



# Biological Programs Updates

Jeff Thomas

Ryan Argo

John Spaeth



# Pool Assessments Annual Report

- Summary of biological components of aquatic life use assessments of 3-4 each year
- 15 randomly selected sites within each pool
  - Habitat
  - Electrofishing
  - Basic WQ

## 2011 Ohio River Pool Assessments

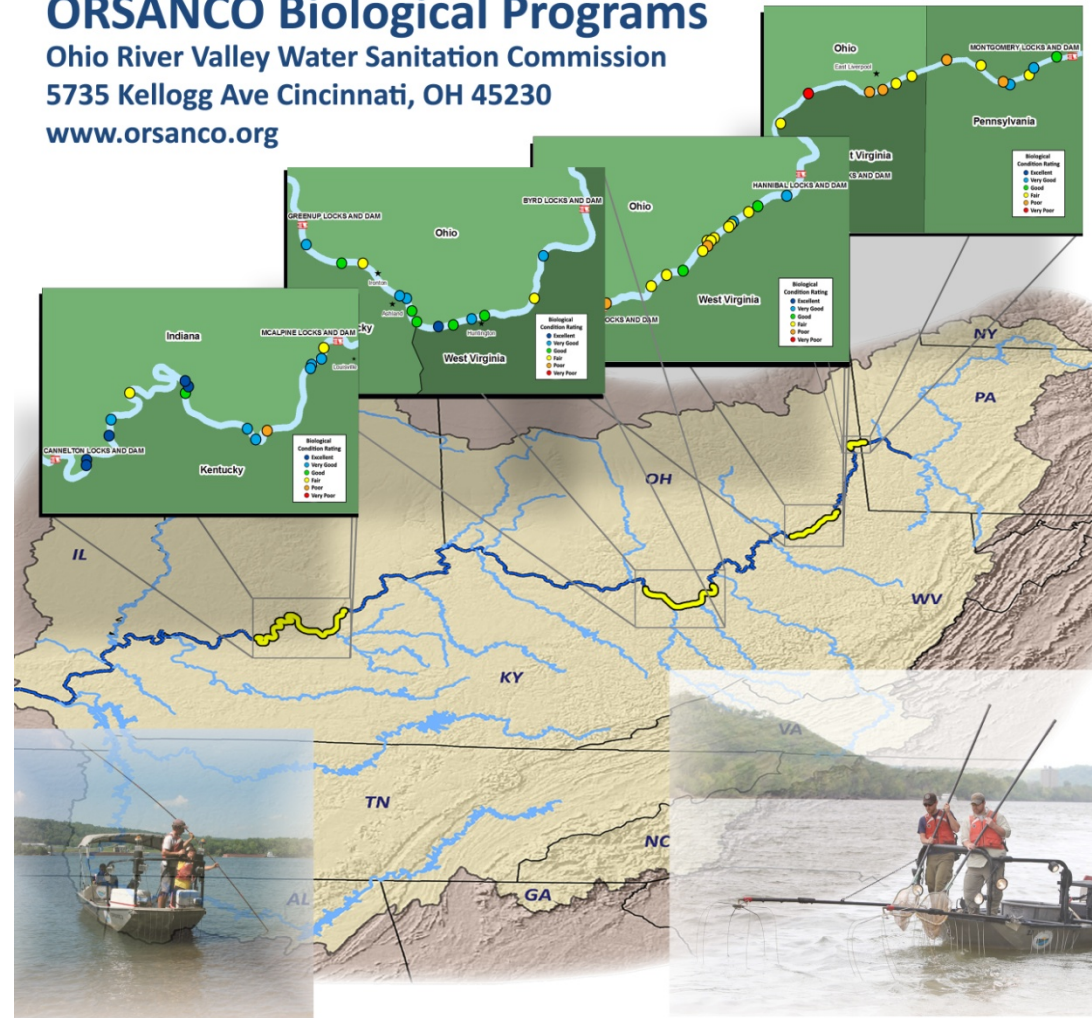
*New Cumberland, Willow Island, Greenup, and Cannelton*

