Current and future threats to water quality in the Guana Estuary and looking forward for solutions

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GUANA NUTRIENTS BUDGETS AND BIVALVES

UF IFAS UNIVERSITY of FLORIDA

SOIL, WATER, AND ECOSYSTEM SCIENCES

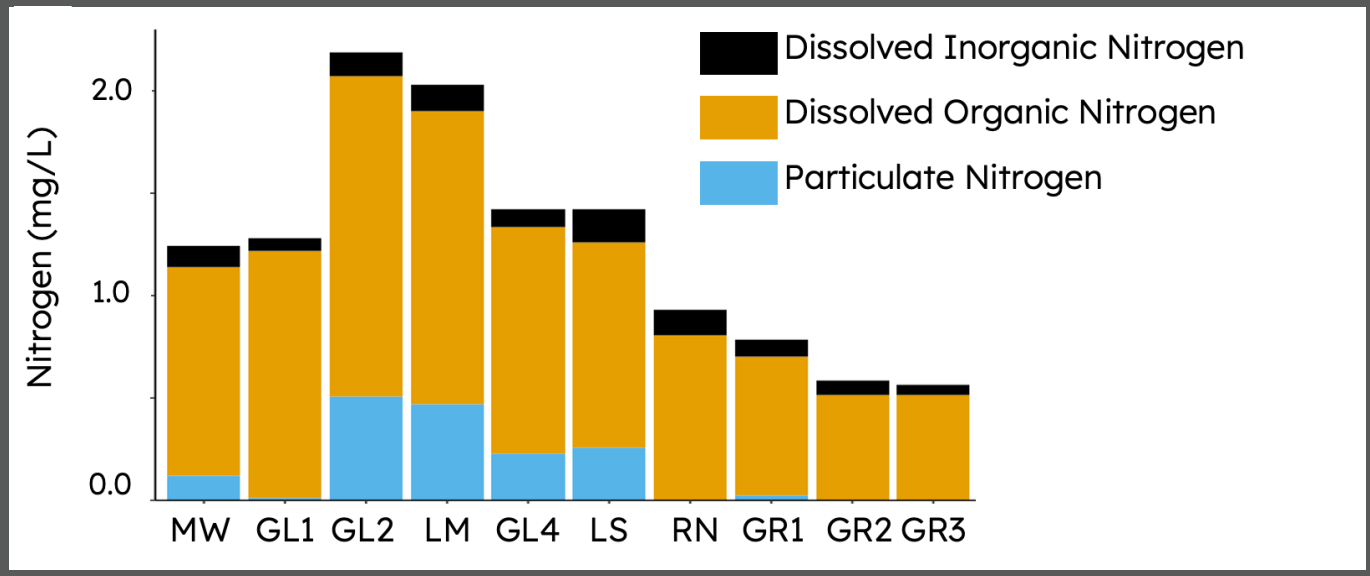
GTM RESEARCH RESERVE

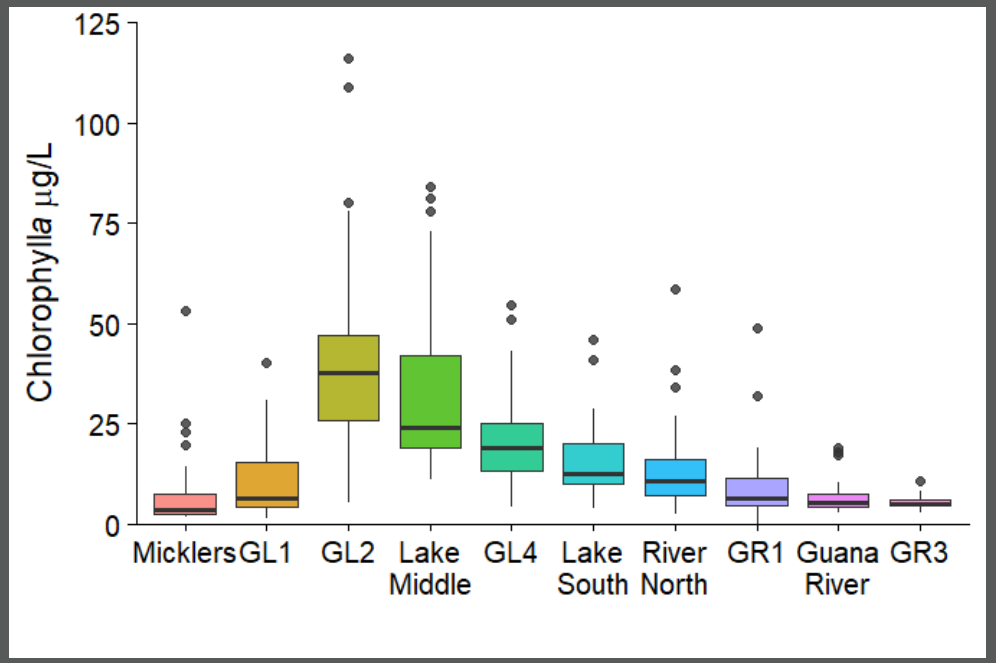
Current threats to water quality

- Urbanization
  - Nutrient and organic matter inputs
