

***St. Johns River Water  
Management District Springs  
Protection Initiative:  
How will it help 5 Years from  
now?***

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**Silver Springs/River Basin Management Action Plan  
Meeting  
23 April 2014**

# ***SJRWMD Springs Protection Initiative***

- **Research component**
  - University of Florida contract
  - Other monitoring work
- **Projects component**
  - Provide cost share funding to local partners to implement projects which reduce water use and/or nutrient loads
  - Leverage/enhance state and local funds





# ***SJRWMD Springs Protection Initiative***

**Research component goal**

**Identify the major drivers influencing plant community structure in the river**



# ***The Problem***

## ***Shift in spring plant communities***

Weeki Wachee 1951



Weeki Wachee 2006



# ***Drivers of Plant Communities***

- Increase in nitrate concentrations
- Loss of algal grazers
  - Lower dissolved oxygen
  - Increases in other solutes
  - toxicity
- Reduced spring flows ~ lower current velocities
- Increases in other dissolved solutes



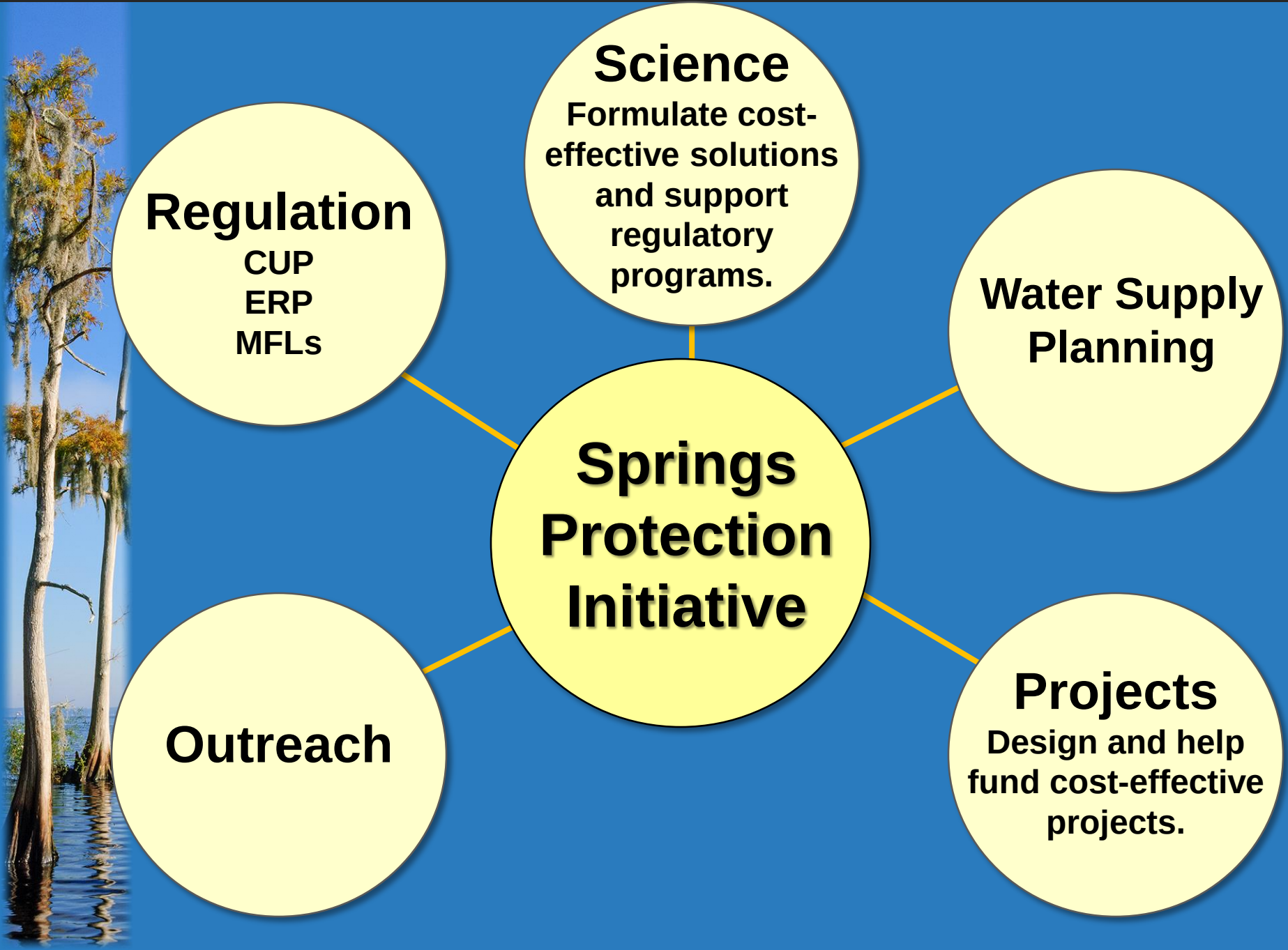


# ***Reasons to reduce nitrate loads***

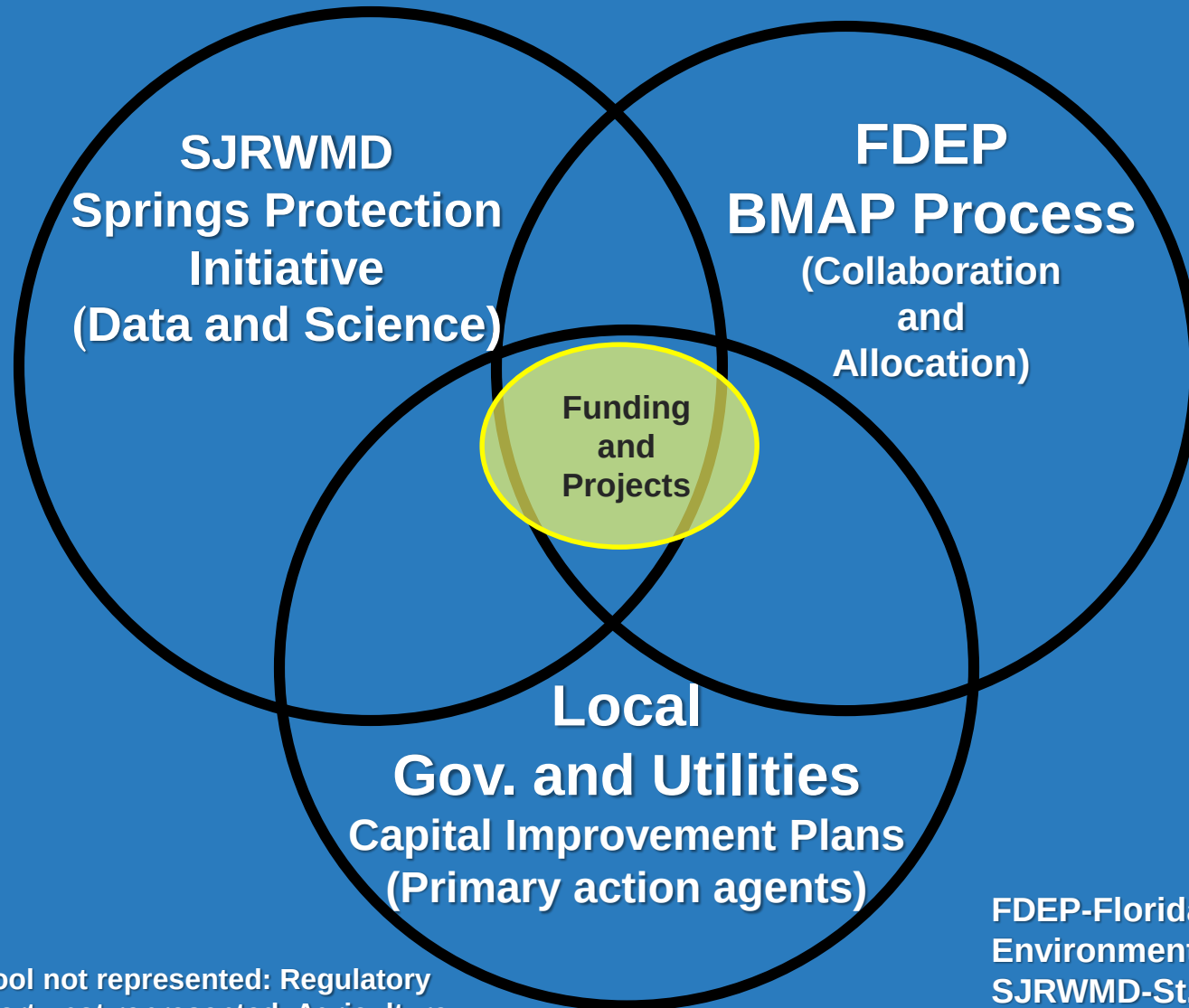
- Increased growth rates of nuisance macroalgae
- Toxicity to spring fauna
- Inhibits growth of submerged macrophytes
- Loading to downstream ecosystems

