Diving deeper into our knowledge of Florida's underwater caves

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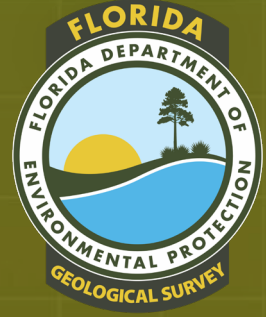
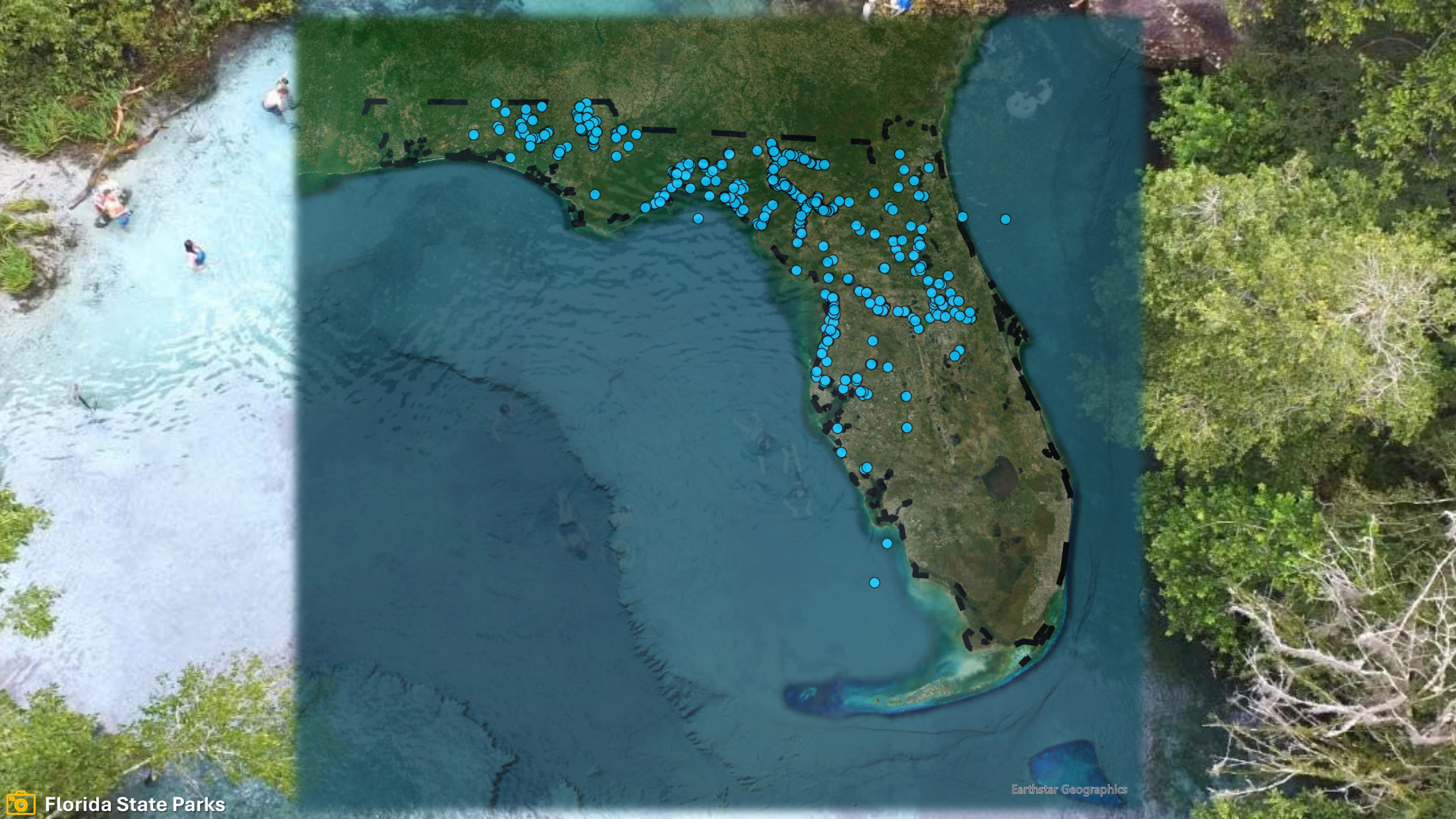
Collaborators and funding sources

