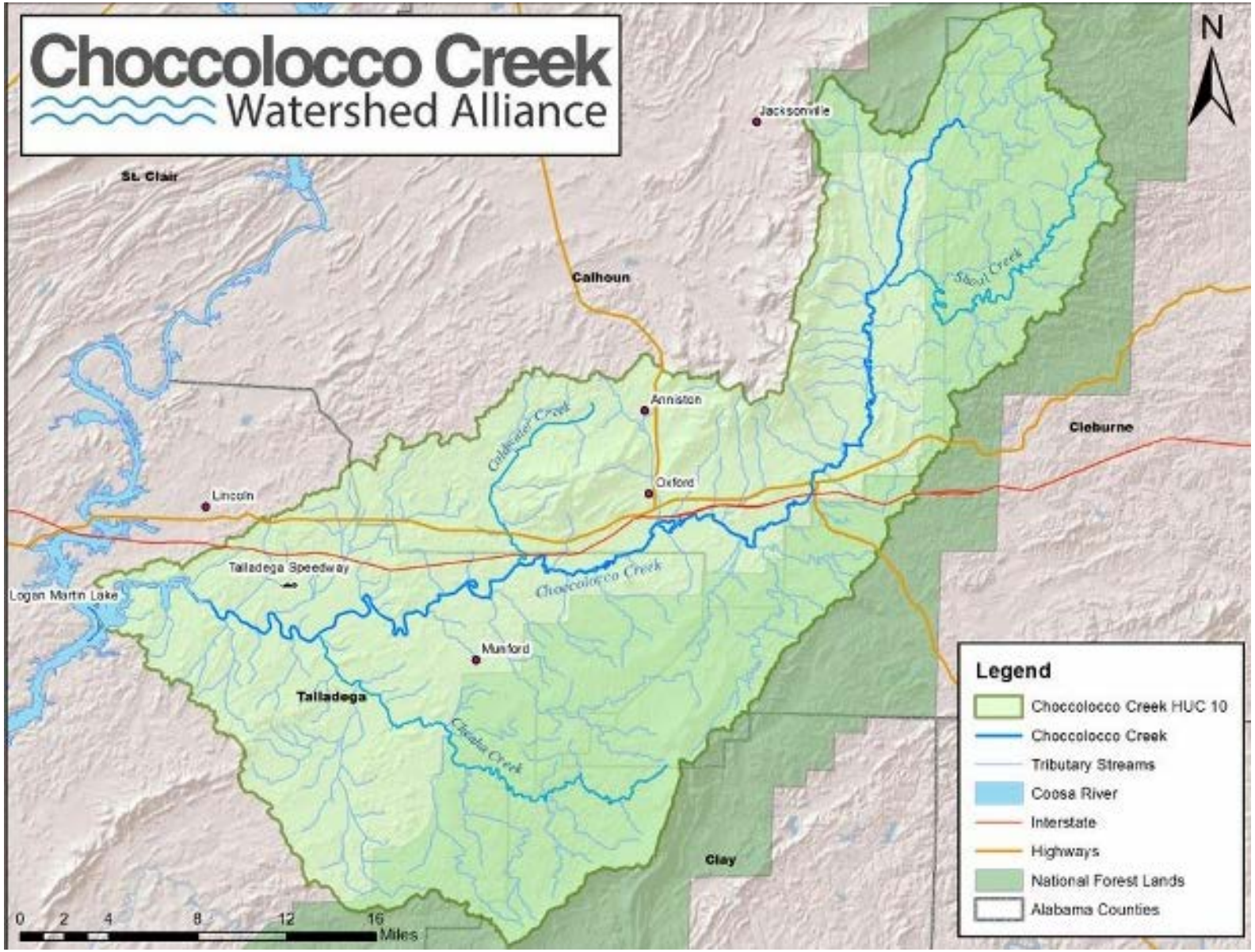
BENTHIC BIODIVERSITY IN LOWER CHOCCOLOCCO CREEK

Alan S. Fowler
Ramboll Environ

CHOCCOLOCCO CREEK WATERSHED

- Choccolocco Creek is the hydraulic focal point of a 500 square mile watershed
- Watershed supports diverse land uses
- Multiple permitted outfalls discharge to the Choccolocco Creek
- Nonpoint sources include urban and agricultural areas
- Permanent riparian buffer protects significant portions of the creek from nonpoint runoff and livestock



