

US EPA ARCHIVE DOCUMENT

USE-PERCEPTION DATA FROM WADEABLE STREAMS OF NEW YORK STATE: IMPLICATIONS FOR NUTRIENT CRITERIA

ALEXANDER J. SMITH, ROGER THOMAS, J. KELLY NOLAN, SYLVAN KLEIN,
AND BRIAN T. DUFFY

34TH ANNUAL MEETING OF THE NEW ENGLAND ASSOCIATION OF ENVIRONMENTAL BIOLOGISTS
NEWPORT, RHODE ISLAND
MARCH 19, 2010

NYSDEC Stream Biomonitoring Unit
Division of Water



Outline

- Nutrient criteria in NY
- User perception data
- Study design
- Results
- Conclusions w/ implications for nutrient criteria

Nutrient Criteria in NYS

Waterbody Type	Recreation	Aquatic Life	Human Health
Rivers & Streams	Ongoing	X	Ongoing
Lakes & Reservoirs	X	Ongoing	X
Wetlands	?	?	?

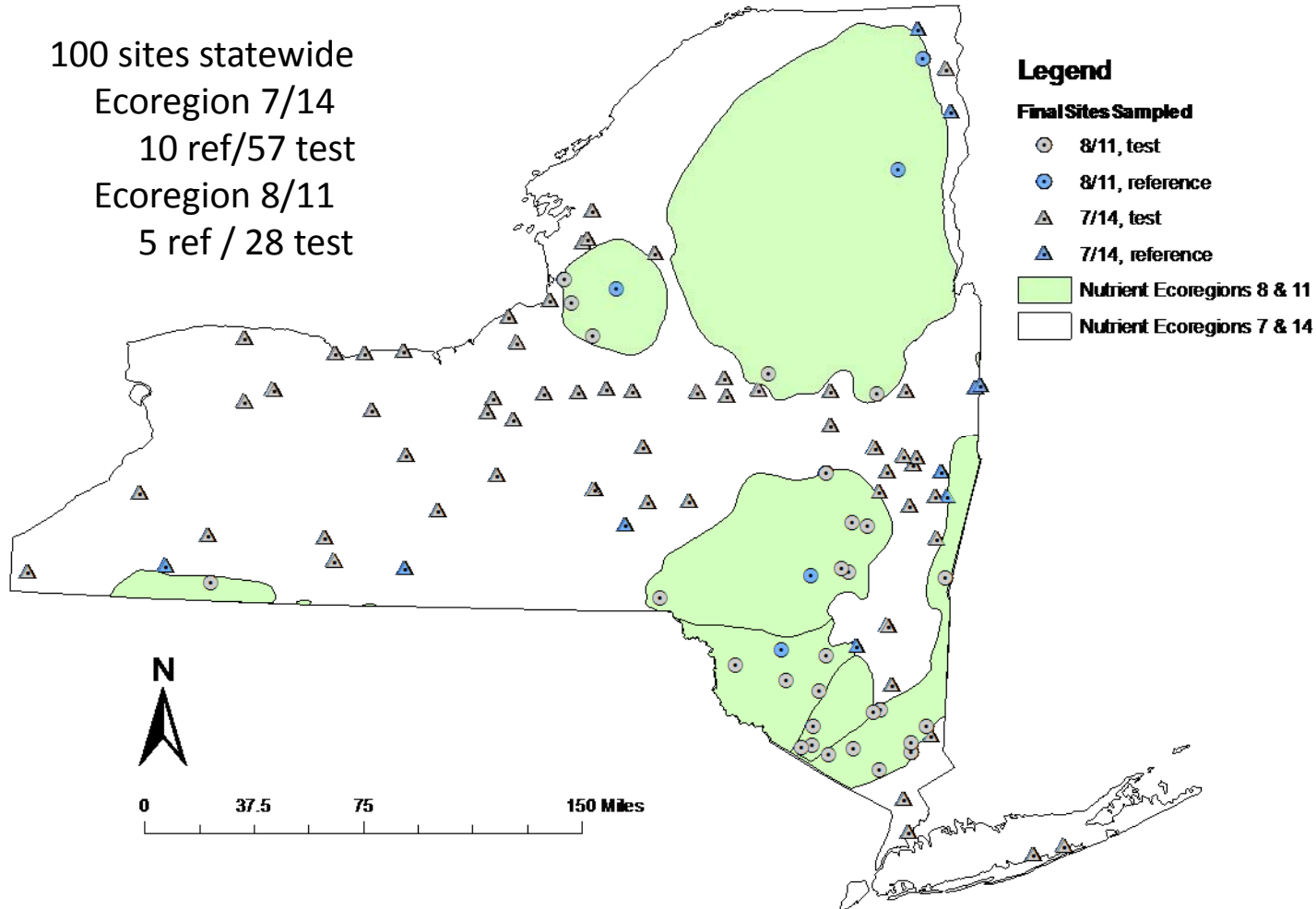
- Rivers and Streams: $30\mu\text{g/l}$ TP, $880\mu\text{g/l}$ TN, $530\mu\text{g/l}$ NO_3^-
- Lakes and Reservoirs (Human Health): $12\text{-}17\mu\text{g/l}$ TP, $4\text{-}5\mu\text{g/l}$ Chl-a
- Lakes and Reservoirs (Recreation): $12\text{-}34\mu\text{g/l}$ TP, $5\text{-}17\mu\text{g/l}$ Chl-a, $1.2\text{m}\text{-}2.7\text{m}$ Clarity

User Perception Data

- Used often in Lake water quality assessment programs
- Widespread surveys targeting lake associations
- Link sampling parameters and recreational impacts
- Provides a rationale for selecting nutrient criteria for the maintenance of desired aesthetic qualities and recreational uses

Study Design

100 sites statewide
Ecoregion 7/14
10 ref/57 test
Ecoregion 8/11
5 ref / 28 test



Study Design

- Water chemistries
- Benthic invertebrates
- Periphyton
- User perception survey
- EPA habitat assessment



Use Perception Field Sheet

NYSDEC - Assessment of Recreational Use Perception

Circle the one answer which best describes your ability to participate in 1⁰ contact recreation:

- a. Beautiful, could not be nicer. Ability to swim, wade, dive, water ski etc. ~~fully attained.~~
- b. Minor aesthetic problems, but still excellent for 1⁰ contact recreation
- c. 1⁰ contact recreation slightly impacted.
- d. Desire to participate in 1⁰ contact recreation substantially reduced.
- e. Awful! 1⁰ contact recreation impossible.
- f. Not applicable (headwater/high flows/dry, etc.)

Circle the one answer which best describes your ability to participate in 2⁰ contact recreation:

- a. Beautiful, could not be nicer. Ability to fish and boat fully attained.
- b. ~~Minor aesthetic problems, but still excellent for 2⁰ contact recreation.~~
- c. 2⁰ contact recreation slightly impacted.
- d. Desire to participate in 2⁰ contact recreation substantially reduced.
- e. Awful! 2⁰ contact recreation impossible.
- f. Not applicable (headwater/high flows/dry, etc.)

Use Perception Field Sheet

Weather conditions (Current):	Sun	Rain	Clouds								
Weather conditions (Past 24hrs):	Sun	Rain	Clouds								
Water Clarity:	0	1	2	3	4	5	6	7	8	9	10
	Clear			Intermediate						Turbid	
Phytoplankton: (suspended)	0	1	2	3	4	5	6	7	8	9	10
	Natural			Intermediate						Severe	
Periphyton Cover:	0	1	2	3	4	5	6	7	8	9	10
	Natural			Intermediate						Severe	
Macrophyte Cover:	0	1	2	3	4	5	6	7	8	9	10
	Natural			Intermediate						Severe	
Odor:	0	1	2	3	4	5	6	7	8	9	10
	Natural			Intermediate						Noxious	
Trash:	0	1	2	3	4	5	6	7	8	9	10
	None			Intermediate						Landfill	
Discharges/Pipes:	0	1	2	3	4	5	6	7	8	9	10
	None			Intermediate						Dominant	

Use Perception Field Sheet

- c. 1⁰ contact recreation slightly impacted.
- d. Desire to participate in 1⁰ contact recreation substantially reduced.

