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Building Successful Partnerships – Rowing the Same Direction

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Presentation roadmap

- HAB research coordination in KS
  - KU Field Station – Aquatic Facility

- 2 collaborative projects at KUFS
  - 2018 Tank Project Overview
  - High-frequency monitoring at Cross Reservoir
    - Vertical profiling
    - Sub-hour nutrient data

HAB research coordination in KS

- Started in 2017 by Kansas Water Office
- Working group with Federal, State, & University
- 31 members from 10 KS universities or agencies
- Primary goal to identify research gaps for KS

HAB research coordination in KS

- Identified short- and long-term priorities
- Short-term
  - What is the historical context for HABs?
  - Terrestrial-aquatic interactions (Nutrients)
- Long-term
  - Are there HAB early-warning signs?
    - High-Frequency WQ monitoring

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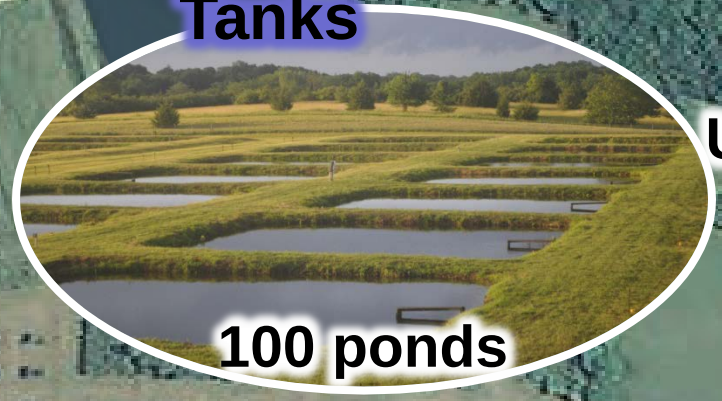
Experimentally Studying Managem

Manage causes to better control effects

Experimental Reservoir and Watershed

Experimental Ponds and Tanks



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deNoyelles, Kettle and Sinn 1982
deNoyelles et al. 2016

1977 to Present

2018 Tank Experiment

- Does nutrient form control HAB toxins?
- Goal:
  - Examine how nutrient limit regimes (N and P) and forms (NO_3 and NH_3) affect cyano + toxins
- Funded by KS Water Resource Institute
- Collab. with KBS, Mizzou, EPA R7, EPA ORD

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Milford 2017 →

KUFS storage + 2018 Milford inoculum w/ 6 Treatments

Treatment	*Target N:P*	*N-limited?*	*P-limited?*
Control	Ambient	Ambient	Ambient
+ Nitrate	20:1	No	Yes
+ P & Nitrate	4:1	Yes	No
+ Ammonium	20:1	No	Yes
+ P & Ammonium	4:1	Yes	No
+ P	4:1	Yes	No

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Algae/water from Milford

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Stir to homogenize while dosing

