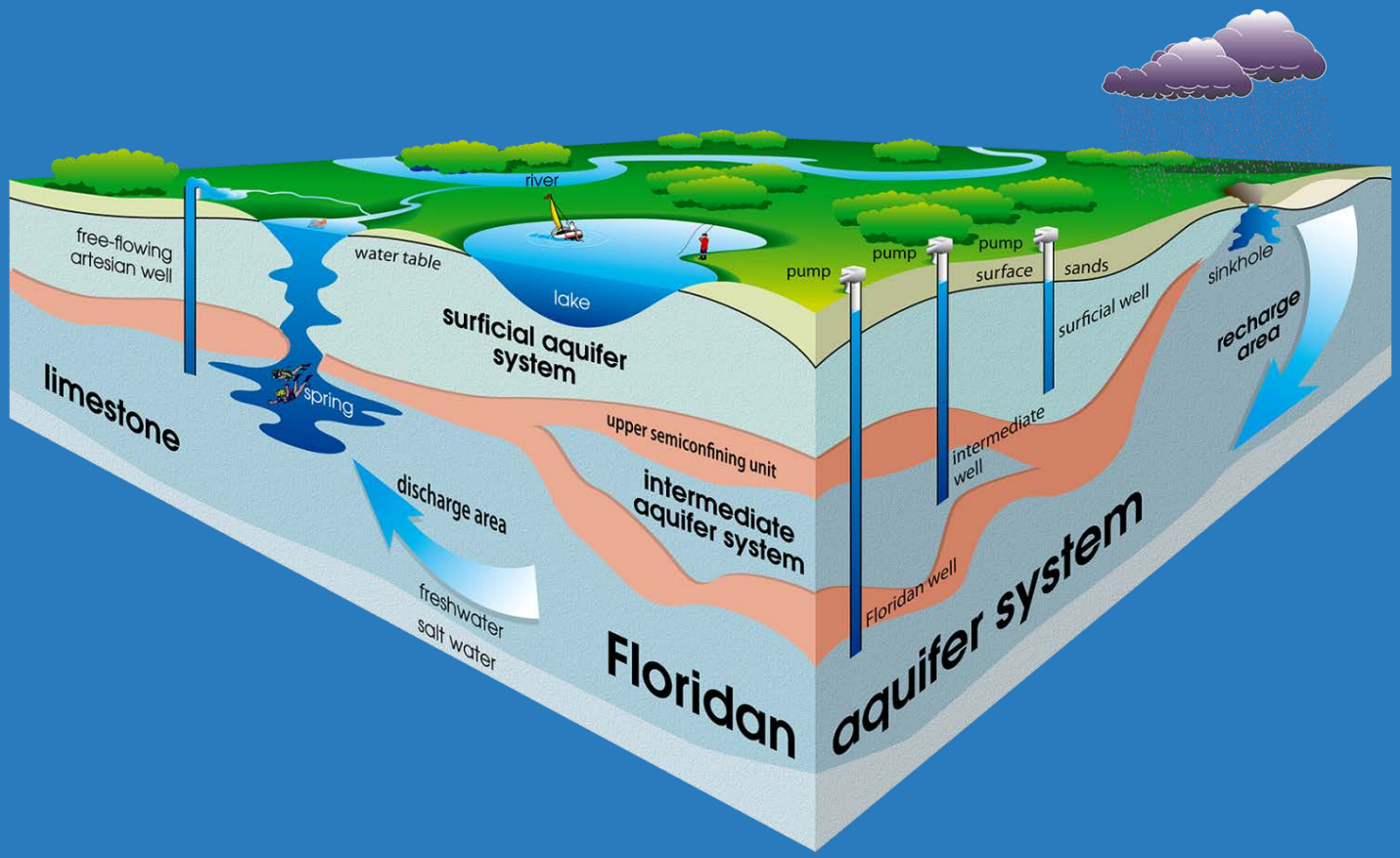
Hydrogeology of North Florida

Regional Community Institute Water Committee

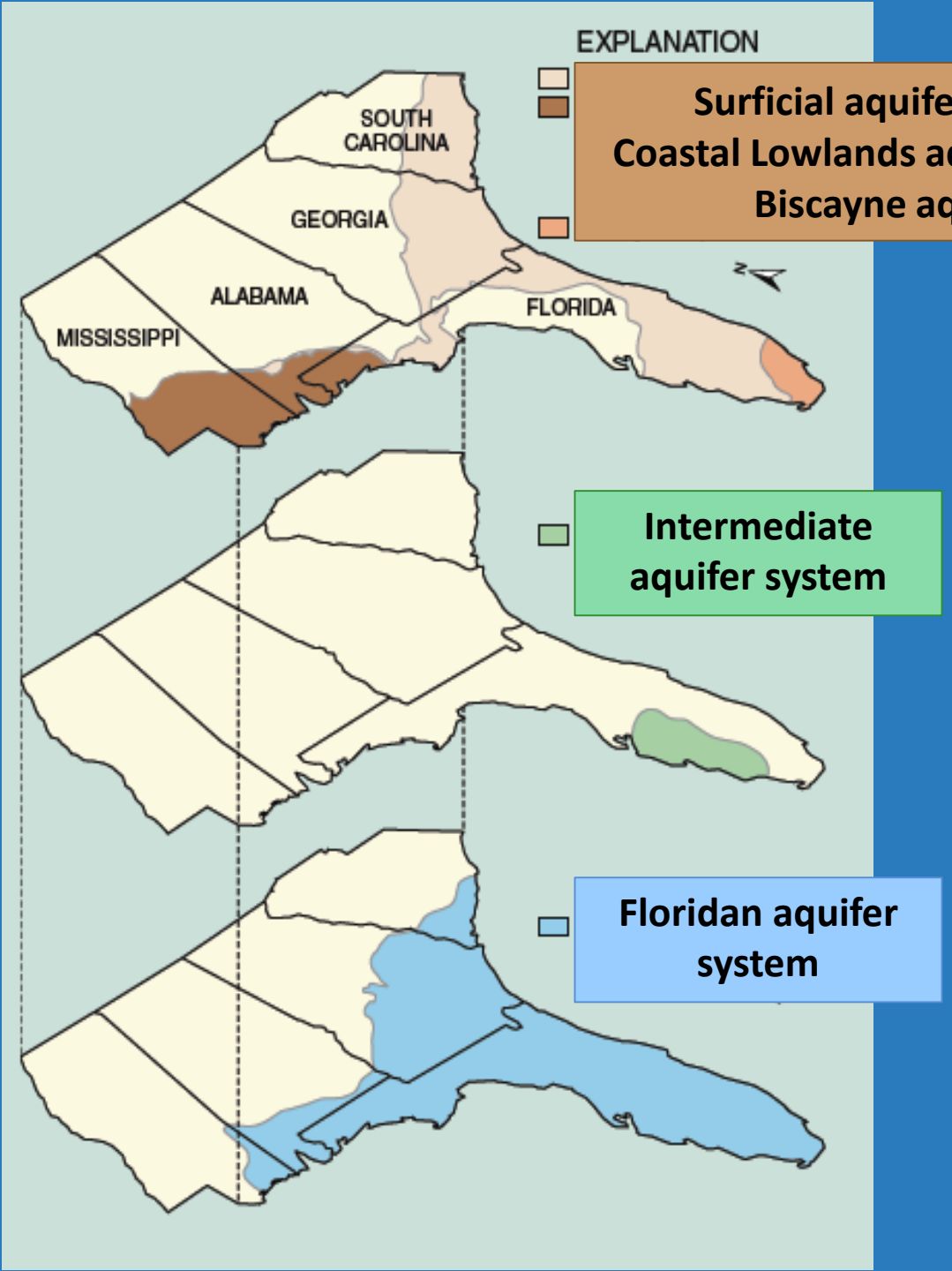
February 8, 2017

P. Scott Laidlaw, P.G.
Bureau of Water Supply Planning, Chief

Where Does Our Water Come From?

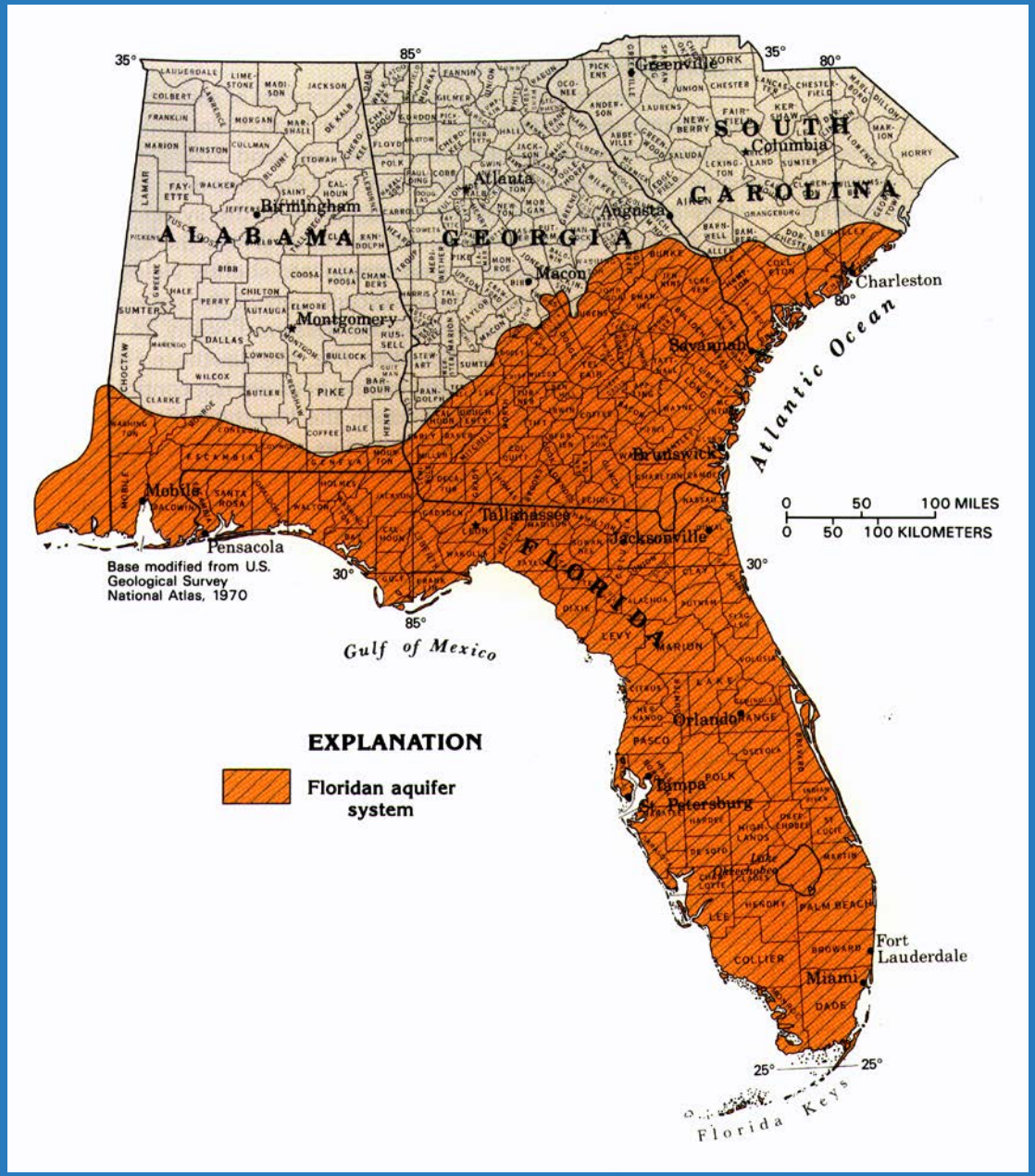


More than 90% of our water comes from the aquifer system.



