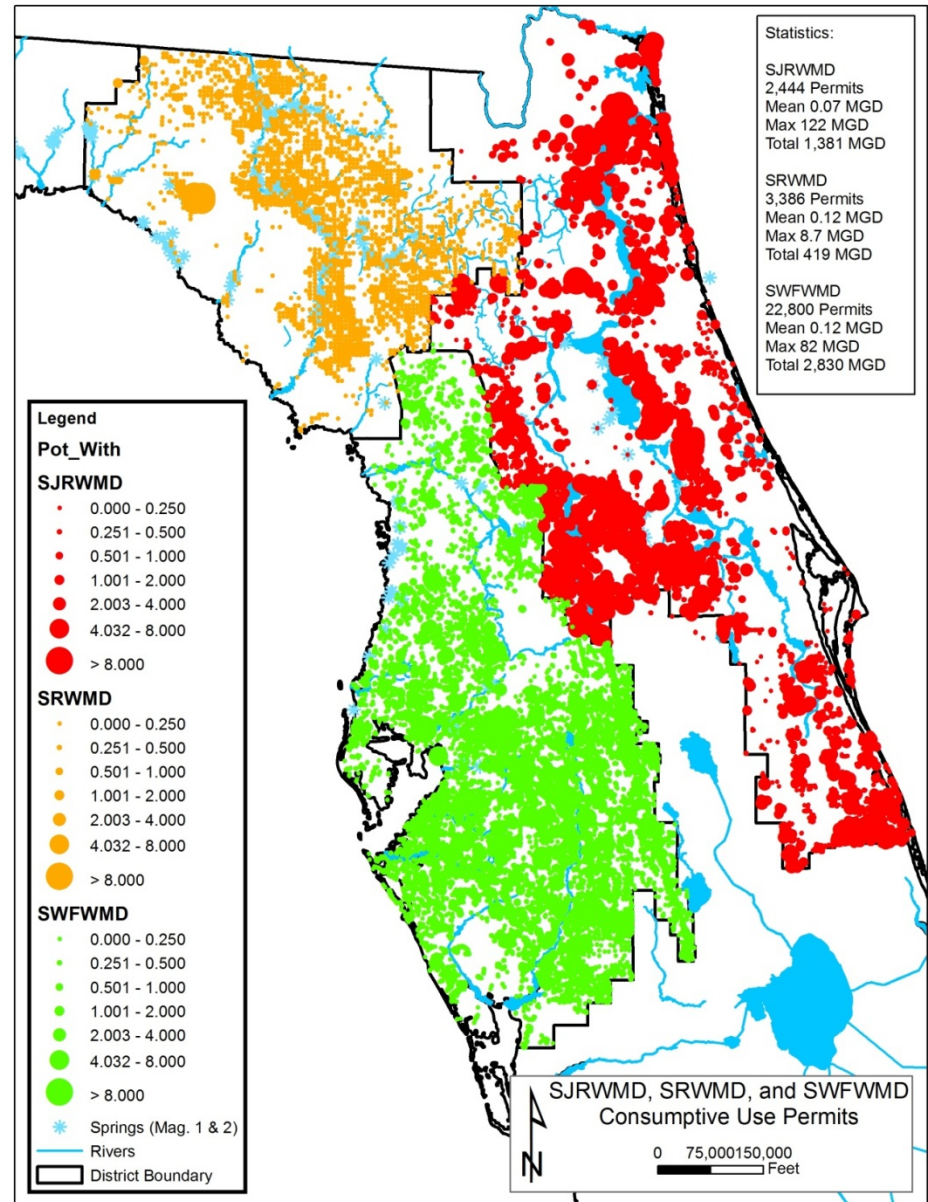


The Floridan Aquifer is Over-Permitted

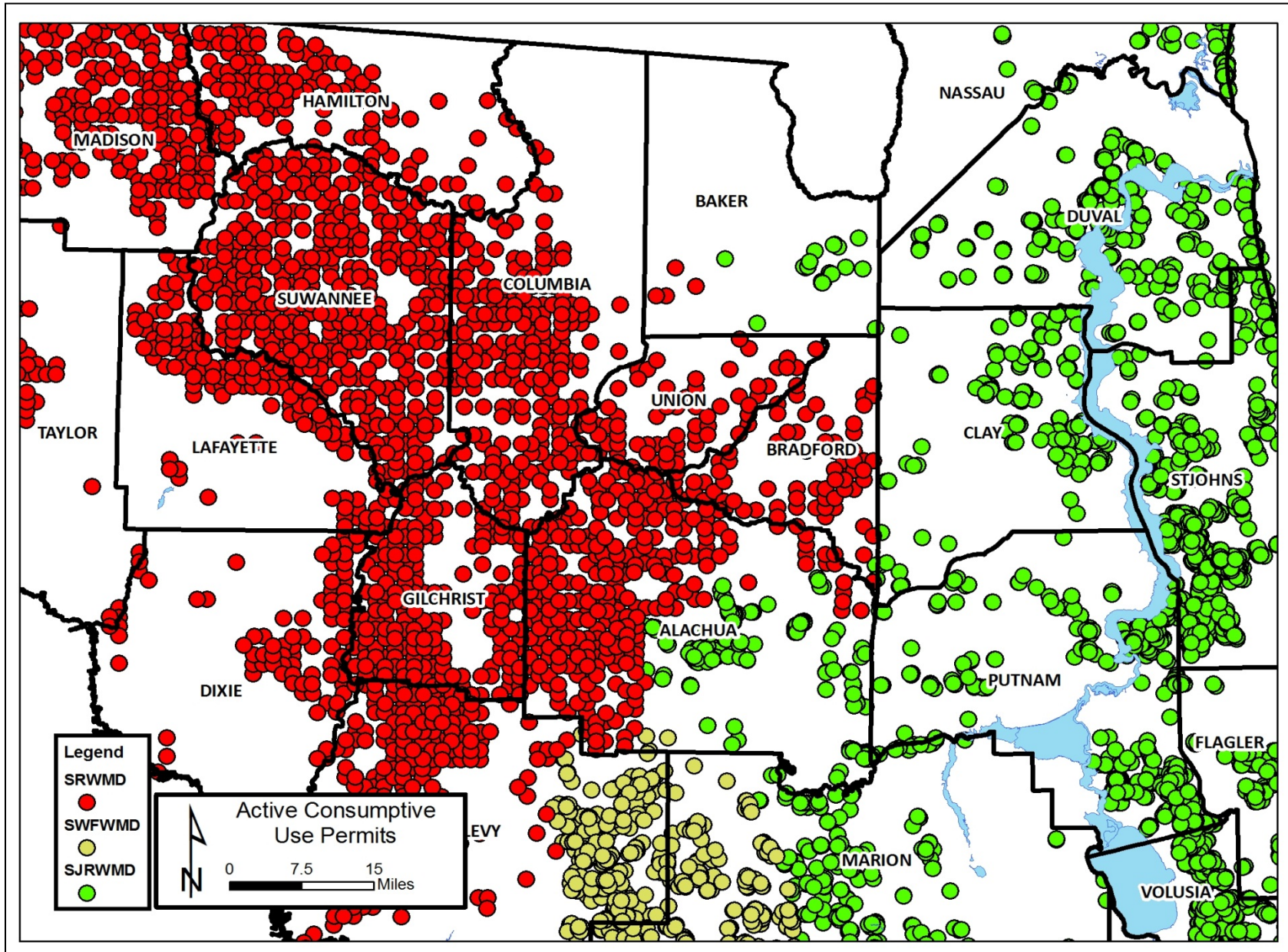
Existing Groundwater Consumptive Use Permits:

- Total permits – **28,630**
- Estimated 2010 pumping – **2,622 MGD** = 30% of recharge
- Total allocated groundwater use – **4,630 MGD** = 50% of entire aquifer recharge!

