Bon Secour River Constructed Wetland

September 21, 2022

Presenter

Andrew E. James, P.E.
Environmental Design Manager

Hi, I'm your speaker.

Andrew James, P.E.

Environmental Design Manager

Civil Engineer with a focus on Water Resources

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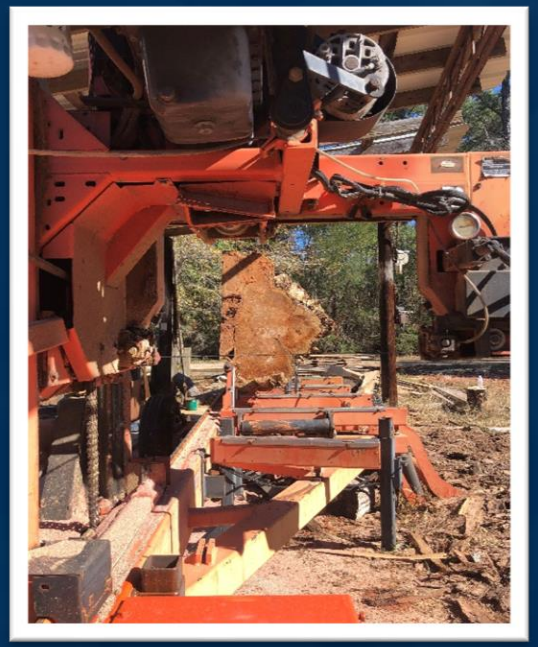
Education

Batchelor of Science in Civil Engineering
Auburn University **August 2005**

Masters of Civil Engineering,
Auburn University **May 2006**

Interests

- Competitive Axe Throwing
- Sawmilling
- Hunting, Fishing, and Camping



Bon Secour River Constructed Wetland

- Project Background
- Project Design
- Adaptive Management
- Project Construction
- Challenges and Lessons Learned
- Closing Remarks & Questions

Project Background

- What is a constructed Wetland?
  - EPA: Treatment Systems that use natural processes involving wetland vegetation, soil, and their associated microbial assemblages to improve water quality.
- Why build it?
  - The 2017 Watershed Management Plan identified Bon Secour River as a source of sediment and nutrients
  - The project was estimated to reduce or mitigate 800 tons of sediment per year, reduce phosphorous and nitrogen by 17% and 40% respectively
  - Reduce flood elevations adjacent to the project by 4-6”
  - Create or enhance 72 acres of wetland habitat