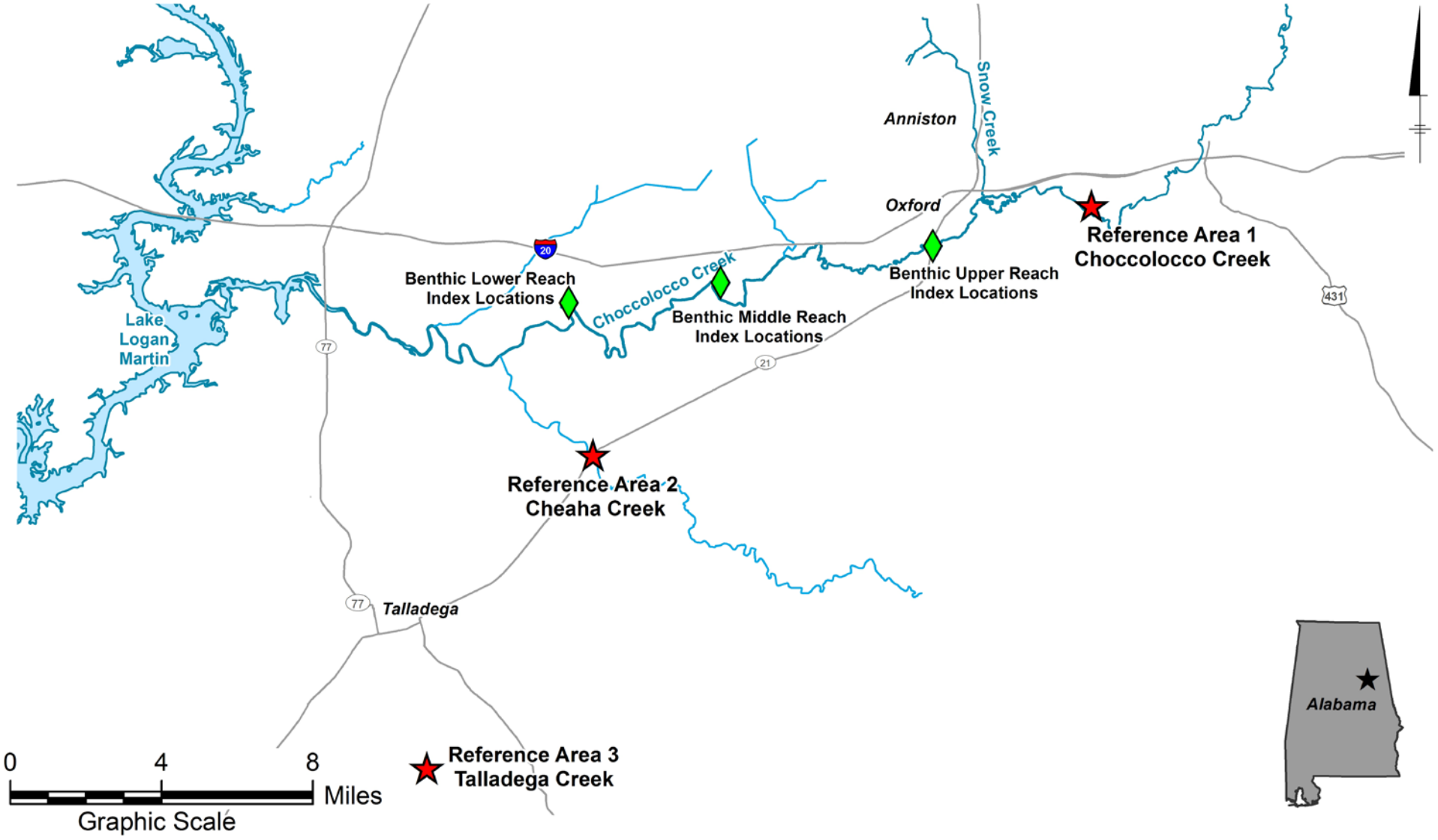
WATERSHED RELATED STUDIES

- Choccolocco Creek and its watershed have been extensively studied over the past 50 plus years
- Example studies have focused on:
  - Fish assemblages
  - Habitat quality
  - Threatened and endangered species including mussels, fish and bats
  - Water quality
  - Point and nonpoint source identification
  - Creel studies
  - Legacy contamination