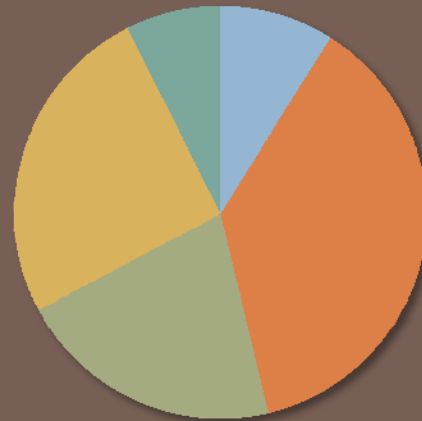
Contact Recreation

Primary Contact Recreation



ER 7/14

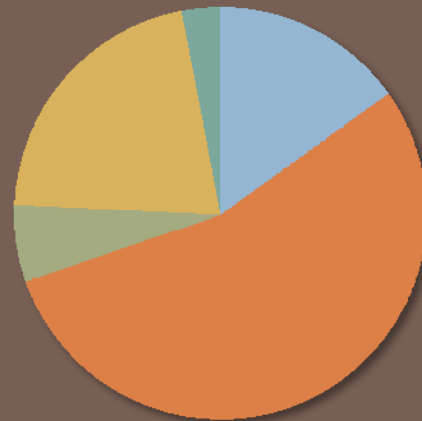
Secondary Contact Recreation



ER 7/14



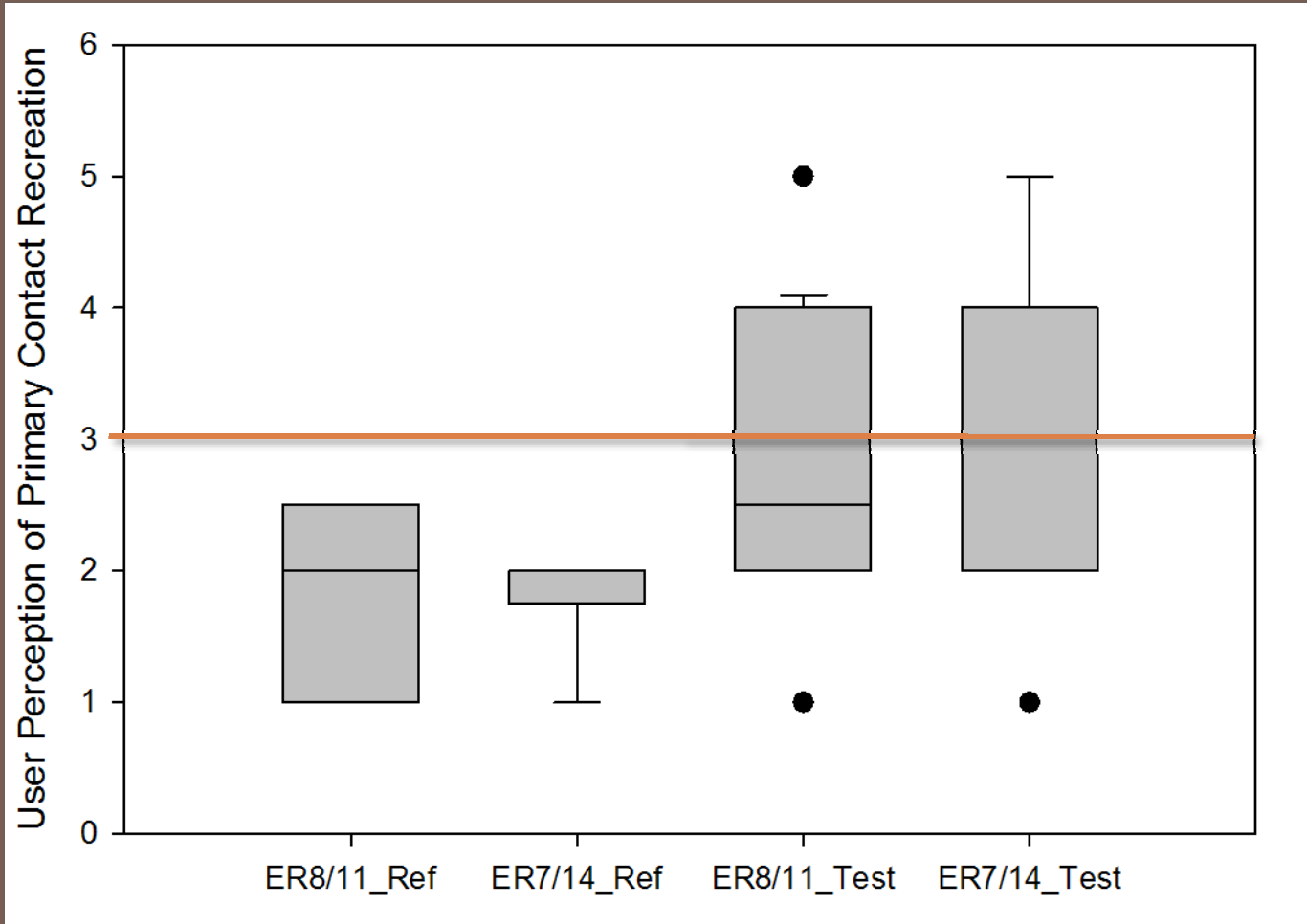
ER 8/11



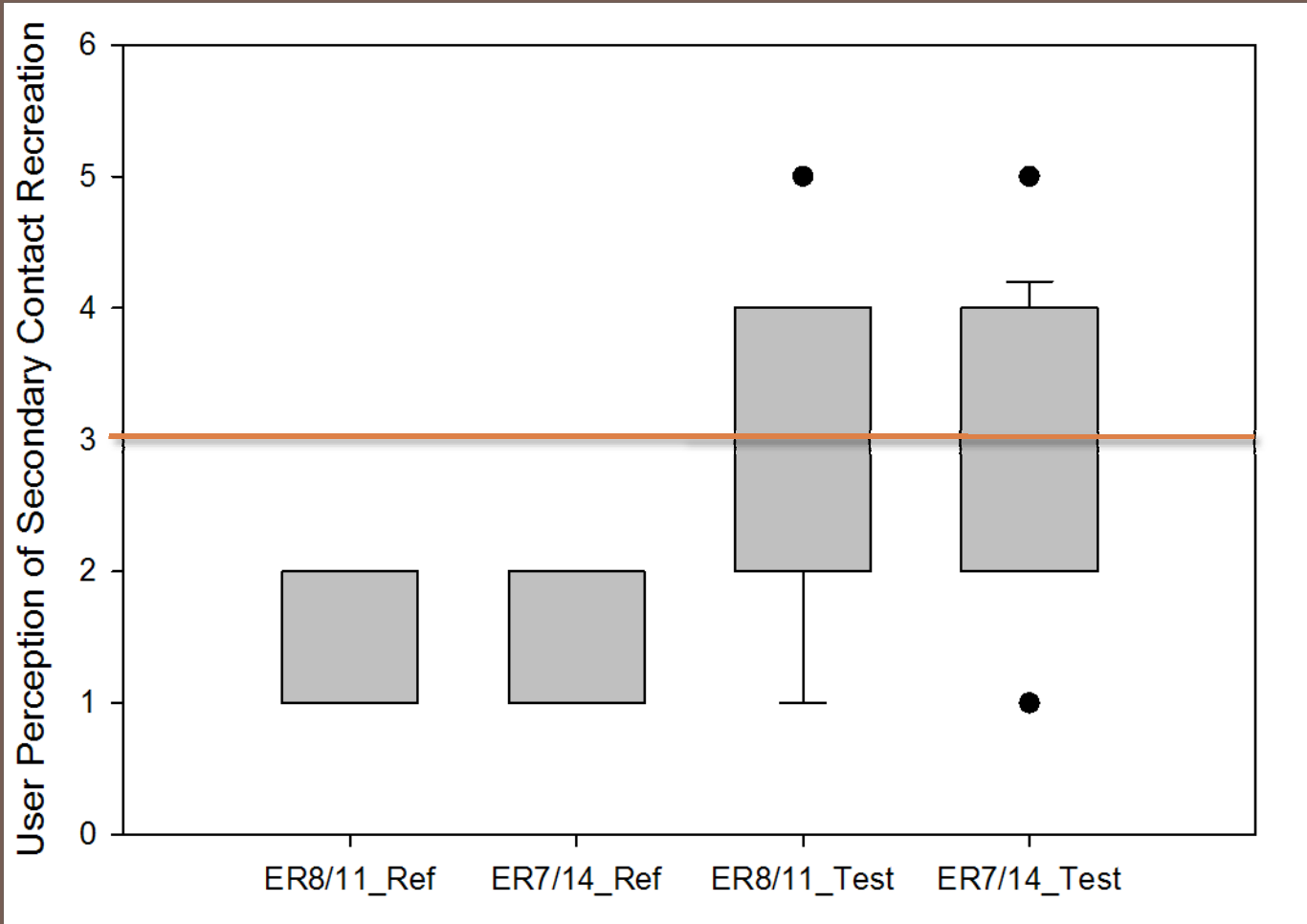
ER 8/11

- Beautiful
- Minor problems
- Slightly impacted
- Substantially reduced
- Awful, impossible

