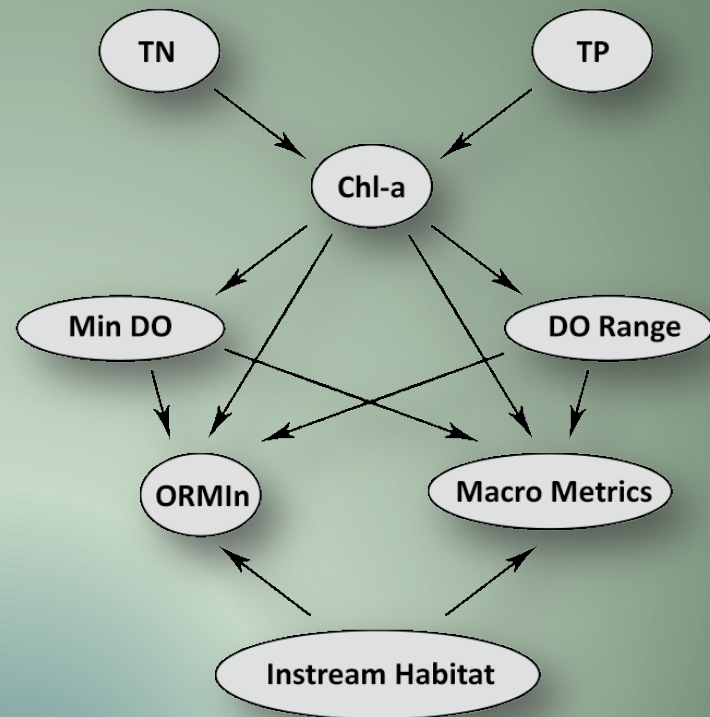


Nutrient Criteria Development

A New Approach

Greg Youngstrom

Ryan Argo



A New Approach

Nutrients (TN, TKN, TP)



Algal Growth (Chl-a, TChl)



Dissolved Oxygen (min, Stds, Δ)

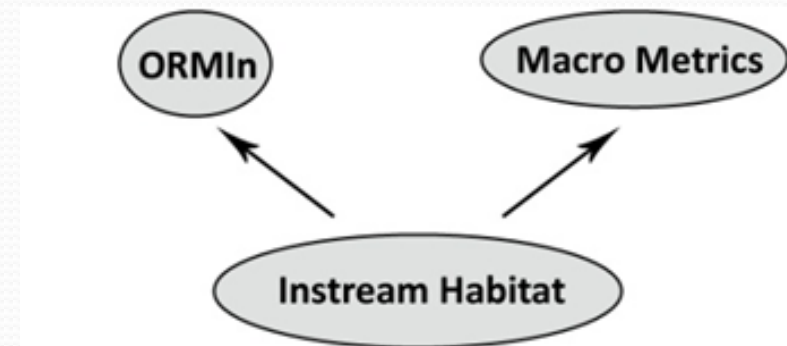
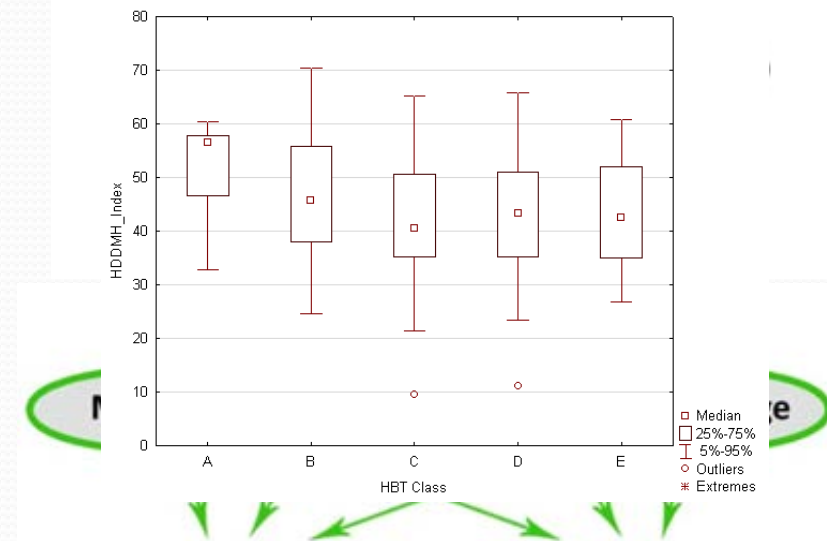
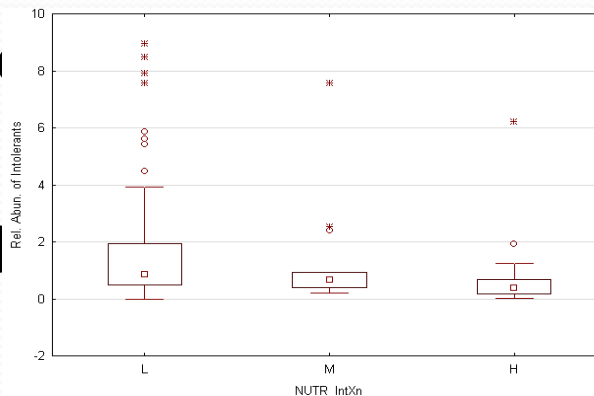