### ORSANCO Biological Programs

Ohio River Valley Water Sanitation Commission

5735 Kellogg Ave Cincinnati, OH 45230

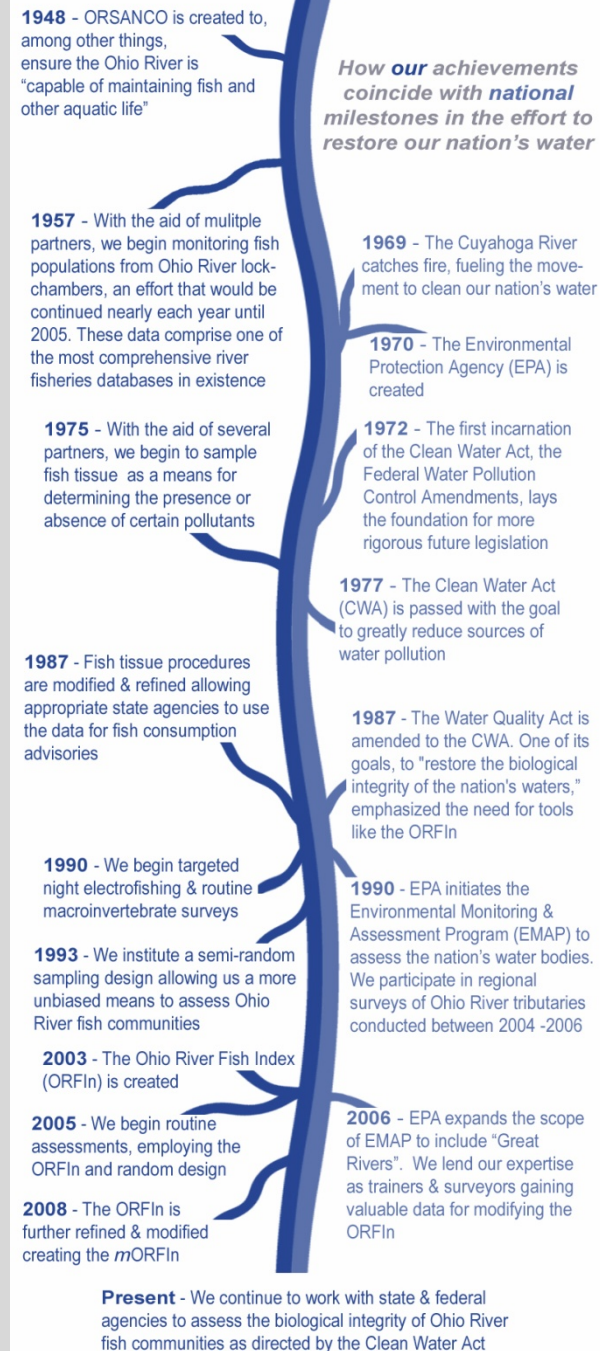
[www.orsanco.org](http://www.orsanco.org)





# Pool Assessments Report

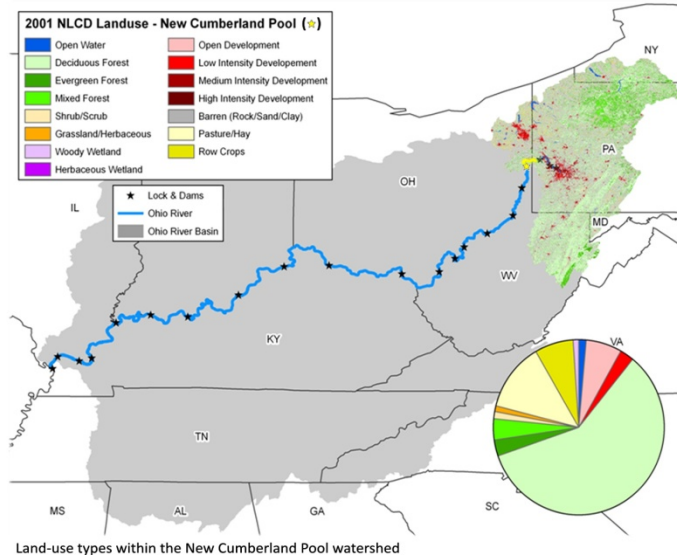
- Background Information
  - ORSANCO
  - Ohio River
  - Site Selection
  - Electrofishing
  - Habitat
  - Water Quality/Hydrology
  - Modified Ohio River Fish Index (mORFIn)



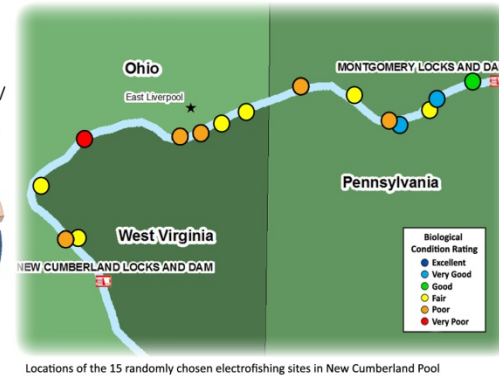
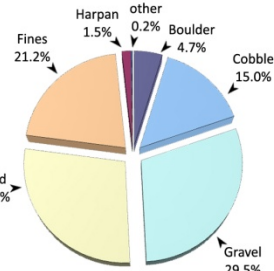
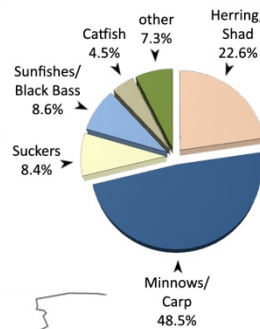
# Pool Assessments Report - Results