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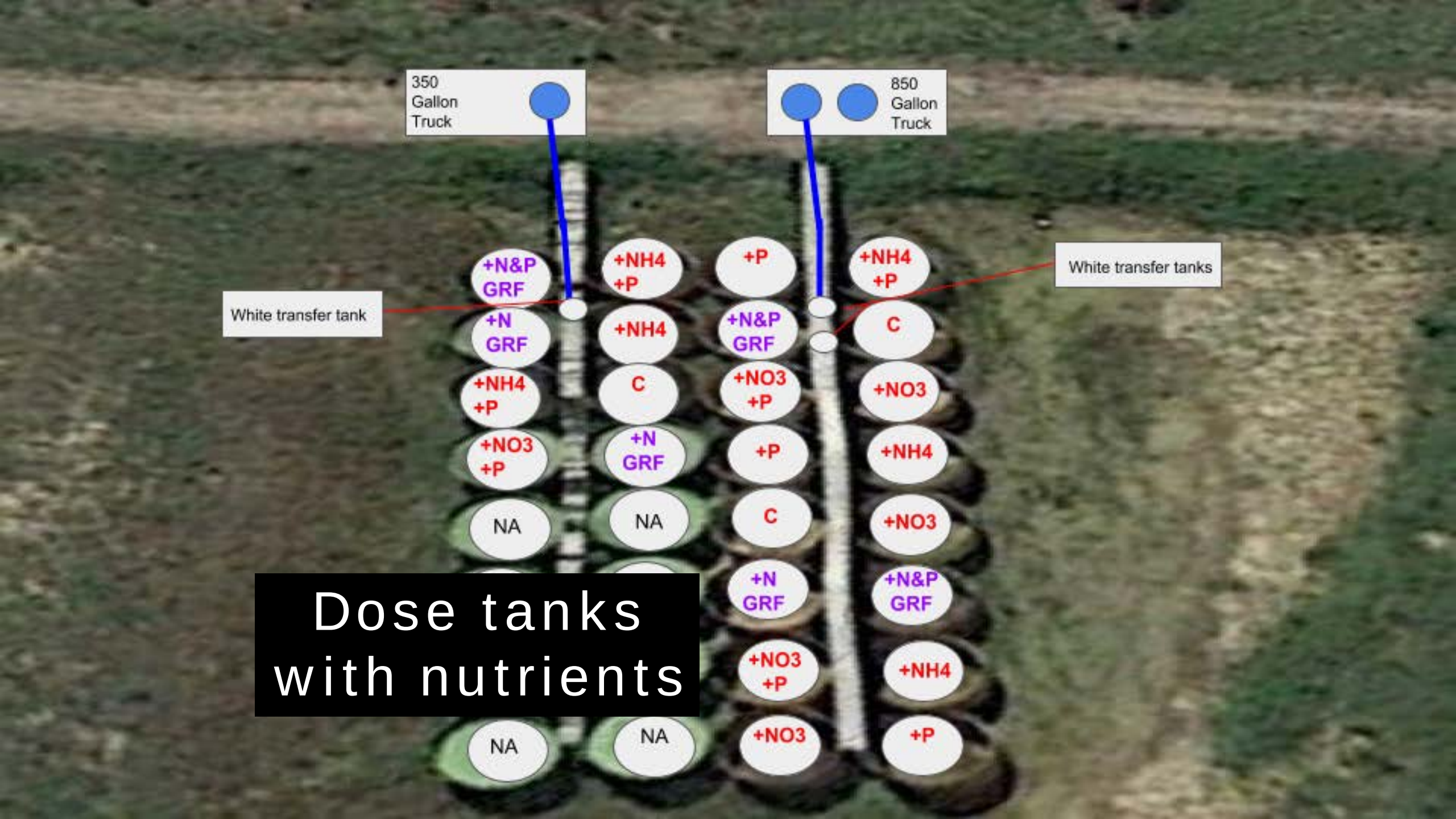