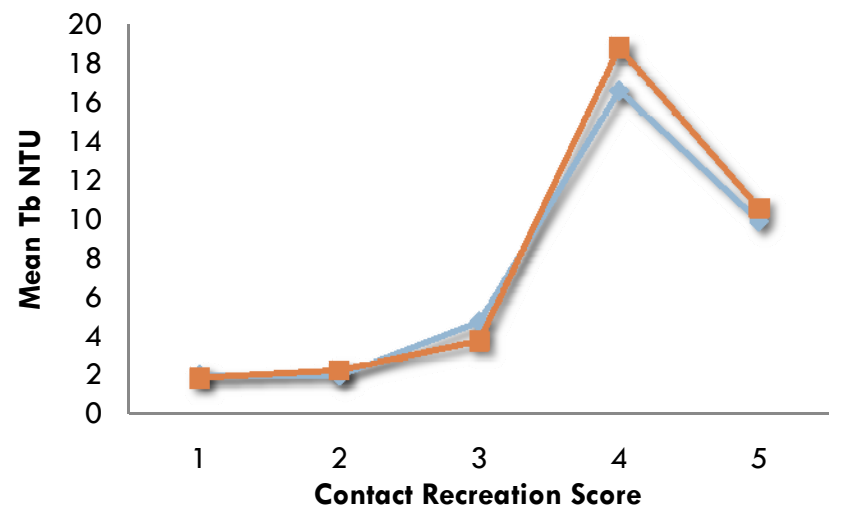
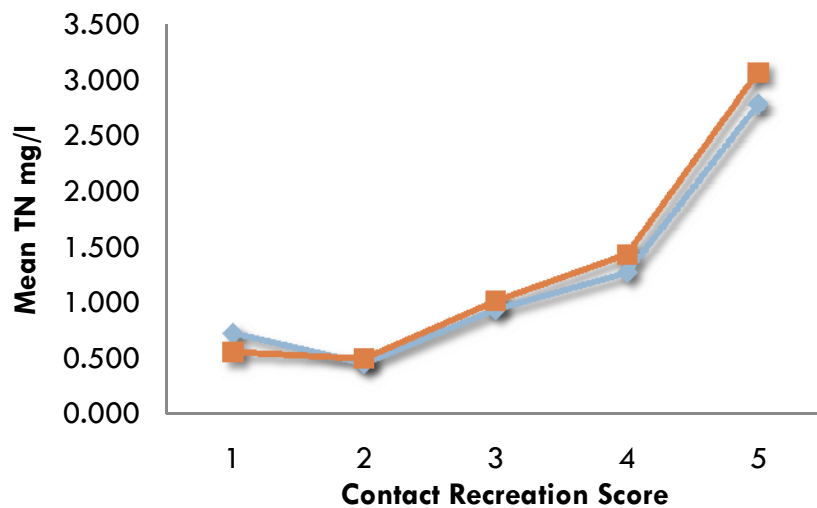
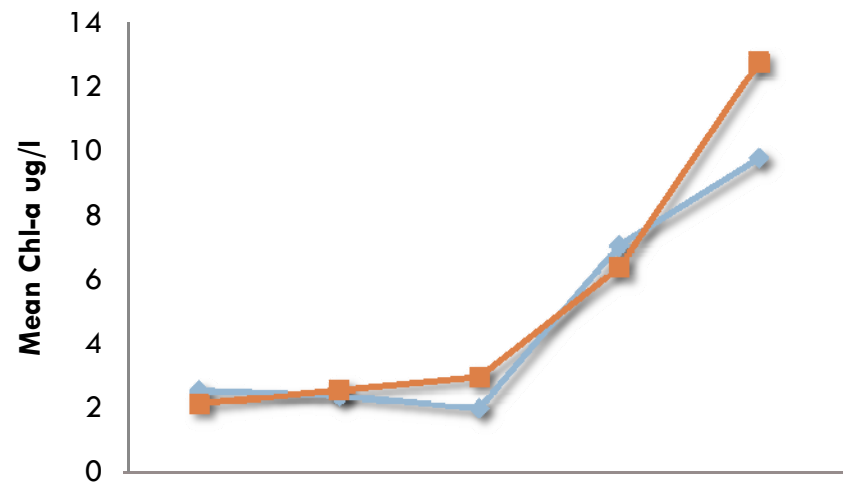
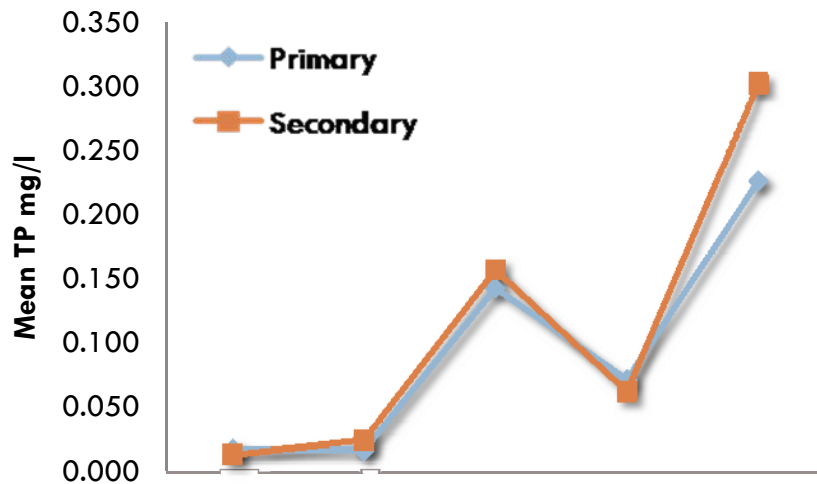
Primary Contact Recreation



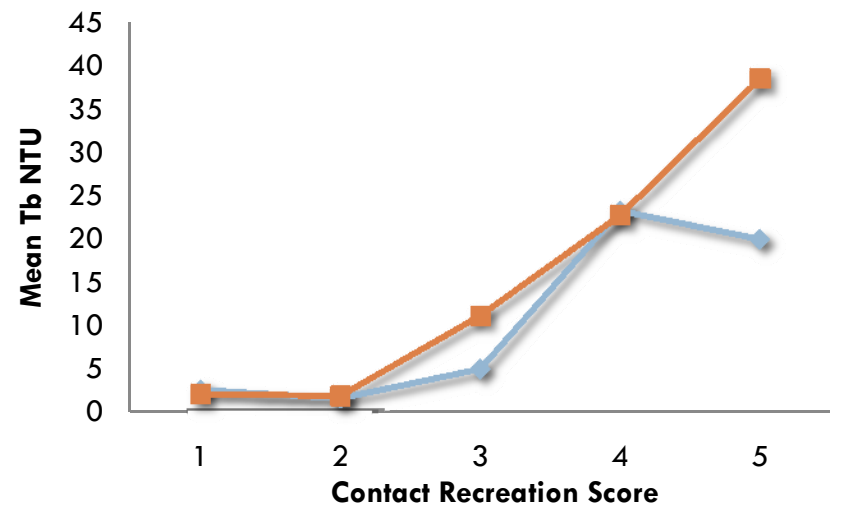
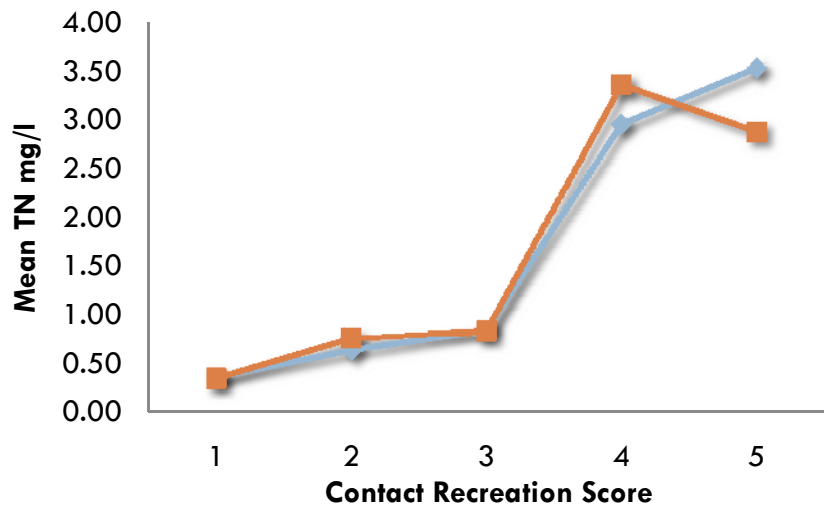
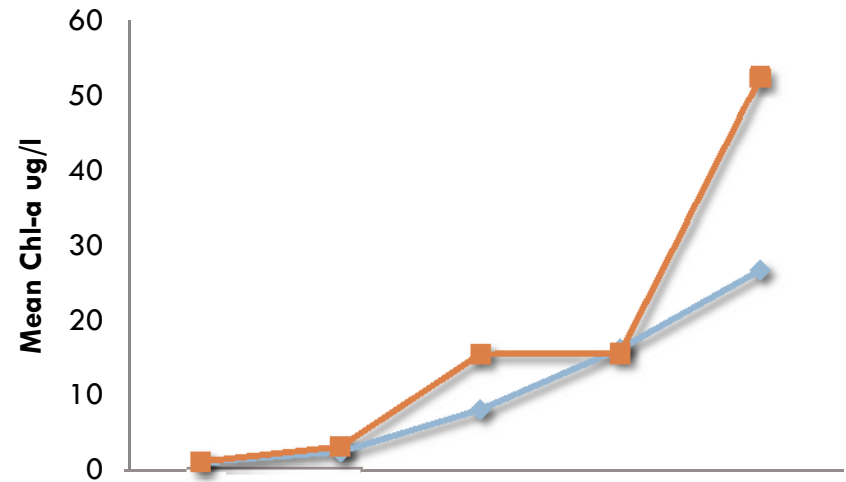
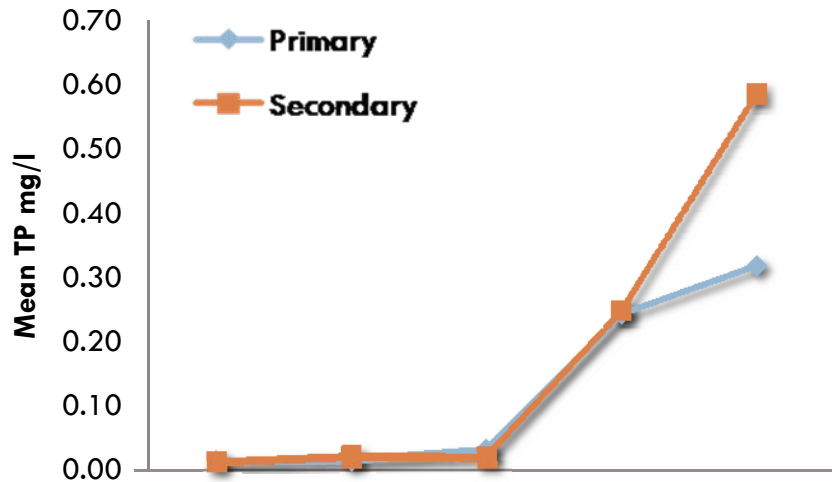
Secondary Contact Recreation



