MANAGEMENT GOALS TABLE DISCUSSION: AVAILABLE INFORMATION AND METHODS

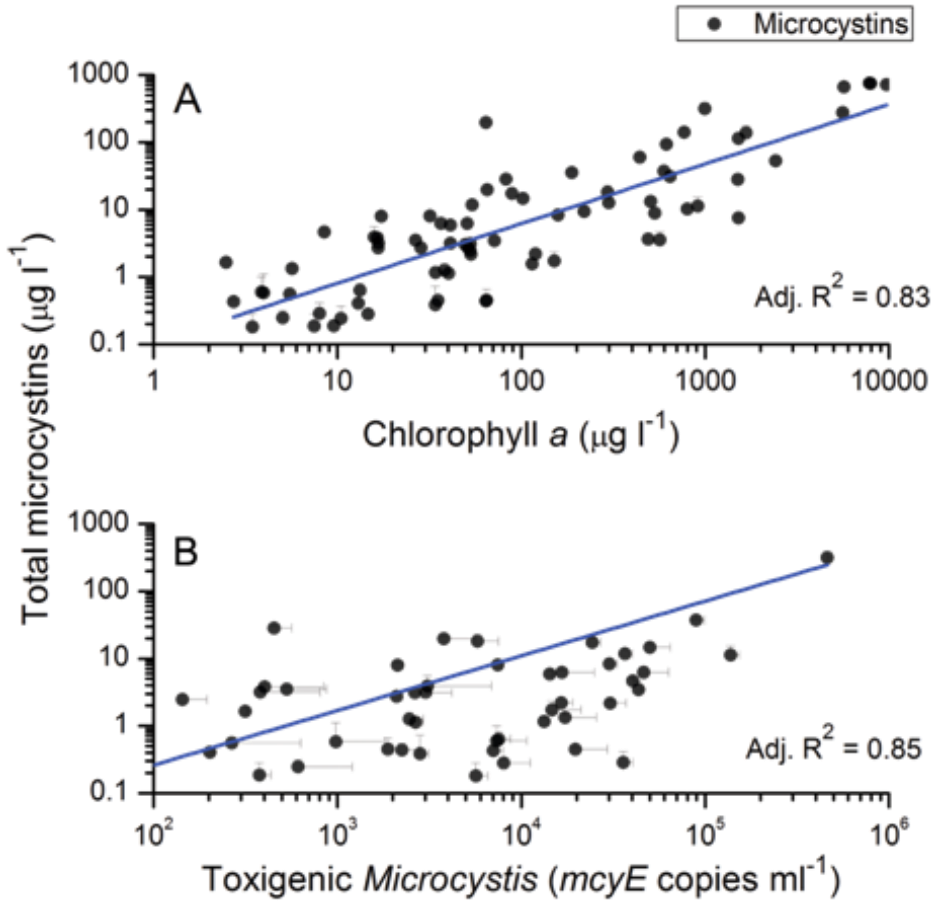
Utah Lake Water Quality Study
Steering Committee Call
2020-10-21

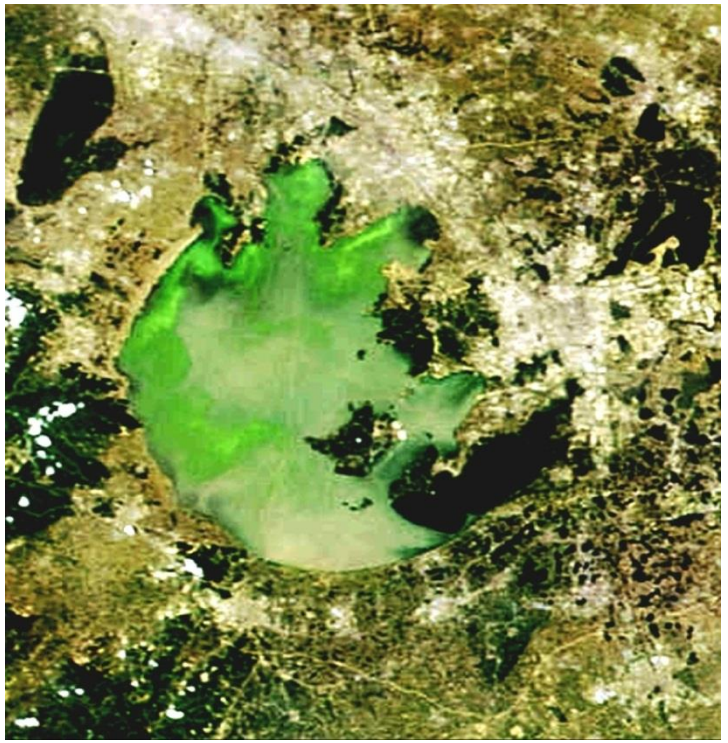
UTAH DEPARTMENT of ENVIRONMENTAL QUALITY