Extent of Aquifers Utilized in Florida

Extent of the Floridan Aquifer System



Pumping water from the Floridan Aquifer System is most like:

a) Pumping water from a river

b) Pumping petroleum from an underground reservoir

c) Making a withdrawal from your bank account

d) It's too mysterious to say for sure

The Floridan Aquifer System is one of the most productive in the world because:

a) High rates of recharge in many places

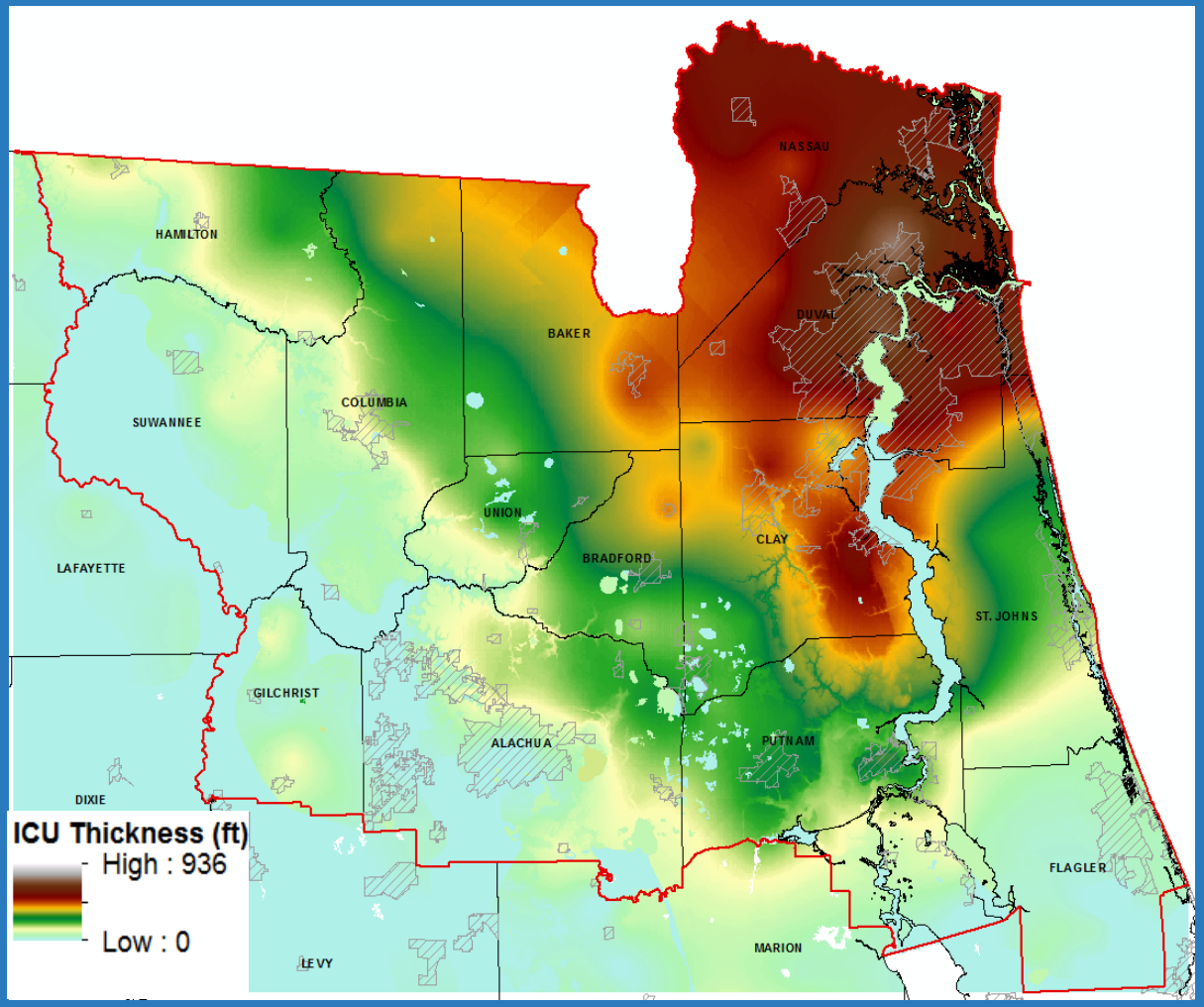
b) High porosity in some of the rocks that make up the aquifer system

c) High permeability due to fractures, faults and dissolution of the rocks

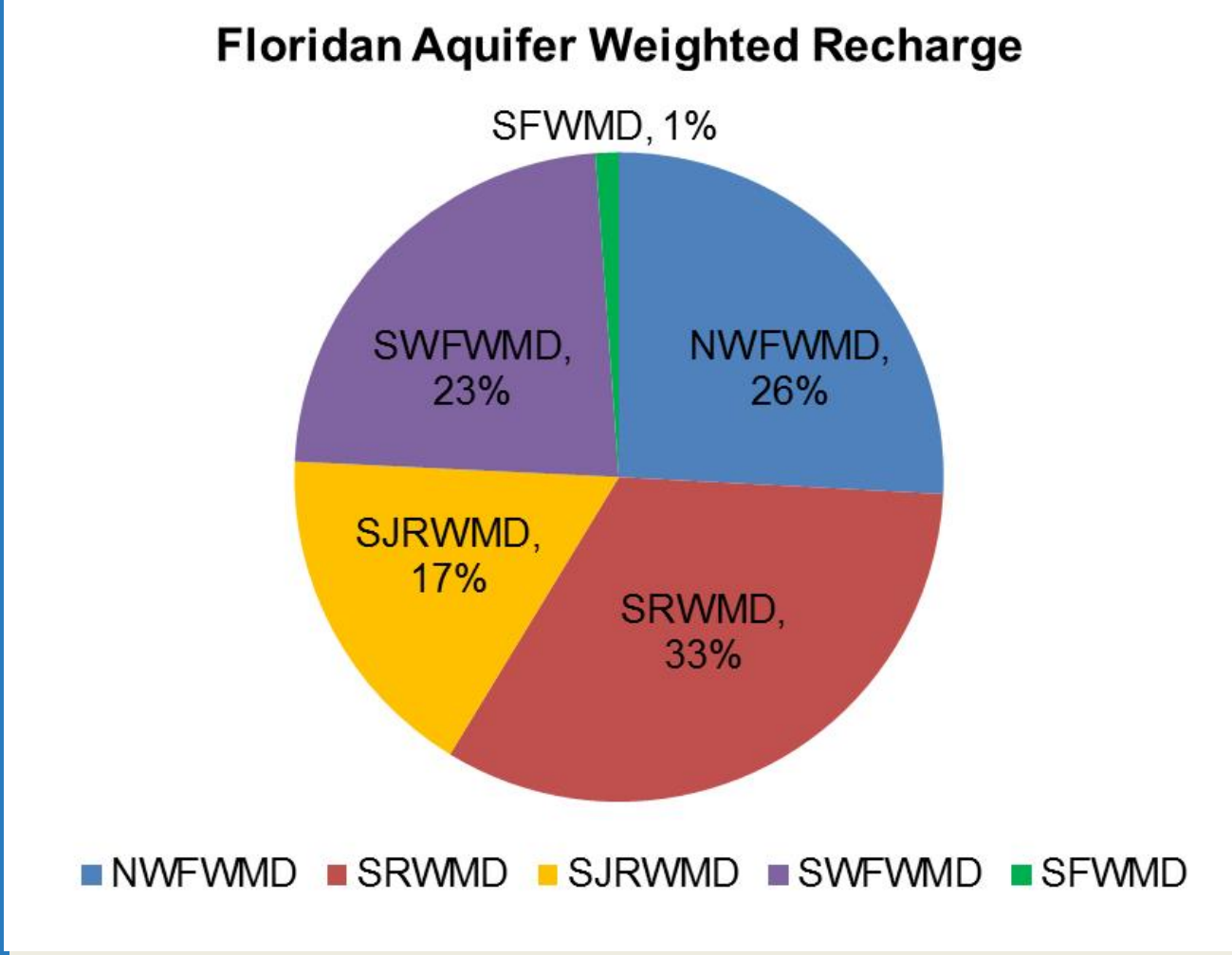
d) The aquifer system has been highly developed by pumping