Biology (macros, ORMin)

Establish Criterion
Breakpoint Analysis
or
Bayesian Hierarchical Model

Prior Knowledge

- Nutrient Program – Paired data collections
 - nutrients, planktonic algae & chl-a
 - failed to develop a cause and effect relationship
- ORMin
 - Metrics varied with habitat and showed responsiveness to nutrients
- Missing Piece
 - Determining
- Augmented
 - USACE Lo



ORSANCO's conceptual approach to nutrient criteria development modified from Qian & Miltner (2014, in prep)

Filling the Gap

- Goal – minimum 2yr study
 - Obtain standardized, paired samples of sestonic nutrients, chl-a, DO, & macros
- Purchased 60 HOBO DO Loggers
 - Louisville USACE covered macro analytical in 3 pools – offset cost

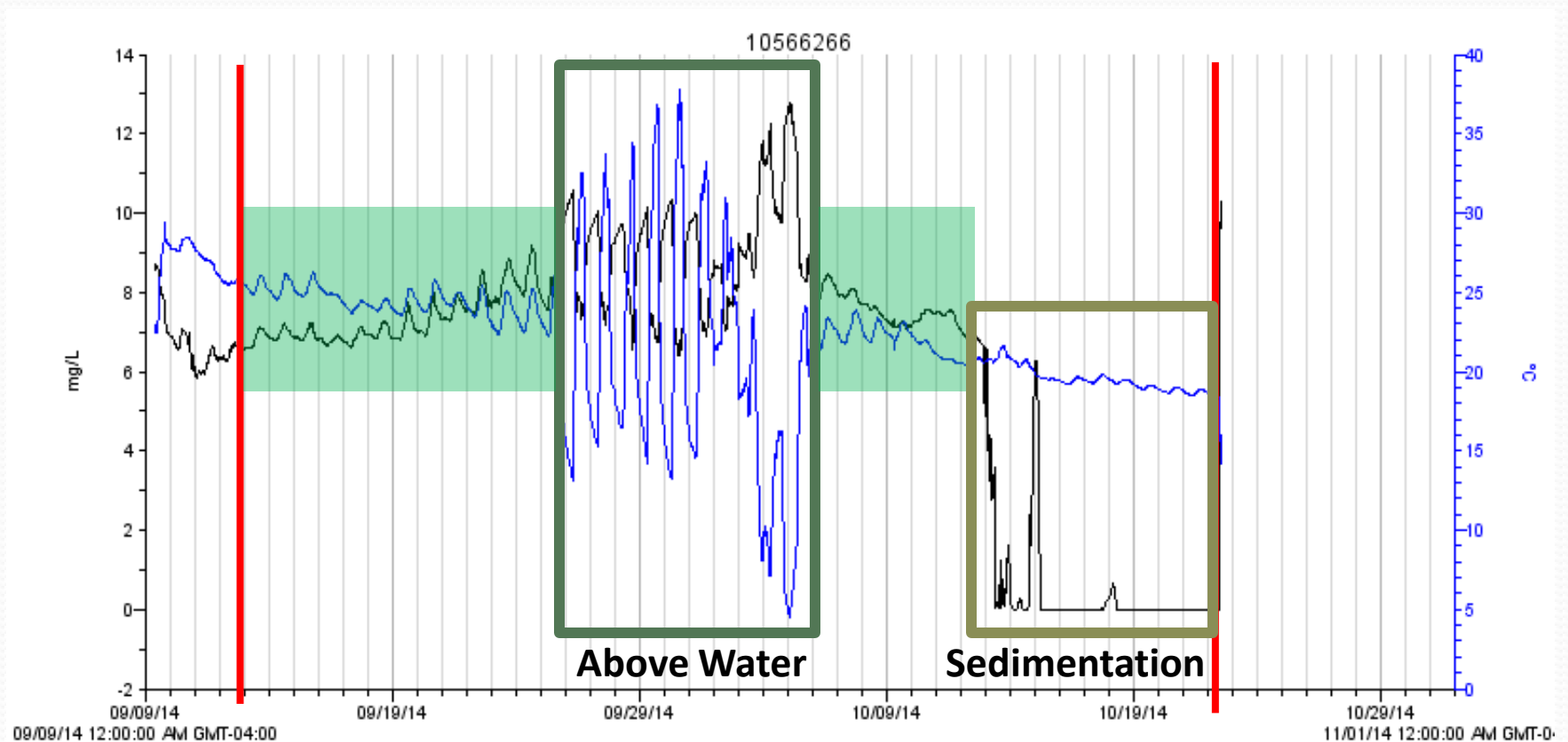


How'd we DO

- Retrieved 58/60, one stolen, one lost to time
- 15 had questionable periods
 - Issues with stage and sedimentation
- One buried under 3' sediment, 2' under water