Project Background

Timeline

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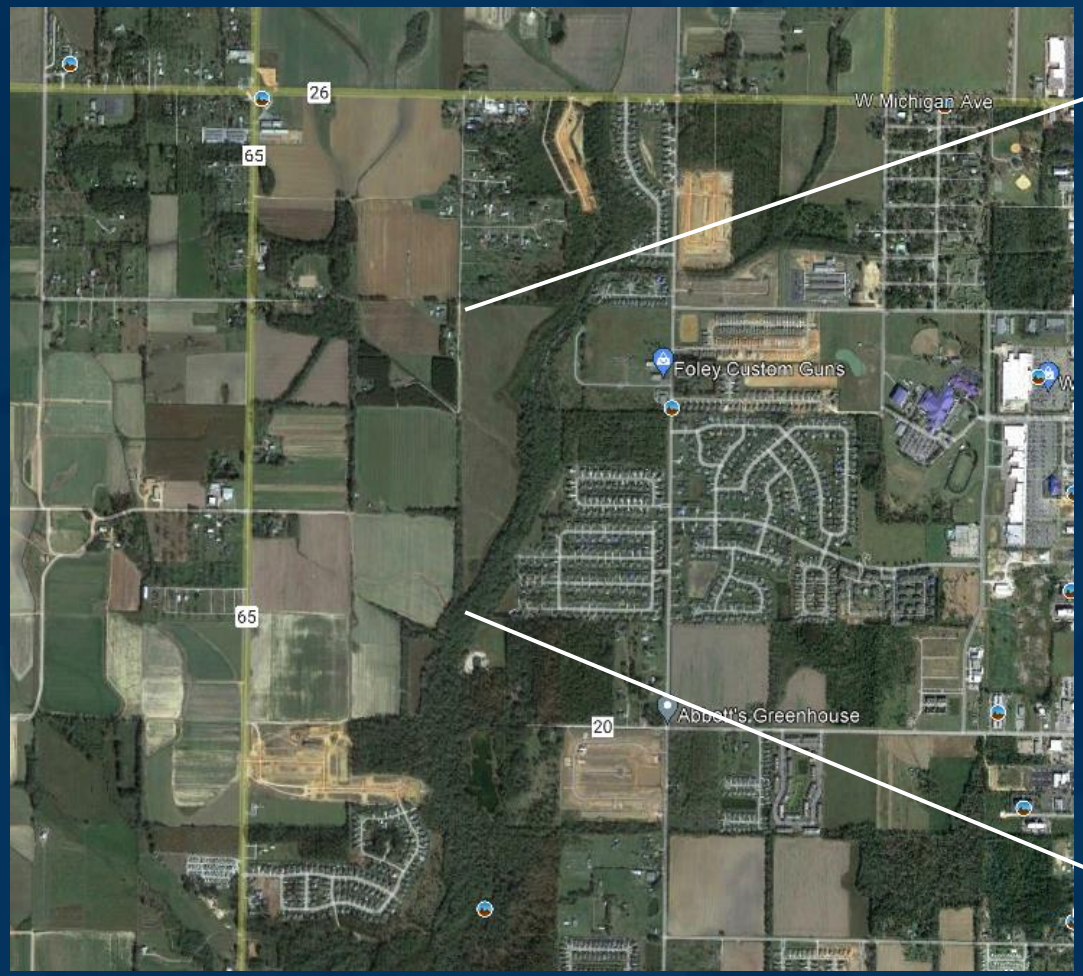