  - Emerging contaminants
  - Hydrology
- Climate change
  - Extreme events
  - Sea Level Rise
- Watershed management?
  - Drainage improvements
  - Vegetation control
  - Shellfish management

Water quality responses

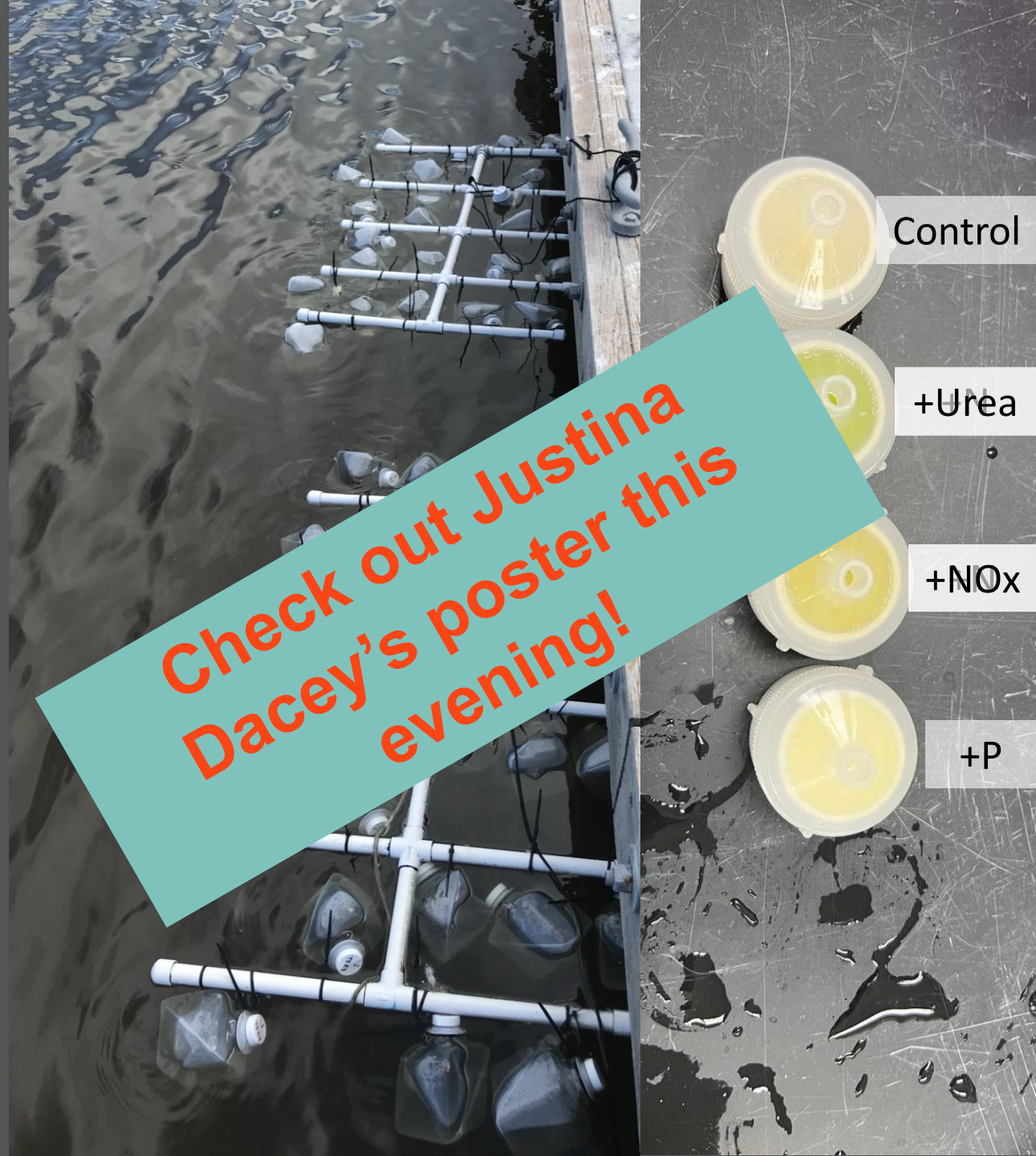
- Nitrogen inputs from upstream come in various forms
  - A lot of DON
  - Relatively little DIN
  - Difference due to inputs? Or upstream processing?
- Algal responses