Water Management District data



Only the Largest Wells Need a Permit



Suwannee Farms – 40 Pivots



Abundant Fresh Water = Healthy Springs



White
Sulfur
Springs on
the
Suwannee
River in the
1920s

46 MGD

White Sulfur Springs on the Suwannee River 2011



Declining
flows
since
1960s

(John Moran
photo)

An aerial photograph of a river winding through a forested landscape. The river is significantly lower than its banks, revealing large, light-colored sandbars and exposed patches of green vegetation. The water is dark and reflects the sky and surrounding trees. The banks are covered in dense green trees and shrubs.

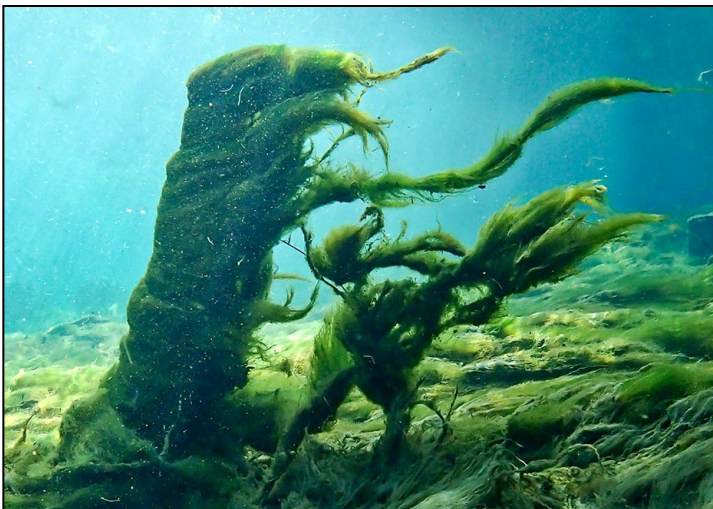
**Rivers
Stop
Flowing
When
Springs
Dry Up**

**Upper
Suwannee
Record Low**


Springs Problem – Part 2

GW nitrate nitrogen levels are increasing:

- Nitrate contamination is wide-spread in the Floridan Aquifer
- Springs are sensitive to elevated nitrate