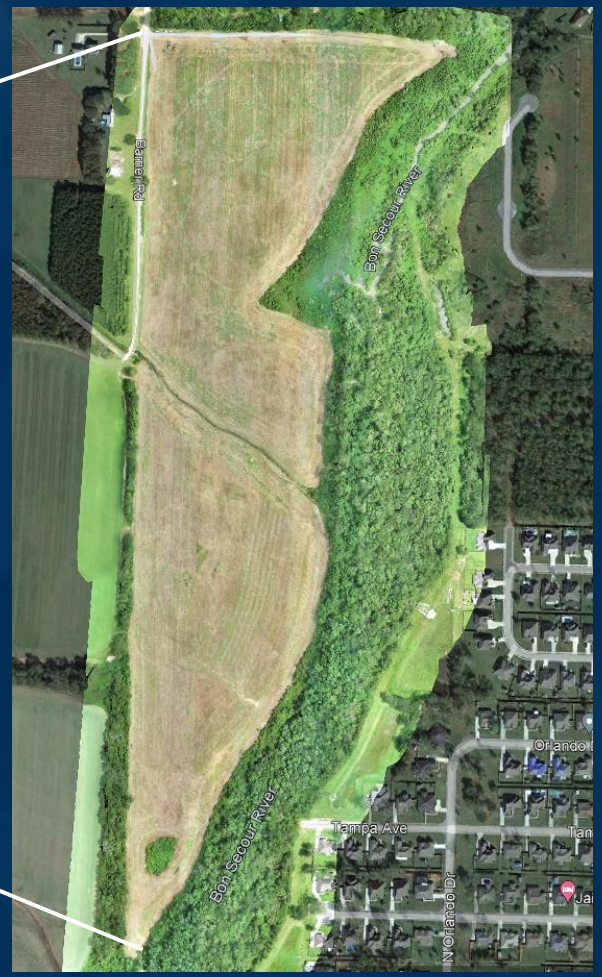
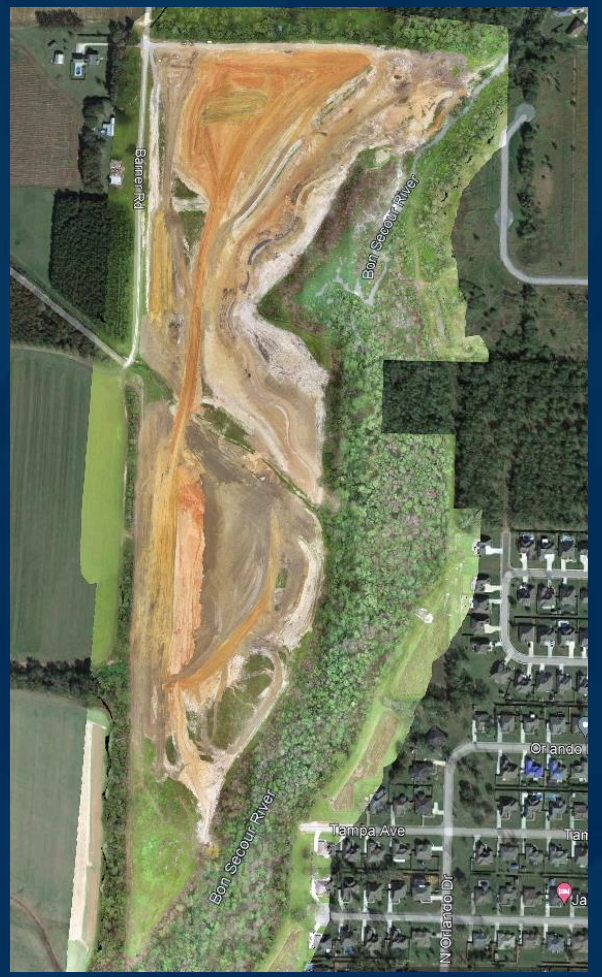
Project Background