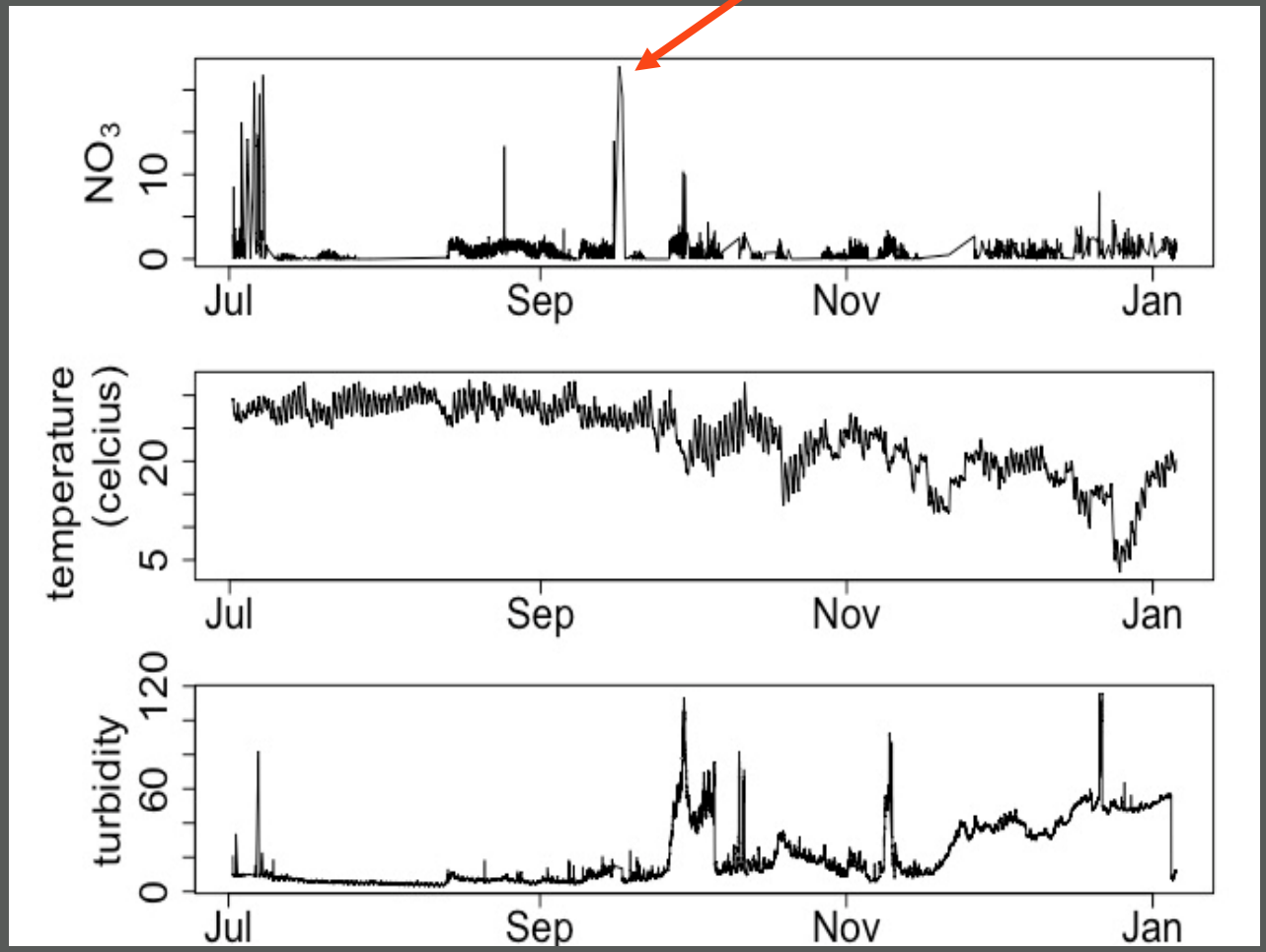
Water quality responses

- Typical assumption is that DIN is more bioavailable than DON
- Algal nutrient limitation bioassay:
  - Phytoplankton are N limited
  - Particularly responsive to Urea
- Limiting N inputs is important, but focus should include DIN and DON



