



DRIVERS OF BLOOM  
INITIATION & TERMINATION



# Role of sediments as a driver of Lake Okeechobee HAB initiation and termination

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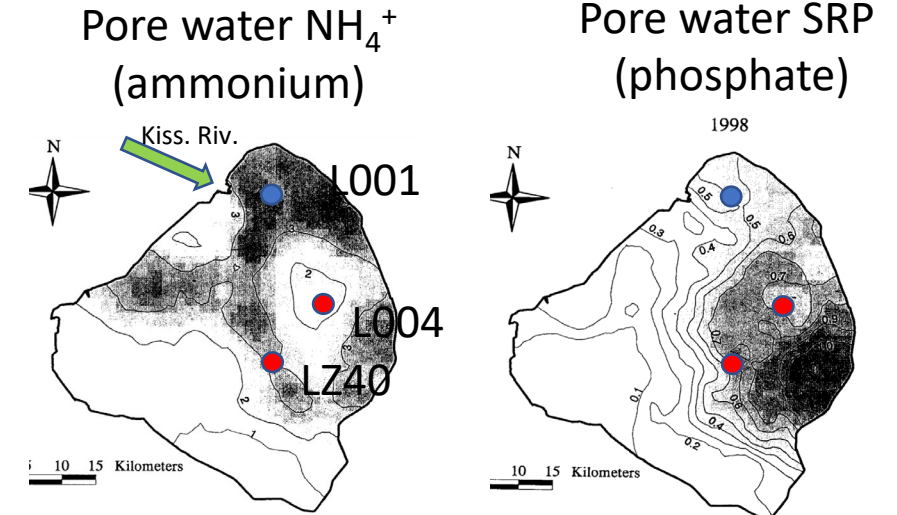


# PROJECT SUMMARY

**Goals: Understand sub-seasonal and episodic temporal drivers of Lake Okeechobee HABs**

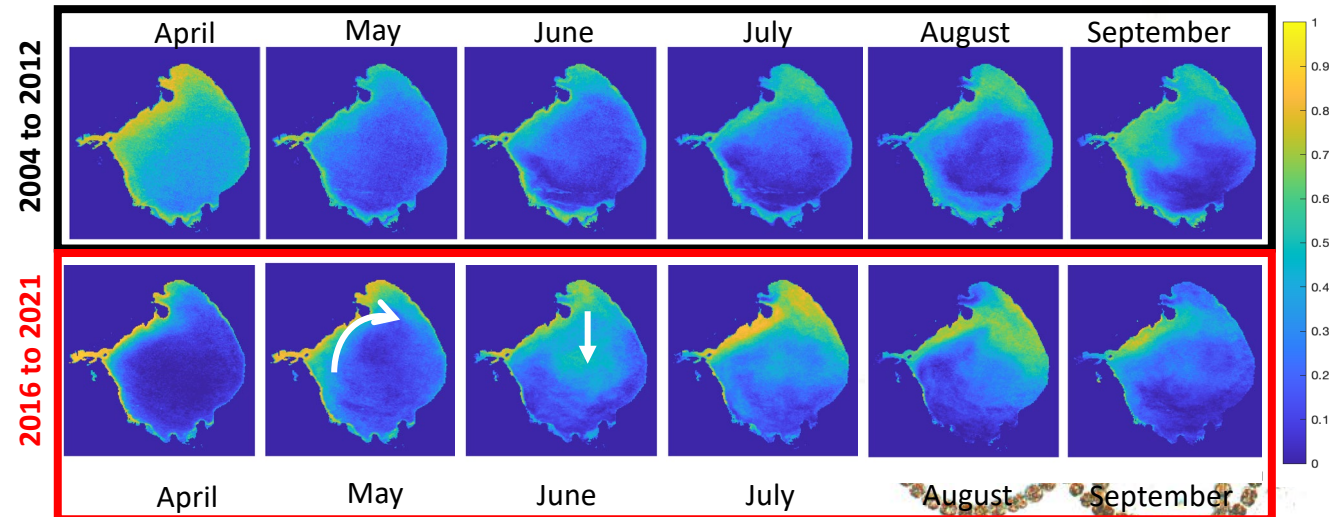
## **Implications:**

- **Nutrient ecology critical for predictive modeling**
- **Intervention strategy mechanisms & timing**
- **Annualized loading for dredging prioritization**