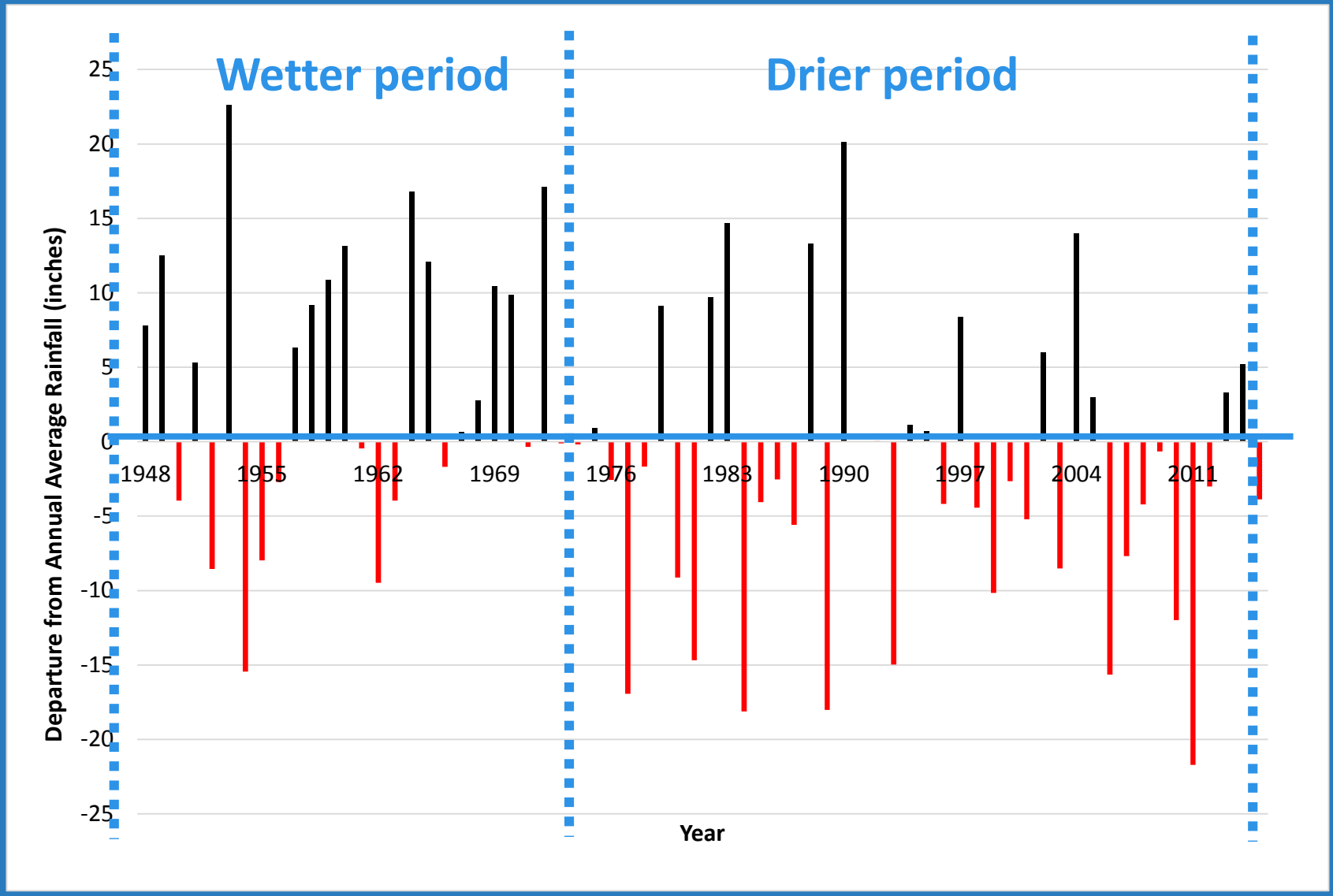
e) All of the above

Confining Units

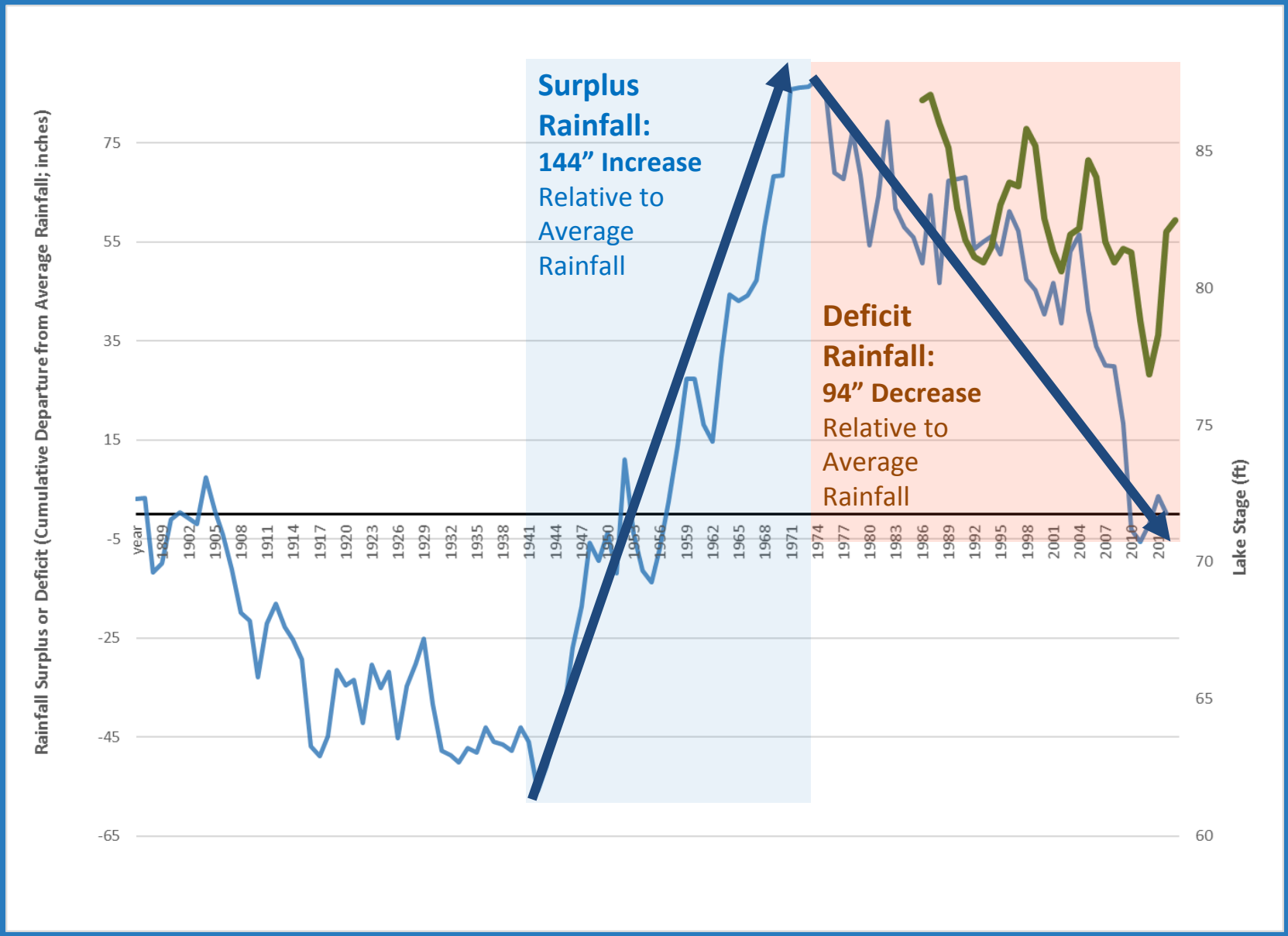


Recharge to Floridan Aquifer



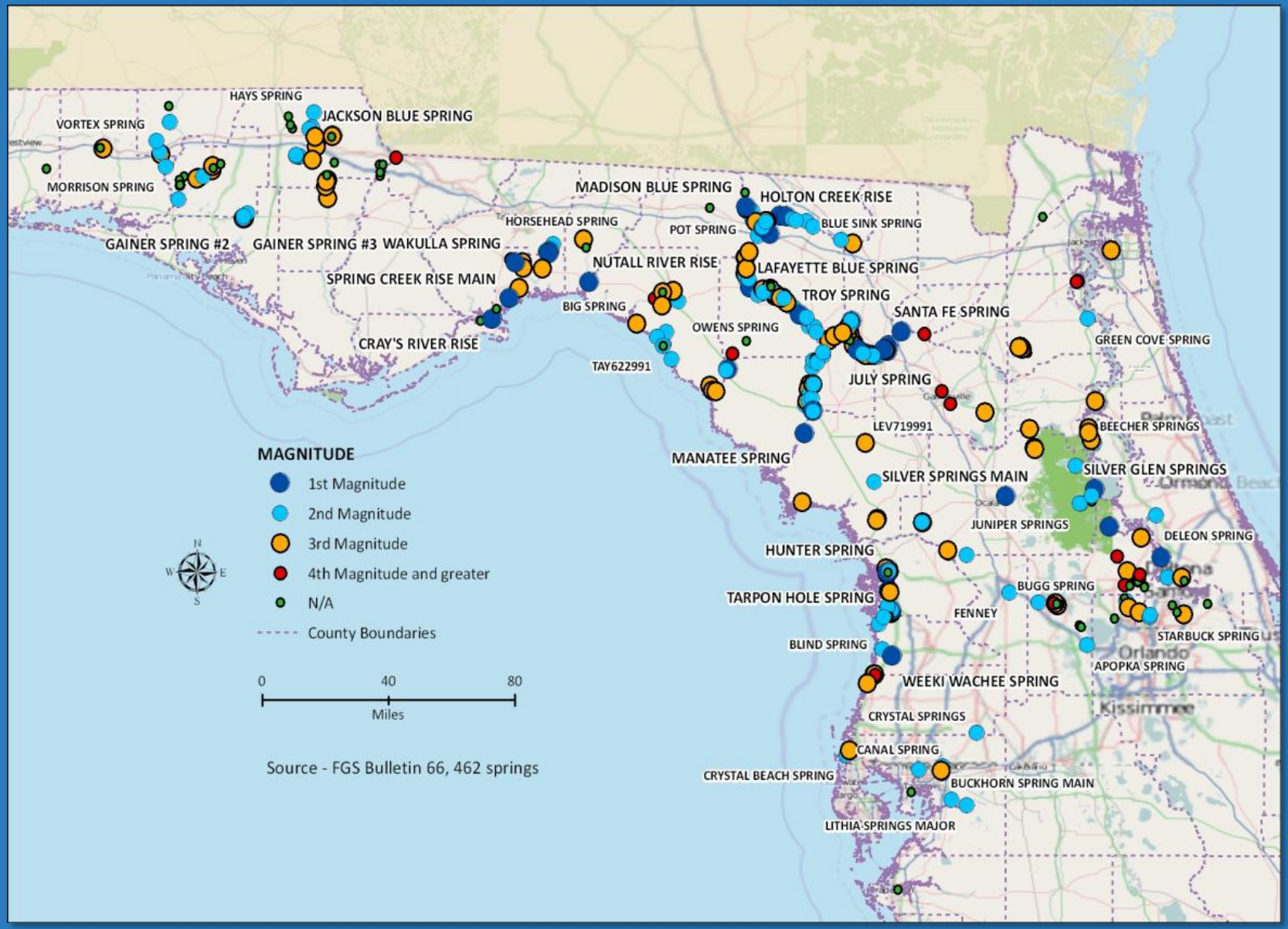


Regional Rainfall for northeast Florida (1948–present)