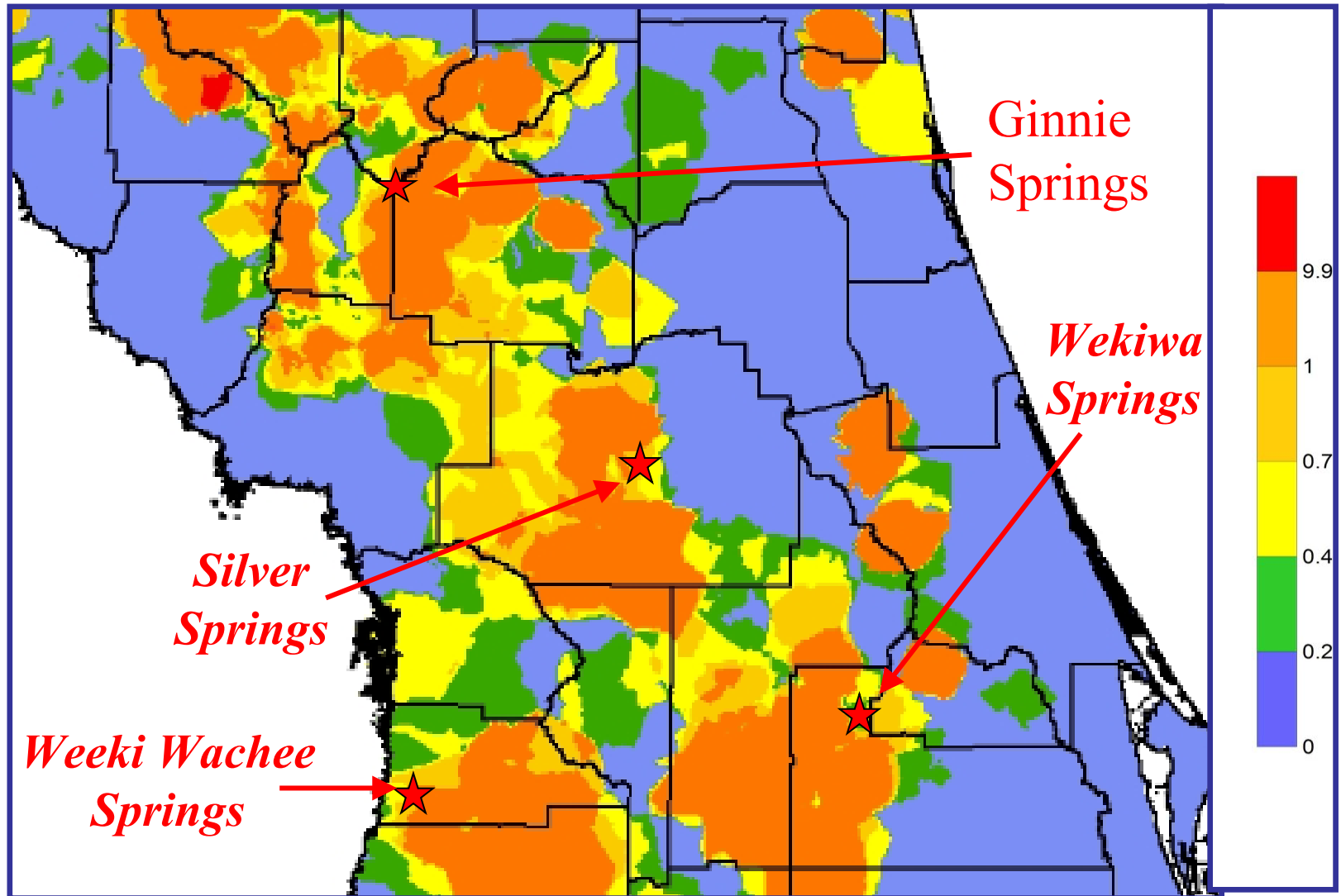
John Moran photos



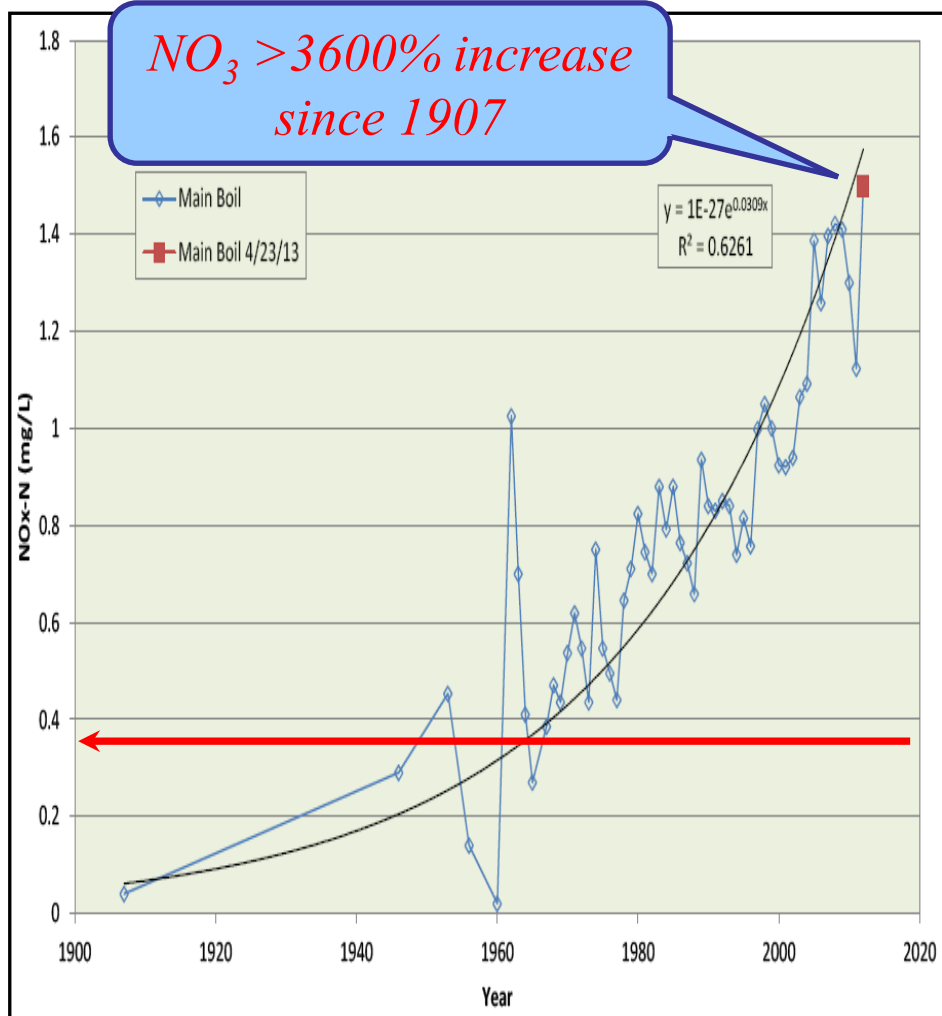
Everything we pour on the ground up here
ends up in our drinking water down there...