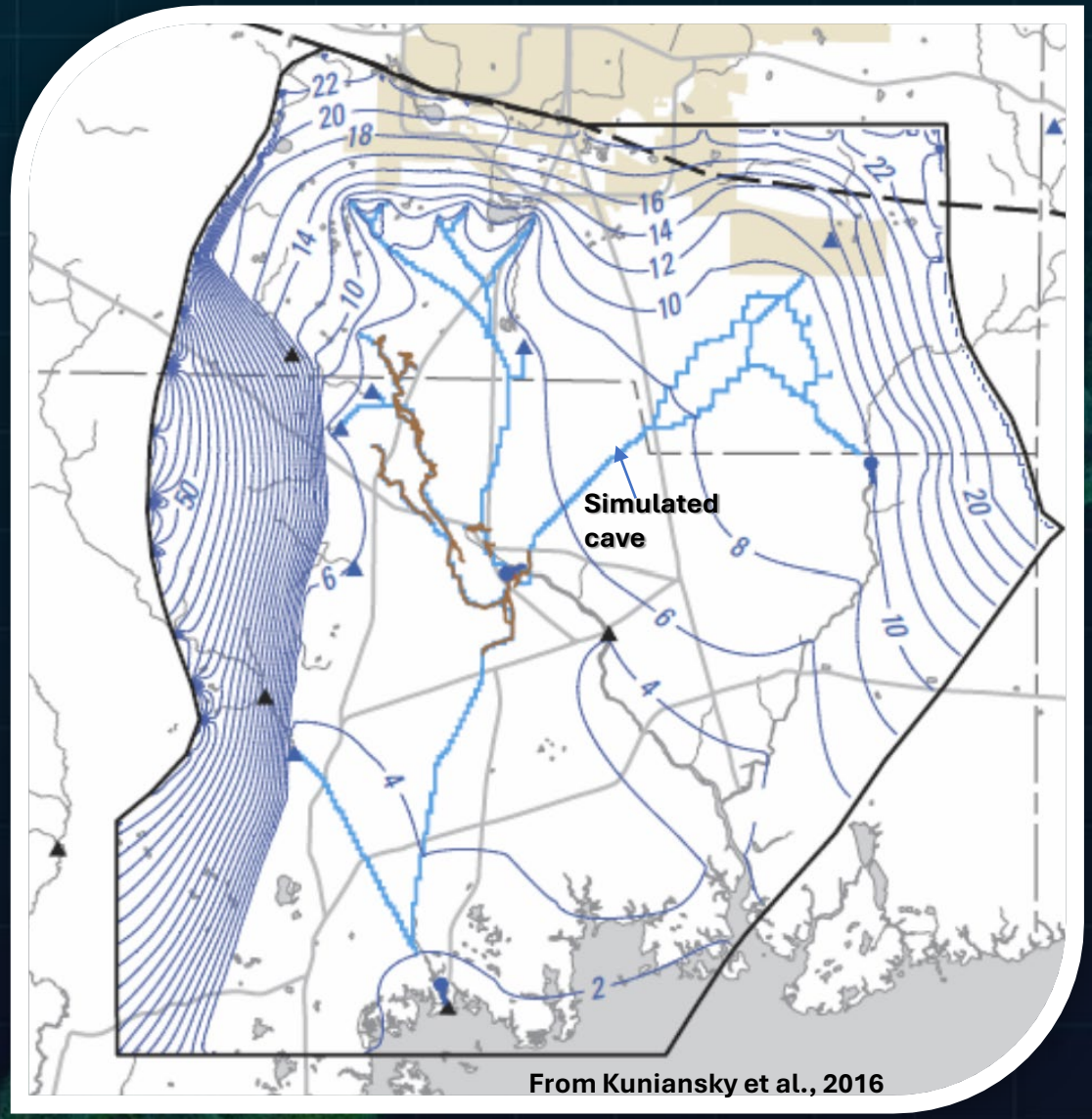


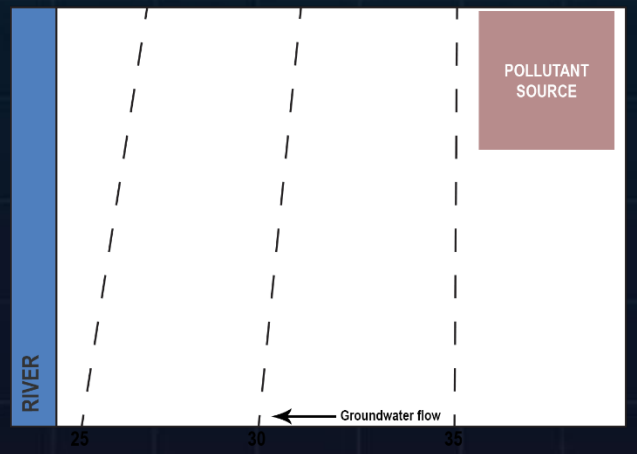


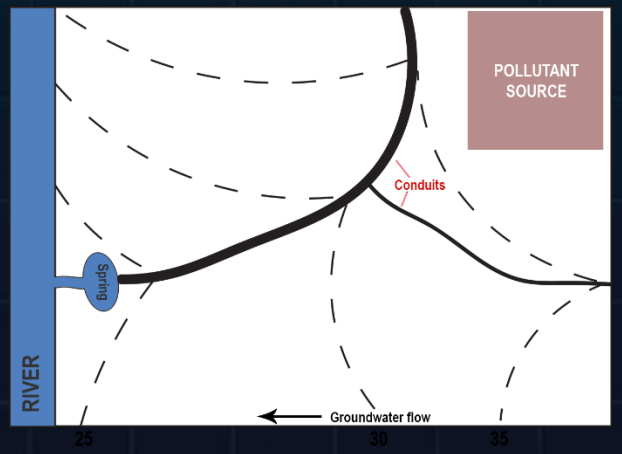
Florida State Parks


Peacock Springs
Jason Gulley

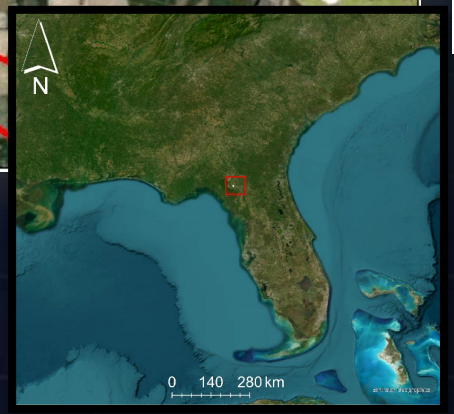
Conduit impacts on groundwater flow