BENTHIC COMMUNITY STUDY DESIGN

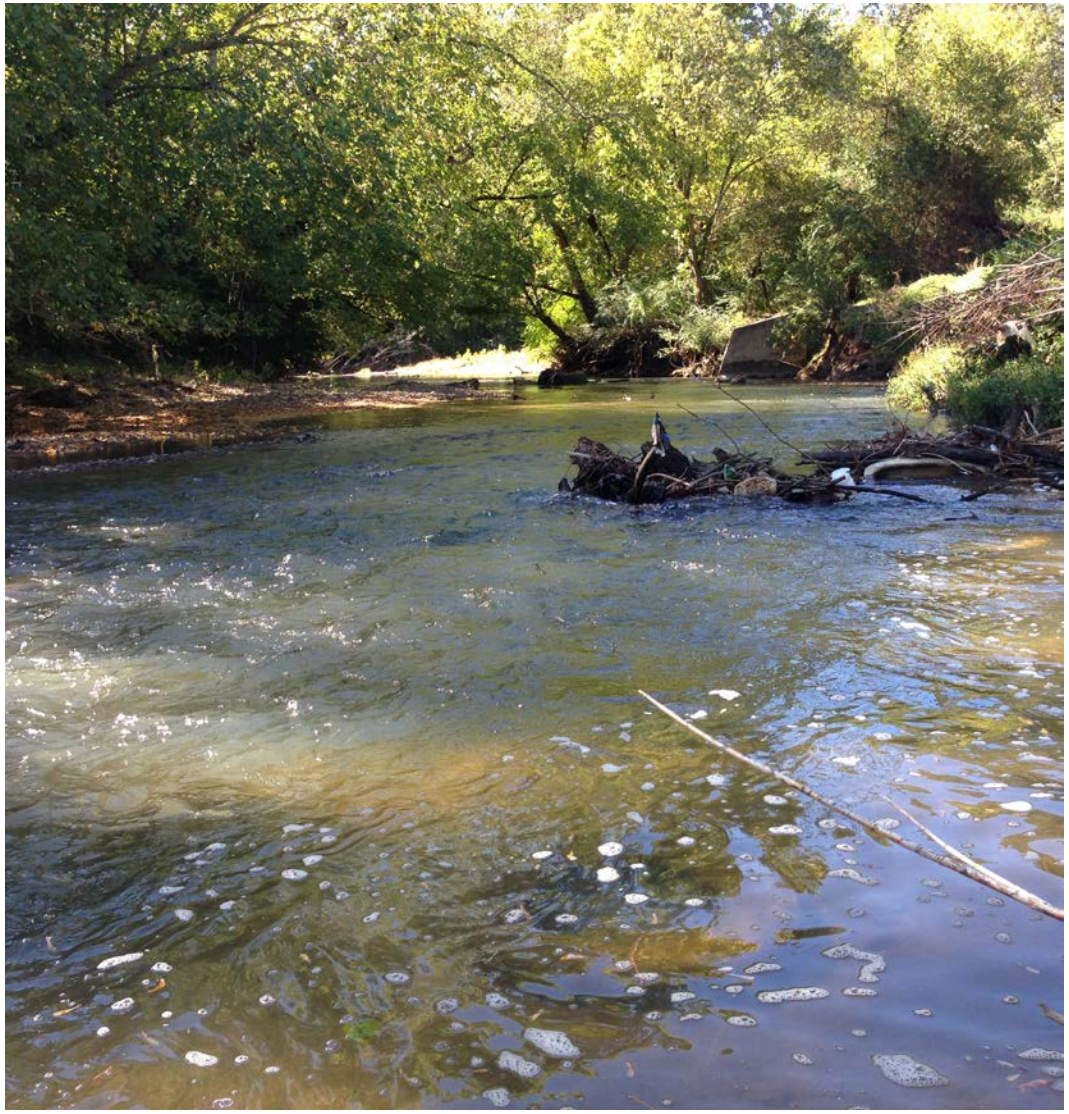
- Benthic invertebrate study conducted as part of the Anniston PCB Site investigations
- Sampling including 30 stations along Choccolocco Creek distributed between three general areas:
  - Upper reach
  - Middle reach
  - Lower reach
- Parent and replicate samples collected at the 30 locations for a total of 60 samples per event
- Three reference locations including one located upstream on Choccolocco Creek and two located on tributary creeks
- Replicates collected at each reference location
- Sample collection during two separate events…spring and fall