## New Cumberland Pool - 2011

The New Cumberland pool is 22.7 miles long, extending from Montgomery Locks and Dam (ORM 31.7) to New Cumberland Locks and Dam (ORM 54.4). The pool has a gradient drop of 0.2 feet per mile, averages 1,439 feet wide and 22 feet deep. The pool flows within the state of Pennsylvania for the upper nine miles and is bordered by Ohio and West Virginia for the remaining 13.7 miles. Though the pool has few major metropolises (East Liverpool, OH), New Cumberland lies in a portion of the Ohio River heavily influenced by industry and is just 31.7 miles below the city of Pittsburgh. The New Cumberland pool receives water from two small tributaries: Little Beaver Creek and Yellow Creek. The pool's watershed is primarily forested with some agricultural land usage (crops and pasture), but also has significant urban influences. In unmodified sections of the pool the shoreline largely consists of coarse substrates.



yellow perch (*Perca flavescens*)



rock bass (*Ambloplites rupestris*)

### Site Performance

Site No.	River Mile	Habitat Class	ORFIn Exp	ORFIn Obs	mORFIn Score
1	32.3	D	41.80	54.20	35.47
2	33.6	C	44.55	64.03	42.40
3	34.2	C	44.55	48.72	25.43
4	35.2	C	44.55	67.13	44.97
5	35.6	B	46.71	42.49	15.21
6	37.2	D	41.80	45.35	24.48
7	39.0	C	44.55	35.67	13.84
8	41.0	C	44.55	49.91	26.98
9	42.0	B	46.71	50.62	24.69
10	42.7	B	46.71	45.35	18.46
11	43.5	B	46.71	43.16	15.97
12	47.0	A	50.03	34.70	8.40
13	49.4	C	44.55	45.24	20.90
14	52.2	A	50.03	40.69	13.03
15	52.5	B	46.71	54.70	29.57

Average Pool mORFIn Score 23.9

### New Cumberland Pool - Results Overview

#### Sampling Results

##### Environmental Measures

Dominant Habitat Class: C – equal mix of coarse and fines

Notable Measures: relatively high percentage of coarse shoreline

##### Biological Measures

Total No. of Fish Species: 39

Average No. of Individuals: 149

Dominant Family (minus herring/shad): Minnows/Carp

Dominant Species (minus shad/shiners): golden redborse

Threatened & Endangered Species: mooneye, silver chub (PA)

Rare Ohio River Mainstem Species: channel darter

Notable Catch: abundant game fishes (sm. bass and bluegill)

#### Assessment Results

Highest scoring ORFIn metric (minus DELTs): % Non-natives

Lowest scoring ORFIn metric: % Piscivores

Sites Above 25<sup>th</sup> percentile (i.e. mORFIn Score = 20): 9

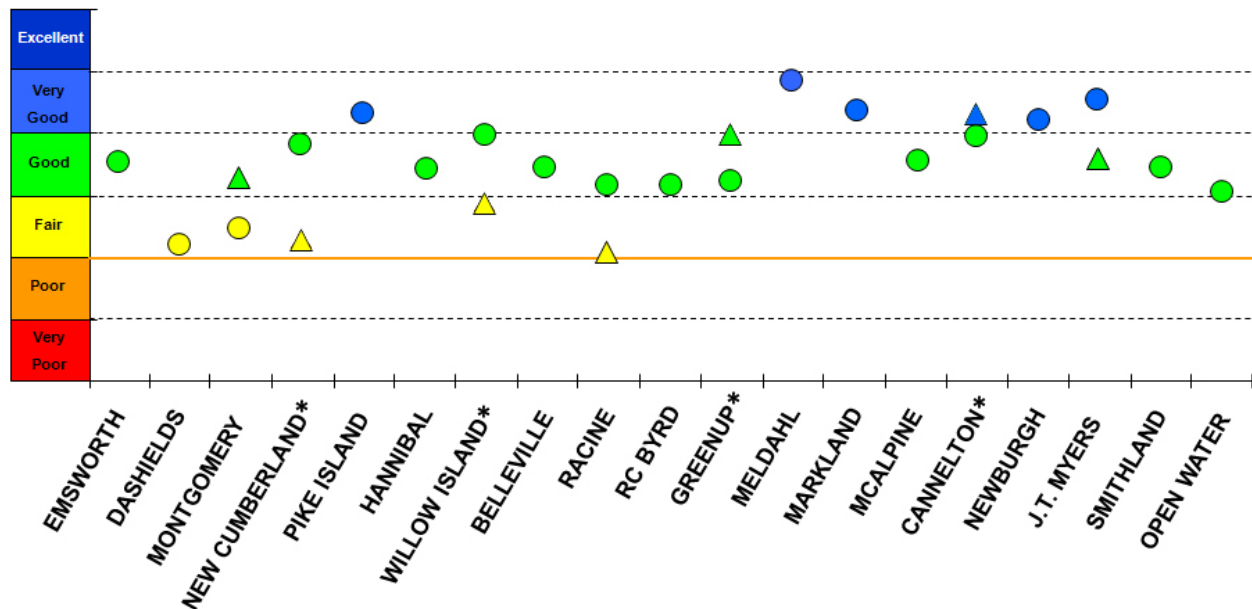
Sites Below 25<sup>th</sup> percentile (i.e. mORFIn Score = 20): 6