Extreme events and N inputs

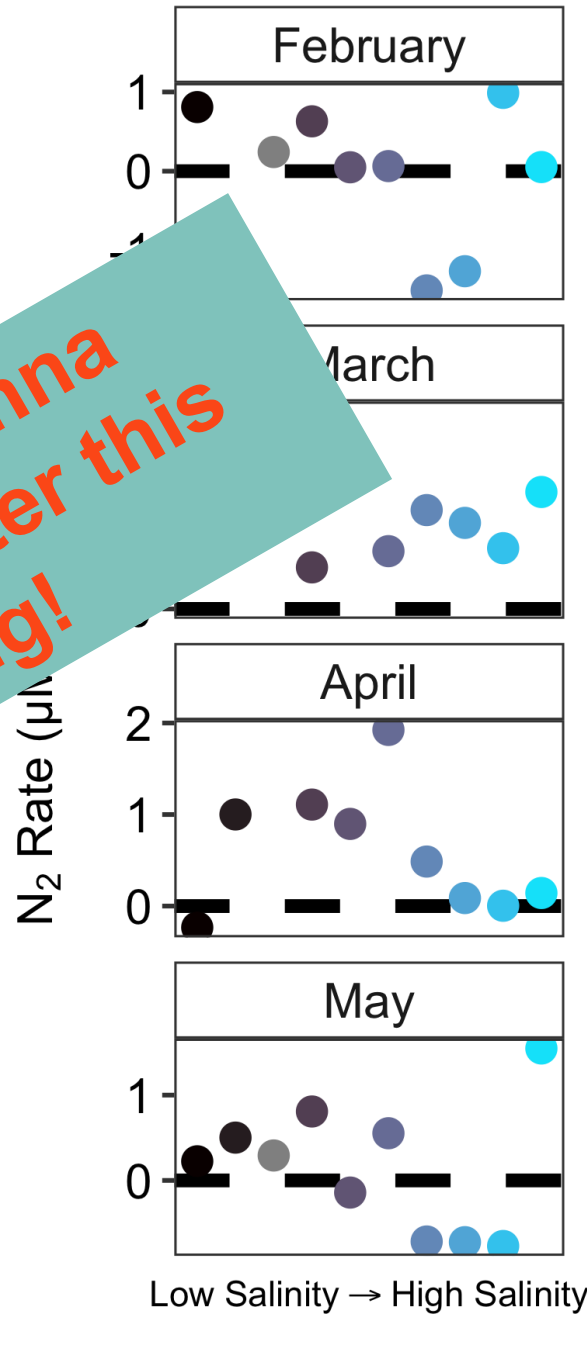
- Extreme events are increasingly likely
- They contribute a lot of water and pollutants into the system
- Potential for compound flooding and multiple pollutants