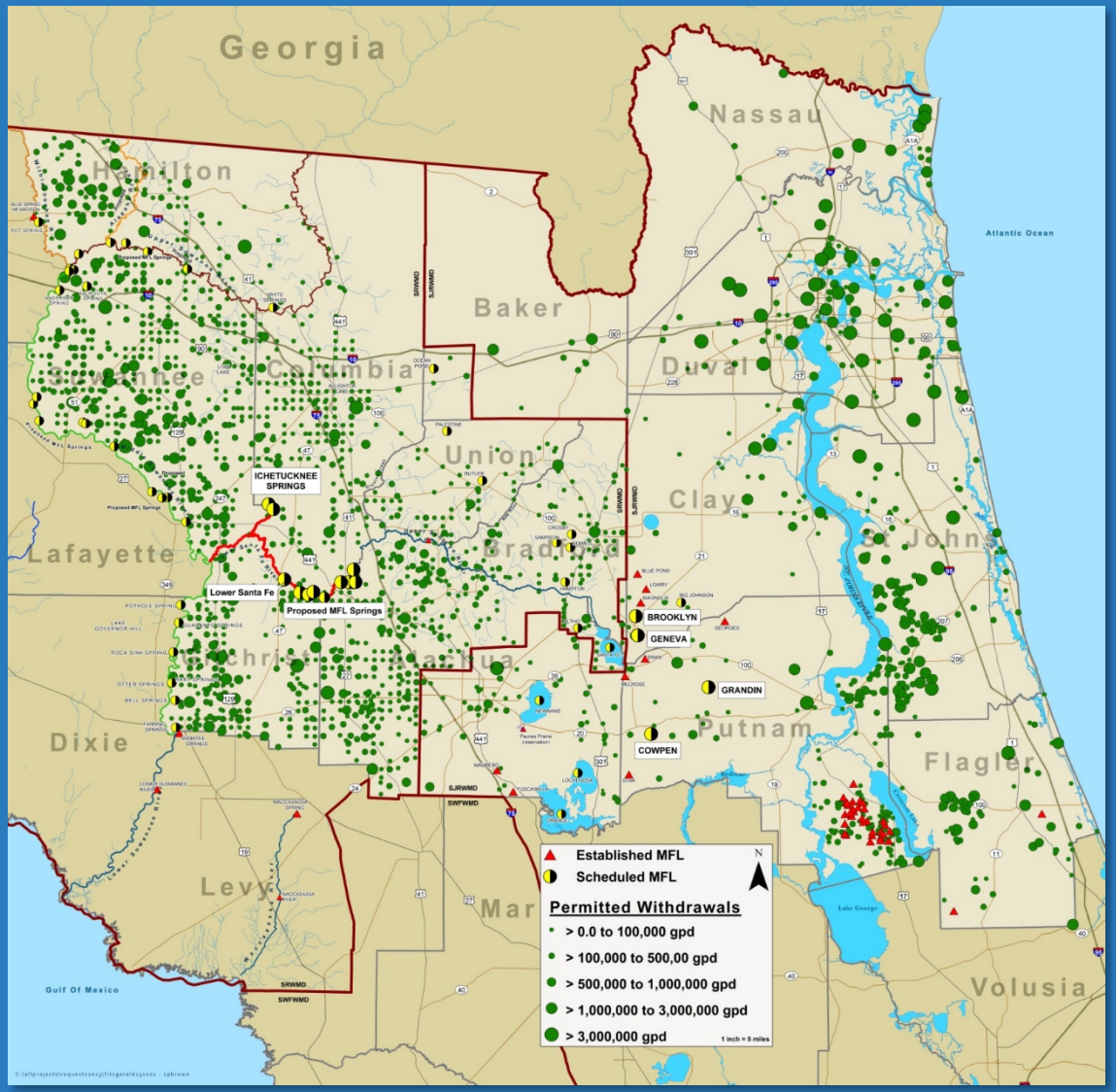


Cowpen Lake (1986–present) vs. Rainfall Surplus/Deficit

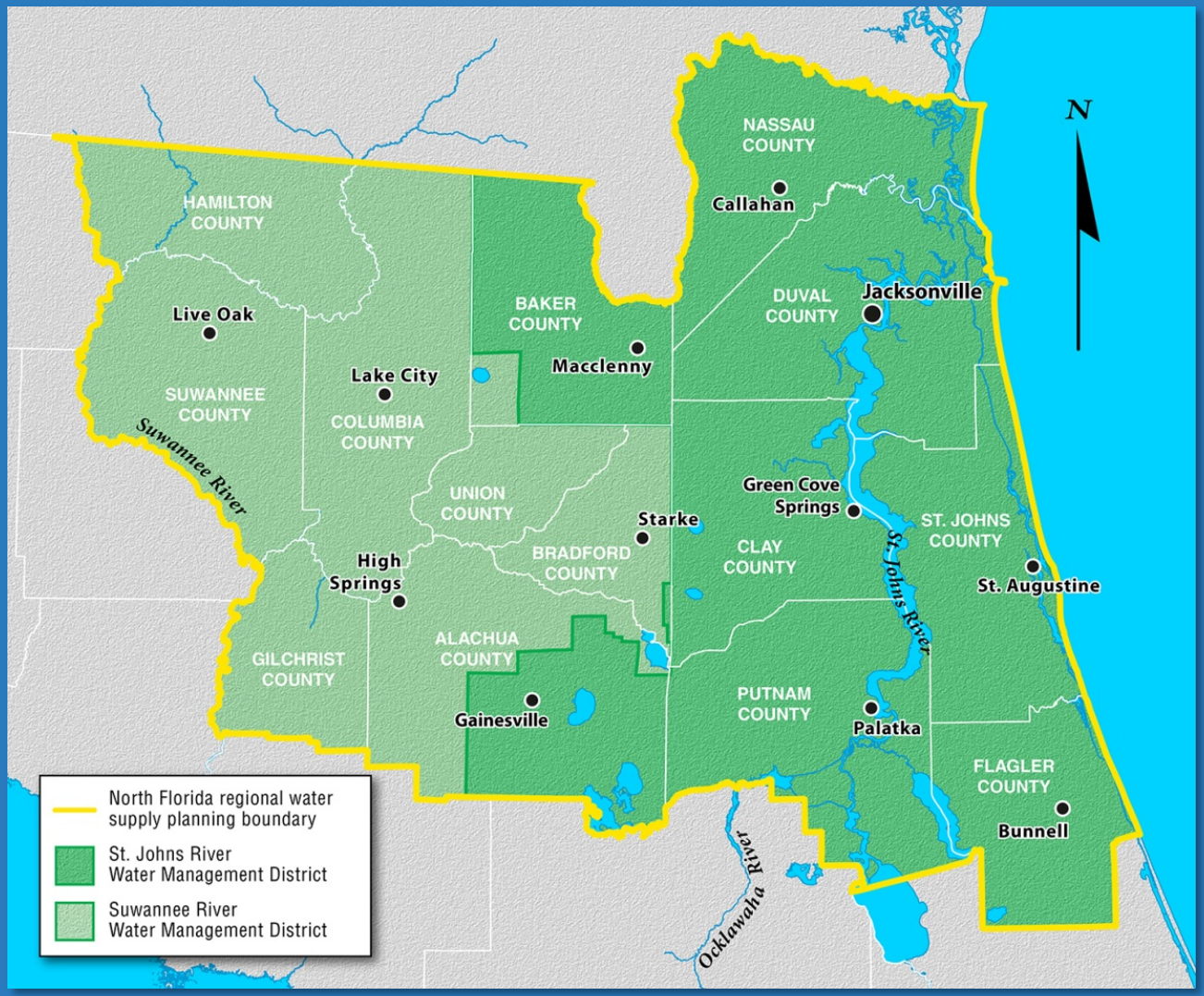
North Florida is the Springs Heartland



Permitted Withdrawals



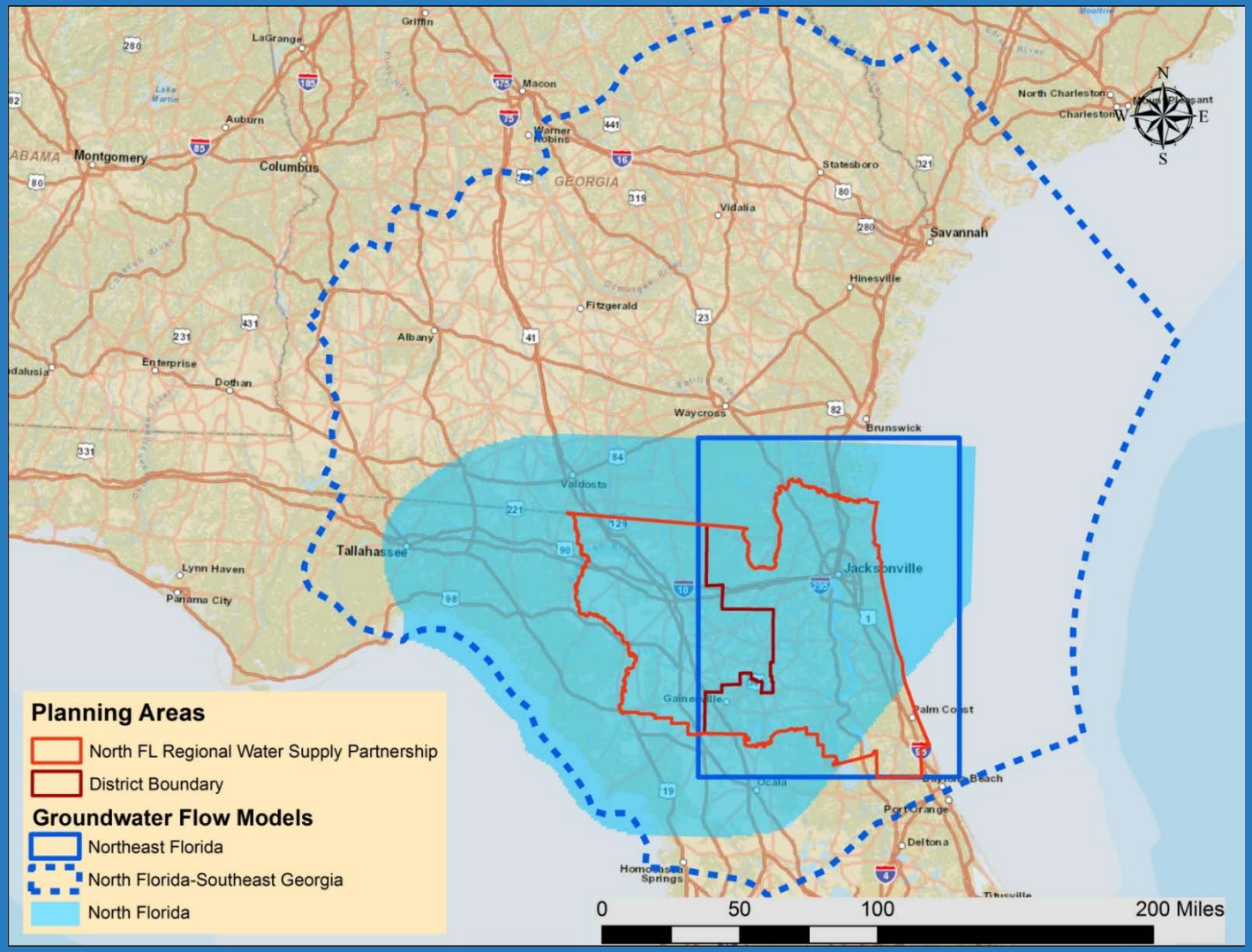
North Florida Regional Water Supply Partnership



Regional Water Supply Plan

- **Does NOT guarantee water availability**
  - **Provides a roadmap to achieve water supply needs in the future**
- **Is NOT a regulatory tool**
  - **Districts have separate regulatory programs to permit reasonable and beneficial uses while preventing harm to the water resources**