John Moran photo

Groundwater Nitrate Concentrations are Very High (mg N/L)



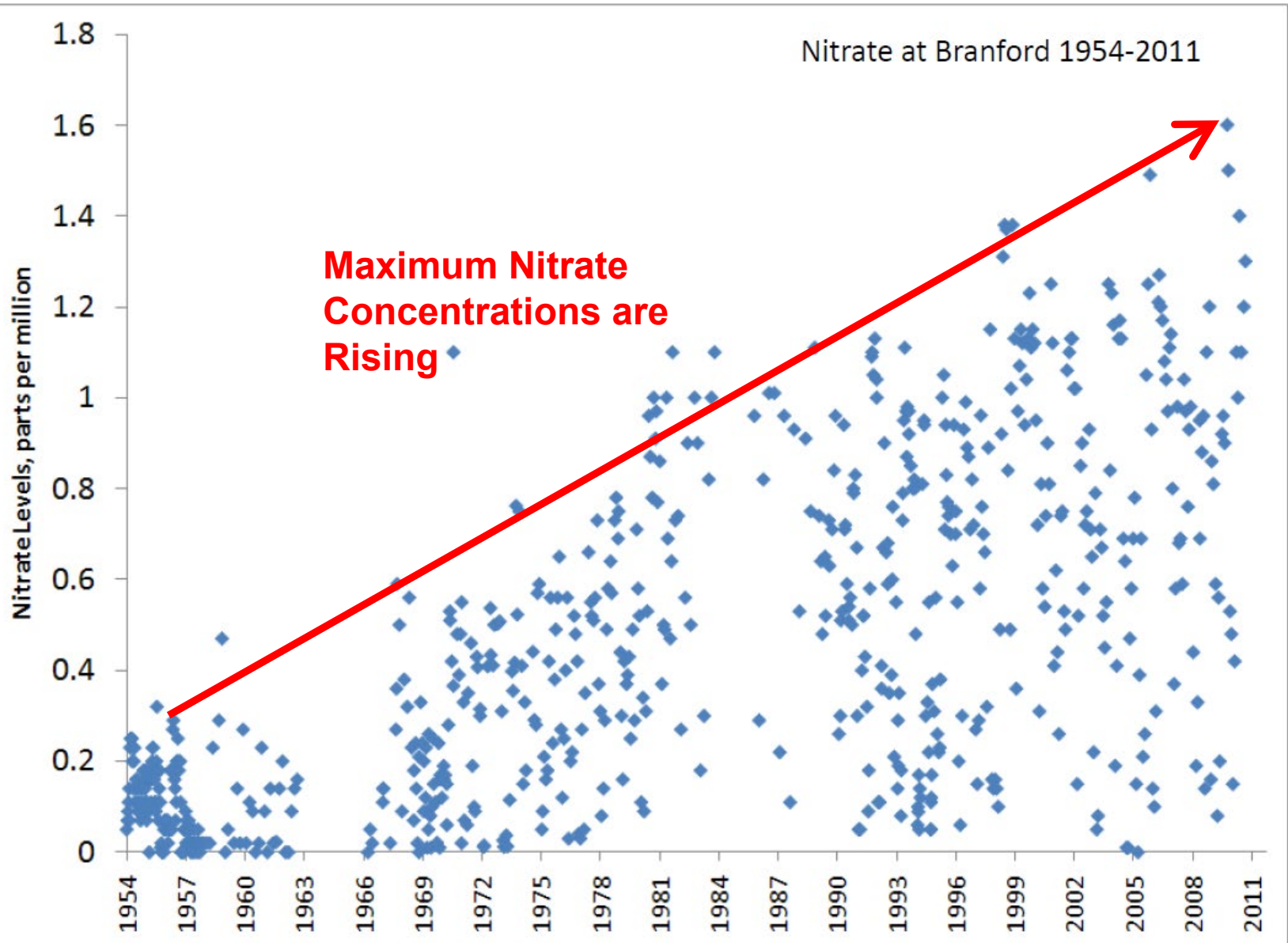
Silver Springs Nitrate Concentration Needs to be Reduced by 79%