Potential solutions

- Natural processes
  - Denitrification
  - Assimilation
  - Shellfish-mediated contributions
- Management options
  - Vegetation management
  - Water levels
  - Harvesting, recreation

Check out Jenna Reimer's poster this evening!



Controlling inputs

- Maximizing biogeochemical functioning is great
- But it can only get us so far
- Need to deal with the source of the problem, not the symptoms
- What opportunities do we have to reduce the sources of water quality problems?

Treat the source

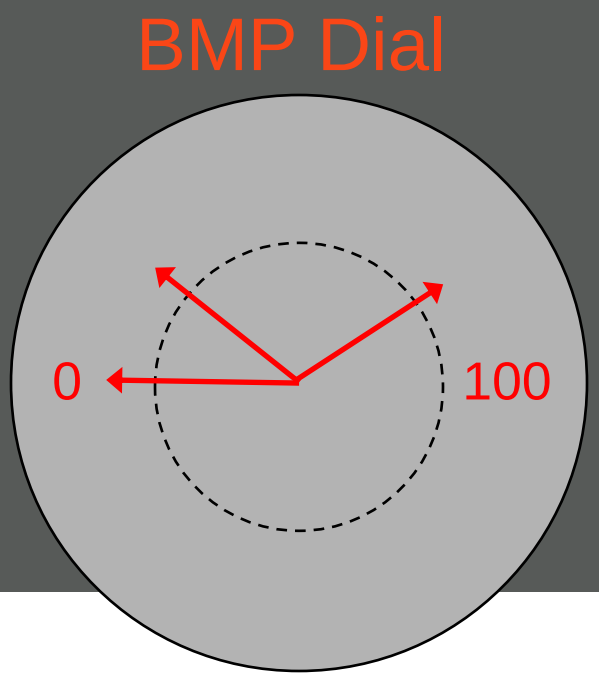
- Environmentally-responsible design, construction, and management of ongoing development
  - Residential landscapes
  - Wastewater management
  - Green stormwater infrastructure
  - IFAS programs: FFL, GI-BMP, Healthy Ponds
- Work with the range of decision makers (you all!)
  - Municipal officials
  - Builders/developers
  - Homeowners
  - Golf course superintendents

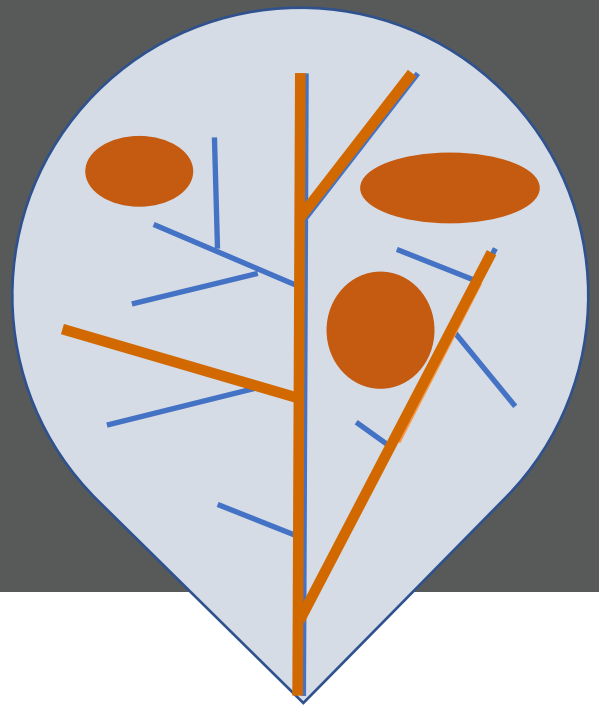
Both photos are success stories from FDEP Green Stormwater Infrastructure program. Top: Indian River County Osprey Acres Stormwater Park; Bottom: Oakland Stormwater/Drainage Improvements