Regional Groundwater Models in NF



The Region's Challenge

Estimate 667 mgd of water need at 2035

Range of recovery for the Lower Santa Fe and Ichetucknee MFLs

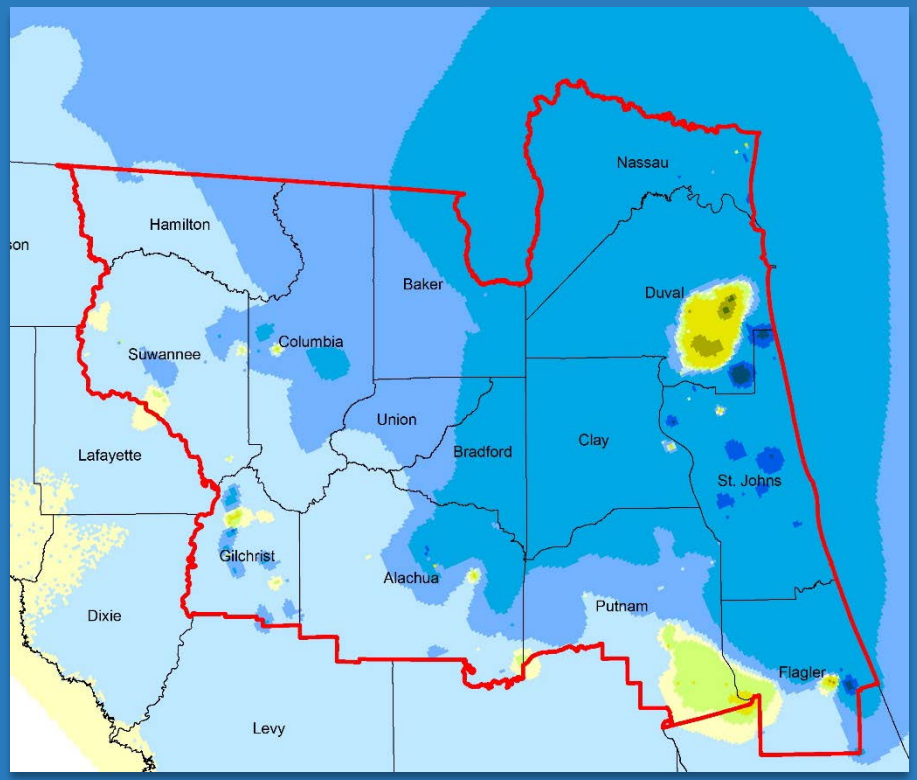
117 mgd potential needed by 2035

550 mgd in 2010

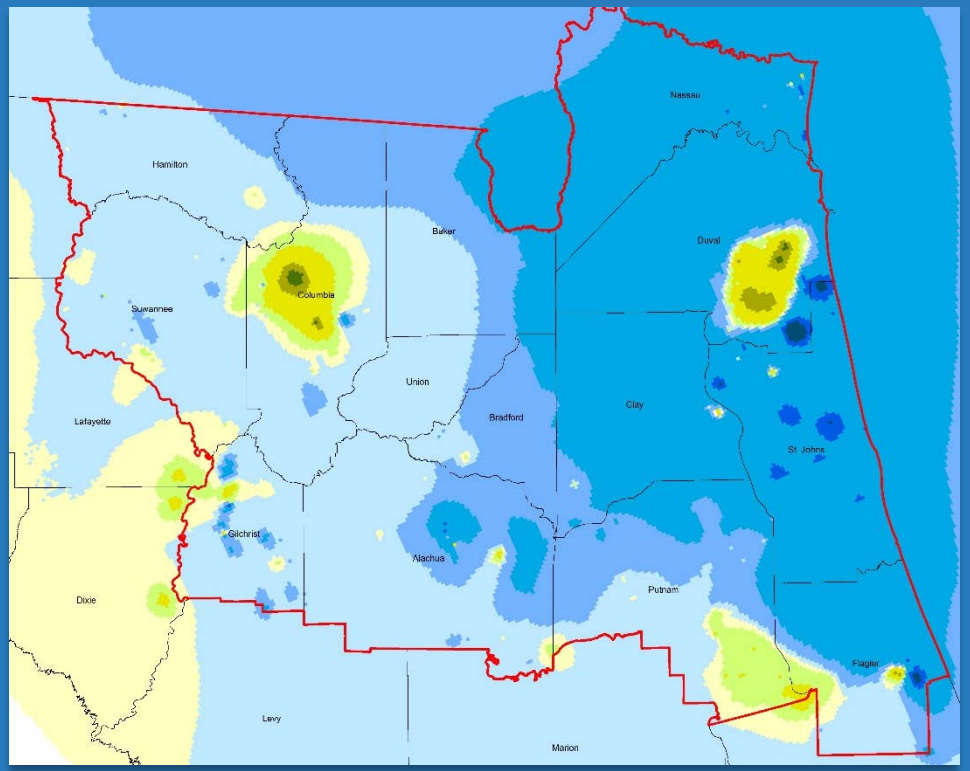
WRD projects are predicted to reduce withdrawal effects to MFLs and non-MFL water bodies.

Predicted Drawdown Changes

2035 without WRD Projects

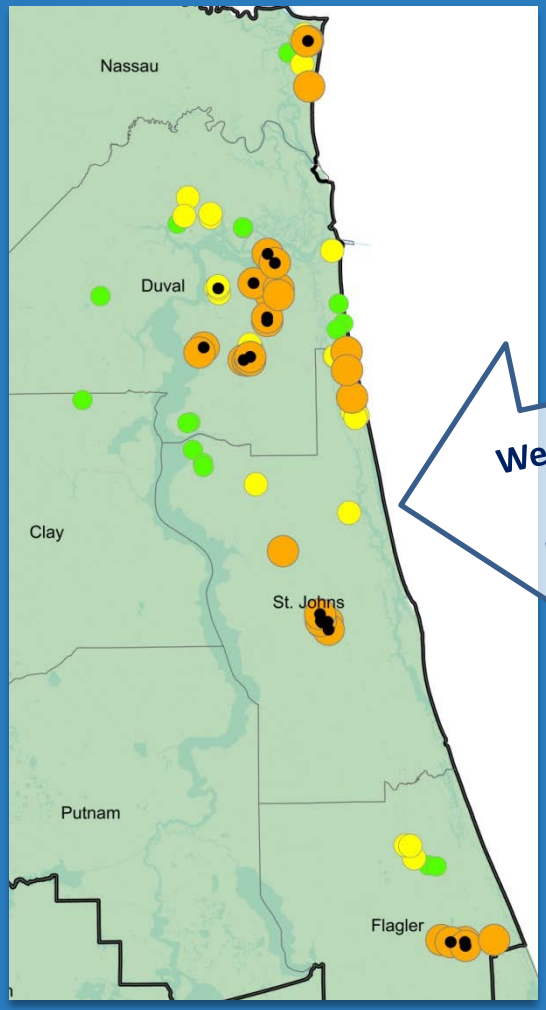


2035 with WRD Projects

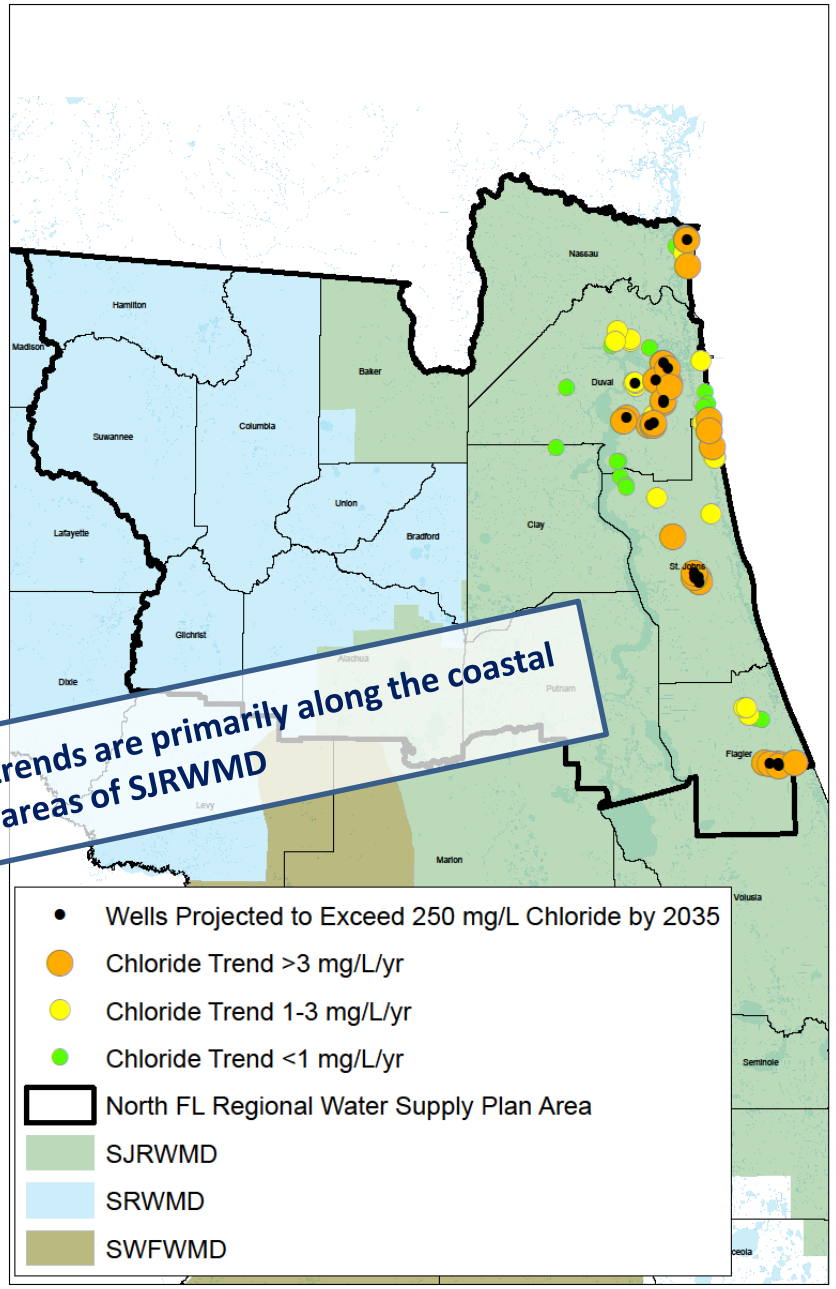


Rebound		Drawdown	
	-10 - -18		0 - .25
	-5 - -10		.25- 1
	-1 - -5		1- 5
	-.25 - -1		5 - 10
	0 - -.25		10 - 88

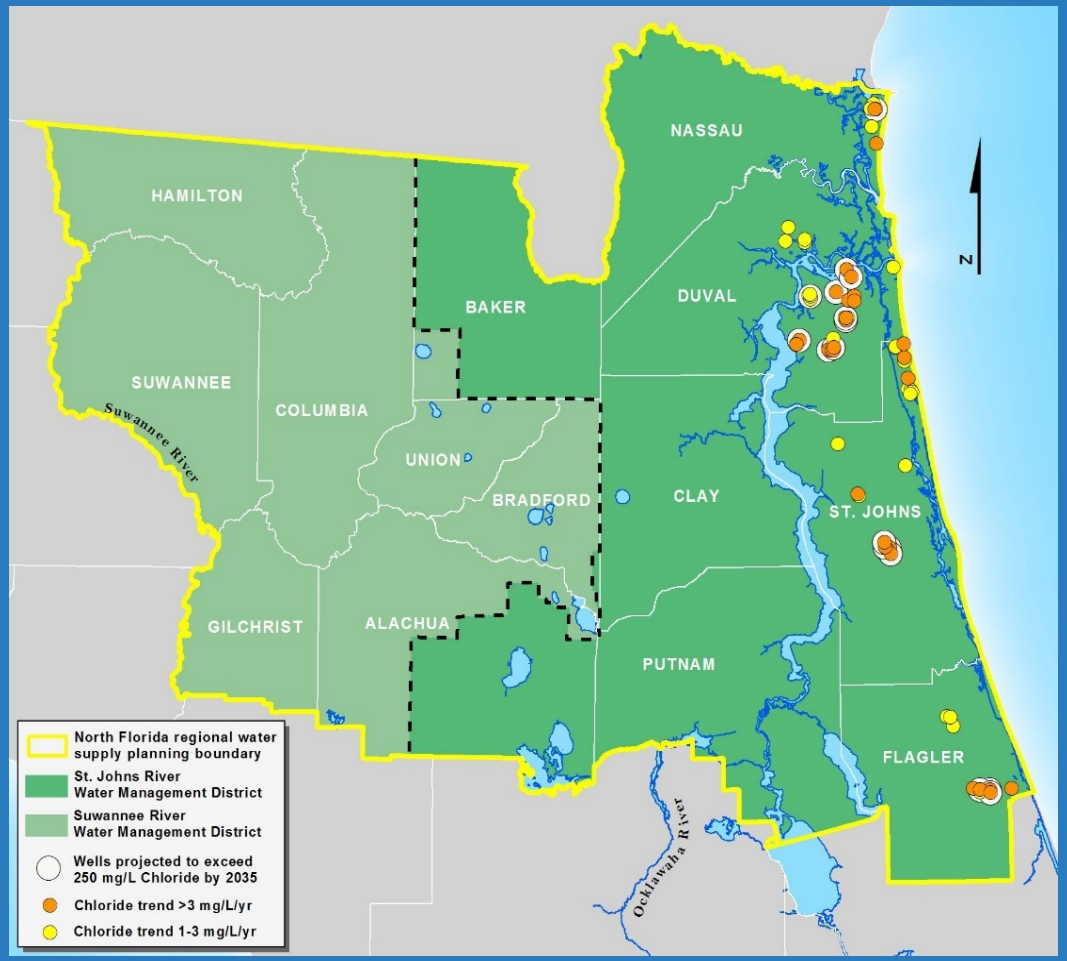
Wells that Indicate Areas of Concern Regarding Groundwater Quality