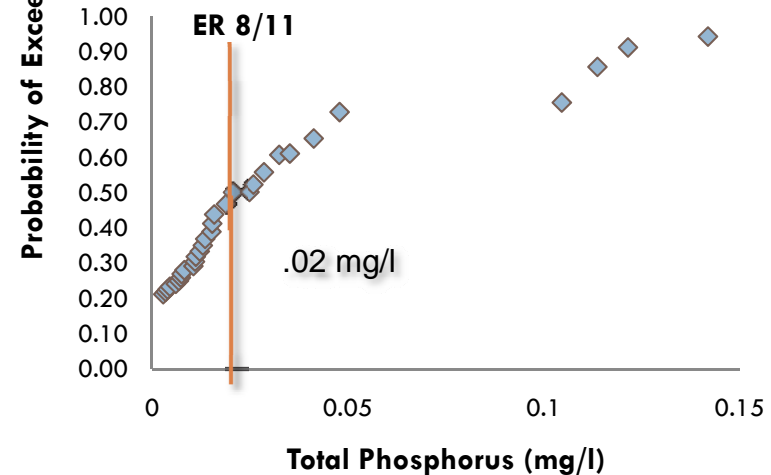
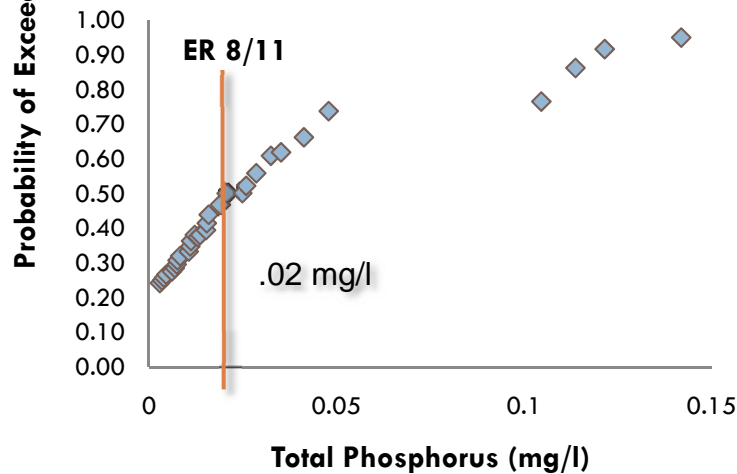
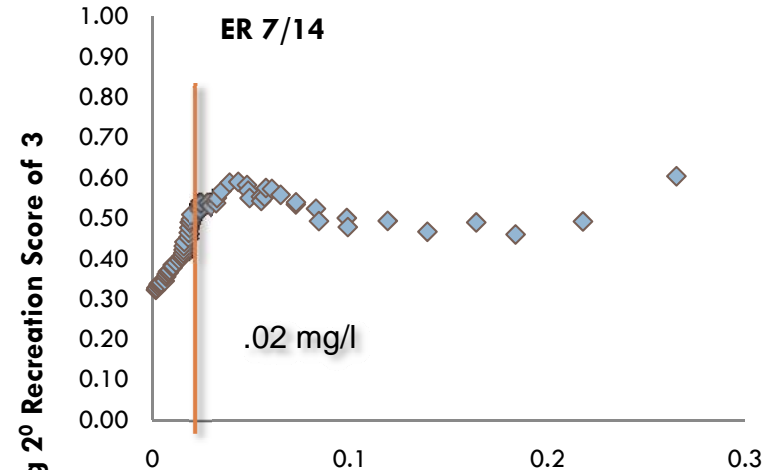
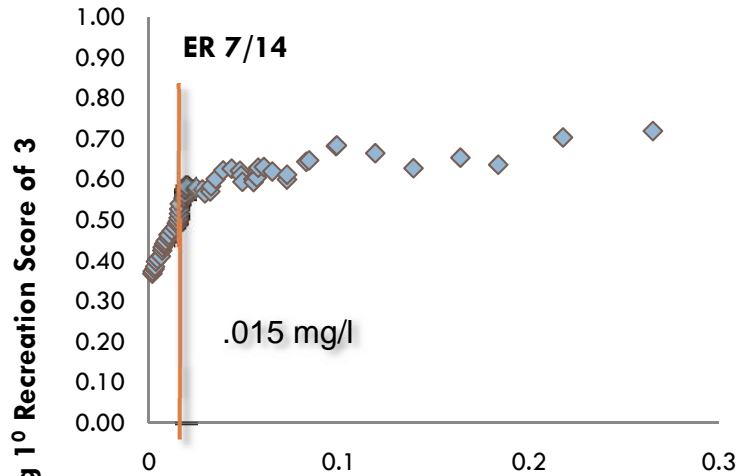
Chemistries ER 7/14



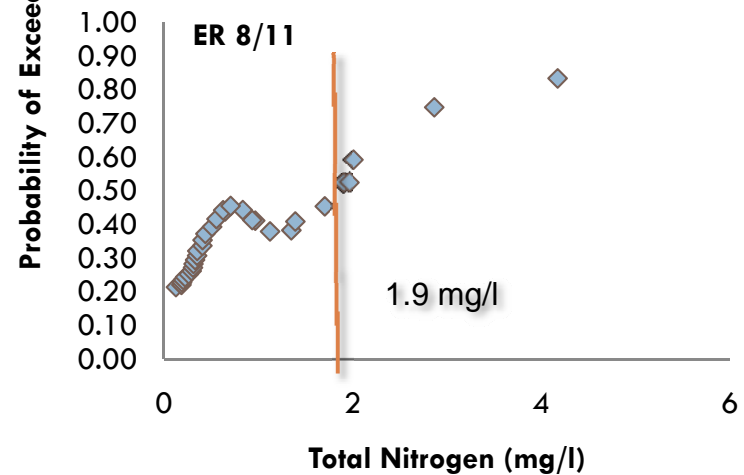
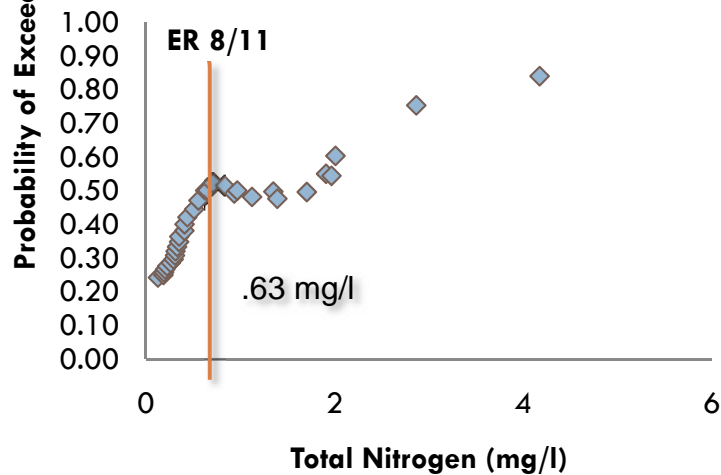
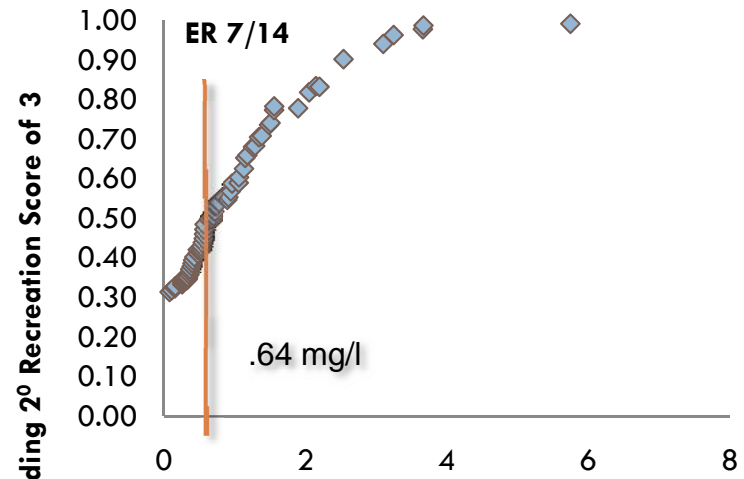
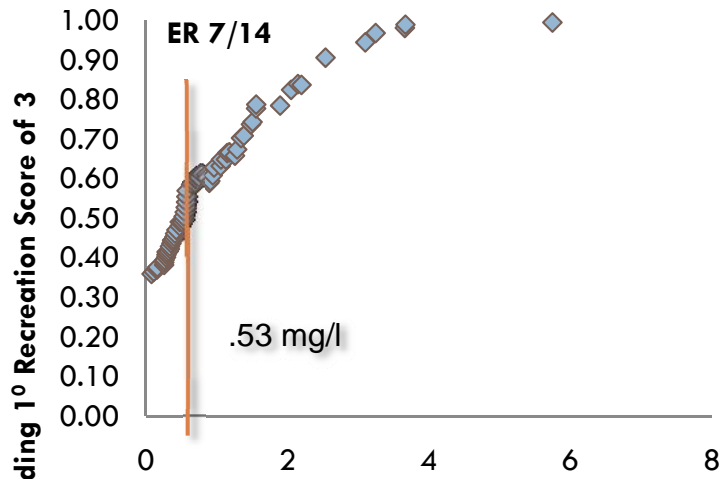
Chemistries ER 8/11