Greatly exceeds 0.35 mg/L spring
standard!

Year	Nitrate-N Load (tons/yr)
1957	47
1979	407
1995	478
2005	529
2055 (projected)	880

Suwannee River Rising Nitrate Concentrations





Fanning Springs, 1989

THEN & NOW

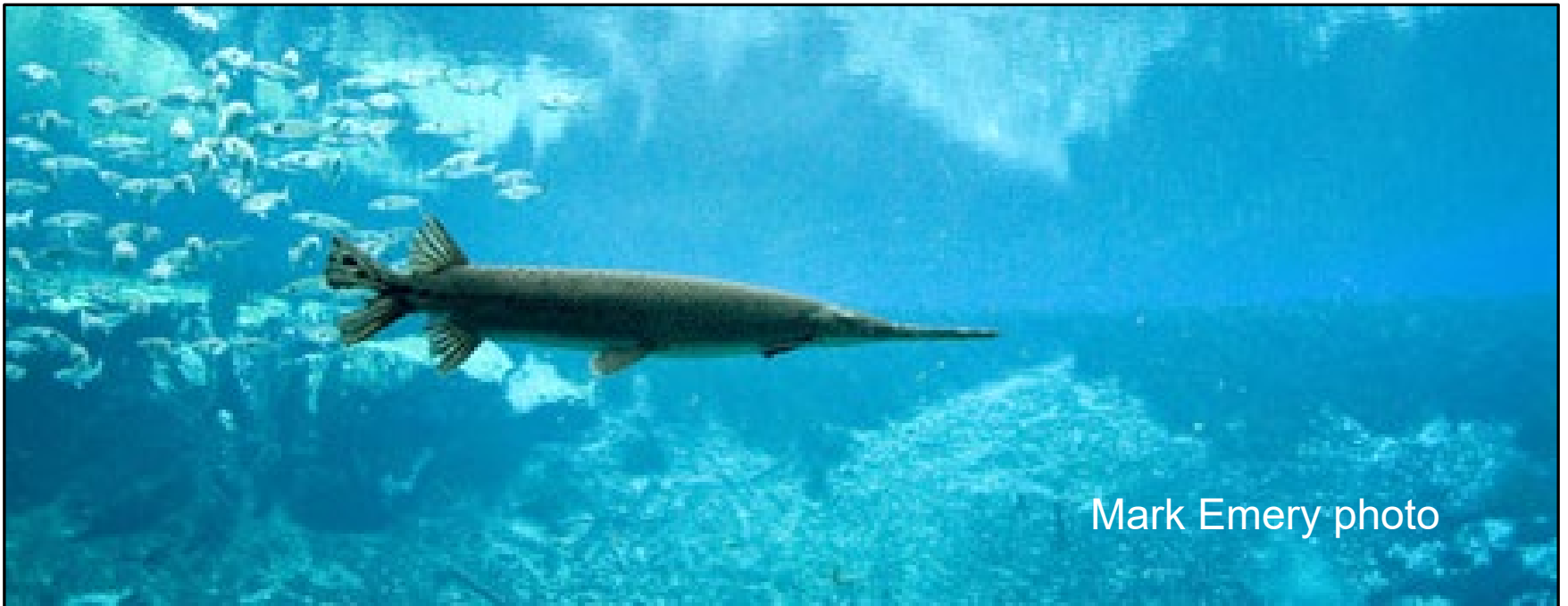


Fanning Springs, 2012

John Moran photos

Florida Springs and Groundwater Summary

1. The Floridan Aquifer is over-utilized, and pumping must be reduced if we wish to protect our natural aquatic environments
2. Our drinking water has alarming concentrations of nitrate nitrogen and we must cut back on fertilizer use and wastewater discharges



Florida Springs Conservation Plan

Presents a holistic approach to restore all of Florida's springs to their natural condition and to protect them and their intrinsic ecologic values for the enjoyment of future generations.



Florida's 32 Sentinel Springs Ecological Health Assessment

Half of Florida's springs were rated **D+ or lower**, and **75%** were below a **B-**, indicating an unacceptable level of existing harm and a need for significant restoration efforts. **None** of these springs received a rating **above a B+**.

Florida's Sentinel Springs 2015 Ecological Health					
Spring/System	Springs Focus Area	Overall Rating	Flow	Salinity	Nitrate
Silver	Silver	F	F	F	F
Silver Glen	Lower St. Johns	C+	D	C	A
Alexander	Lower St. Johns	B+	B	B	A
Volusia Blue	Lower St. Johns	C	B	D	C
De Leon	Lower St. Johns	B	A	A	D
Wekiwa	Upper St. Johns	D-	D	D	F
Madison Blue	Upper Suwannee	D	F	B	F
Suwannee	Upper Suwannee	B-	F	A	A
Lafayette Blue	Middle Suwannee	D-	F	C	F
Troy	Middle Suwannee	D	F	B	F
Falmouth	Middle Suwannee	C	F	A	C
Manatee	Lower Suwannee	D-	F	C	F
Fanning	Lower Suwannee	F	F	D	F
Ichetucknee Blue Hole	Santa Fe	B-	A	C	C
Poe	Santa Fe	C-	F	C	B
Ginnie	Santa Fe	D+	F	A	F
Gilchrist Blue	Santa Fe	C+	A	B	F
Ichetucknee Head	Santa Fe	C+	A	C	D
Rainbow	Rainbow/Withlacoochee	F	F	C	F
Gum Slough	Rainbow/Withlacoochee	D-	F	A	D
Kings Bay/Crystal River	Springs Coast	D	F	F	B
Homosassa	Springs Coast	D	F	D	C
Chassahowitzka	Springs Coast	D-	F	F	C
Weeki Wachee	Springs Coast	C-	D	C	C
Crystal	Southwest Coast	F	F	D	F
Sulfur	Southwest Coast	D	F	F	B
Wakulla	Nature Coast	B-	A	C	C
Wacissa	Nature Coast	B+	A	A	C
Jackson Blue	Northwest Coast	D-	F	C	F
Gainer	Northwest Coast	B+	B	A	B
Ponce DeLeon	Northwest Coast	C+	F	A	B
Washington Blue	Northwest Coast	B	C	B	A

How Do We Protect Our Springs?



What Can You Do to Protect Water Quantity?

- ✓ Be conscientious of all the water you use
- ✓ Do not water your lawn!
- ✓ Grow *Springs Friendly* plants that require no irrigation
- ✓ Use less electricity!
- ✓ Encourage your family and friends to use less water



What Can You Do to Protect Water Quality?