Wells experiencing trends are primarily along the coastal areas of SJRWMD

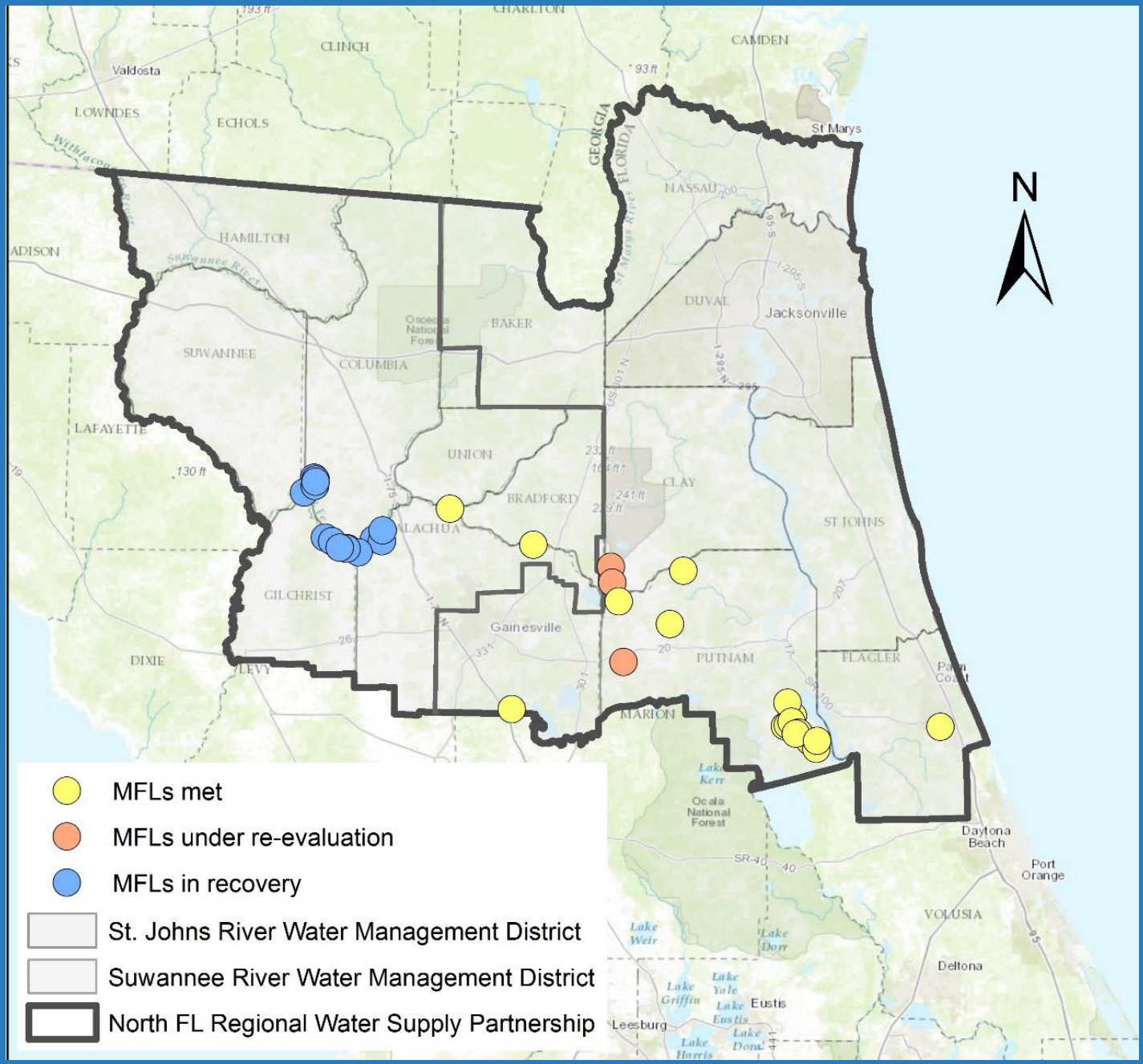


Groundwater Quality Concerns

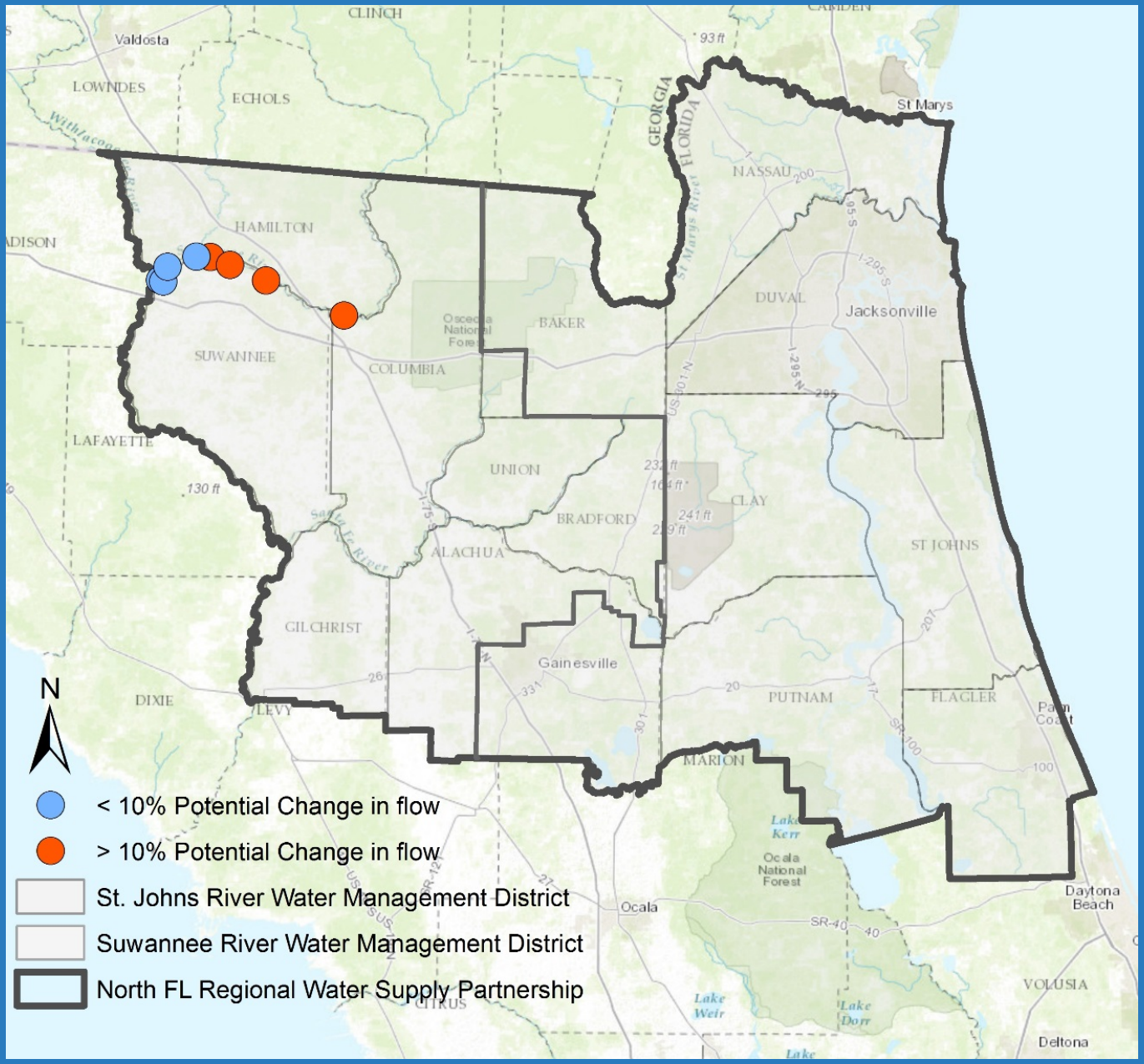


Chloride Trends – Rate of Change	Number of Wells Currently >250 mg/l	Number of Wells Expected >250 mg/L by 2035
> 3mg/L per year	5	11
1 to 3 mg/L per year	0	1

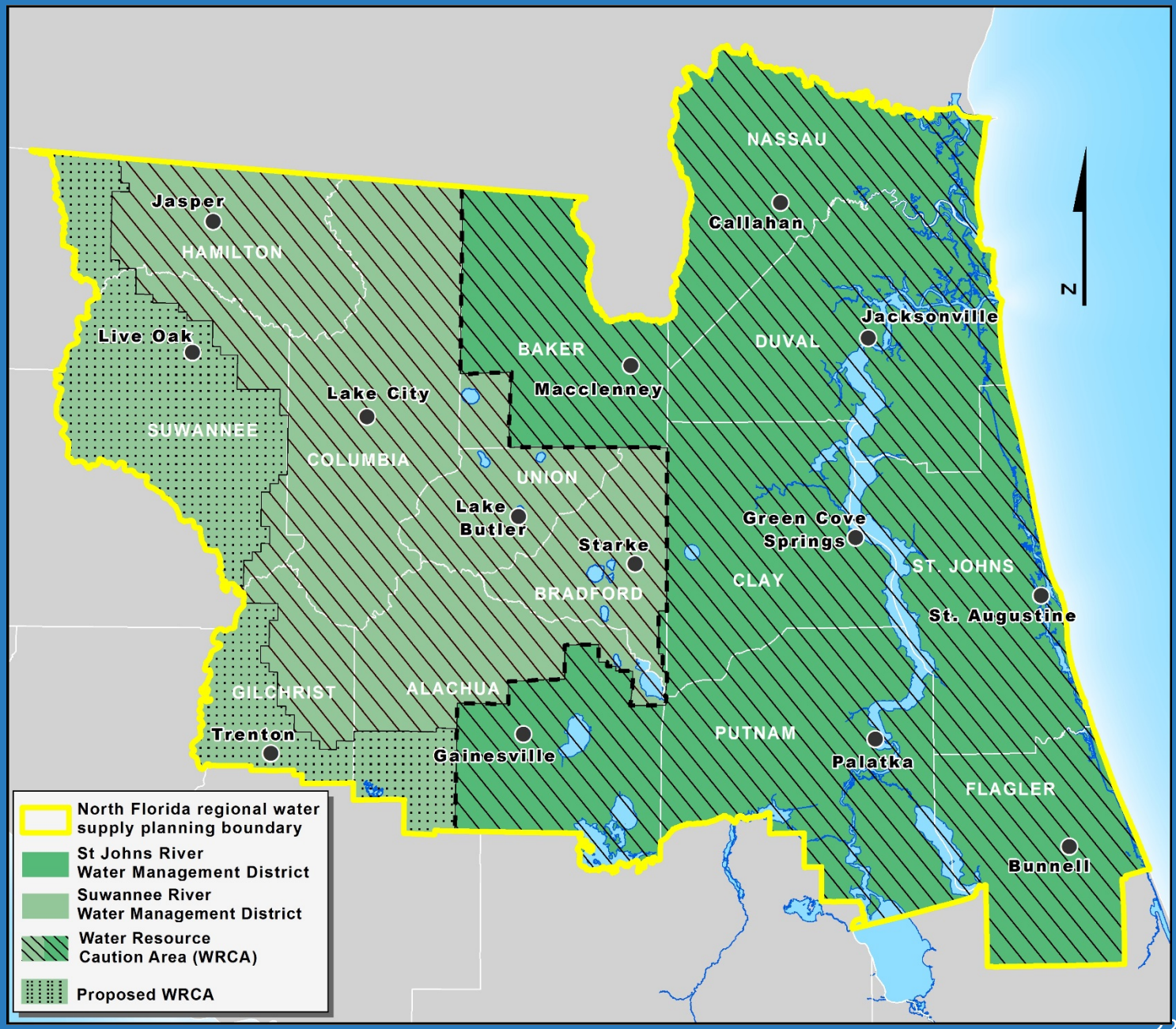
MFLs


CHARLTON
CAMDEN
CLINCH
Valdosta
LOWNDES
ECHOLS
GEORGIA
FLORIDA
St Marys
NASSAU
HAMILTON
ADISON
Suwannee River
DUVAL
Jacksonville
Osceola National Forest
BAKER
SUWANNEE
COLUMBIA
LAFAYETTE
UNION
BRADFORD
CLAY
ALACHUA
ST JOHNS
GILCHRIST
Gainesville
DIXIE
LEVY
PUTNAM
FLAGLER
MARION
Ocala National Forest
Daytona Beach
Port Orange
VOLUSIA
Deltona
Lake Weir
Lake Dorr
Lake Griffin
Lake Yale
Lake Eustis
Eustis
Leesburg
Lake Harris
N
MFLs met
MFLs under re-evaluation
MFLs in recovery
St. Johns River Water Management District
Suwannee River Water Management District
North FL Regional Water Supply Partnership