Aquatic Life-Use Designation: Met

Overall Biological Condition Rating: Fair

# Pool Assessments Report

- Conclusions
  - Summarize each pool survey
    - Habitat & fish species compositions, notable catches, etc
- Comparisons to previous surveys
  - Why (how) is the current survey different that the last survey for each pool (~5 years ago)





# Macroinvertebrate Program

## *Index Development & Methods Comparison Update*

D. Ryan Argo

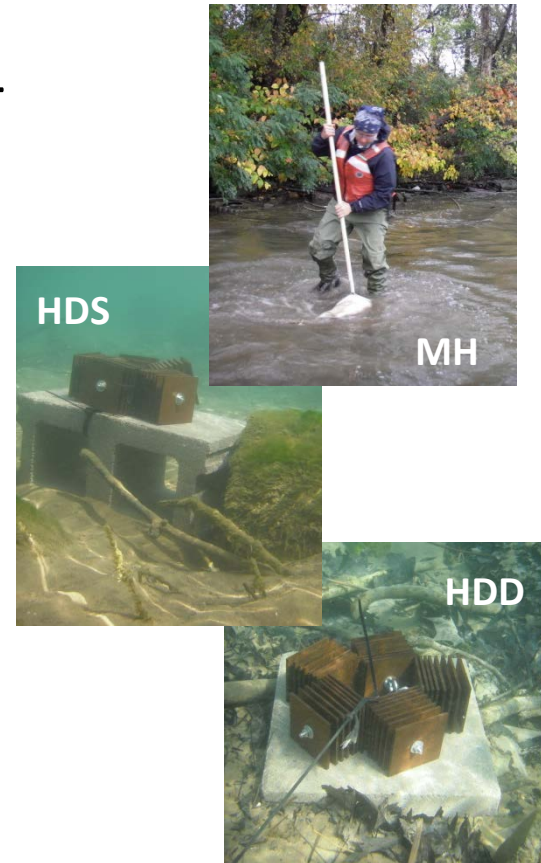


*199th Technical Committee Meeting  
Oglebay Resort & Conference Center  
Wheeling, West Virginia*