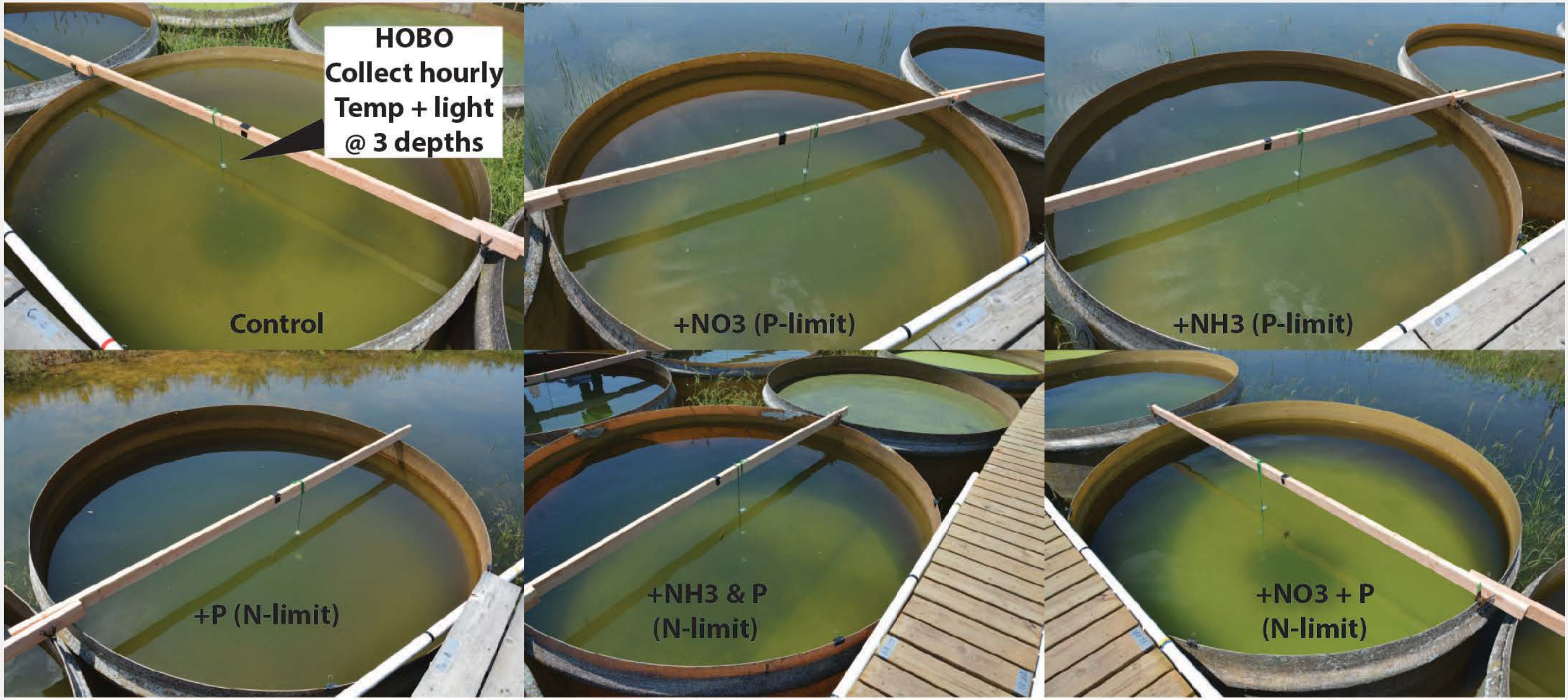
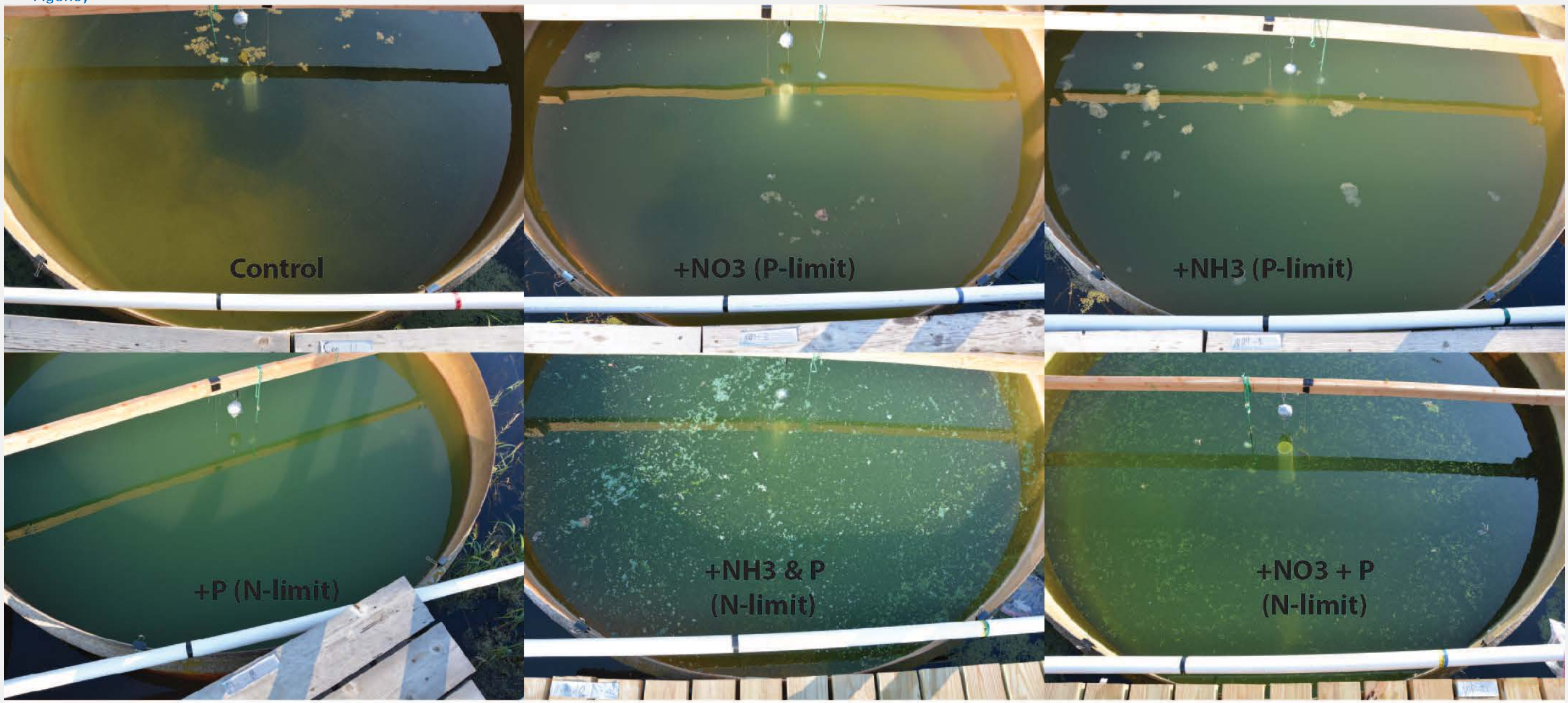