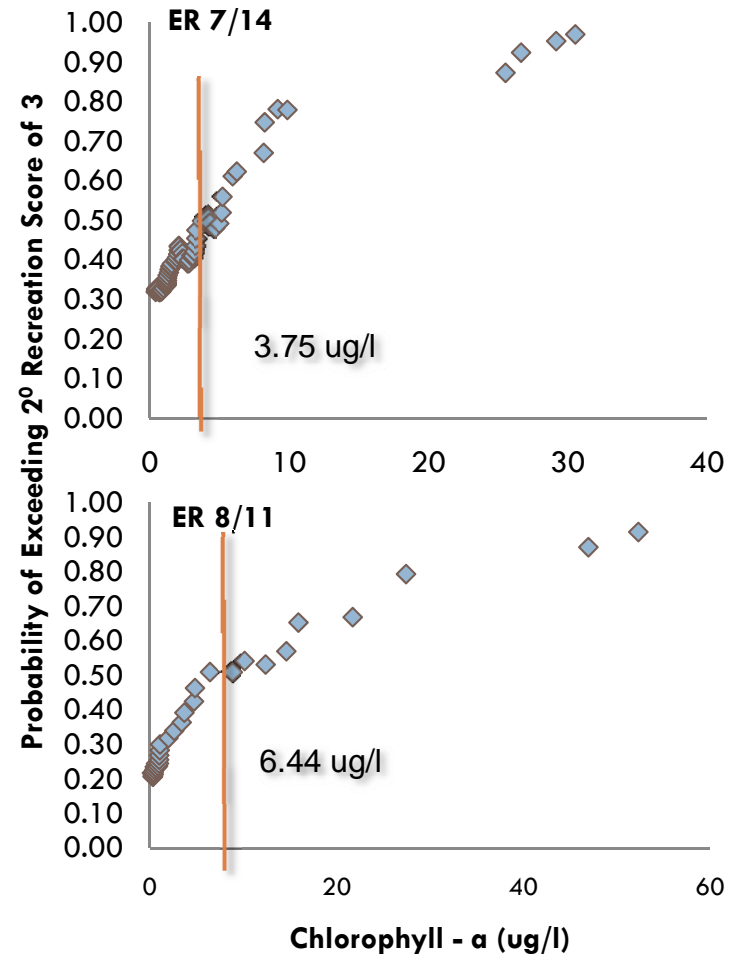
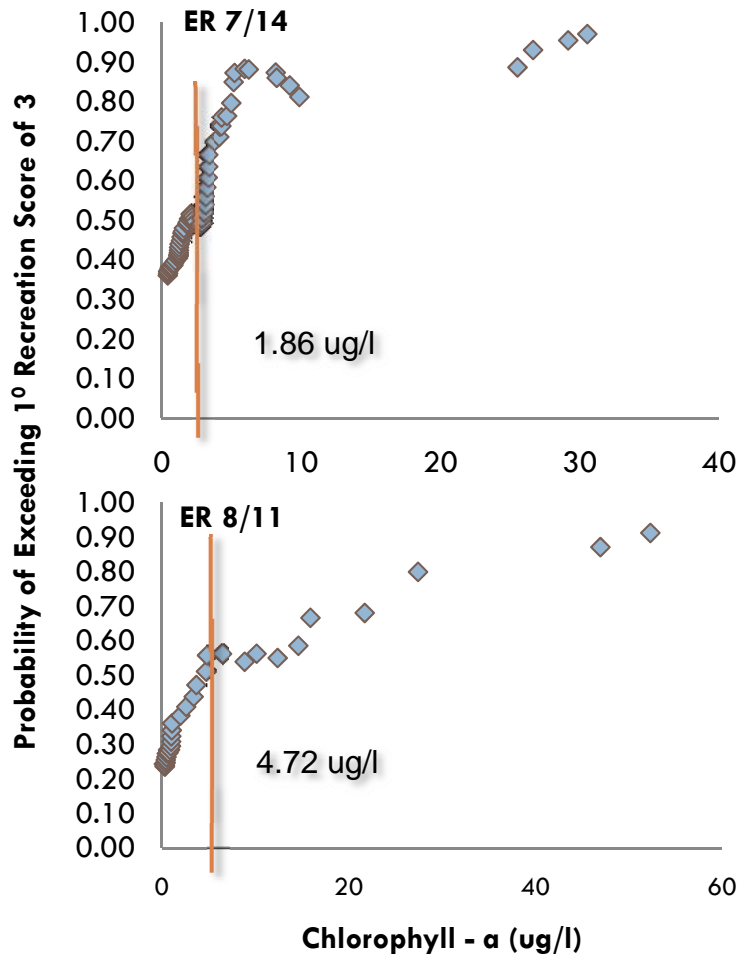
Conditional Probability - TP



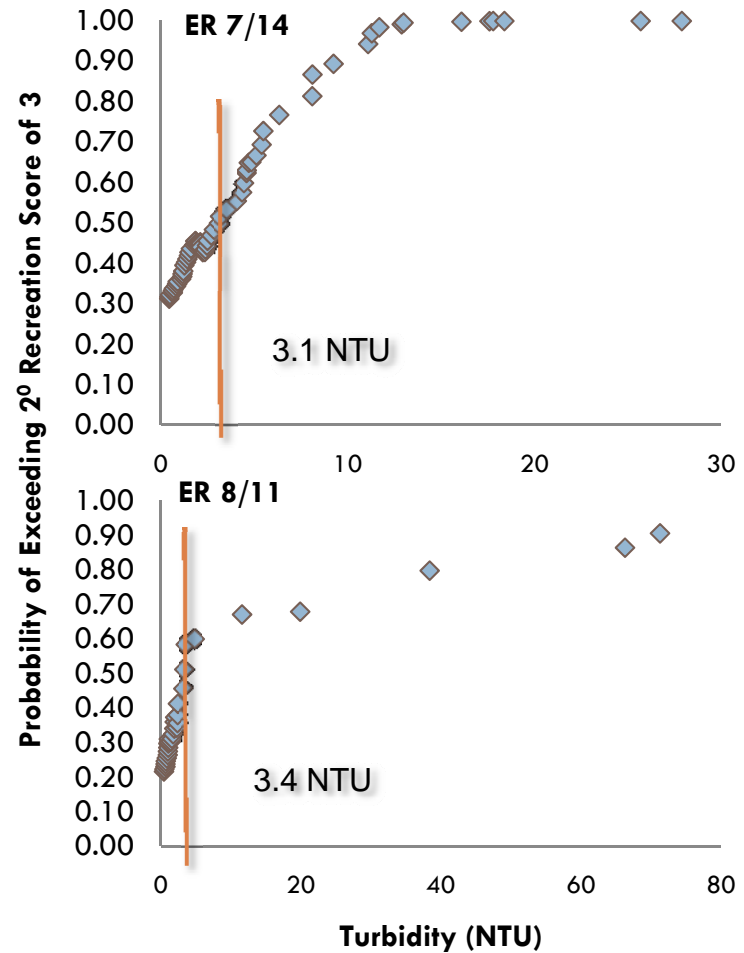
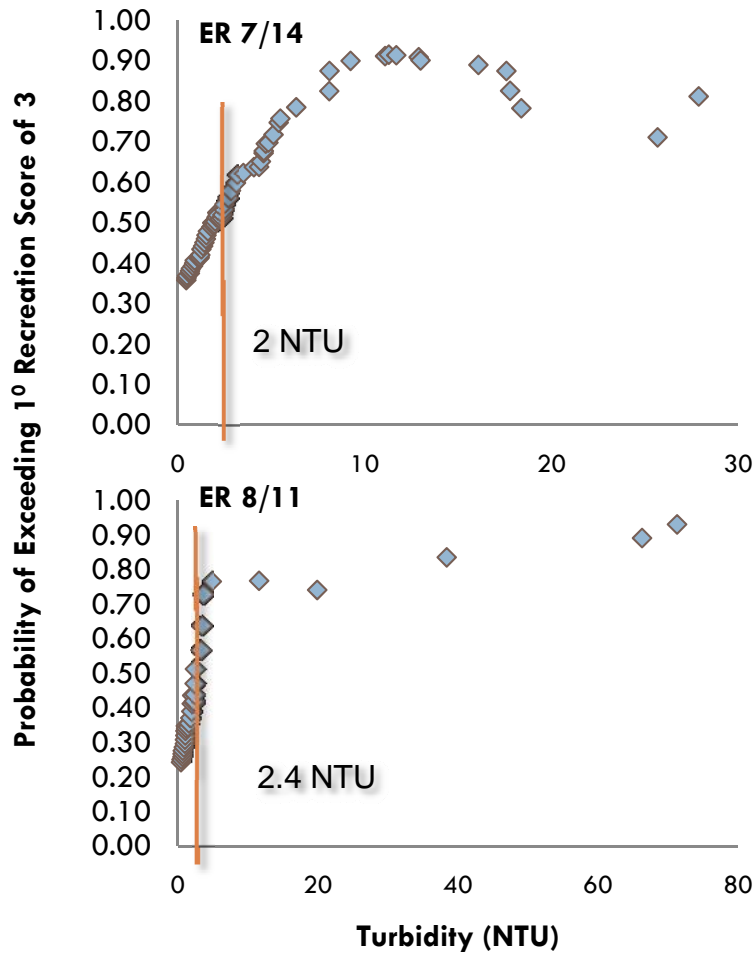
Conditional Probability - TN