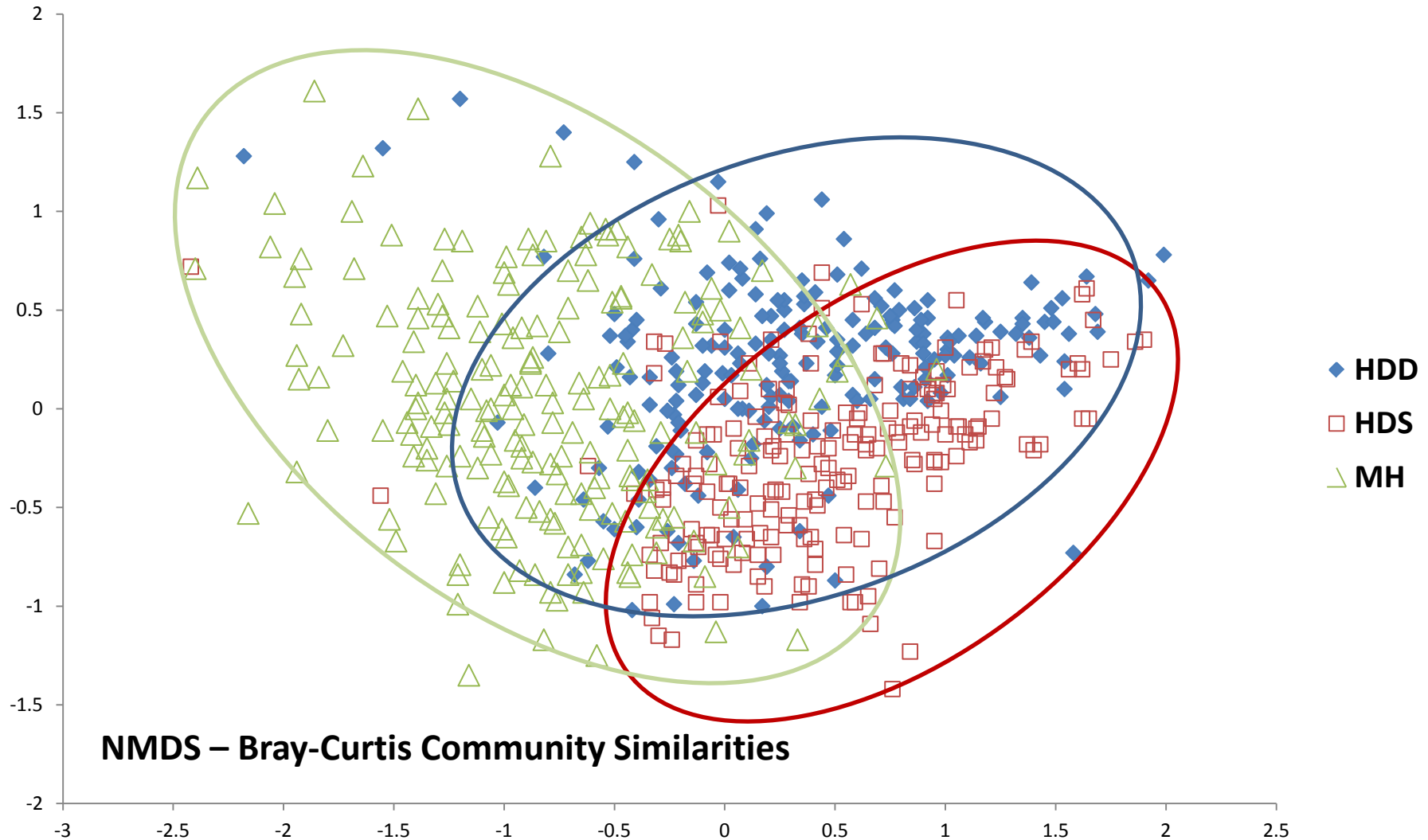
# Methods Comparison

**Goal:** Develop macroinvertebrates as an additional indicator for evaluating aquatic life use

- Collected macros via 3 methods since 2004
  - Multi-Habitat (MH), Hester-Dendy Shallow (HDS), HD Deep (HDD)
- Have paired EMAP abiotic data since 2007
  - Water & sediment chemistry and nutrients



# Each method provides slightly different results





# Index Development

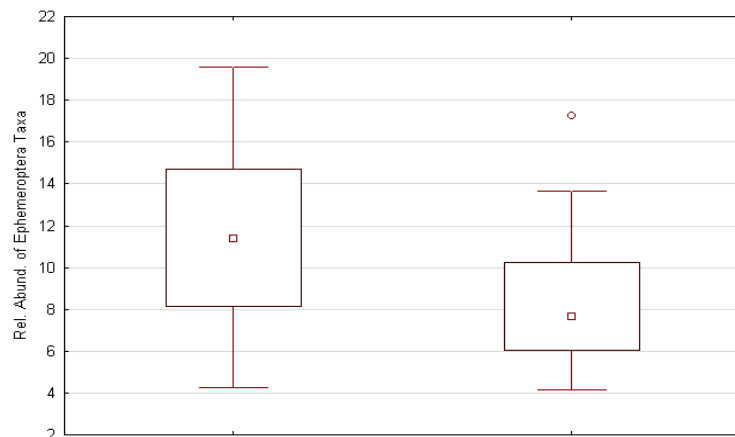
- **Approach**: Since each method provides different results, we will develop 7 separate indices
  - Single Method Indices
    - HDD, HDS, MH
  - Two Method Indices
    - HDDHDS, HDDMH, HDSMH
  - All Methods
- **Rationale**: Create the indices that are responsive to defined instream condition gradients
  - i.e. responsive to stress

Taxonomic Groups	
Individuals	Coenagrionidae
No. Taxa	Hemiptera
Ind-ZM	Coleoptera
Zebra Mussels	EPT
Corbicula	Ephemeroptera
Clitellata	Plecoptera
Oligocheata	Trichoptera
Diptera	Hydroptilidae
Chironomidae	Non-Insecta
Chrinominae	Polycentropodidae
Tanytarsini	Amphipoda
Orthoclaadiinae	Crustacea
Cricotopus	Gammaridae
Tanypodinae	Bivalvia (-C&D)
Megaloptera	Gastropoda
Odonata	Pleuroceridae
Tolerance & Diversity	Functional Feeding Guilds
Shannon Diversity	Collector-Filterers
Hilsenhoff Biotic Index	Collector-Gatherers
Intolerants	Piercer-Carnivores
Tolerants	Piercer-Herbivores
Habits	Predators
Burrowers	Scrapers
Climbers	Shredders
Clingers	
Sprawlers	
Swimmers	

