



DRIVERS OF BLOOM
INITIATION & TERMINATION

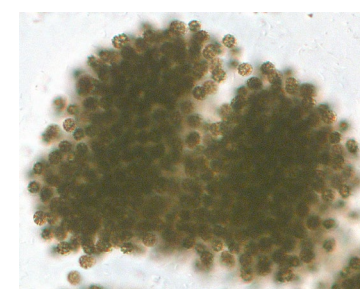
Diversity and Drivers of CyanoHAB Forming Genera in the Kissimmee Chain of Lakes and Lake Okeechobee

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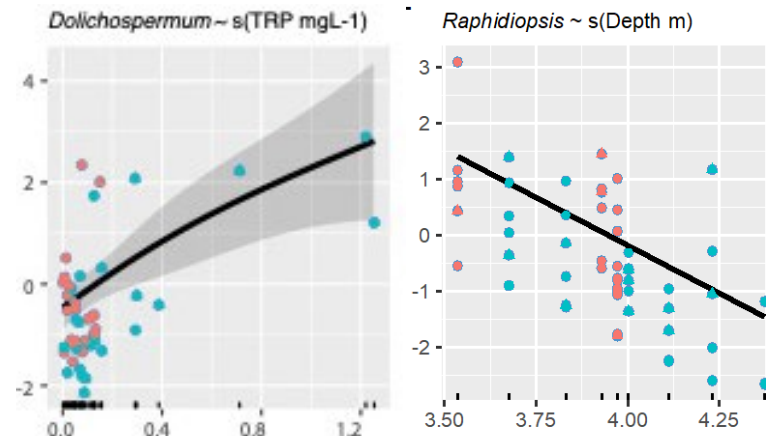
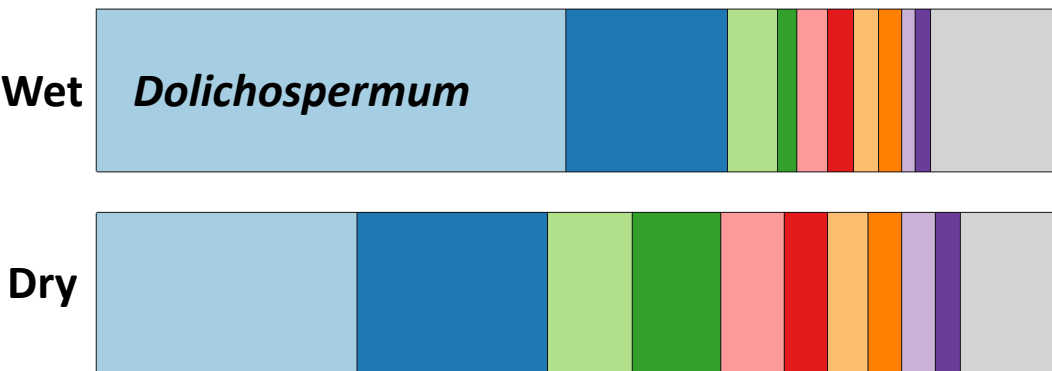
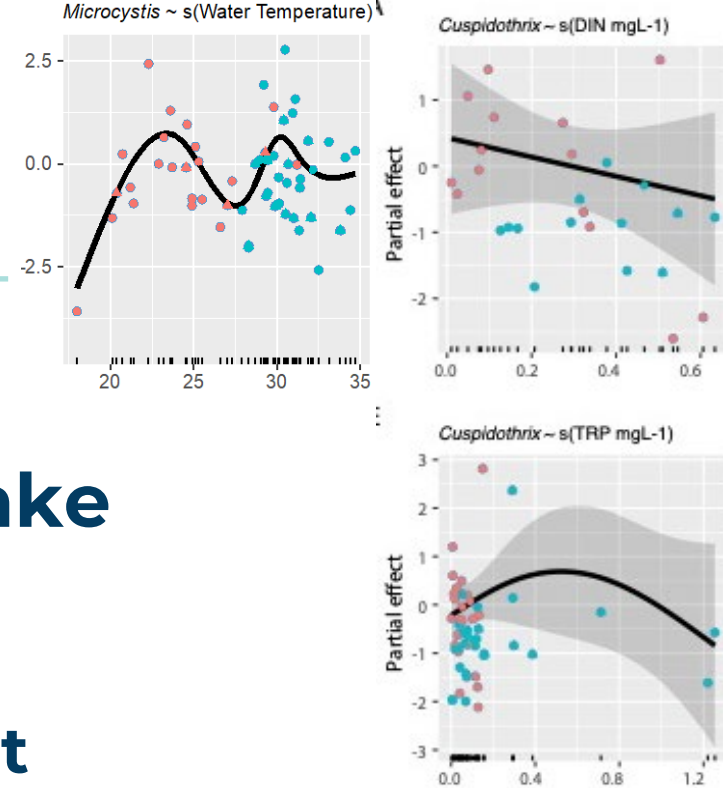
PROJECT SUMMARY

- Conducted a spatiotemporal assessment of the cyanobacterial community structure in KCoL and LO
- LO: August 2019 – September 2020
- KCoL: Spring 2021 – current, data 2021 only
- Community structure determined via 16S rRNA metabarcoding
- Who is there?
 - Focus on bloom-formers
- When/where do they occur?
 - Seasonal/spatial variation?
- Why do they occur?
 - What are their drivers?