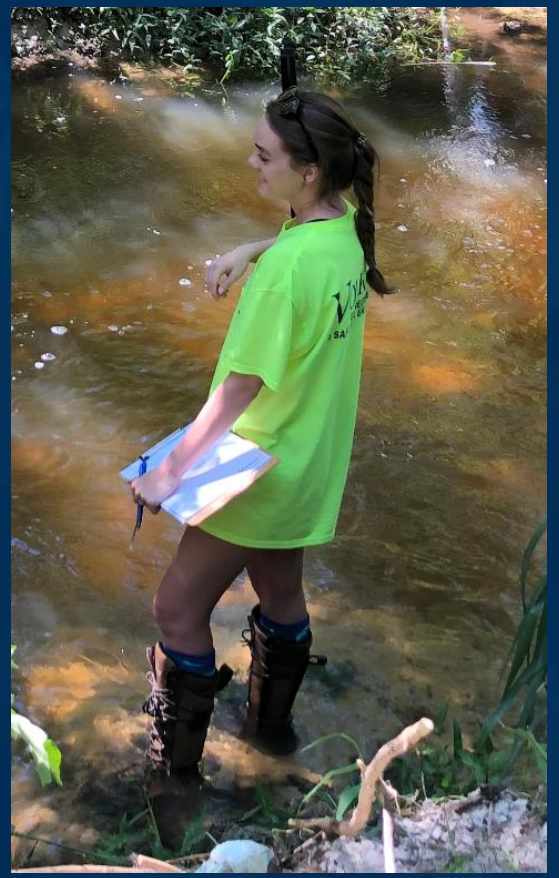




Project Design – Design Team

Andrew James, PE

Annelise Dodd, PE, CFM



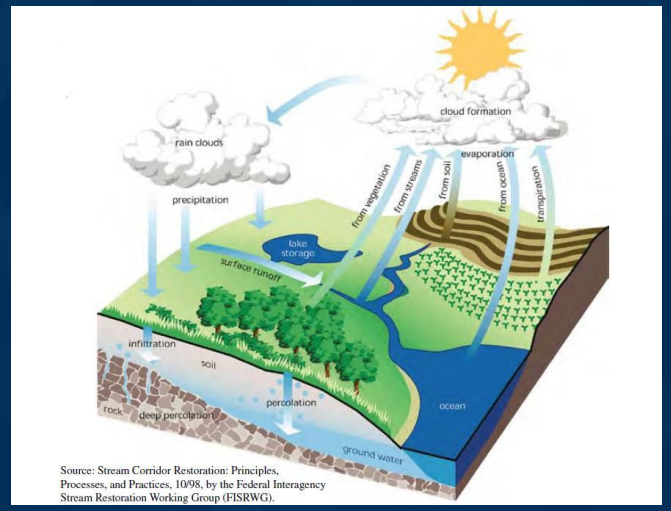
Katy Hines, EI

Sean Miller, EI

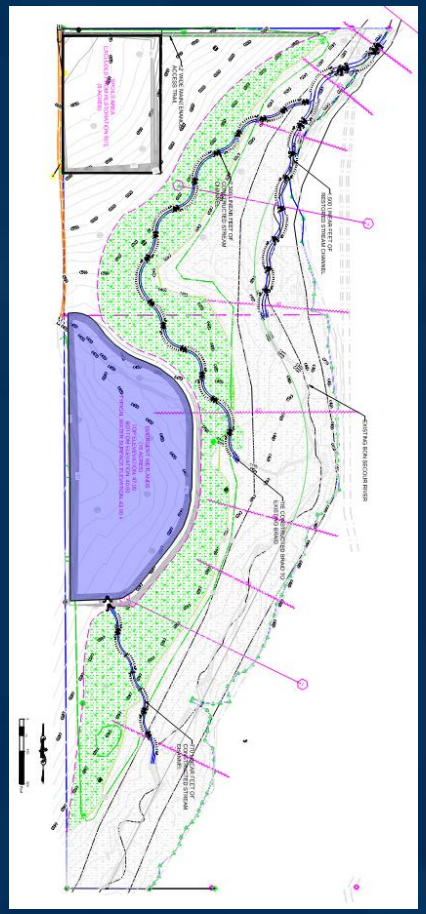
Project Design

- Conceptual Design and Planning
  - Site review and Geomorphic Assessment
  - Development of mini regional curves for stream parameters
  - Development of a water budget for constructed wetlands
  - Review existing and invasive vegetative communities
  - Design Charettes

Month	Observed Precipitation ('18-'19)	Normal	Max	Min
1-January	4.27 in.	5.65 in.	6.16 in.	.55 in.
2-February	5.22 in.	5.12 in.	11.89 in.	1.09 in.
3-March	1.62 in.	6.14 in.	12.34 in.	.24 in.
4-April	3.07 in.	4.79 in.	18.08 in.	.08 in.
5-May	5.87 in.	5.14 in.	15.08 in.	.22 in.
6-June	6.99 in.	6.11 in.	26.67 in.	.53 in.
7-July	6.96 in.	7.25 in.	20.50 in.	1.13 in.
8-August	4.20 in.	6.96 in.	14.56 in.	2.83 in.
9-September	5.24 in.	5.11 in.	--	--
10-October	1.98 in.	3.69 in.	13.44 in.	--
11-November	6.29 in.	5.13 in.	--	--
12-December	9.45 in.	5.06 in.	15.37 in.	.53 in.