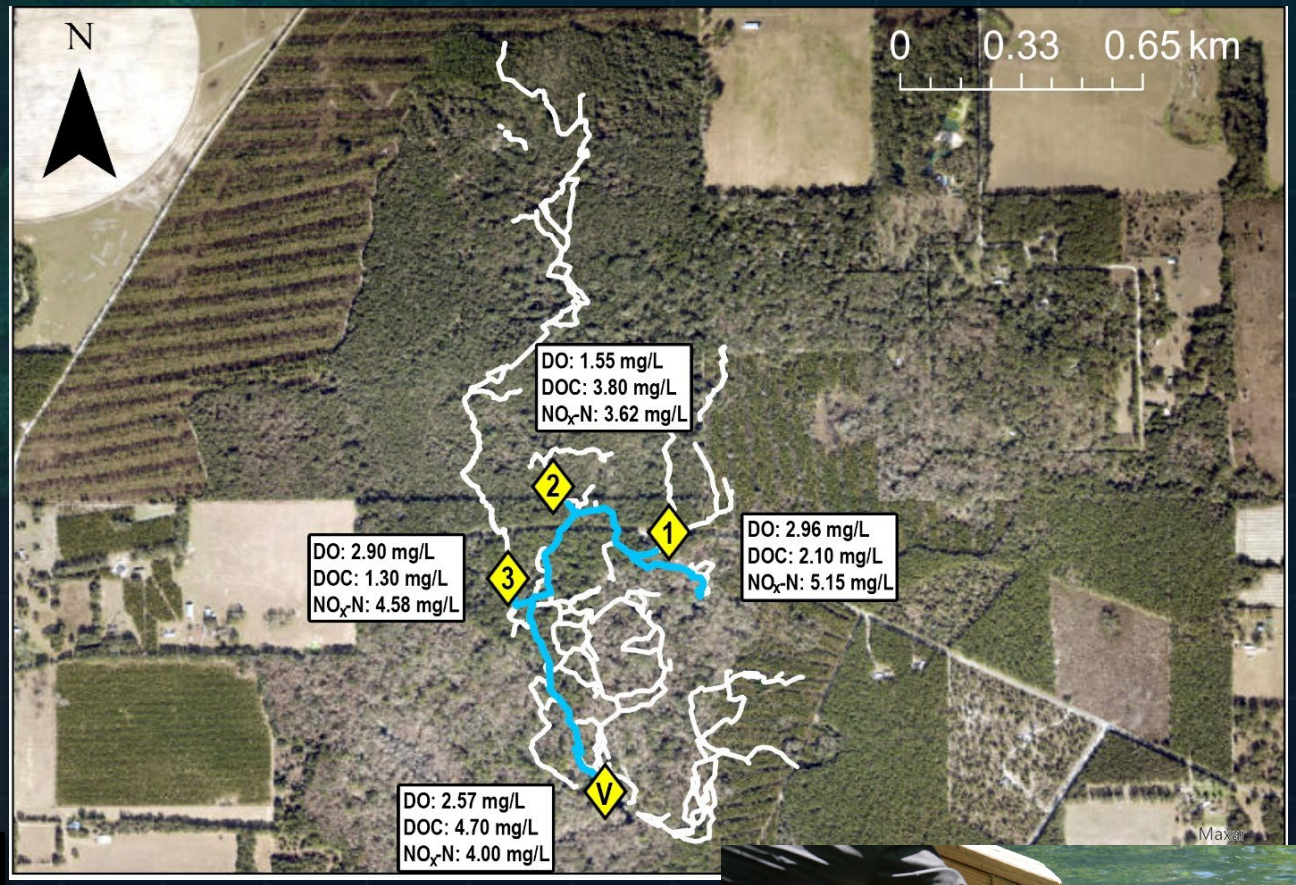




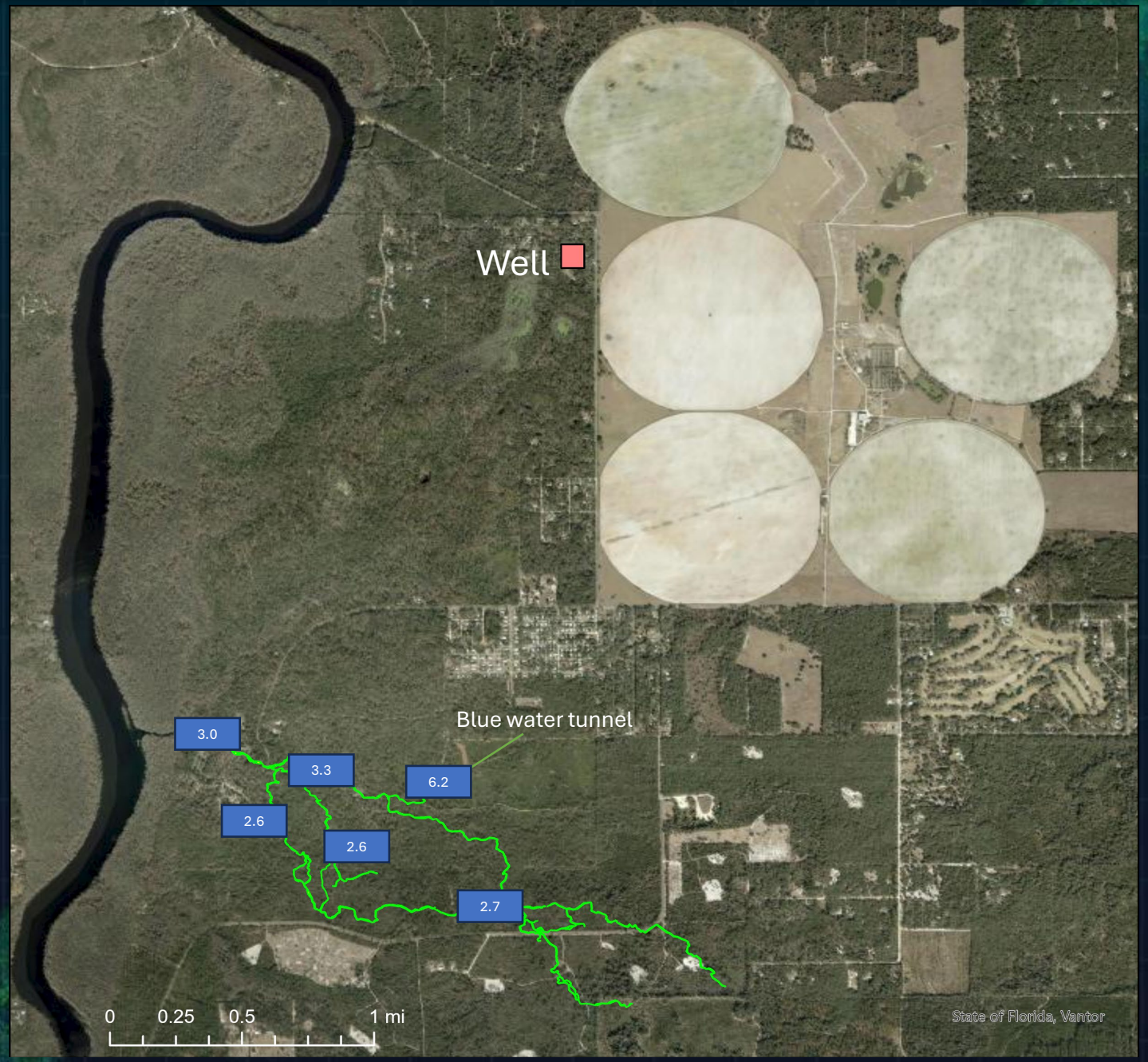


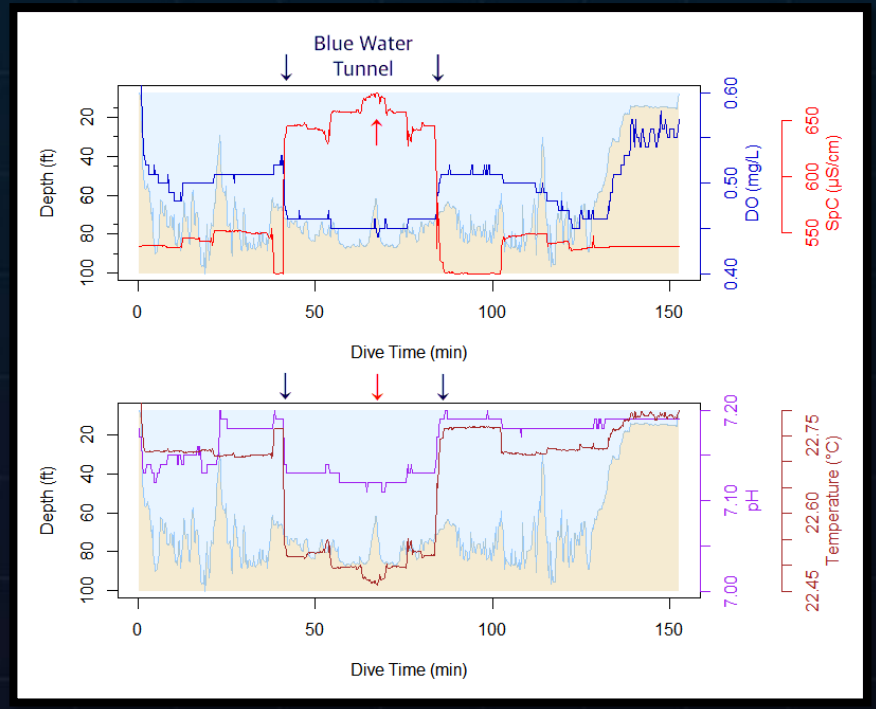
Peacock Springs





Manatee Springs water quality study – KUR Citizen Science

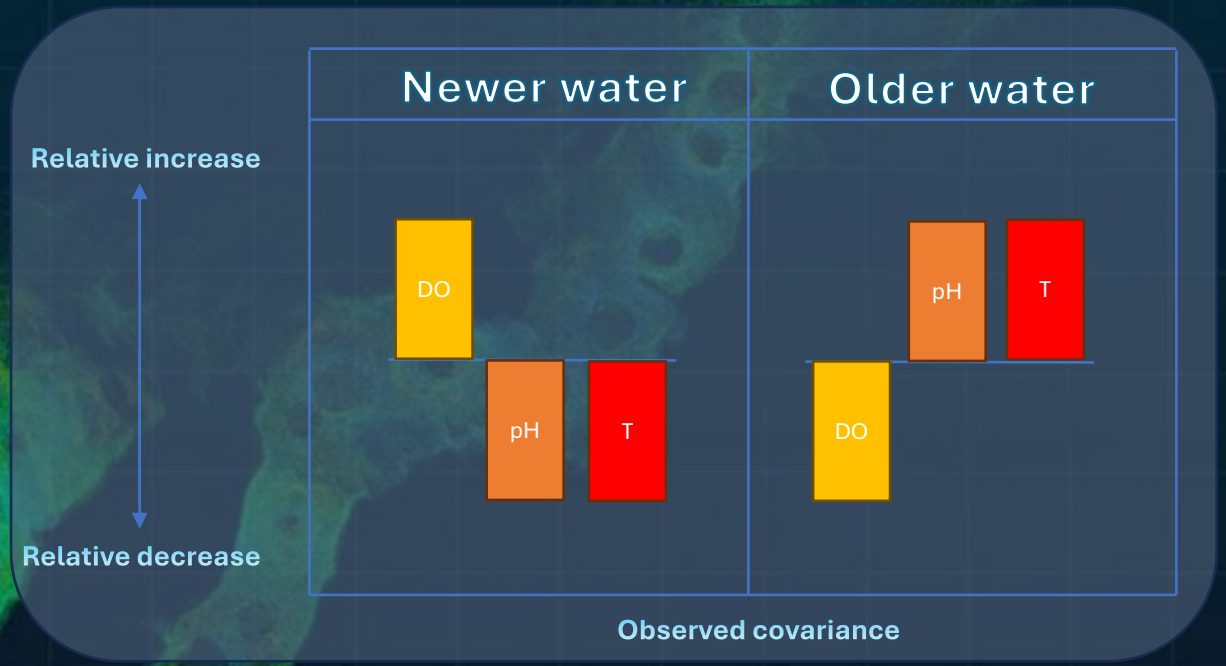


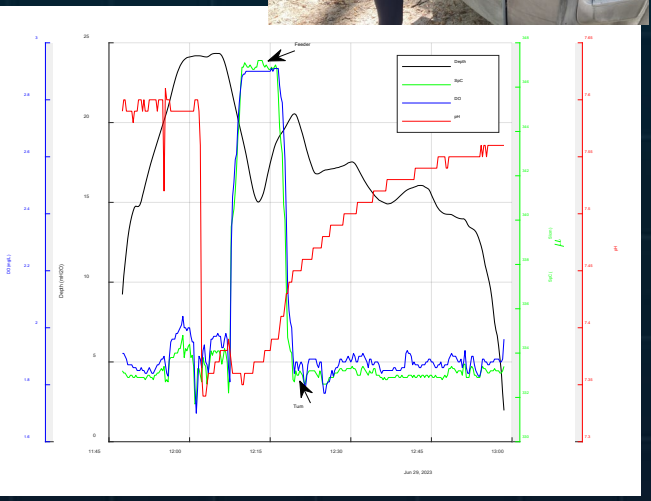


Signal interpretation from aggregated data

Sites used in interpretation

- *Madison Blue Spring*
- *Ichetucknee Blue Hole*
- *Peacock Springs*
- *Manatee Springs*
- *Lafayette Blue Springs*





Specific conductance was **not** unique

Increases for newer water interpretation	Decreases for newer water interpretation
Ichetucknee Blue Hole **Peacock** **Manatee Springs*** **Lafayette Blue Springs**	Madison Blue

Uploading data to Hydroshare and SpeleoDB!

http://www.hydroshare.org
http://www.speleodb.org

Divers can only do so much.