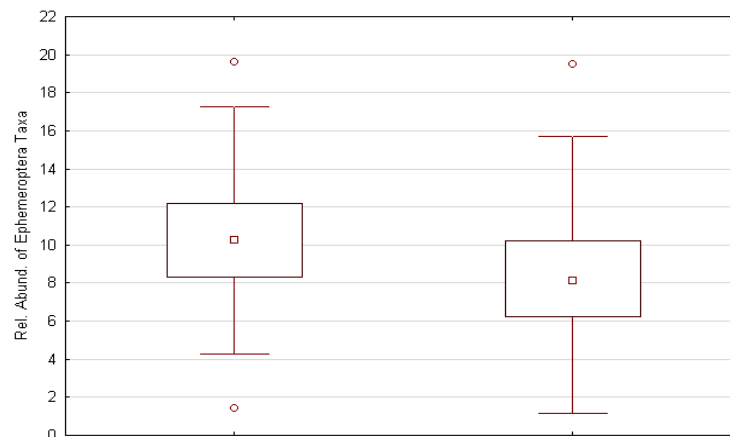
# Metric Calculation

- From this base list calculated 160 candidate metrics
  - Including both individual and taxa abundance and relative abundance measures
- Evaluated metrics for responsiveness to environmental gradients

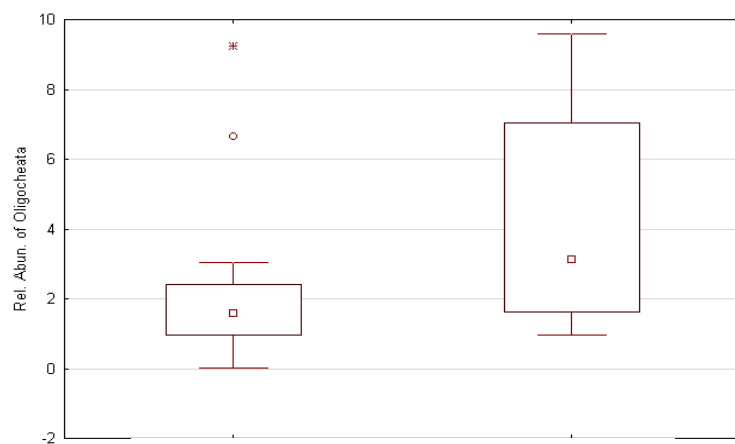
# Metric Evaluation



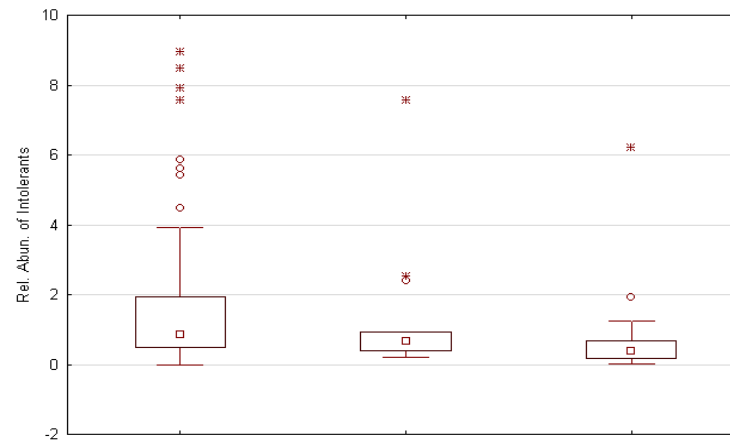
WATER\_CHEM



TOT\_NUTR



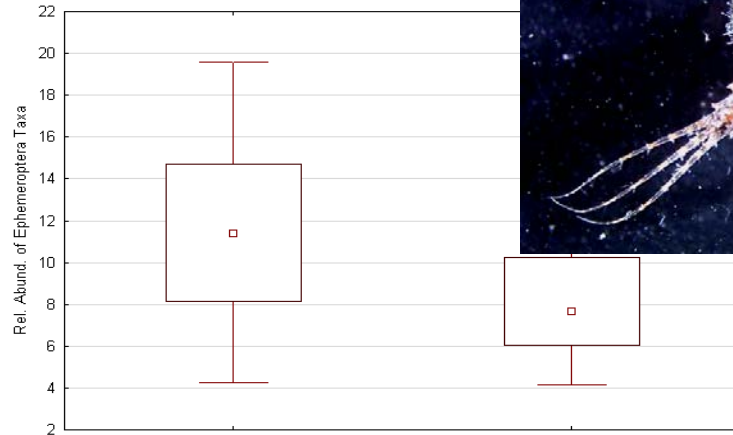
SED\_CHEM



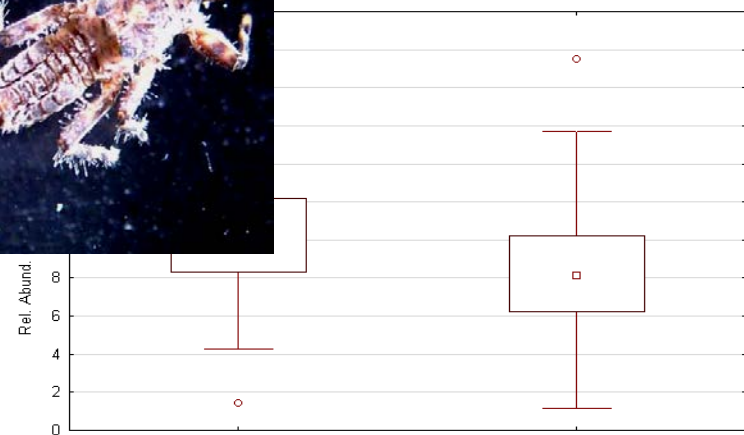
NUTR\_INTxN



## % Ephemeroptera Taxa



WATER\_CHEM