BENTHIC STUDY LOCATIONS



FIVE TYPES OF HABITAT EVALUATED

- Benthic samples were collected from five different habitat types :
  - Backwater (BW)
  - Emergent aquatic vegetation (EAV)
  - Depositional (Dep)
  - Riffle (Rif)
  - Run (Run)



SAMPLING LOCATIONS IN LOWER REACH

Legend

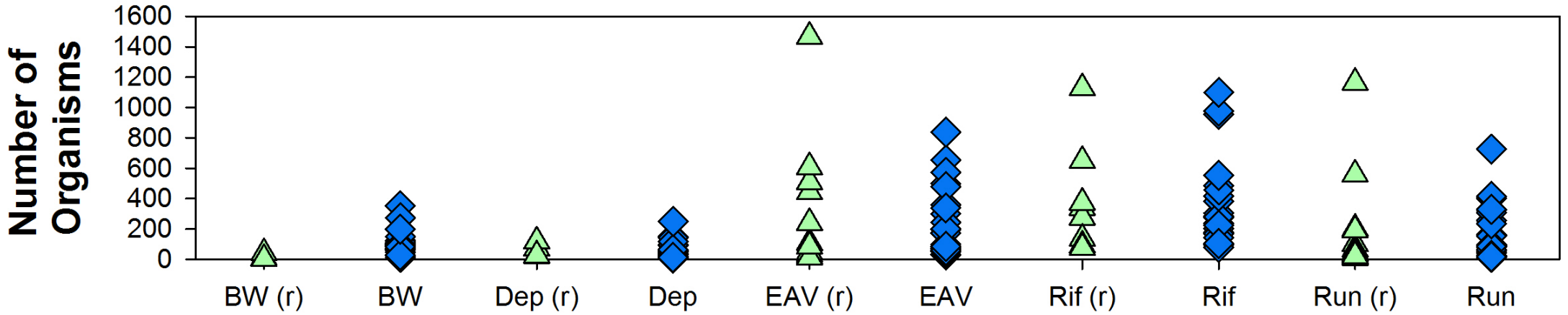
Benthic Index Locations

- Backwater
- Depositional Area
- Emergent Aquatic Vegetation
- Riffle
- Run
- Creek

BENTHIC COMMUNITY METRICS

- Five community metrics evaluated:
  - Abundance (number of organisms)
  - Richness (total taxa)
  - EPT richness (number of orders):
    - Ephemeroptera (mayflies)
    - Plecoptera (stoneflies)
    - Trichoptera (caddisflies)
  - Diversity (Shannon Weiner)
  - Tolerance (Hilsenhoff Biotic Index)
- Benthic community metrics for the Choccolocco Creek stations were compared with the reference site community metrics
- Results from other relevant studies were considered as an independent line of evidence