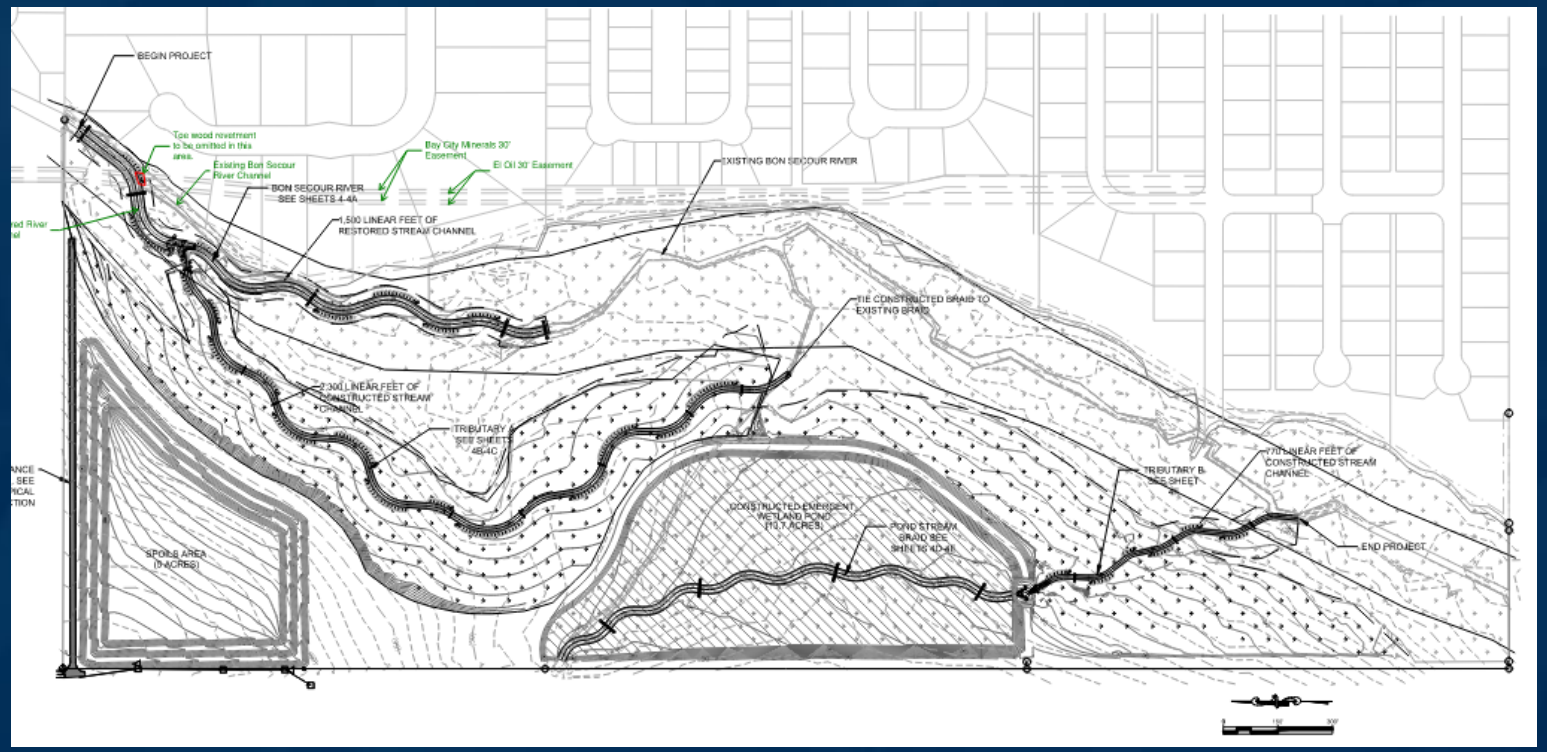


Source: Stream Corridor Restoration: Principles, Processes, and Practices, 10/98, by the Federal Interagency Stream Restoration Working Group (FISRWG).