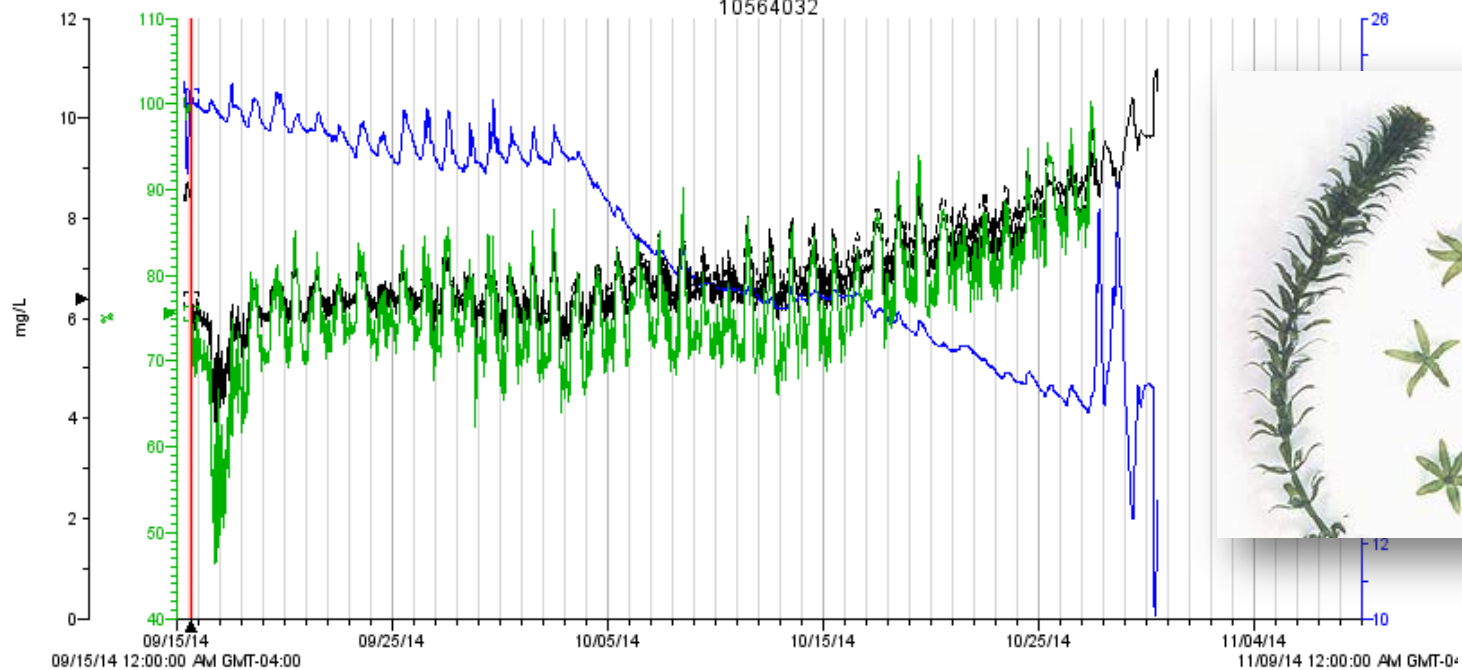
Addressing Complications



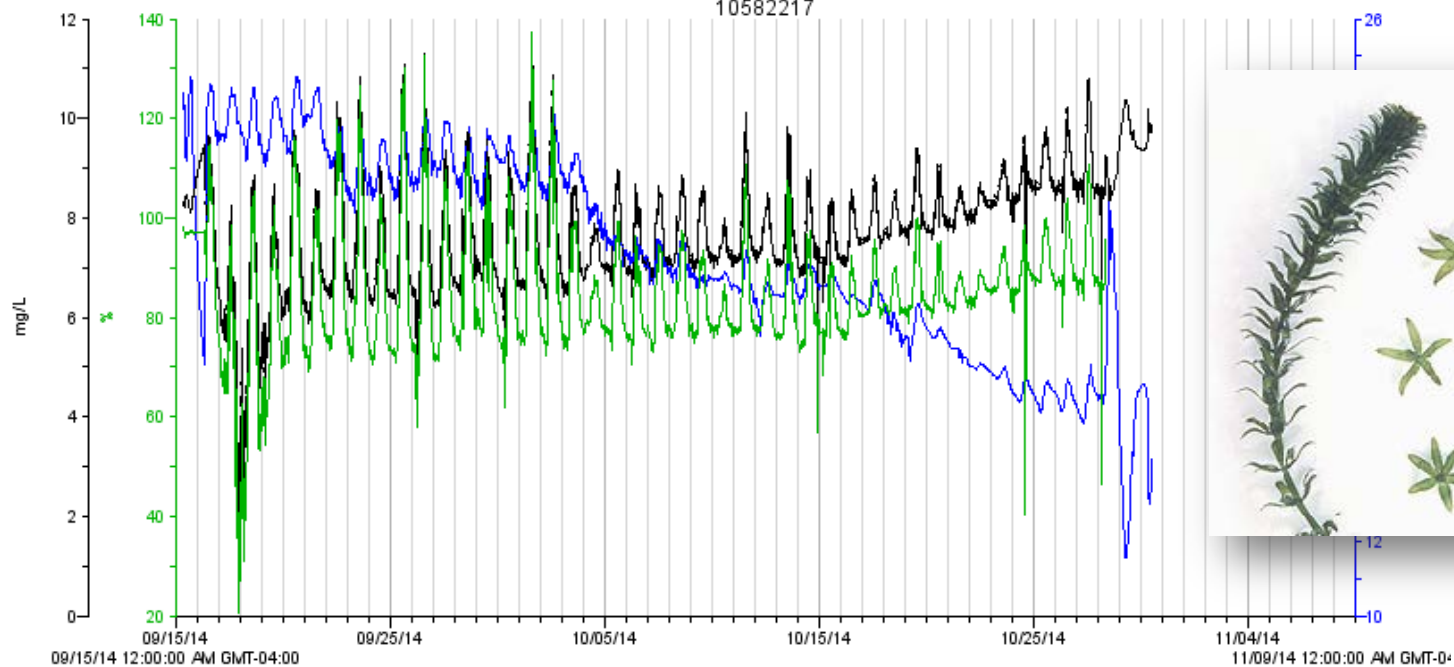
Deployed

Retrieved

10564032



10582217



HOBO Summary Data

Pool	Avg Daily Min (ABS) mg/L	Freq DO Readings <5mg/L	Freq >3mg/L Diel Δ
Belleville	6.06 (0.02)	12 sites (0-40%)	9 sites (0-60.5%)
Markland	6.39 (2.16)	9 Sites (0-5.1%)	8 Sites (0-13.9%)
McAlpine	6.54 (1.03)	11 sites (0-4.2%)	7 sites (0-23.8%)
Olmsted	6.89 (4.67)	4 sites (0-0.2%)	9 sites (0-5.9%)