ABUNDANCE



BW = Backwater

Dep = Depositional

EAV = Emergent Aquatic Vegetation

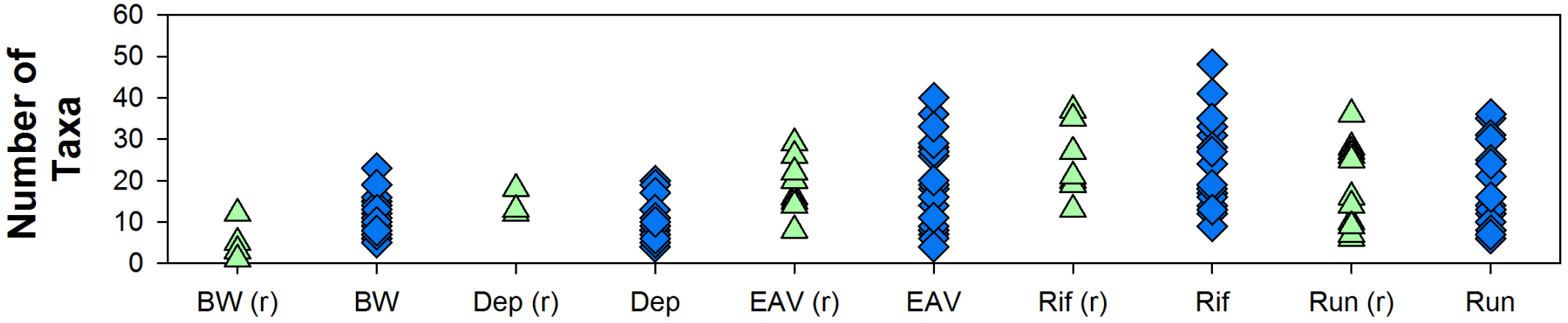
Rif = Riffle

Run = Run

Reference Area

Nonreference Area

RICHNESS



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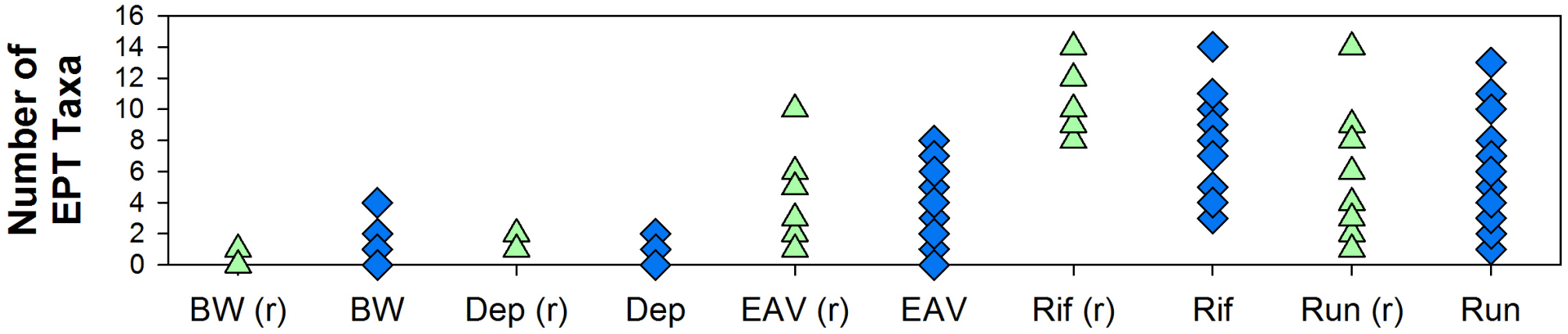
EPT RICHNESS



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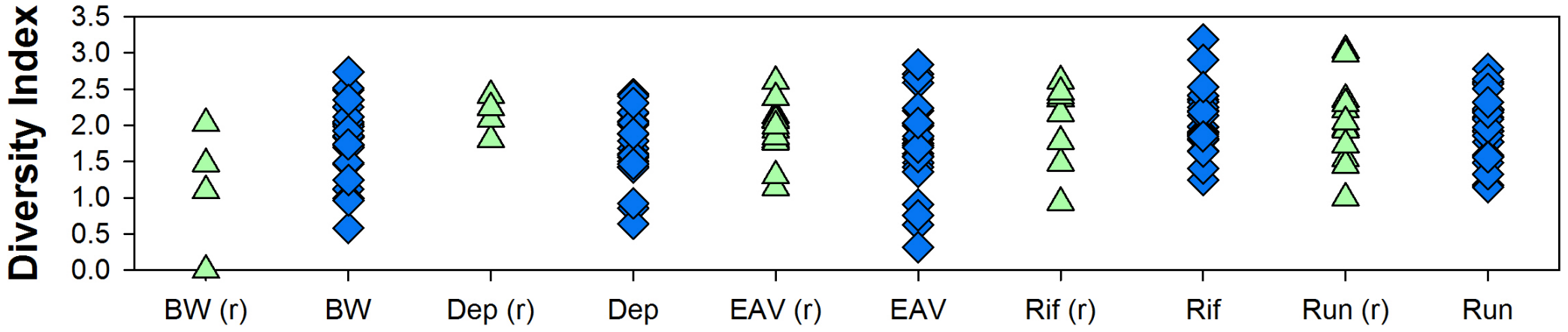
Reference Area