Conditional Probability – Chl-a



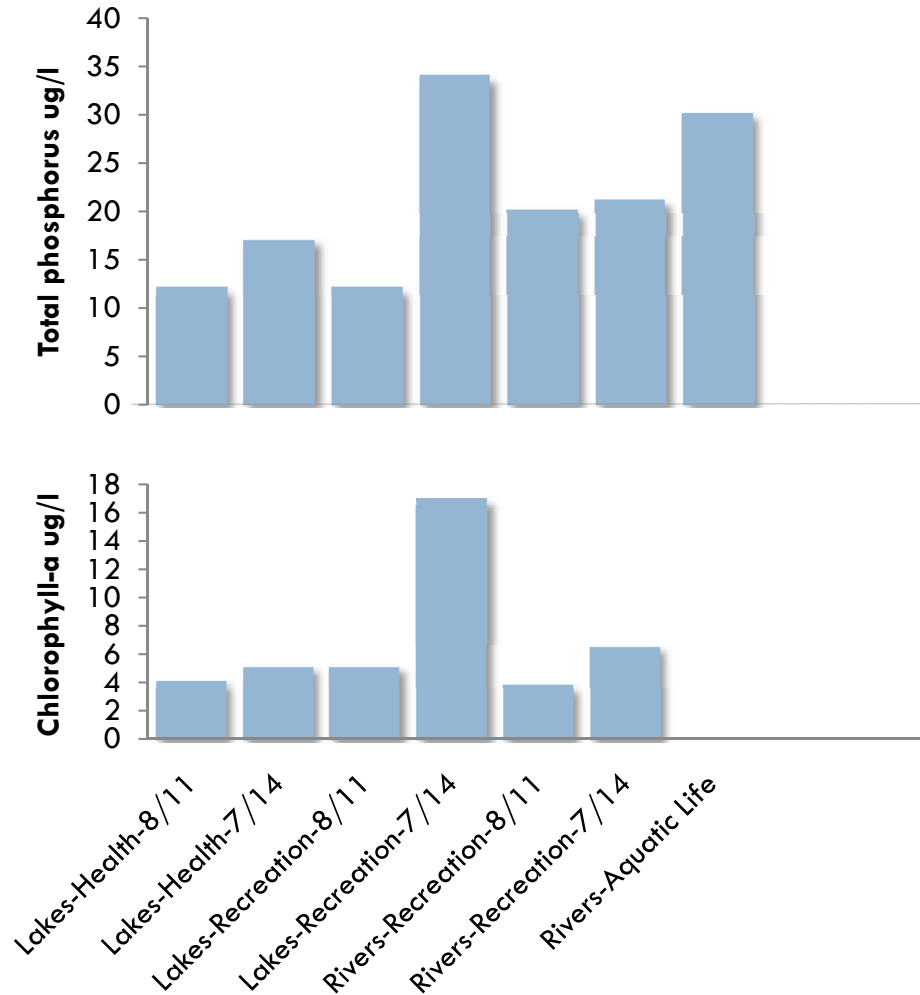
Conditional Probability - Tb



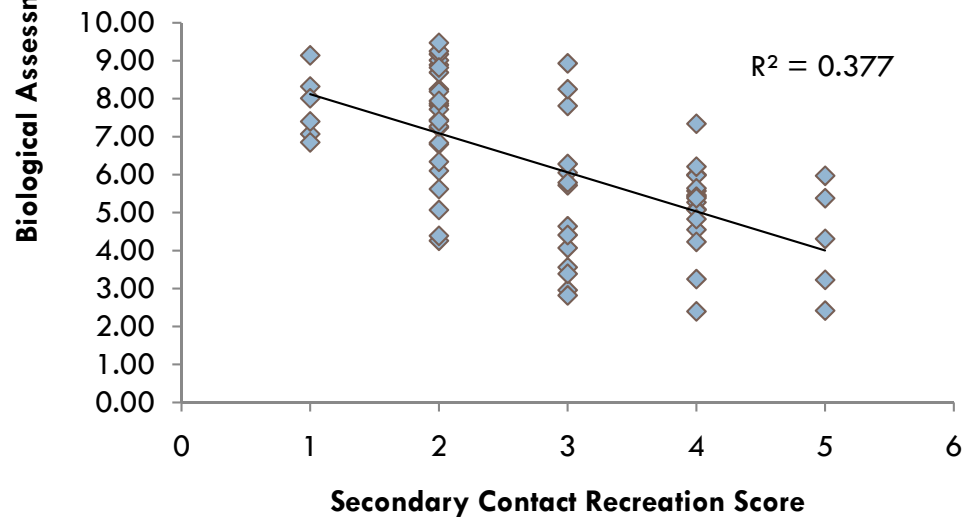
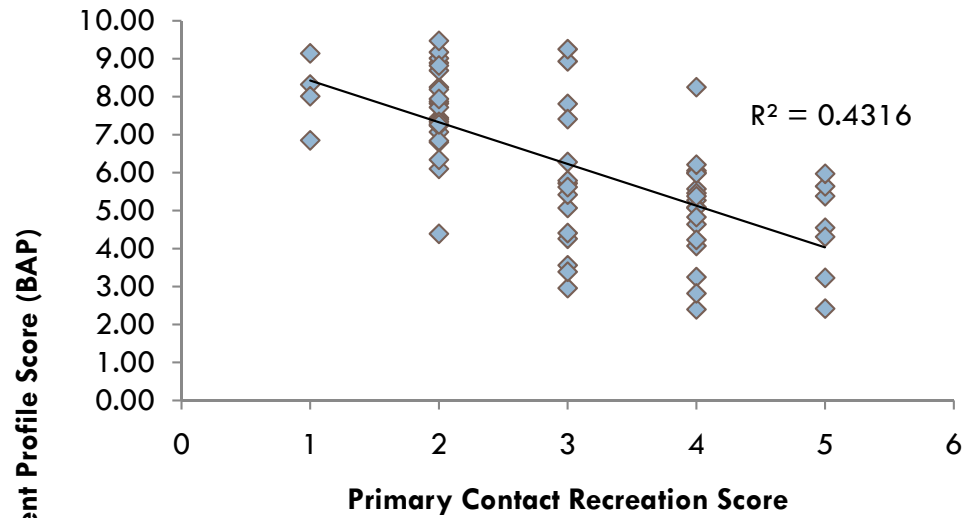
Conditional Probability - Summary

Probabilities of Exceeding Primary and Secondary Contact Recreation								
Ecoregion	TP (mg/l)		TN (mg/l)		Chl-a (ug/l)		Tb (NTU)	
	1 ⁰	2 ⁰	1 ⁰	2 ⁰	1 ⁰	2 ⁰	1 ⁰	2 ⁰
7/14	15	20	530	640	1.86	3.75	2.0	3.1
8/11	20	21	630	1900	4.72	6.44	2.4	3.4