SUNFISH
SUNFISH

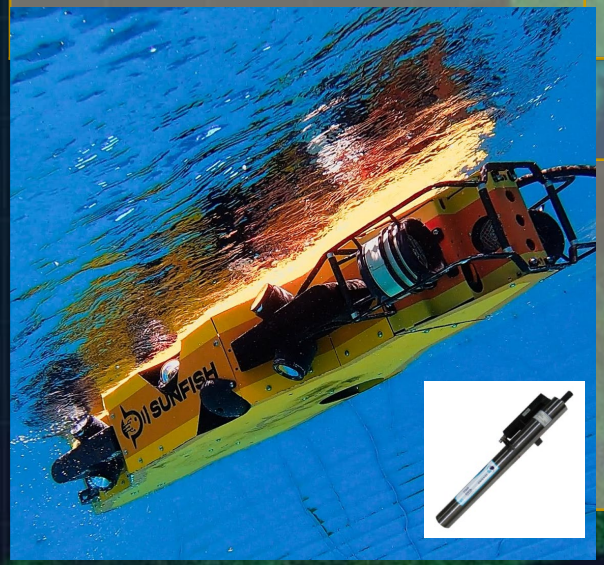
SUNFISH features

3-D conduit mapping and imaging

- Multibeam Sonar
- 10 cm resolution
- High definition
- 1920x1080 resolution

Geolocation

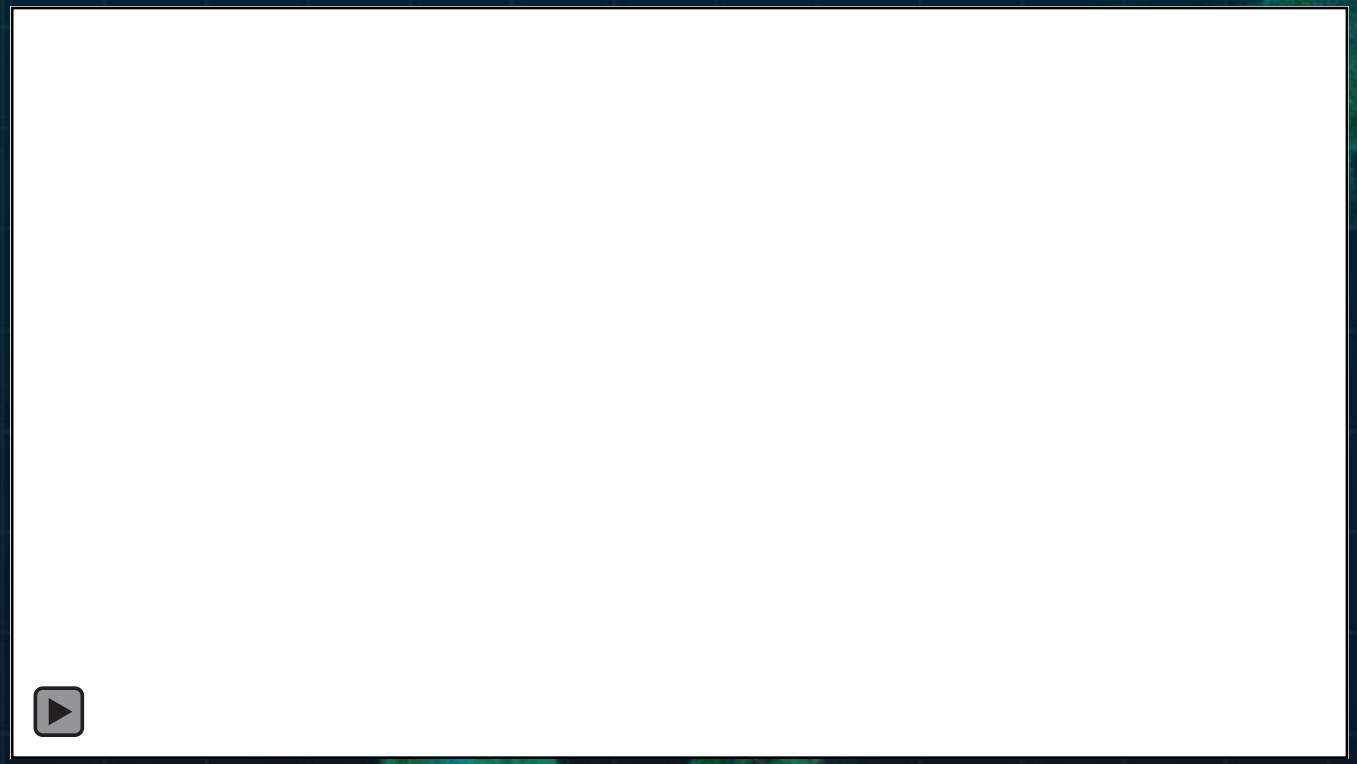
- 20 cm sample position accuracy within map, map accuracy 1% of distance from entrance
- SLAM



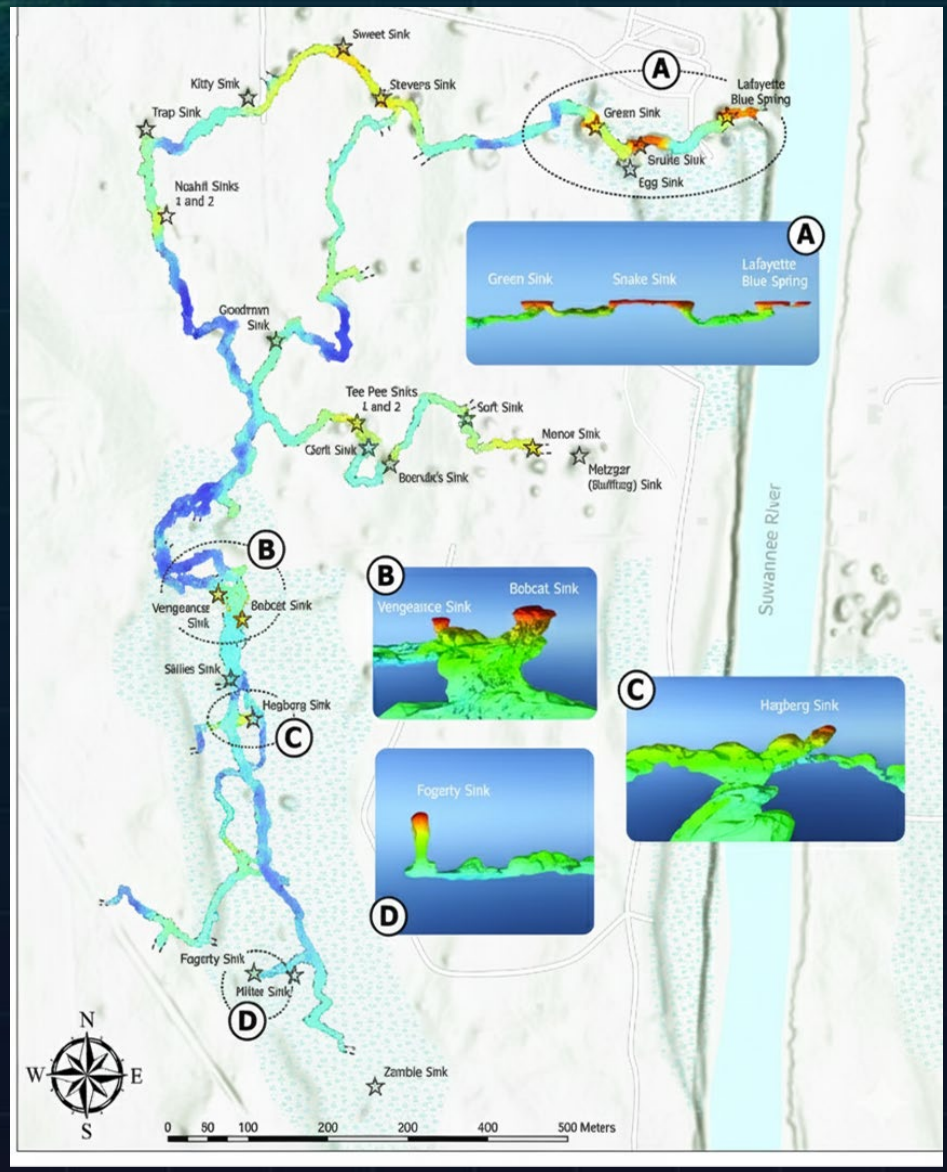
Water quality

- Submersible Ultraviolet Nitrate Analyzer (SUNA)
- NBOSI Conductivity and temperature sensor
- **More optical water collection sensors