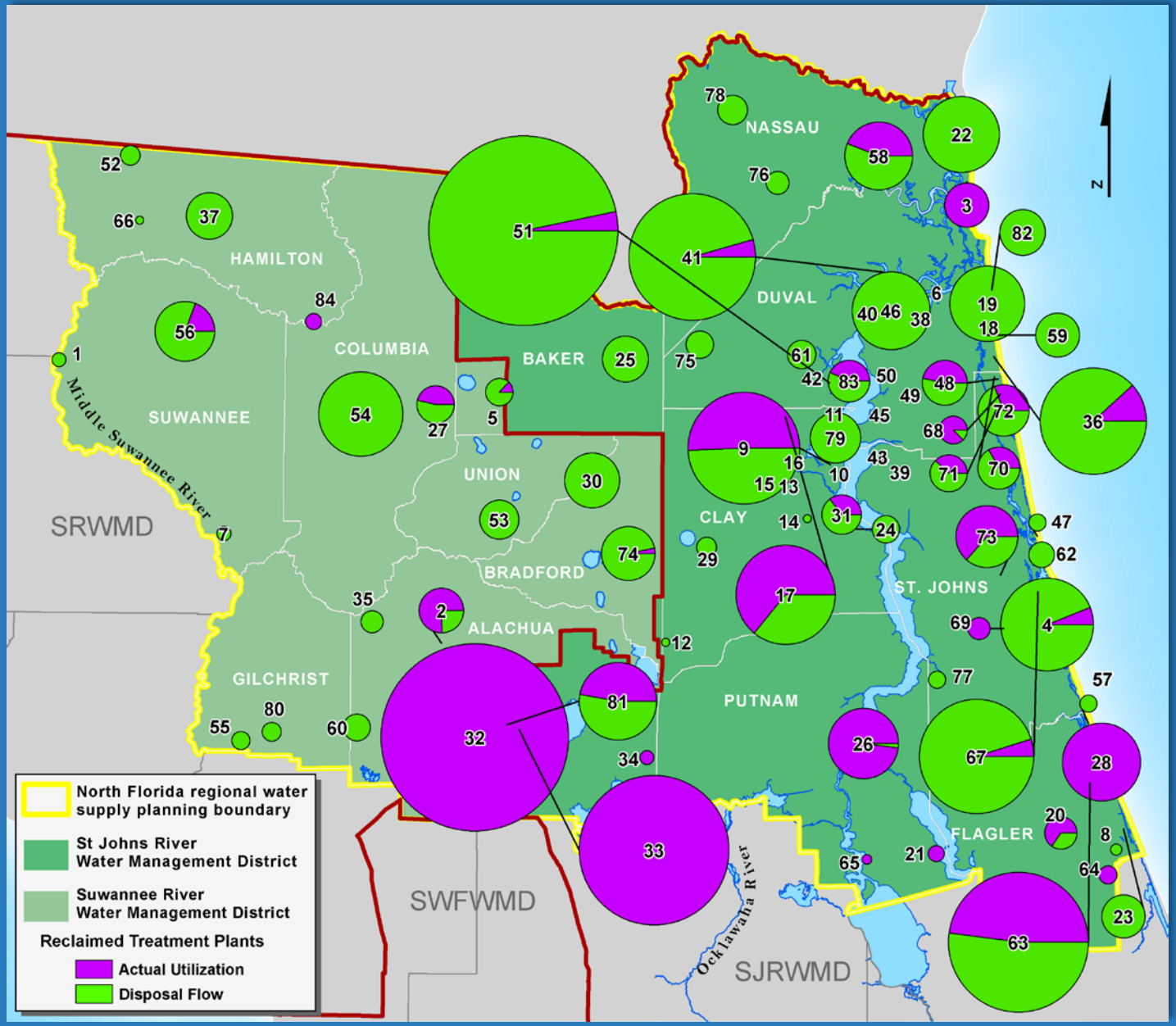
Priority Water Bodies Without MFLs



Water Resource Caution Area



2015 Reuse and Wastewater Disposal

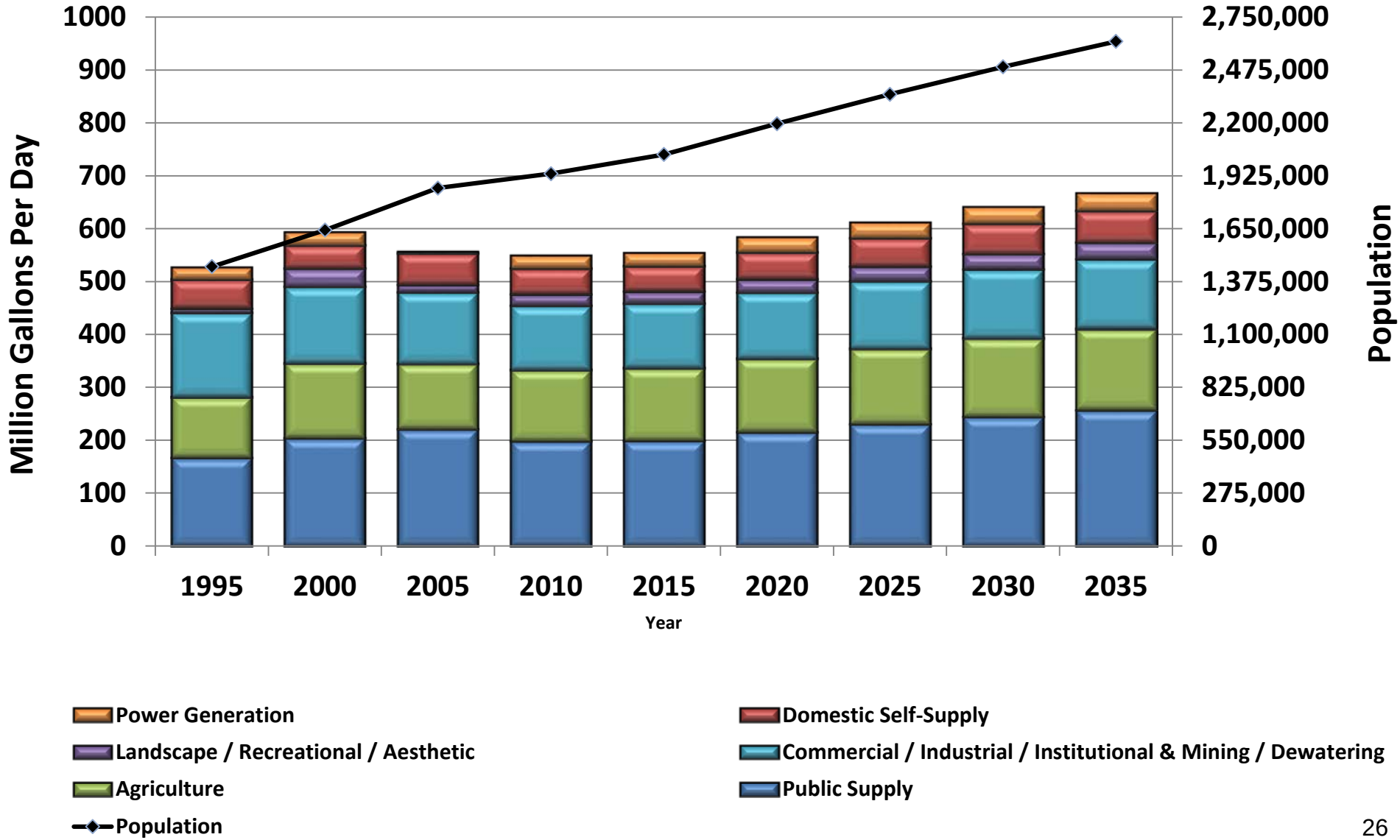


Distribution of World's Water Supply

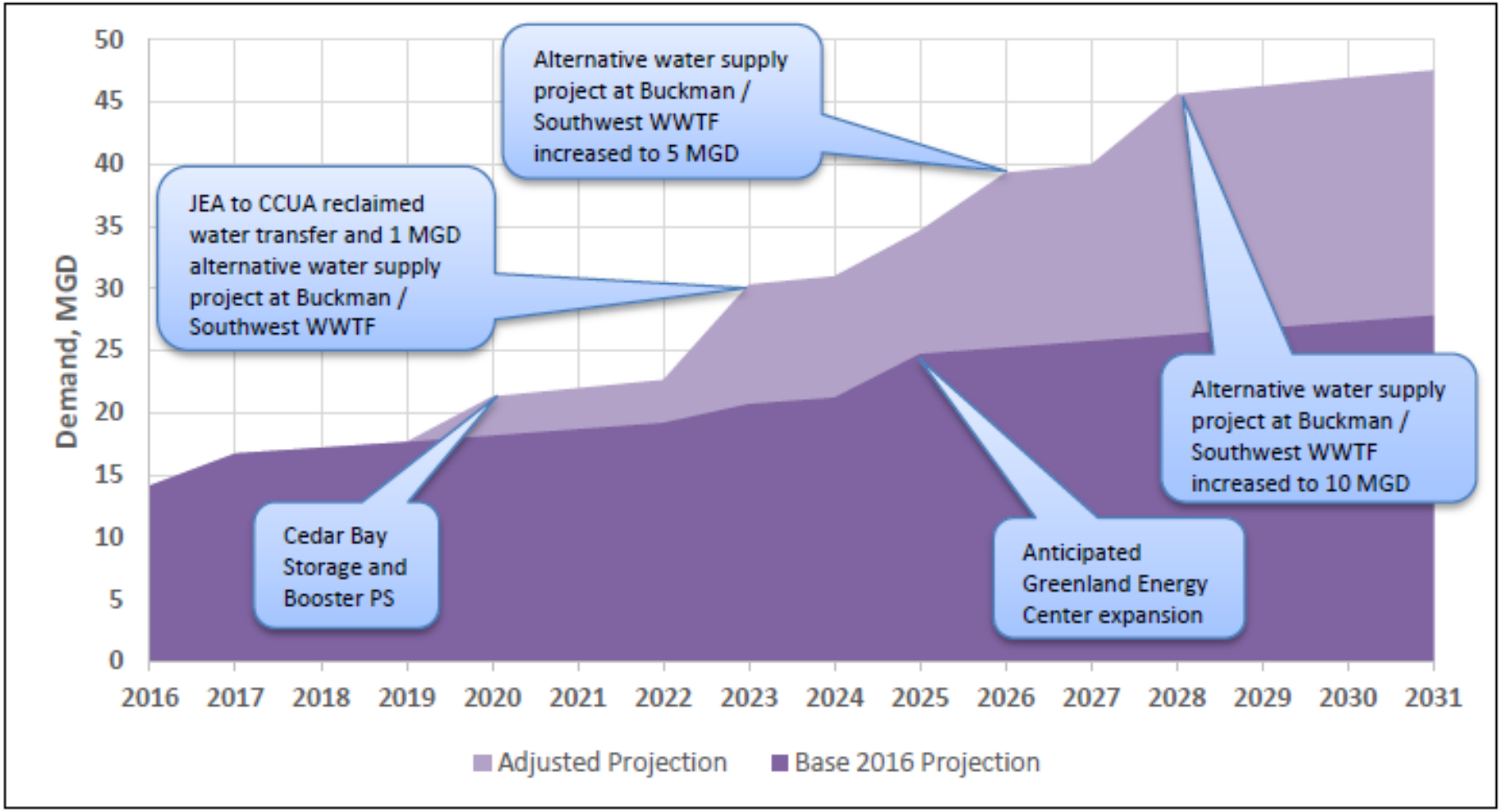
97.000%	Saline water in oceans
2.140%	Ice caps and glaciers
0.610%	Ground water
0.009%	Surface water
0.005%	Soil moisture

Questions?