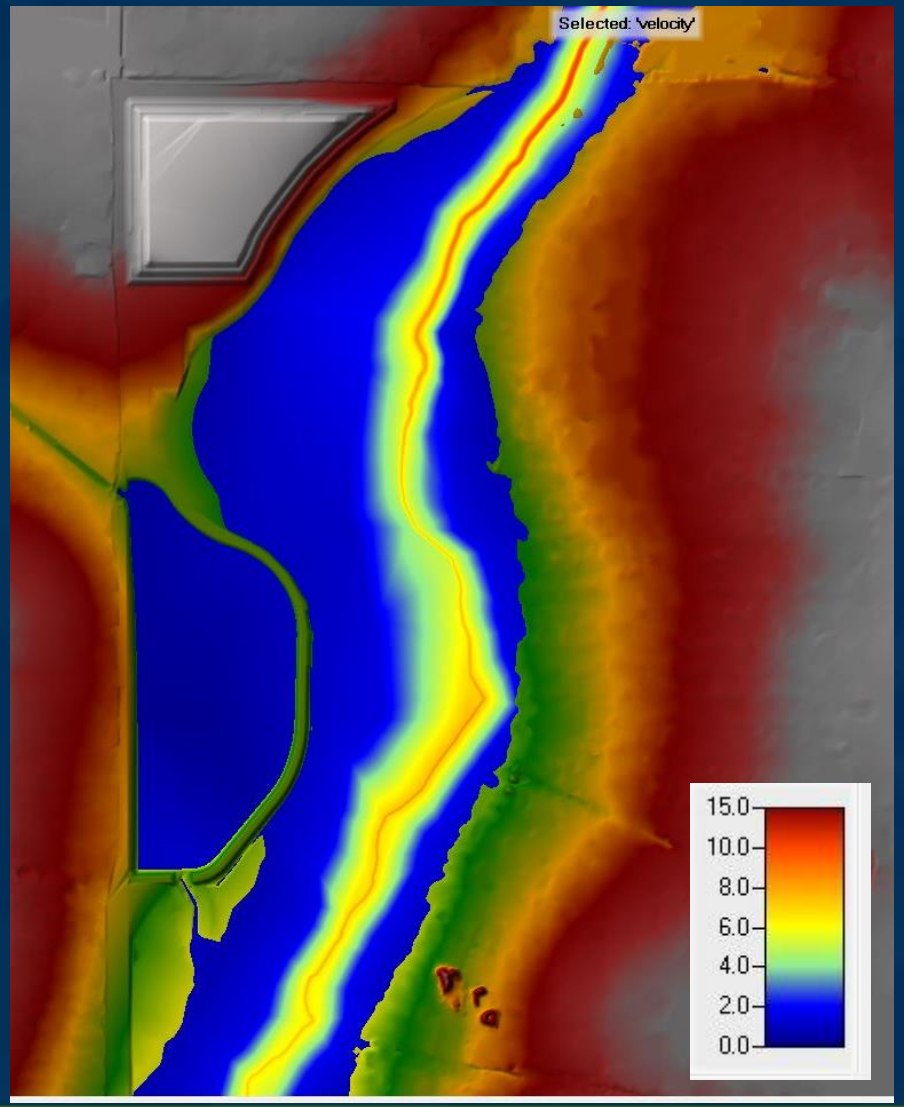


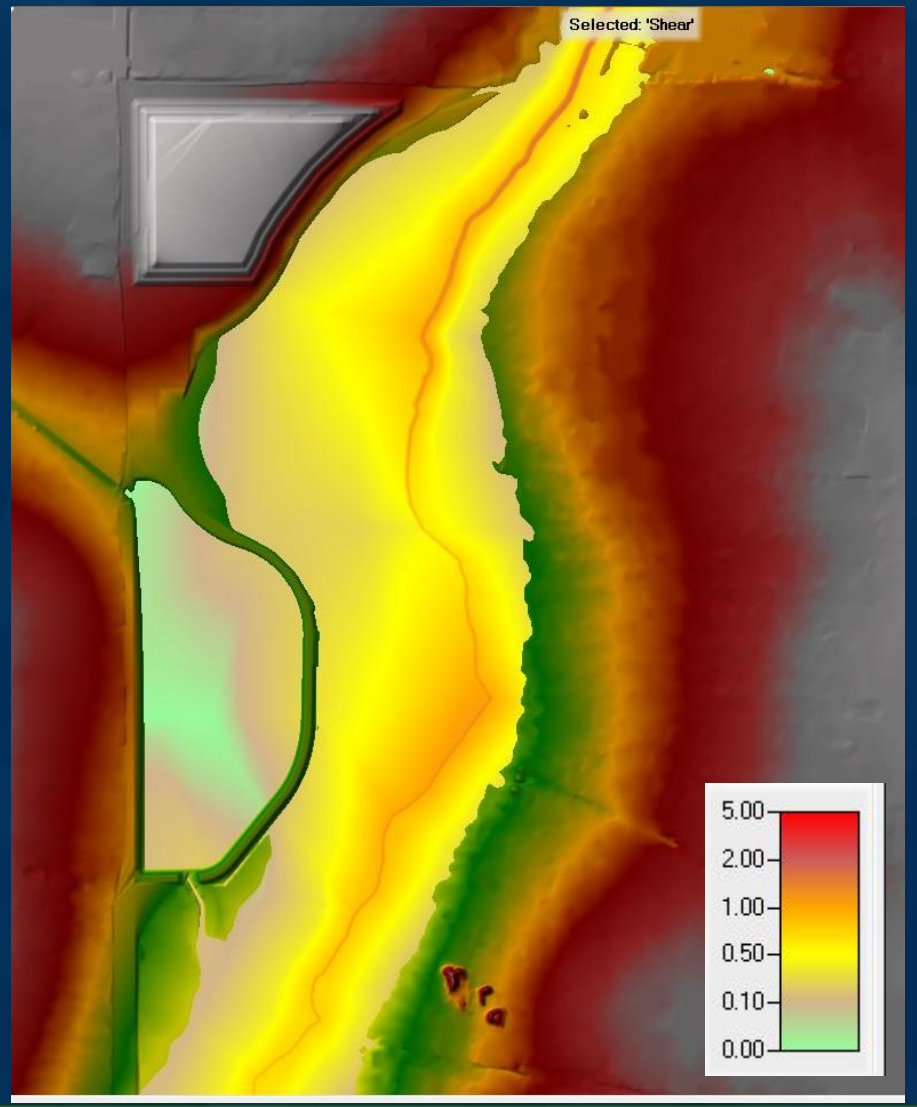
Project Design

- Iterative Design
  - Optimize hydroperiod for each component
  - Assess shear and velocity of stream components
  - Assess Floodplain impacts
- Visualize data
  - HEC-RAS & RAS Mapper
  - SRH-2D