Nonreference Area

DIVERSITY (SHANNON WEINER)



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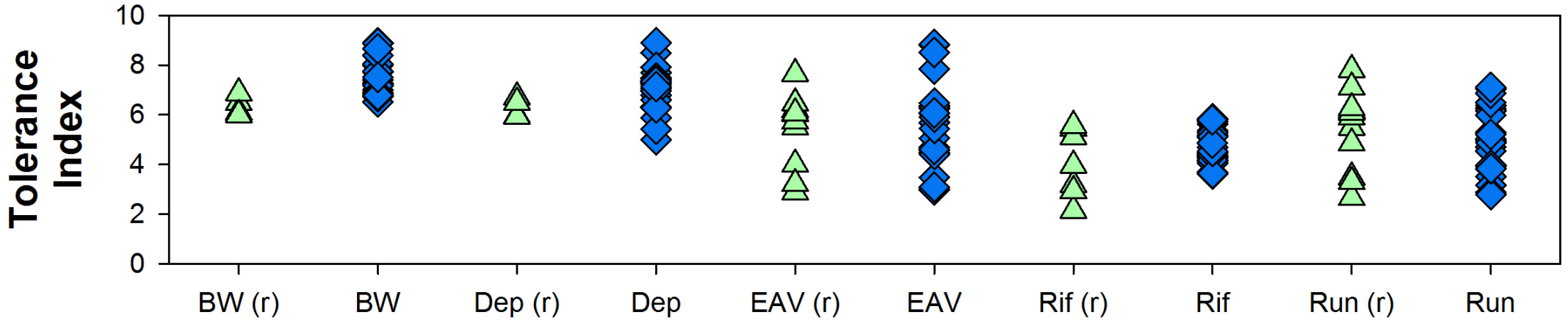
Reference Area

Nonreference Area

TOLERANCE (HBI)



BW = Backwater

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Rif = Riffle

Run = Run

△ Reference Area

◆ Nonreference Area

Family Biotic Index	Water Quality
0.00 to 3.75	Excellent
3.76 to 4.25	Very good
4.26 to 5.00	Good
5.01 to 5.75	Fair
5.76 to 6.50	Fairly poor
6.51 to 7.25	Poor
7.26 to 10.0	Very poor

Hilsenoff 1988

STATISTICAL EVALUATION

Habitat Type	Benthic Community Metric Means by Area and Habitat Type									
	Abundance		Richness		Diversity		Tolerance		EPT Taxa	
	Reference	CC	Reference	CC	Reference	CC	Reference	CC	Reference	CC
Backwater	15	115	5	13	1.1	1.8	6.4	7.5	0.5	0.7
Depositional	61	58	14	10	2.1	1.7	6.3	7	1.3	0.1
Emergent Aquatic Vegetation	300	241	18	18	1.9	1.7	5.5	5.6	4.1	3.3
Riffle	384	358	24	21	2	2.1	3.9	4.7	10.4	7.9
Run	203	175	18	17	2	2	5.4	4.9	4.9	5.3
p-value for Area	0.36		0.117		0.249		0.552		0.145	

Notes:

CC = Non-reference Choccolocco Creek sample station results

Significant relationship if p values < 0.05

SUMMARY OF FINDINGS

- Choccolocco Creek benthic community is diverse and healthy
- No statistically significant difference between Choccolocco Creek and reference communities
- No benthic community impacts correlating to legacy contamination were observed
- Independent observations of healthy mussel populations in Choccolocco Creek are consistent with the findings of this study
- Community metrics are somewhat lower in backwater and depositional habitats and consistent with the presence of urban and agricultural runoff

QUESTIONS