*Will nitrate reduction alone be enough to reduce nuisance algal growth ??*





# ***Springs Restoration - Linkages***



Key tool not represented: Regulatory  
Key party not represented: Agriculture

FDEP-Florida Department of  
Environmental Protection  
SJRWMD-St. Johns River  
Water Management District



# ***Springshed/Groundwater Work***

- Better delineate the divide between Silver and Rainbow springsheds
- More detailed understanding of land use nitrogen loading rates
- More detailed understanding of soil processes affecting nitrogen transport
- Linked surface/ground water models to evaluate scenarios



# ***Benthic Sources and Sinks of Nutrients and Other Solutes***

- 5-Year horizon (UF contract)
  - Detailed understanding of exchange of dissolved solutes (nitrogen, phosphorus, iron, manganese, sulfur, others) between river water column and river bottom
  - Are these coming from spring vents alone or is there diffusive addition of solutes through the general river bottom?
  - Better understanding of river bottom as a “sink” (uptake) for nutrients



# ***Nitrogen Dynamics and Metabolism***

- 5-Year horizon (UF contract)
  - Detailed understanding of continuous carbon and nitrogen metabolism in the river water column
  - Does reducing [nitrate] reduce algal growth and quantity? What level of reduction is needed?
  - Elevated [nitrate] are/not suppressing submerged macrophyte growth rates





# ***Trophic Interactions***

- **5-Year horizon (UF contract)**
  - Species that constitute the major algal grazers in the Silver River ecosystem
  - The ability of these to control/suppress macroalgal cover & quantity; especially if nitrate levels are reduced
  - Extent to which predators are suppressing grazer populations



# ***Other Science Components***

- Synoptic biological survey across numerous spring-run streams (statewide)
- Deployment of continuous monitoring sondes in Silver, Volusia Blue, Wekiwa, and other springs (DO, temperature, pH, turbidity, nitrate)
- MFL-related work better understanding hydrology & hydraulics of river
- Work with BMAP efforts to identify pathways of nitrogen loading to Silver Springs



# ***SJRWMD Springs Protection Initiative***

## **Projects component**

**Implement groundwater use/nutrient load reduction projects that will have the greatest initial effects.**





# ***Restoration Projects***

- Implement projects based on current understanding and best professional judgment
- Funding options: Various funding sources are available to leverage springs restoration work. FY2014:
  - \$8 million - SJRWMD *ad valorem* cost-share program
  - \$7 million - Legislative appropriation for St. Johns River Restoration
  - \$3 million - Portion of DEP's \$10 million for Springs Restoration



# ***Restoration Projects***

- **Project types: Primarily pass through to local governments and utilities**
  - Reuse projects that offset groundwater withdrawals
  - Relocation projects that move effluent disposal from short-term capture zones and/or conduits
  - Wastewater treatment plant upgrades or associated wetland/media treatment components in critical locations
  - Stormwater treatment projects and/or upgrades in key areas



# ***Short-term Interventions***

**Suction dredging algae/  
excess sediment (SWFWMD  
in Weeki Wachee and  
Chassahowitzka)**



**Ultrasonic transmitter which  
kills filamentous algae  
(SJRWMD in Silver and  
SRWMD in Allen Mill Pond).  
Monitoring these in Silver in  
cooperation with FDEP**





# Silver Springs Sonicator Locations



Side Channel



# ***Contacts***

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