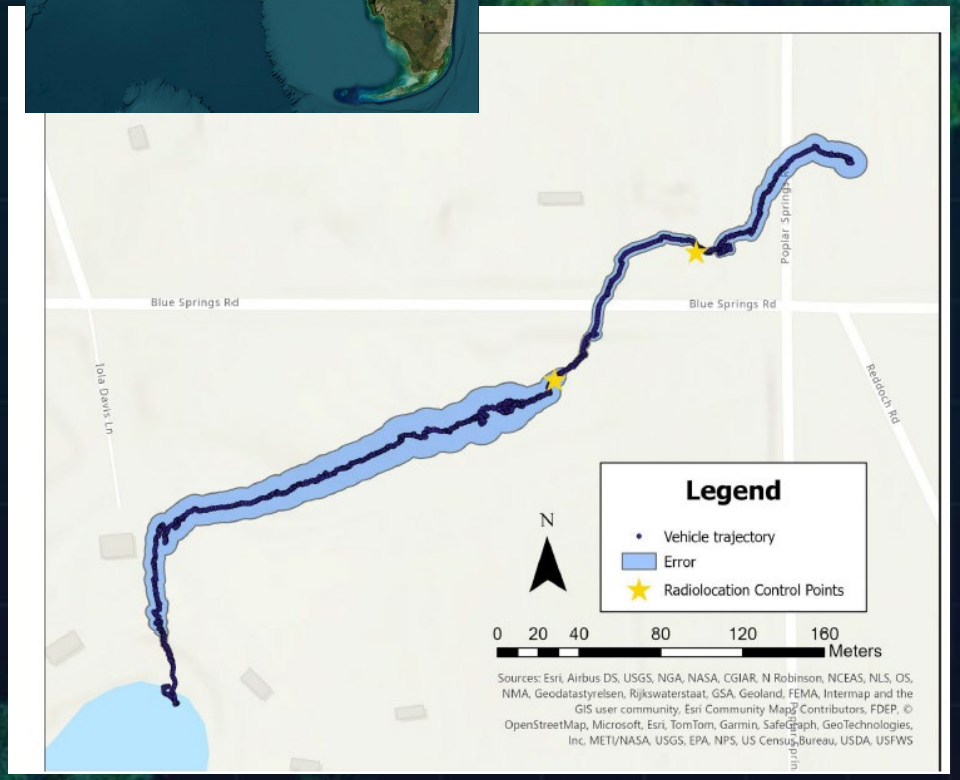
3-D conduit mapping



- Imaging and maps visualize cave system
- Refine and improve conduit hydraulic models
- Test hypotheses on flow, exchange, and contaminant transport
- Determine total porosity contributing to flow from maps (Right)
- Geophysics solutions for developing new tools for exploring caves