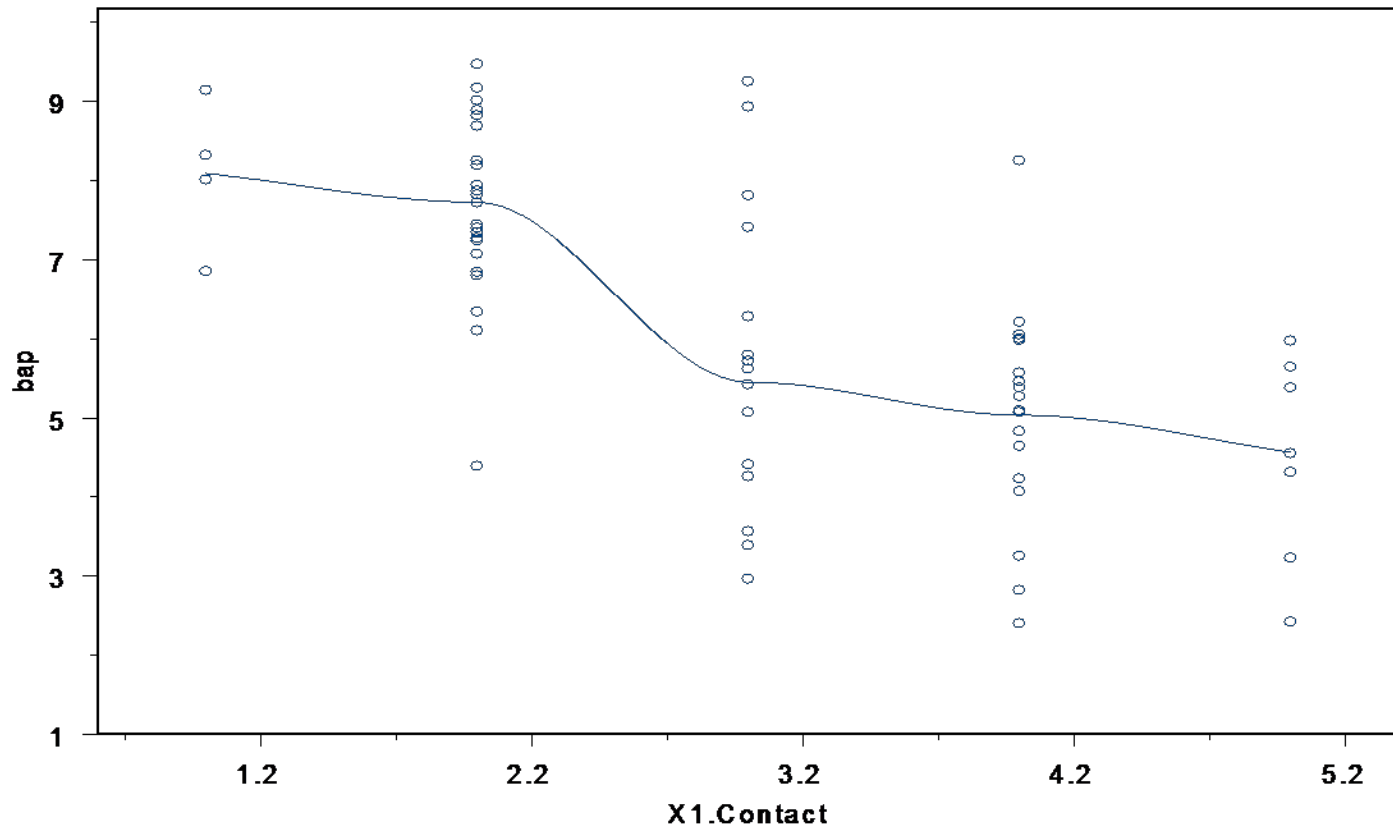
Nutrient Criteria



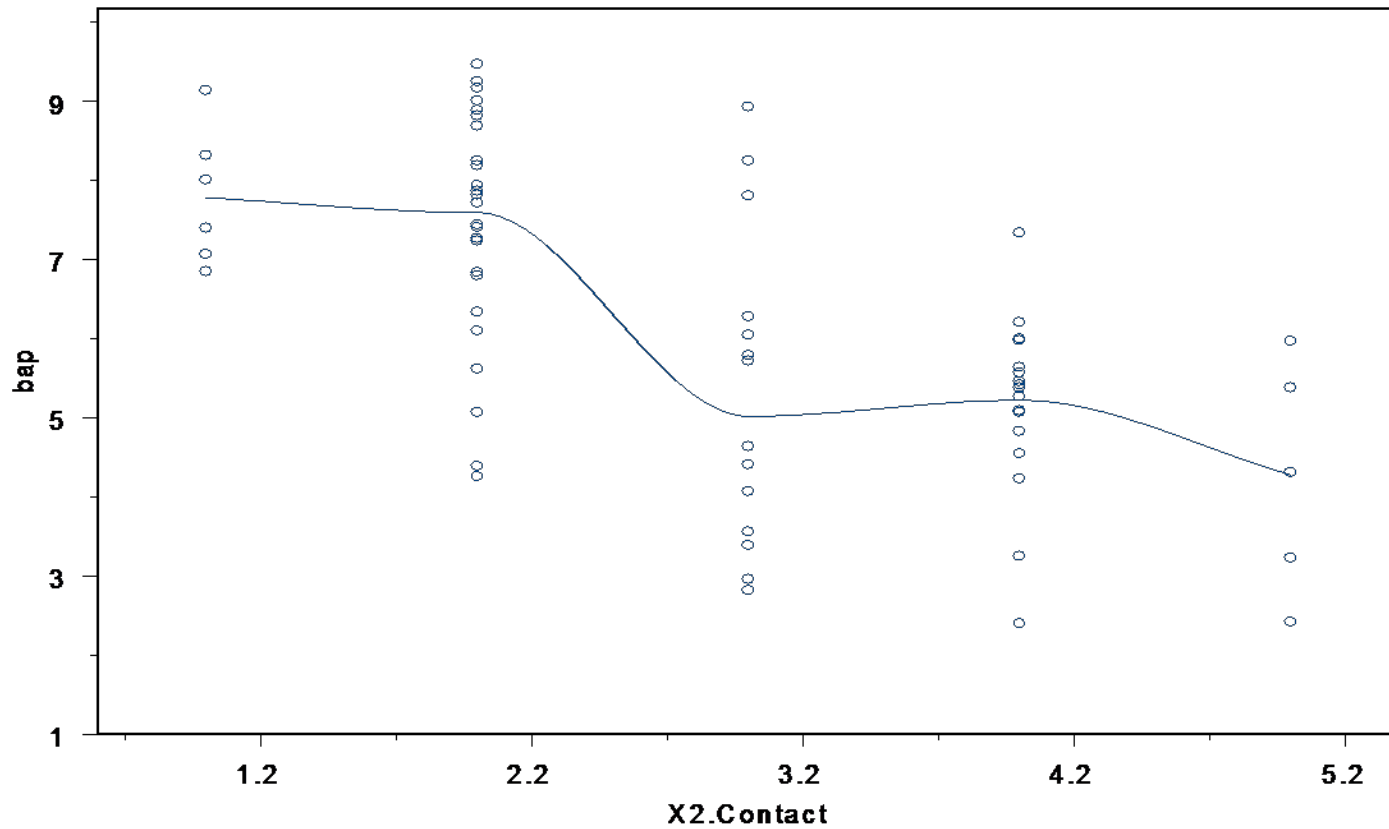
Invertebrate Assessment ER 7/14



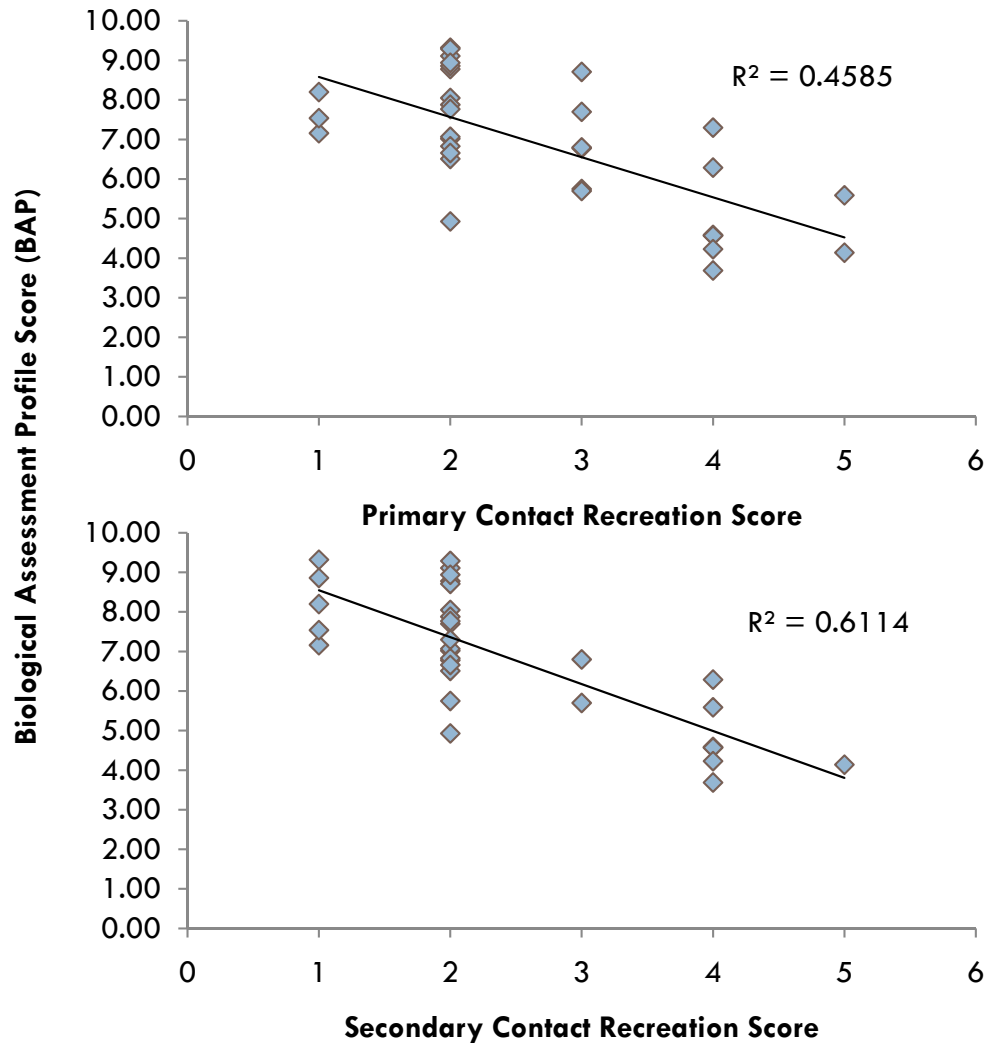
Invertebrate Assessment ER 7/14



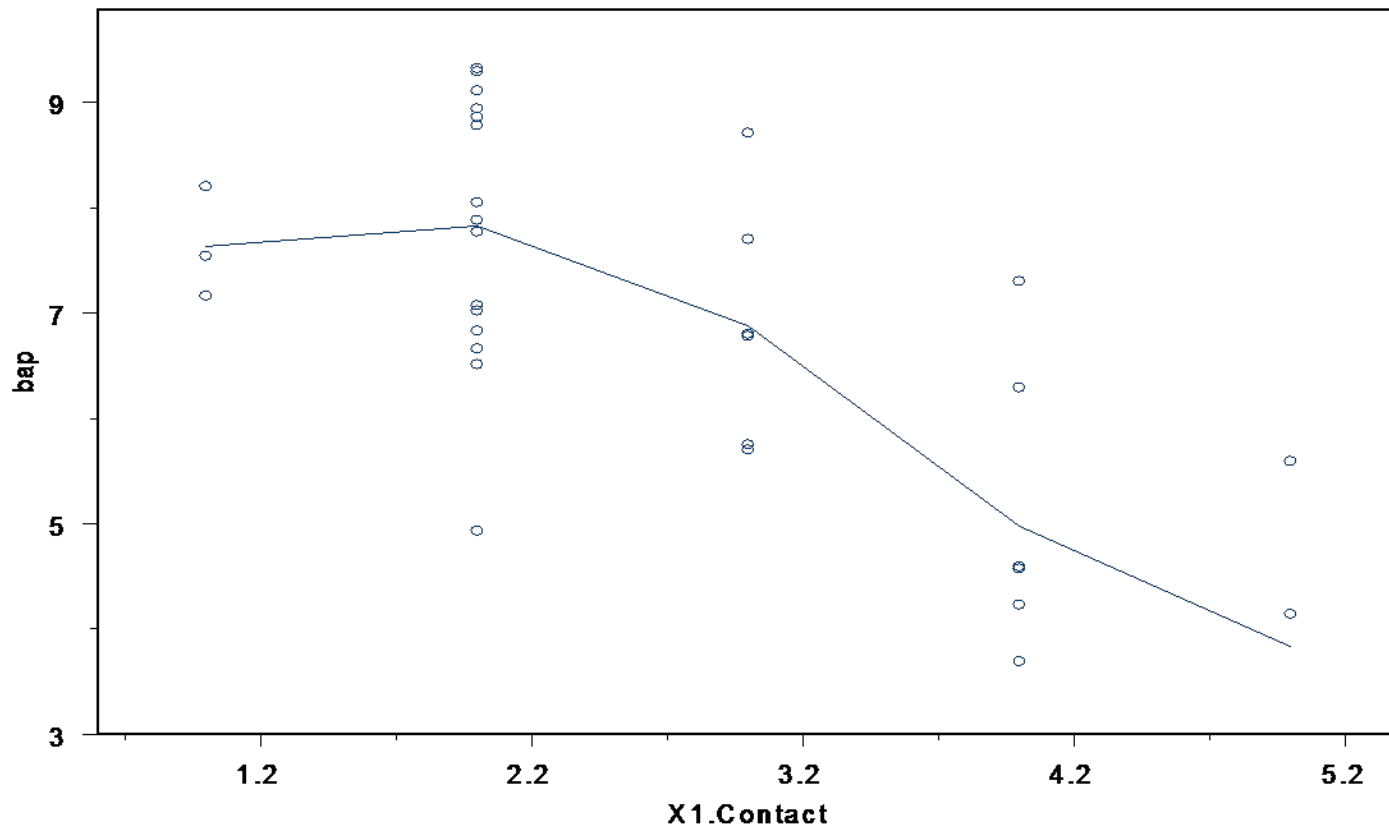
Invertebrate Assessment ER 7/14



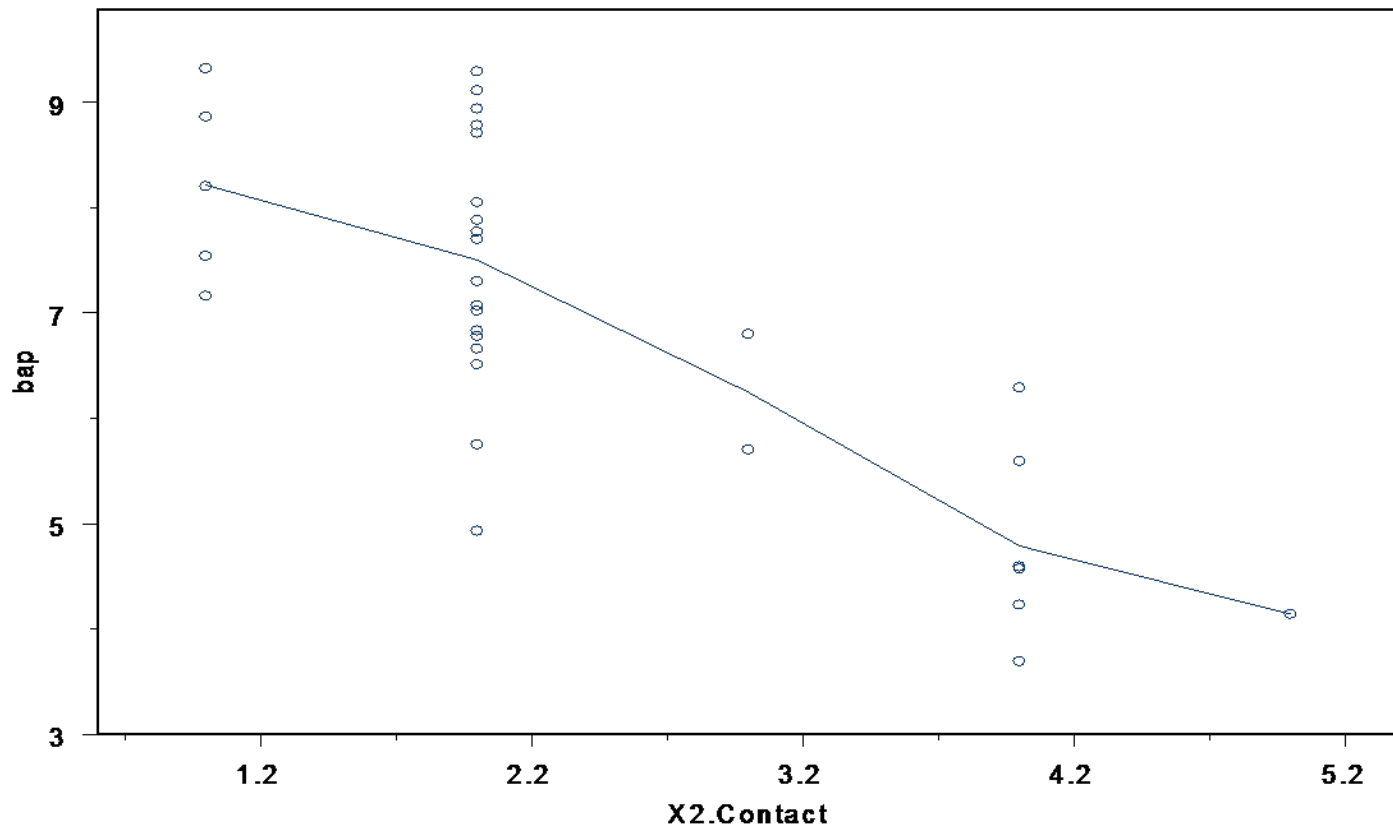
Invertebrate Assessment ER 8/11



Invertebrate Assessment ER 8/11



Invertebrate Assessment ER 8/11



Conclusions – User Perception Data

- Easily collected by field crews
- Difficult to collect actual public opinion
- Promising responses to predetermined thresholds
- More likely to perceive impairment at lower concentrations in ER 7/14
 - ▣ Assimilative capacity of “natural” systems?
- Good connection with the biology
- Different from lakes its what is on the bottom not in the water column!

Acknowledgements



Connecting people to nature since 1812.



Questions?