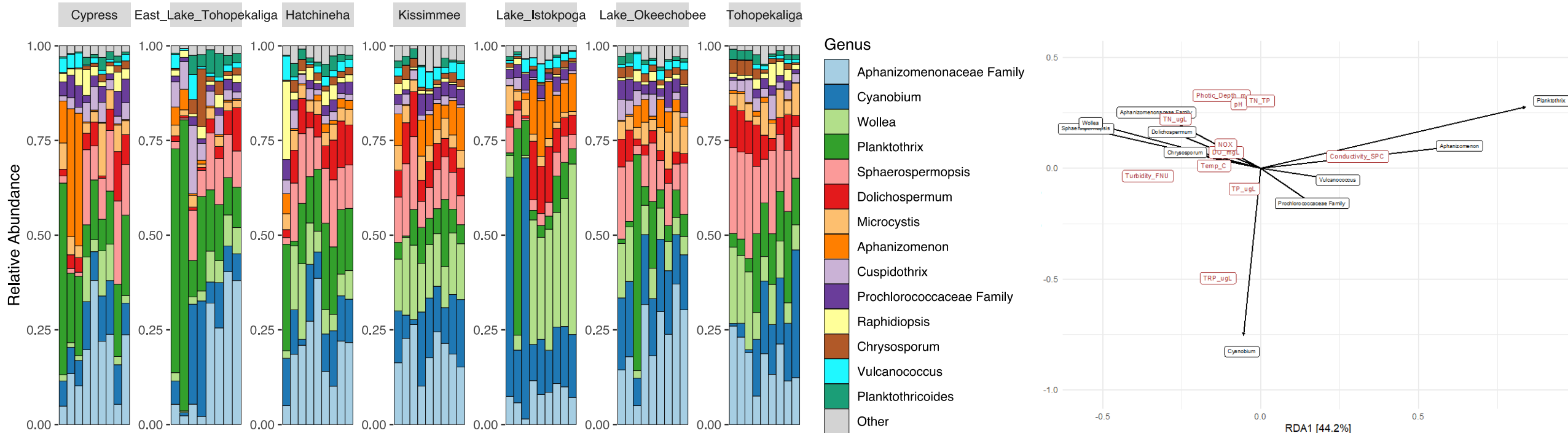
MAJOR TAKEAWAYS: LO

- ***Microcystis*** – northern region of the lake
 - High light, hot, high N:P
- ***Dolichospermum*** – southern region of the lake
 - High light, hot, wet season, phosphorus
- ***Cuspidothrix*** – less frequent
 - Cool, dry season, low nutrient (N&P) requirement
- ***Raphidiopsis*** – shallow waters
 - Cool, dry season, shallow waters, low nutrient requirement



MAJOR TAKEAWAYS: KCOL

- **Cyanobacterial community dominated by diazotrophs**
 - Distinct drivers
- **Bloom-forming cyanobacterial diversity higher than LO**
 - *Aphanizomenon*, *Planktothrix*, *Sphaerospermopsis*
- **Cyano communities significantly differ between lakes**



ADDITIONAL RELEVANT INFO

- Lake Okeechobee dominated by **picocyanobacteria** >50%
- Low abundance of **picocyanobacteria** in KCoL
- Anatoxin-a, microcystin (LR&RR), and nodularin occurred in LO
- Increased *Microcystis* abundance in northern region of LO likely due to nutrient rich inflow from Kissimmee River
- Drivers of bloom-formers in KCoL remain unknown
 - More data are needed to understand why these taxa bloom in KCoL but not in LO



RESEARCH PRIORITIES

- **Understand the factors that contribute to initiation, persistence, severity, and decline of blue-green HABs**
- **Determine what is responsible for variability in toxicity and toxin production**
- **Determine variability of strain toxin levels and the relationship with N & P**



NEW DATA GAPS

- **We are not just dealing with *Microcystis***
 - Several bloom-forming genera throughout this system
 - We need to understand who is occurring when, where, and why
- **No "one size fits all" driver of cyanoHABs**
 - Temperature, N, P, N:P affect bloom-formers differently
- **Why such high abundance of picocyanobacteria in LO not KCoL?**
 - Temporal differences?
- **Who is producing anatoxin-a and nodularins in Lake Okeechobee?**
 - More toxins than MC-LR
- **Why are bloom formers in KCoL different than LO?**
 - Temporal differences?
 - What toxins are they producing?



ACKNOWLEDGEMENTS

- flefler@ufl.edu
- Dail Laughinghouse
- Lab members
- University of Florida IFAS
- USDA NIFA
- Florida Sea Grant



United States Department of Agriculture
National Institute of Food and Agriculture