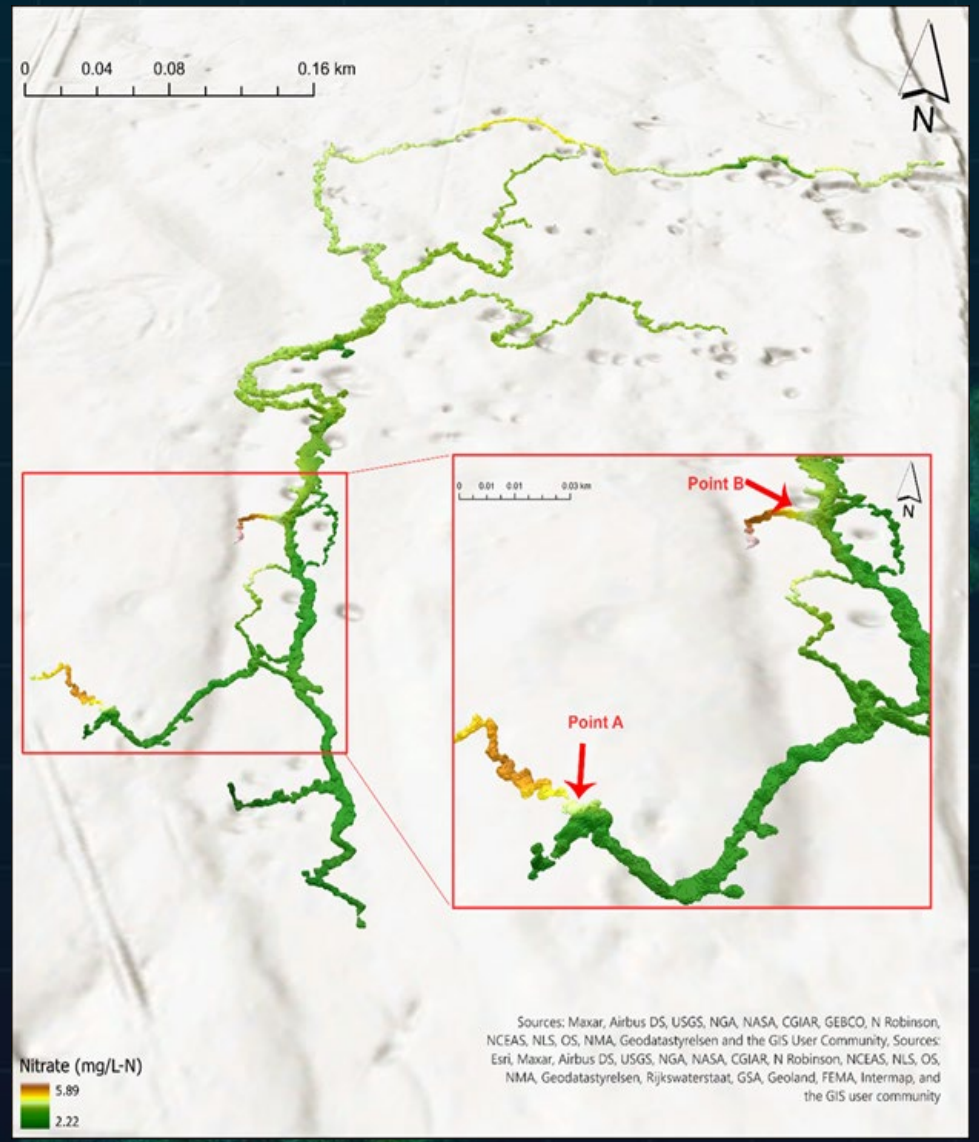


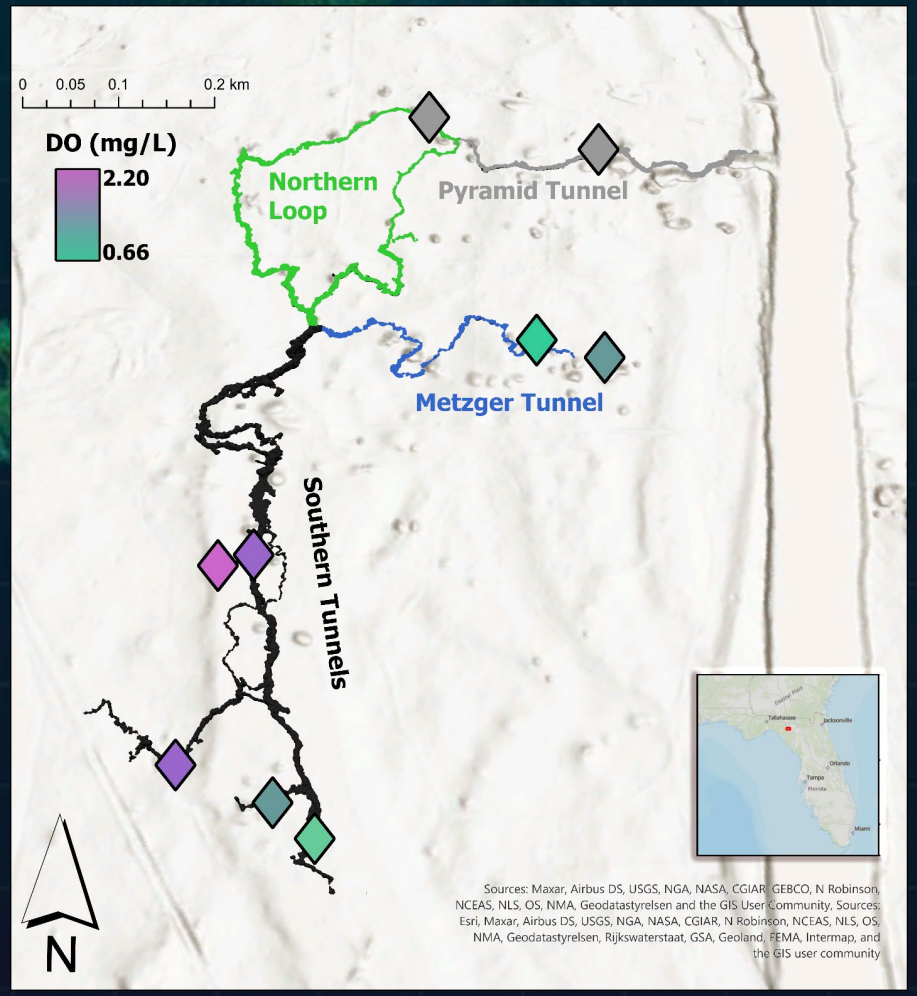
Geolocation



- Help refine potential contamination sources
- Geolocate with discrete features such as sinkholes/ elevation lows
- Improve current groundwater models
- Develop contaminant risk maps

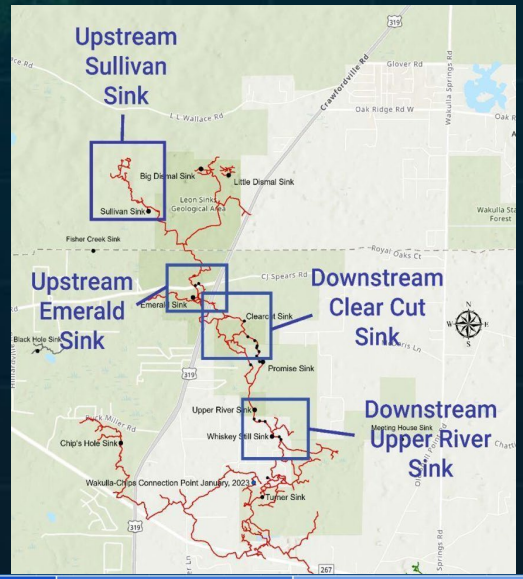
Water quality mapping





- Help refine potential contamination sources
- Geolocate with discrete features such as sinkholes/ elevation lows
- Improve current groundwater models
- Develop contaminant risk maps
- Build up knowledge base on controls of nitrate and other contaminants in the cave systems

Current and future work



Wakulla GIS	Y1	Y2	Y3	Y4
FSU	Advanced groundwater model development			
USF	Develop contaminant risk maps using updated geochemistry and groundwater flow models			
Sunfish	AUV Development			
	Mapping 7 miles	13 miles	14 miles	13 miles
WKPP	Develop GIS Database			

Priorities for USF when robot is improved: Manatee Spring, Madison Blue Spring, and Middle Suwannee River


Questions
WOODVILLE KARST PLAIN PROJECT
EST. 1990
NICOLE ALARID