Project Design

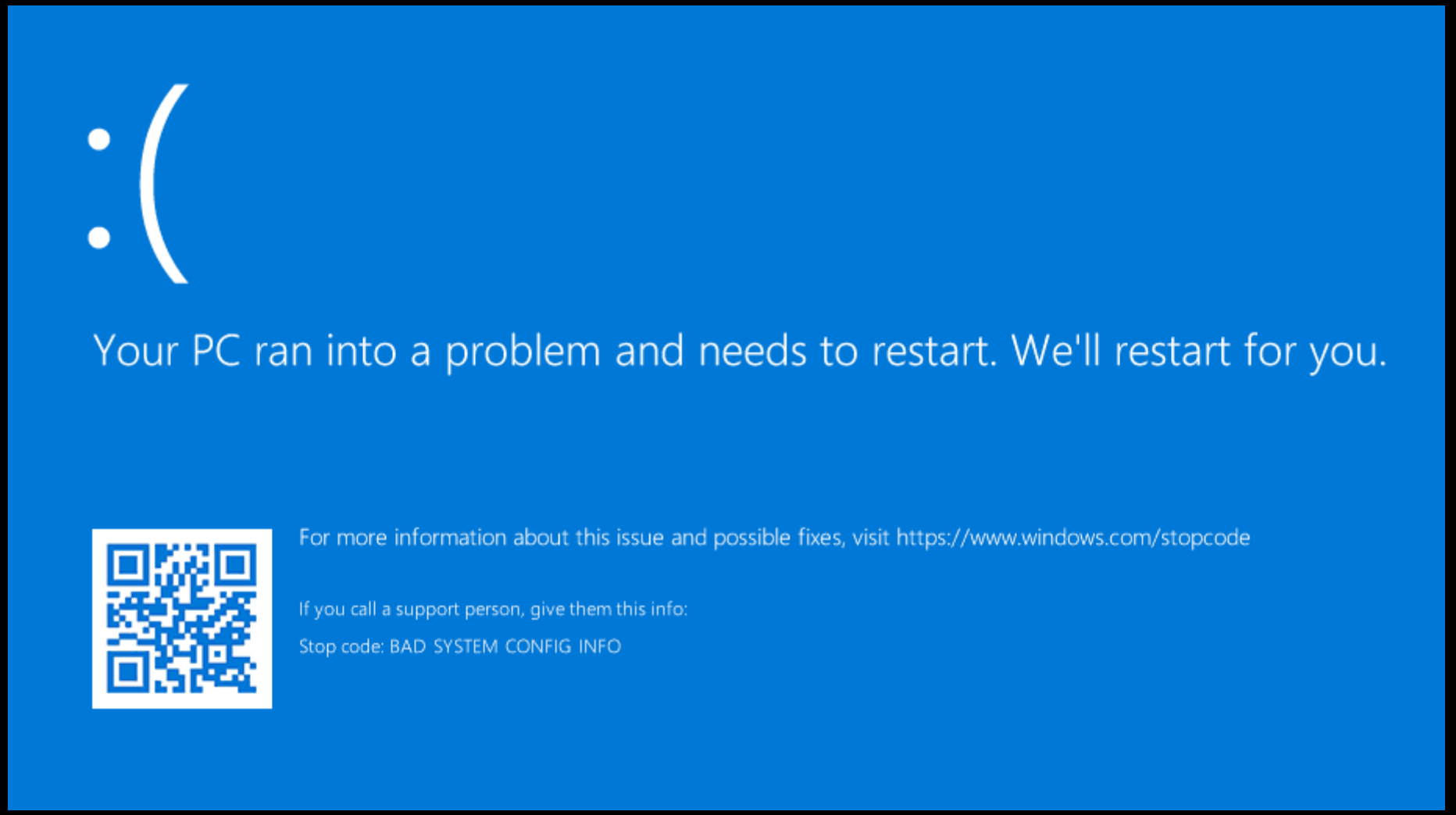




Adaptive Management

- What is adaptive management?
  - Wikipedia: A structured iterative process of robust decision making in the face of uncertainty with the goal of reducing uncertainty over time via system monitoring.
  - Alternatively, adaptive management is an intentional approach to making decisions and willingness to reassess and “adapt” as new information is presented.

  - Example of Adaptive management in the context of a seminar presentation…


:(
Your PC ran into a problem and needs to restart. We'll restart for you.
For more information about this issue and possible fixes, visit https://www.windows.com/stopcode
If you call a support person, give them this info:
Stop code: BAD SYSTEM CONFIG INFO

Andrew James
iPhone

“We’ve been trying to reach you about your car’s extended warranty”

Was this transcription **useful** or **not useful**?