350
Gallon
Truck
850
Gallon
Truck
White transfer tank
White transfer tanks
+N&P
GRF
+N
GRF
+NH4
+P
+NO3
+P
NA
+NH4
+P
+NH4
C
+N
GRF
NA
+P
+N&P
GRF
+NO3
+P
+P
C
+N
GRF
+NO3
+P
+NO3
+NH4
+NO3
+N&P
GRF
+NH4
+P
C
+NO3
+NH4
+NO3
+N&P
GRF
+NH4
+P
Dose tanks
with nutrients



23-Jul-2018 - After Milford water added to all tanks. 1 of 3 replicate tanks pictured per treatment.



13-Aug-2018 - Same tanks as previous picture after 21 days. Note surface scums on N-limit tanks.

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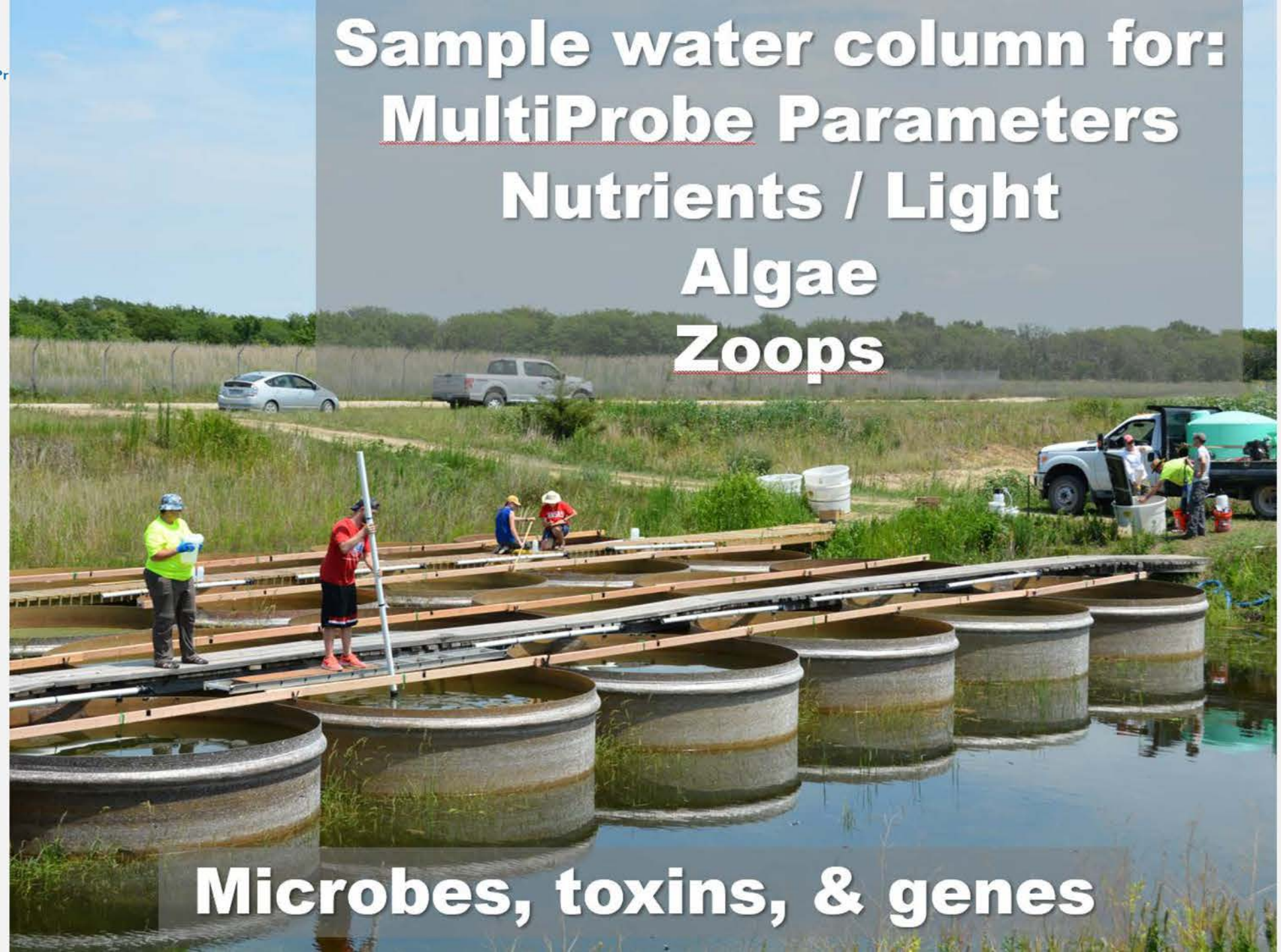
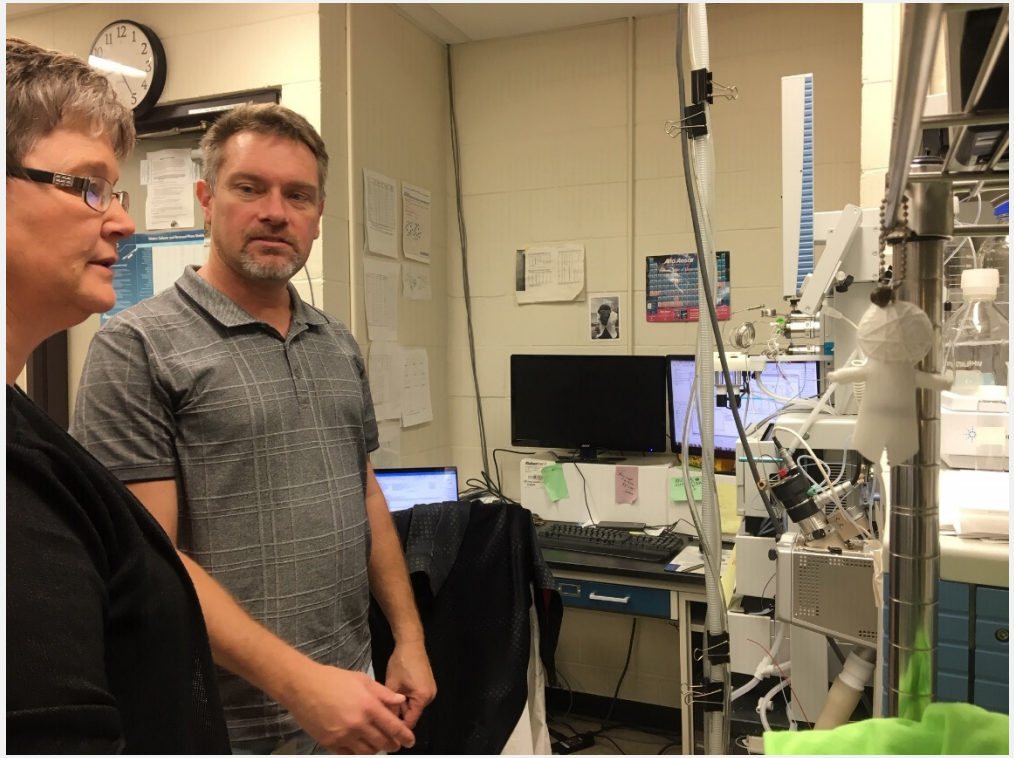