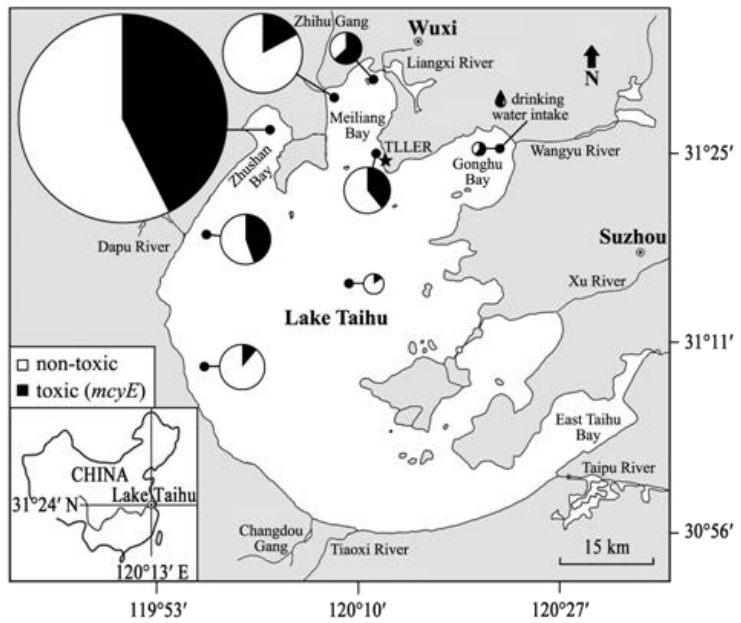
CyanoHAB Toxicity

Related to nutrient inputs and biomass

Chlorophyll a is a sensitive, relevant and easy to use indicator

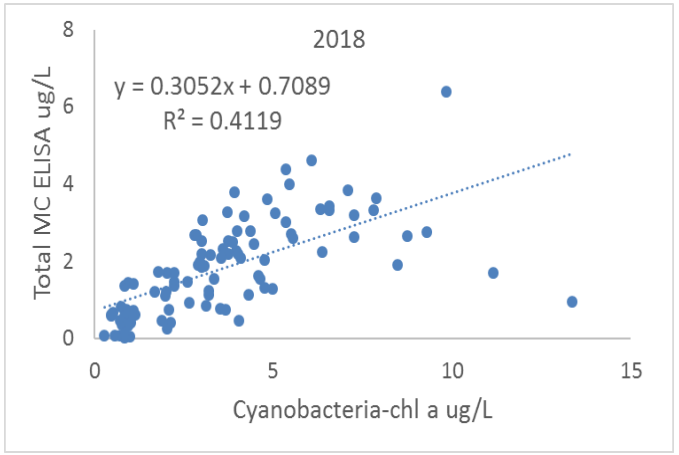


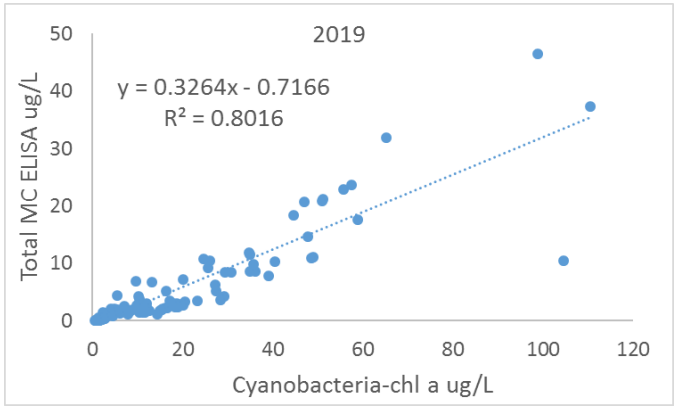


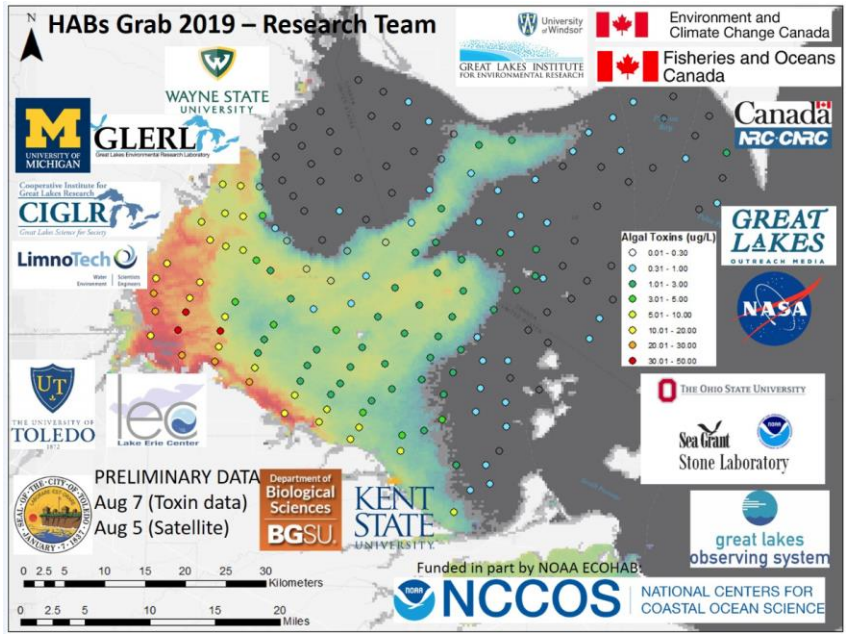


Otten et al., 2011, 2012; Wilhelm et al., 2011

IN 2019 MICROCYSTIN CORRELATED WITH CYANOBACTERIA BIOMASS, LESS SO IN 2018







GREAT LAKES CENTER
FOR FRESH WATERS AND HUMAN HEALTH
AT BOWLING GREEN STATE UNIVERSITY
BGSU

LITERATURE REVIEW

- Davis et al. 2015 (ES&T) – Lake Erie
- Gobler et al. 2016 (Harmful Algae) – Review
- Graham et al. 2010 (ES&T) – Midwest lakes
- Huisman et al. 2018 (Nature Reviews) – Review
- Kramer et al. 2018 (PLoS ONE) – Lake Okeechobee
- Jankowiak et al. 2019 (L&O) – Lake Erie
- Otten et al. 2012 (ES&T) – Lake Taihu
- Waterhorse Engineering 2020 – Klamath River
- WHO 2003 (Guidelines for safe recreational water environments)
- EPA 2020 (Draft Ambient Water Quality Criteria Recommendations for Lakes and Reservoirs of the Conterminous United States) & accompanying data
- EPA 2019 (Recommended Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin)

UTAH LAKE DATA ANALYSIS

- 2017-2020: Cell counts and biovolume paired with toxins (HAB monitoring program)
- Also have phytoplankton data from routine monitoring, but not paired with toxins → use as a check on the distributions between HAB samples and routine samples
- Process data from HAB program, then test for relationships (next slide)

RELATIONSHIPS OF INTEREST

Chlorophyll concentration

Total phytoplankton cell count

Total cyano. cell count

Toxigenic cyano. cell count

Individual genus cell count

vs.

Toxin concentration

- Microcystin
- Anatoxin

COVARIATES/FACTORS TO INCLUDE IN ANALYSES

- Surface vs. composite samples
- Counting method and laboratory
- Year
- Location
- Distributions of cell counts in HAB monitoring samples vs. routine monitoring samples → how representative are paired data from HAB monitoring program?

METADATA FOR INDIVIDUAL MEASURES

To help answer questions 2-5, we plan to compile metadata for each measure.

If data exist for Utah Lake:

- Dataset (i.e., routine monitoring, HAB monitoring, etc.)
- Number of samples
- Spatial extent of samples
- Temporal extent of samples (years and months)