the porewater of Lake Okeechobee surface (0-10 cm) sediments in

Fisher et al. 2009



Moore et al., in prep

# MAJOR TAKEAWAYS

- Solid phase nutrients highly variable
- NH<sub>4</sub> more spatially variable than SRP. Little NO<sub>3</sub><sup>-</sup>.
- Sediments drive water column N:P ratios
- MC stratified @ day & turbid

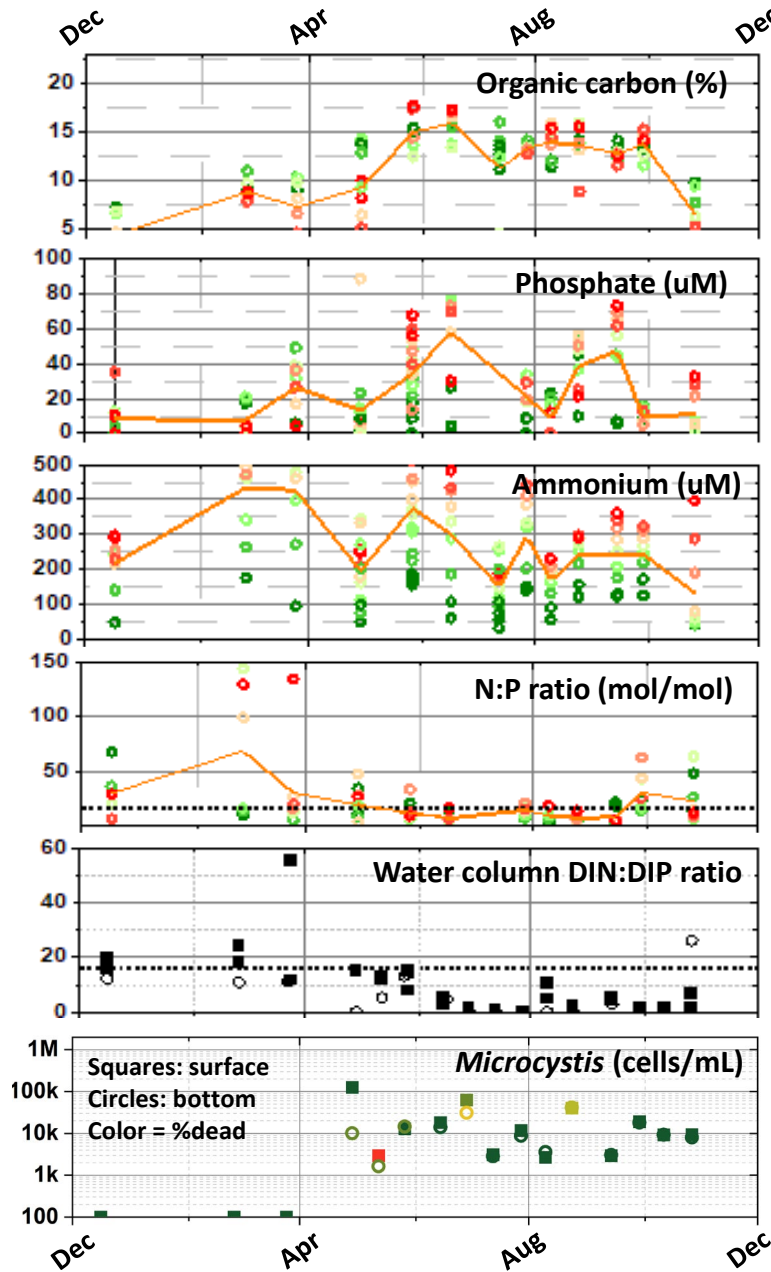
## L001

Intensification, Kissimmee inflow



Sediments

Water column



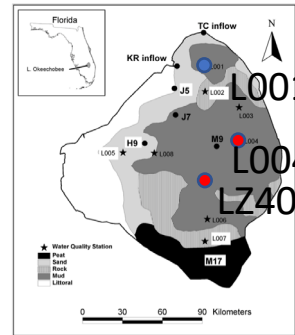
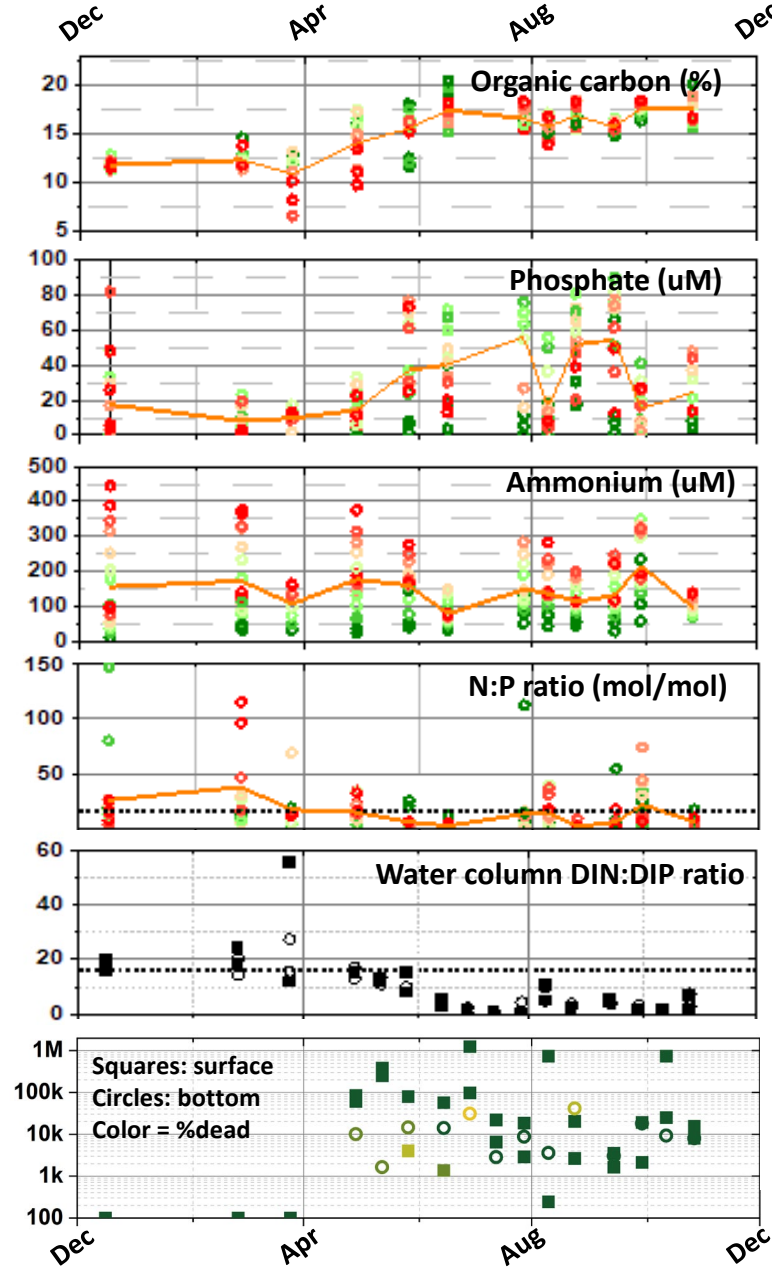
## L004/LZ40