Adaptive Management

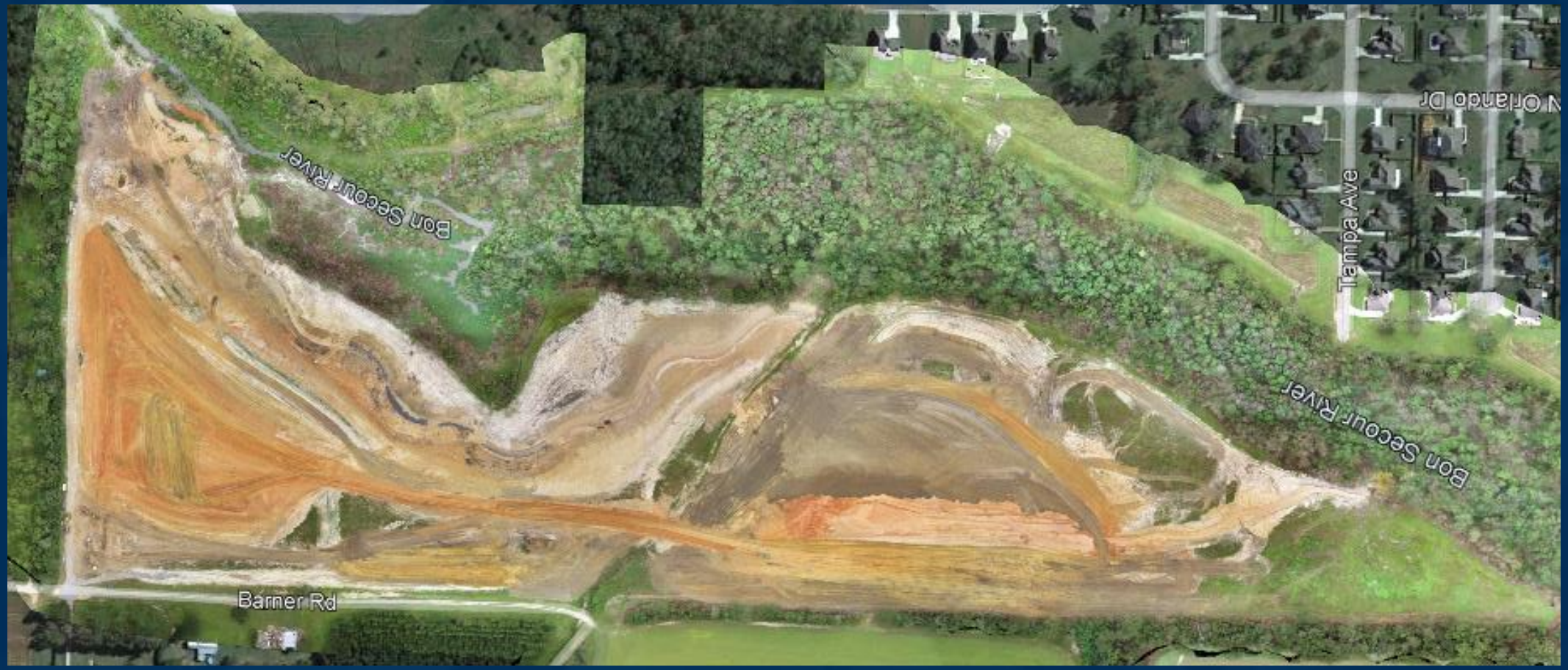
- No really, what is it…
- Design Phase
  - Incorporating flexible design
  - Ranges of geomorphic parameters
  - Diversity of plant species
  - Resilient materials (coir in lieu of straw)
  - Considering both wet (4 months of rain) and dry (drought)
- Construction Phase
  - Project Sequencing and Approach
  - Maximizing site advantages and build in flexibility
- Monitoring Phase
  - Specifications which allow for treatment of “new” invasive species
  - Ability to swap plantings during maintenance phases.
  - If planted species are struggling, adjust!

Adaptive Management

Project Construction

- Contractor: Streamline Environmental, LLC
- Commenced Construction in August 2021
- Planned BMPs vs. Contractor Implementation
  - Excavator and offroad Trucks vs. Pan Scrapers
  - Pan Scrapers saved 2.5 Million on earthwork costs
  - Significantly reduced time of exposure, but significantly increases area of exposure.
  - Incised pit approach utilizing treatment train prior to release
  - Rough graded ephemeral braids and ponded areas utilized for treatment.

Project Construction



Project Construction

Challenges and Lessons Learned

Challenges

- Means and Methods
- Material and Labor Shortages
- Weather
  - Excessive Moisture and Excessive Drought
- Third Party impacts
  - Gas line easements
  - Sod Farms

- Lessons Learned
  - Coordinate with Nurseries as early as possible
  - Pre-construction and As-built surveys are a life saver.
  - Full time inspection during heavy operations
  - Sequence plant counts and monitoring as plants are installed
  - Maintenance Warranties

Questions?

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