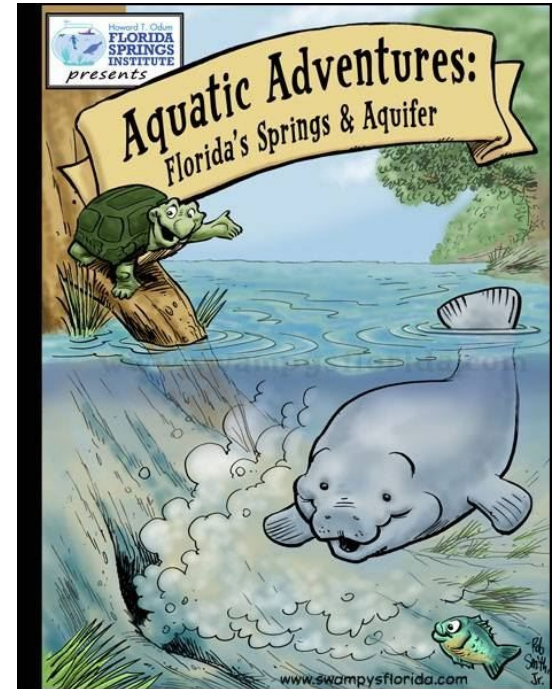
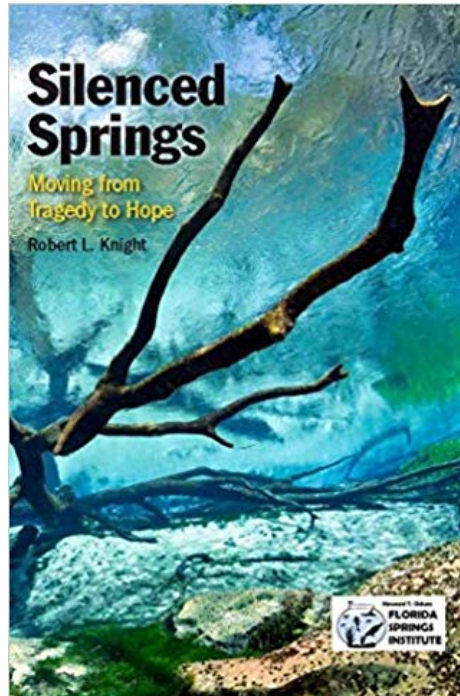
- ✓ Use fertilizers sparingly **or not at all!**
- ✓ Buy slow-release nitrogen products
- ✓ Clean up any unintended fertilizer spills
- ✓ Don't fertilize before predicted rains
- ✓ Do not fertilize near water bodies

Create a **Springs Friendly** yard.



EDUCATE YOURSELF & OTHERS

FSI Educational Publications



Springs Restoration Action Plans | Silenced Springs: Moving from Tragedy to Hope | Aquatic Adventures: Florida Springs & Aquifer

VISIT A SPRING TOMORROW!

FSI Educational Events



Give Springs a Break | Springs Field School | Springs Outings |
Springs Academy

VOLUNTEER



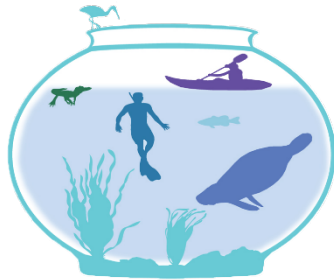
Friends of Silver Springs State Park - Silver SpringsWatch
Rainbow River Conservation - Rainbow SpringsWatch

GET POLITICAL



Vote! | Contact your legislators | Attend local meetings

SUPPORT SPRINGS PROTECTION



Howard T. Odum
**FLORIDA
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www.FloridaSpringsInstitute.org



www.RainbowRiverConservation.com



www.SilverSpringsAlliance.org



www.FloridaSpringsCouncil.org

HELP SPONSOR THE SILVER SPRINGS ENVIRONMENTAL CENTER



PROPOSED EXTERIOR

ENSURING THE FUTURE OF FLORIDA'S HEALTHY SPRINGS

CLEAN AND ABUNDANT WATER WILL LIKELY BE THE MOST
IMPORTANT ENVIRONMENTAL ISSUE AFFECTING OUR FUTURE



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