Pelagic, Turbid, Mud accumulation

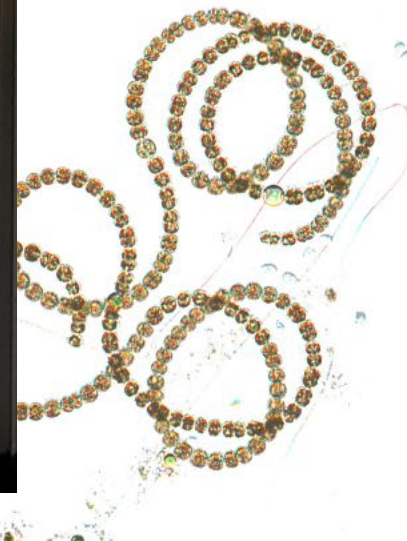


Sediments

Water column

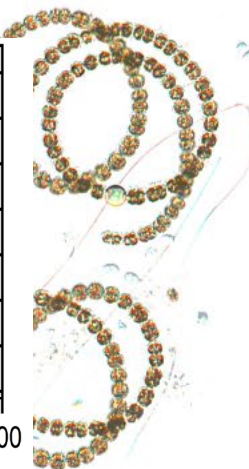
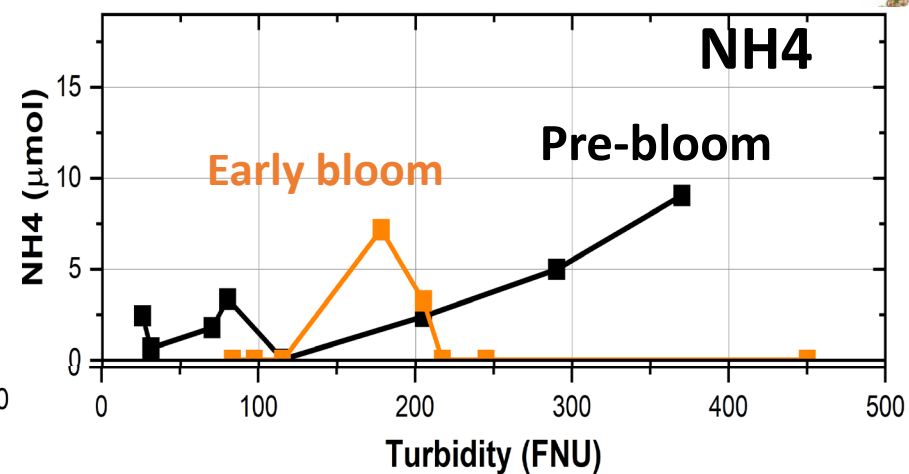
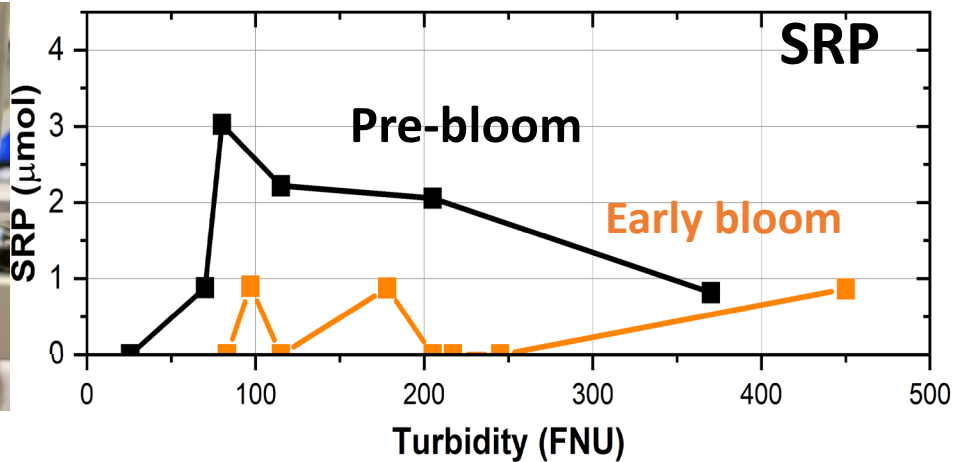
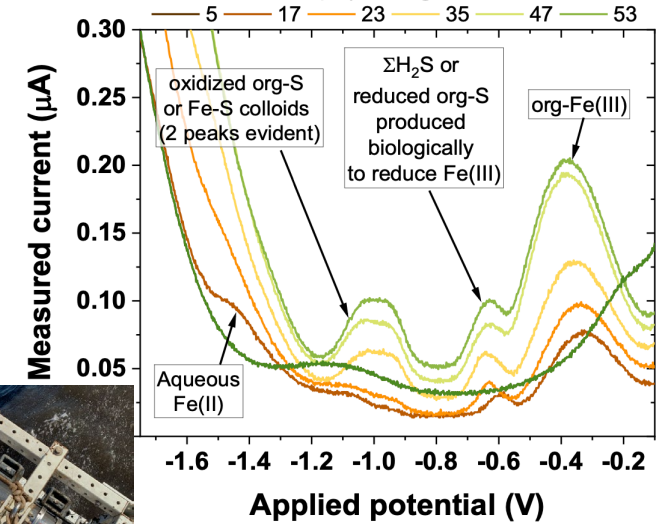