Historic Water Use and Population -vs- Projected Water Demand and Population in NFRWSP

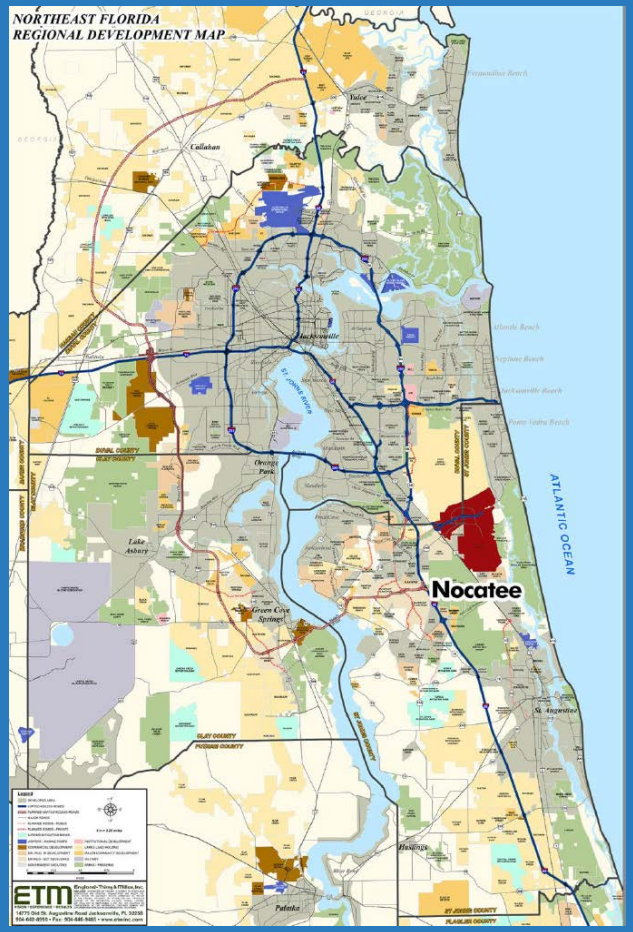


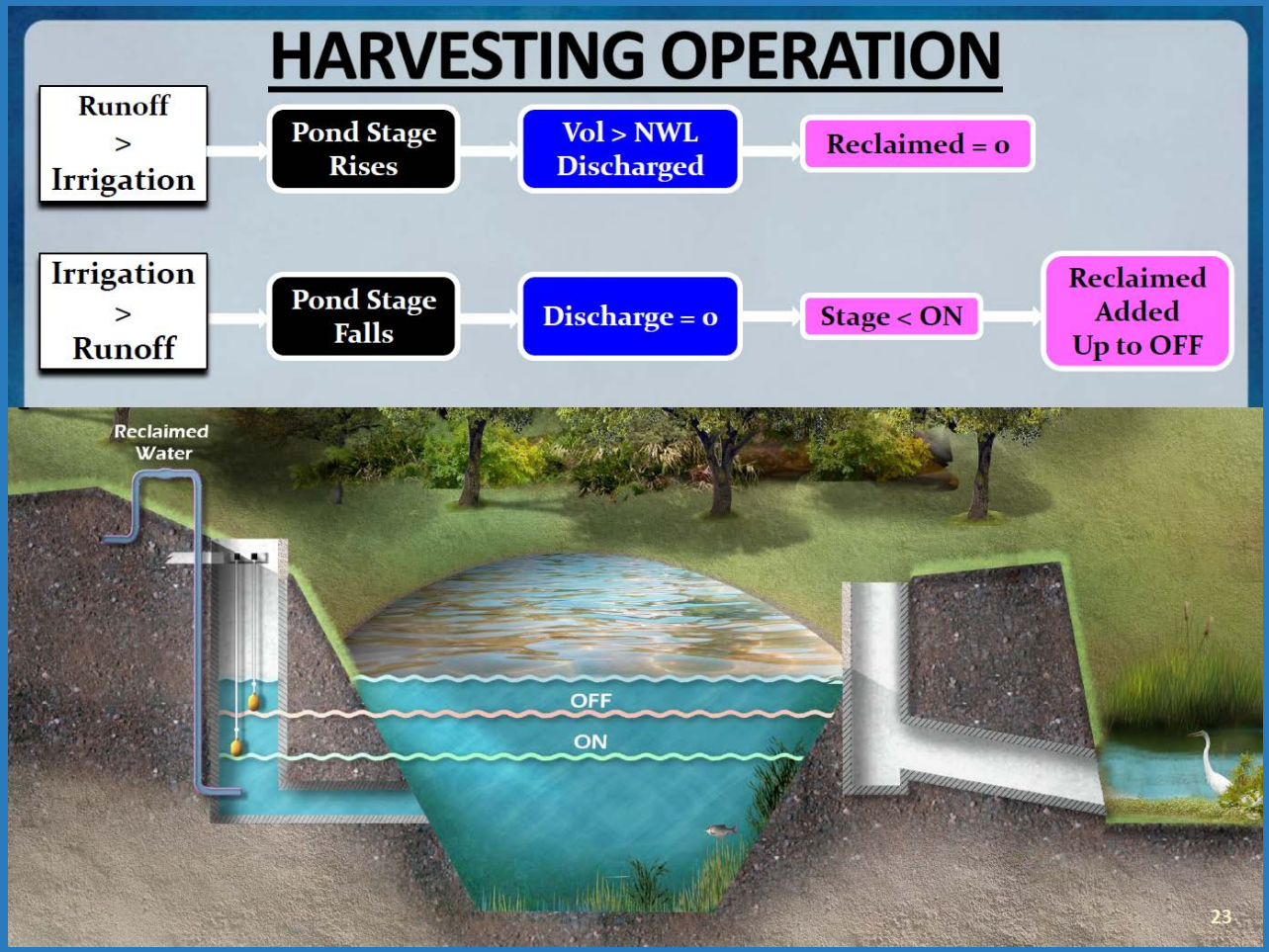
JEA's Projections*



*** Page 36 of JEA's Condition 39 Report**

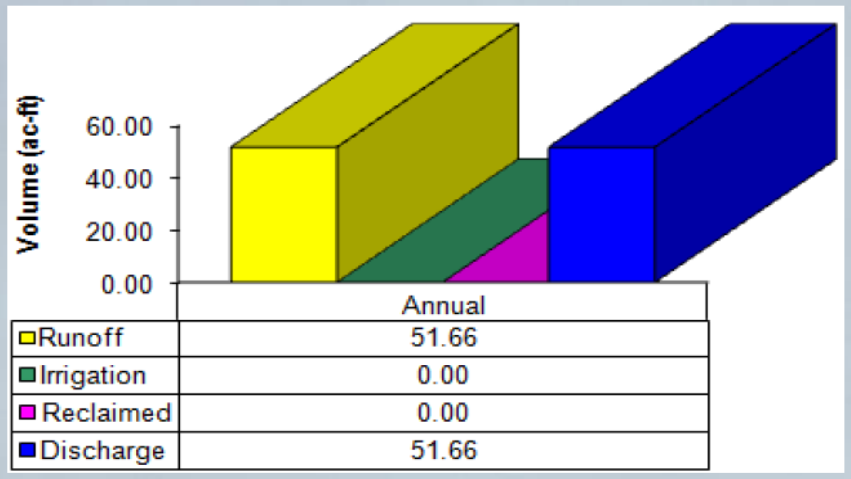
Nocatee Stormwater Harvesting + Reclaimed Water

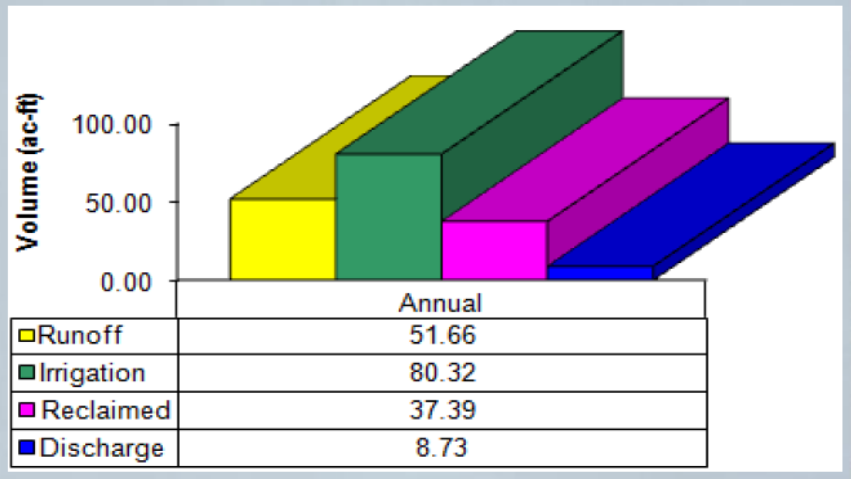




Nocatee – Bottom Line

RESULTS - VOLUME



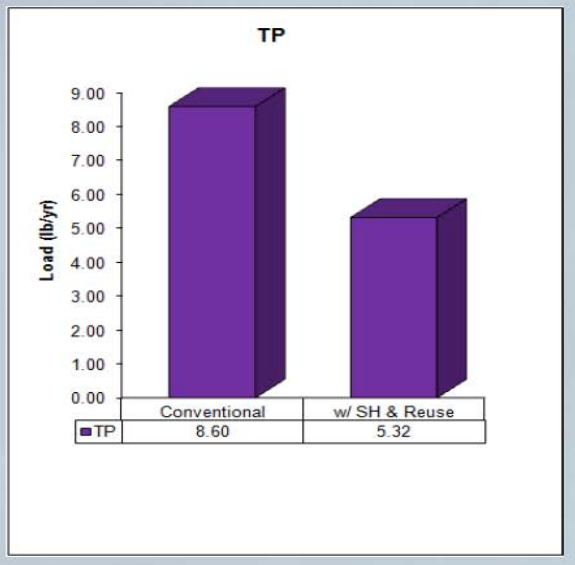


CONVENTIONAL ERP **SUPPLEMENTAL ERP**

83% Discharge Volume Reduction

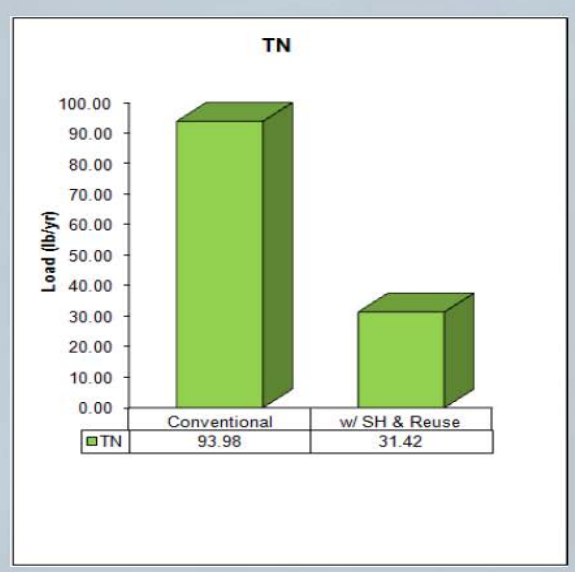
...and more

RESULTS - NUTRIENTS



TP

(-) 38%



TN

(-) 67%