Preliminary results – QA and exploratory analysis ongoing

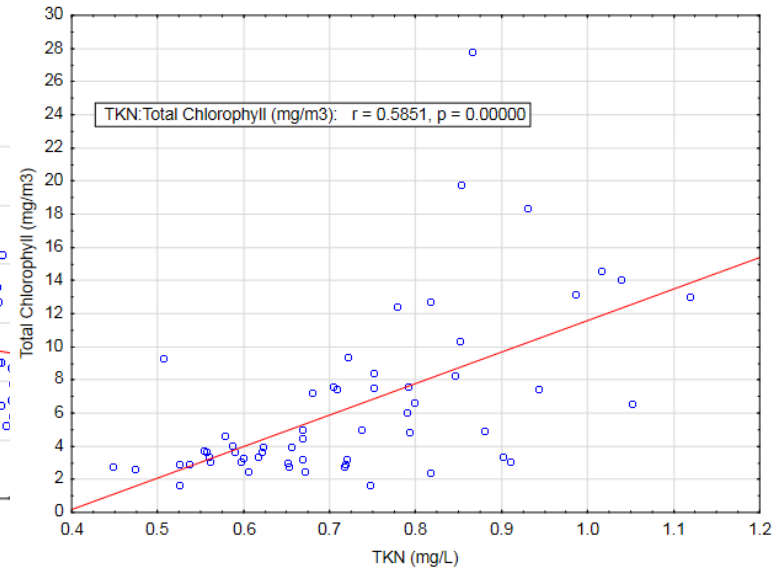
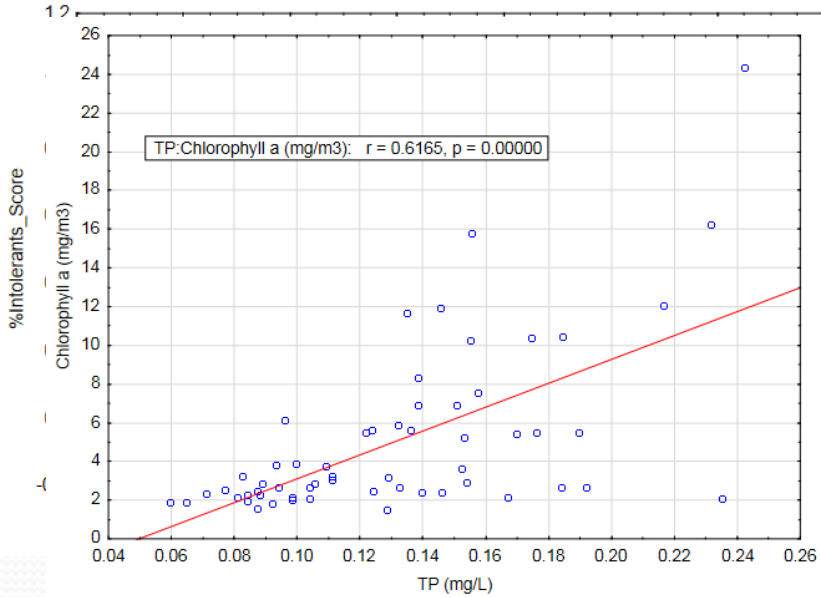
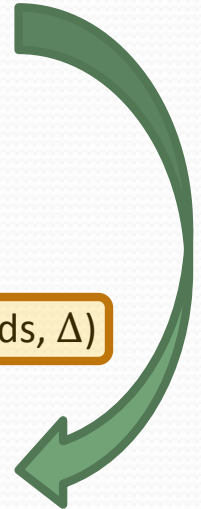
Current Status

Nutrients (TN, TKN, TP)

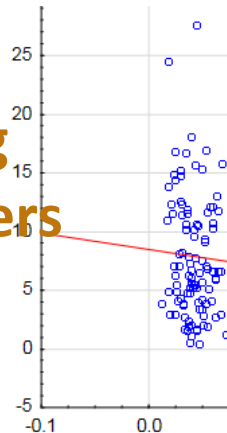
Algal Growth (Chl-a, TChl)

Dissolved Oxygen (min, Stds, Δ)

Biology (macros, ORMIn)



Generating
2007 – 2014 Data
DO parameters



Current Status

- 2014 Field Season
 - All chl-a & macro data should be available at the end of this month
- 2015 Field Season
 - Montgomery, Racine, J.T. Myers
 - Earlier DO deployment
 - June – October
 - Confirm September critical period