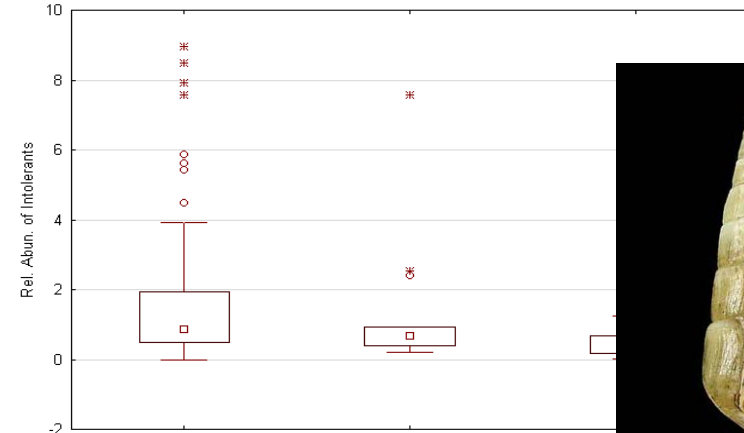
TOT\_NUTR



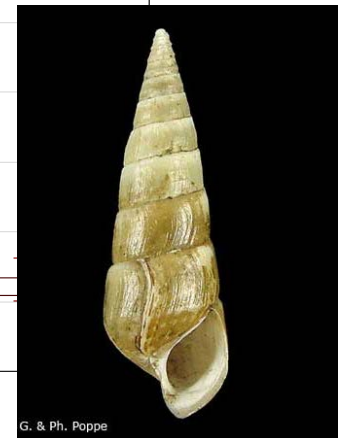
## % Oligochaeta



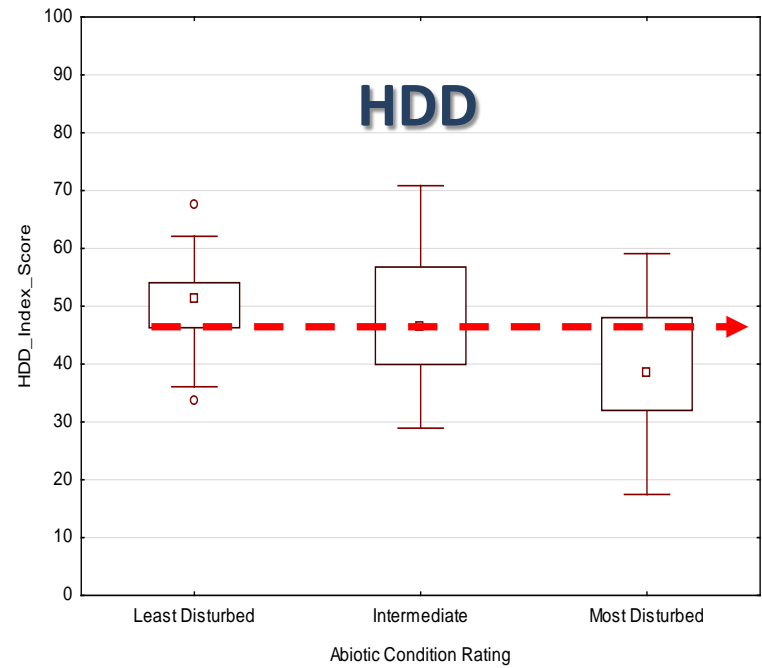
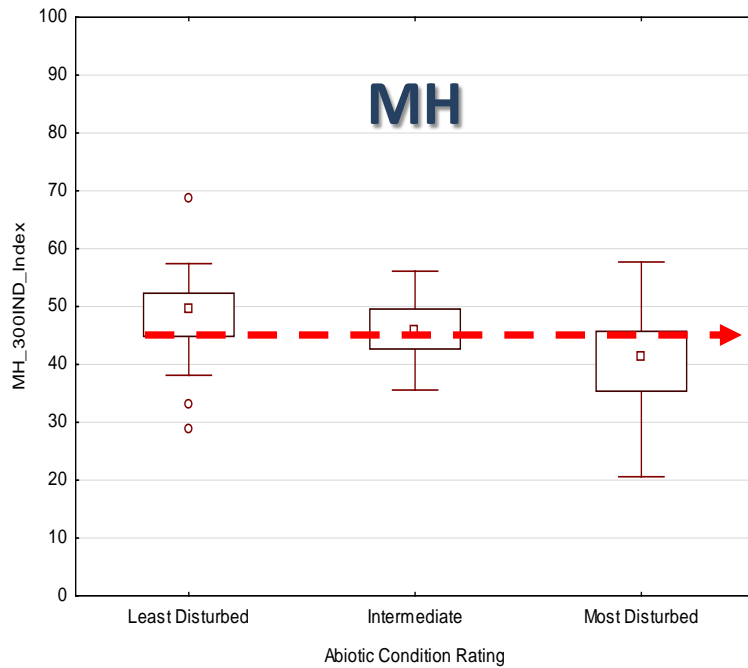
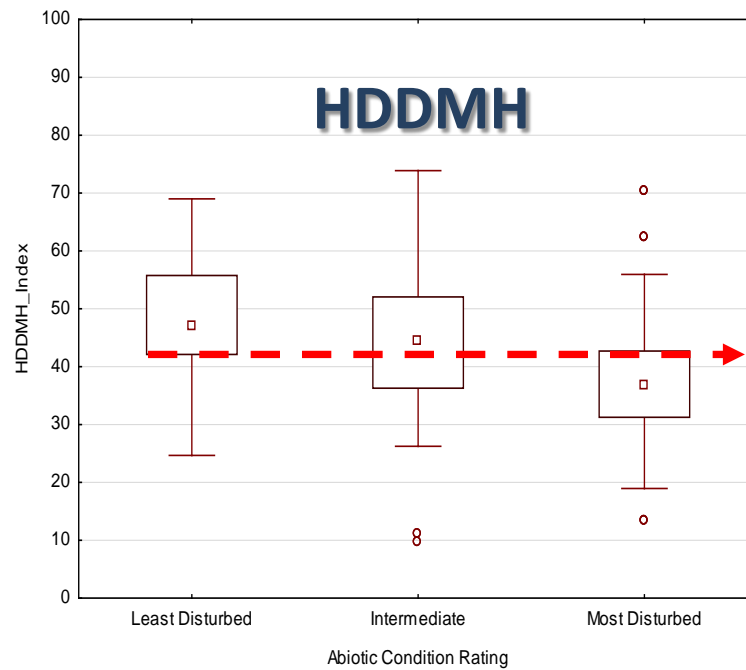
SED\_CHEM



NUTR\_INTxN



## % Intolerants



# Method Results Summary

Method Subset/Combo	Index Sensitivity	Scoring Overlap Severity	Method Cost (per sample*)	Field Notes
HDDMH	2	0.58	Moderate	
MH (300 Ind)	2	0.87	Low	~ 40% of samples have 300 Ind
HDD	2	1.75	Low	~ 85% retrieval
HDSMH	2	1.91	Moderate	
All Methods	2	3.07	High	current approach
HDS	1	10.21	Low	~ 95% retrieval
HDDHDS	1	11.80	Moderate	

\* Cost includes: supplies, analytical, and travel expenses



# Macro Index Timeline

- Late May: Indices completed in past few weeks
- June: Submit results to macro expert panel
  - Review and discuss via conference call
- July: Report reviewed findings to the BWQSC
  - Review discuss most appropriate method(s) to use
  - BWQSC provides recommend sampling strategy to Tec
- Late Summer: Review by Tec????
- Early September: Macro sampling begins
  - HDs are set, to be retrieved in mid-October