- On-site filter processing for qPCR and Phylochip Samples in EPA Mobile Lab
- Analysis of Phycocyanin and Chlorophyll

- Aliquot collected for EPA laboratory analysis of NO3/NO2
- Aliquot collected for EPA ORD analysis of Microcysitin congeners by Dr. Heath Mash



- Processing in EPA lab for qPCR
  - Looking for genetic markers indicating cyanobacteria
  - Toxin producing gene sequences for MC, CYL, and SAX
- Phylochip for bacterial community analysis

Profiling Prototype

Building a platform to float “BOB”

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Who needs floats, we've got boats!

A couple of batteries, a solar panel, and BOB.

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Tying it up.

Cross has three central buoys for this sort of thing.

You can lead a STĒPH to water

Region 7 and Kansas Biological Survey moving the platform.

The other brains of the operation

Stephen Krabbe doing some final checks before deployment.

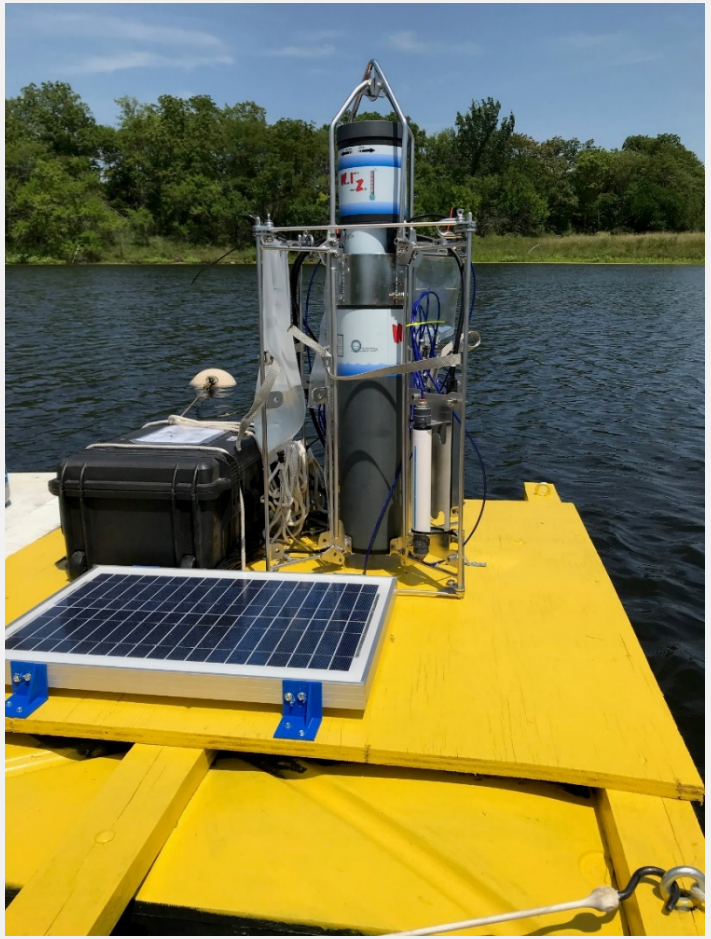
Pretty much the worst paddler ever.

Regina Klepikow – Region 7

STĒPH, Stephen, and Steve

The Steves.

WIZ – Water Insitu AnalyZer



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