Fisher et al. 2009



# ADDITIONAL RELEVANT INFO

- Fe reduction dominant respiratory pathway
- Dynamic Fe redox/dissolution regulates N/P seasonal/episodically
- Disparate N/P seasonal timing → Nutrient Mitigation timing is critical
- Sediment resuspension both P source & sink



# RESEARCH PRIORITIES

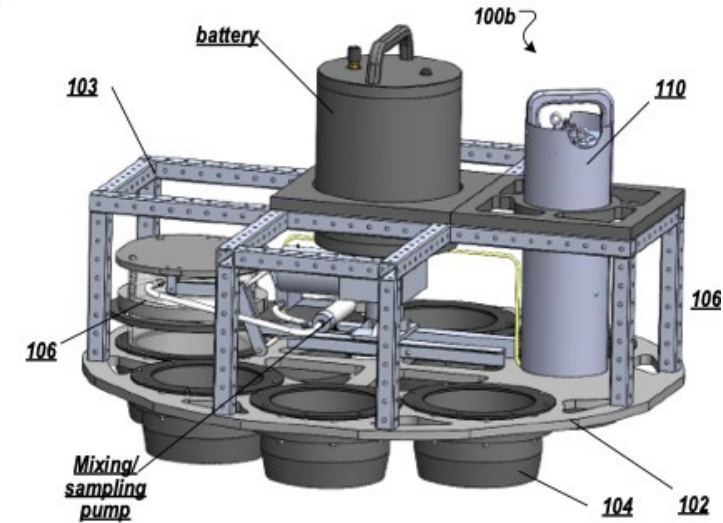
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- **Understand the factors that contribute to initiation, persistence, severity, and decline of blue-green HABs**
- Evaluate past and current hydrology and the effects of freshwater releases on blue-green algae in Lake Okeechobee (**e.g. Kissimmee River**)
- **Determine what is responsible for variability in toxicity and toxin production**
- Understand the movement of toxins into the environment, including air
- Determine variability of strain toxin levels and the relationship with N & P
- **Determine how to adequately measure bloom initiation**
- Assess food web ramifications and develop better ecological models



# NEW DATA GAPS

- High frequency sediment flux measurements needed for prediction & understanding chemical ecology
- Seasonal mismatch between  $\text{NH}_4$  & respiration?
- Resuspension a  $\text{PO}_4^{3-}$  source & sink?
- Bloom termination perhaps more complex than initiation?



Chamber Array for Observing Sediment Long-term (CAROSEL)



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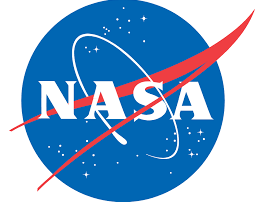


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