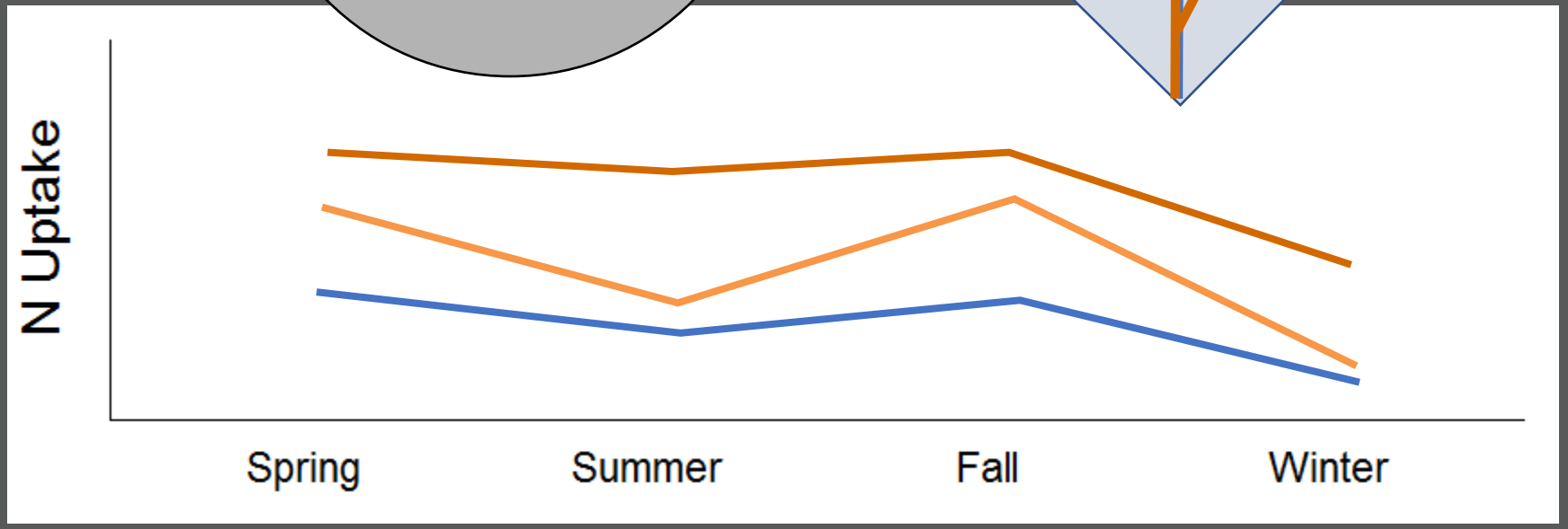
Looking forward for solutions

- How can we work together to protect Guana water quality?
- Develop alternative future scenarios based on conversations with interested parties
- What BMPs are likely? What development is likely?
- We can then test how those future scenarios would affect N loads in the watershed

Scaling up and tuning the dial







We want your input

Reach out if you're interested in scenario development:

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- How should we turn the dial?
- What other knobs are available?
- What are we forgetting?