Macroinvertebrates as Indicators of Isolated Depressional Herbaceous Wetland Condition in Florida

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1. Goal: Analysis of macroinvertebrate response across a gradient of agricultural disturbance (crops, cattle, & citrus) for inclusion in a multi-metric bioassessment protocol.

2. Collection Methods:

- 35 wetlands have been sampled
- 20 Dipnet sweeps per site
- Composited & Preserved
- Sub-sampled by FL-DEP Central Lab
- 100 individuals counted and identified to lowest taxonomic group possible.

Macroinvertebrates have proven useful as wetland bioindicators in other states (MT, MN, OH) and other water bodies here in Florida (Stream Condition Index, Lake Condition Index).

3. Metric Approach:

- Trophic measures
- Composition measures
- Richness measures
- Phylogenic assemblages

Trophic Measures

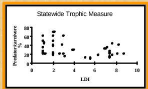
Metrics	Definition	Response
1. Predator/carnivore %	% of the predator functional feeding group	Variable
2. Shredder (macr) (fw) %	% of the macrophyte shredders functional feeding group	Decrease
3. Scraper (peri) (fw) %	% of the periphyton scrapper functional feeding group	Decrease
4. Col-fltr/susp fdr %	% collector-filterers/suspended feeders functional group	Variable
5. Plant piercer %	% of the macrophyte piercing functional feeding group	Decrease
6. Sub col-gthr/dep fdr %	% subcollector-gatherers/deposit feeders functional group	Variable
7. Epi col-gthr/dep fdr %	% epicollector- gatherers/deposit feeders functional group	Variable
8. Scavenger (animals) %	% of macrofauna that feed on dead animals	?
9. Browser-grazer %	% of macrobenthos that browse or graze upon periphyton	Variable
10. Parasite %	% of the parasite functional feeding group	?

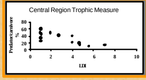
Composition Measures

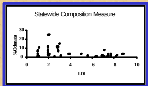
Metrics	Definition	Response
1. Dominant taxon (%)	Measures the dominance of the single most abundant taxon	Increase
2. % Diptera	Percent of true flies	Increase
3. % Coleoptera	Percent of beatles	Decrease
4. % Odonata	Percent of dragonfly and damselfly	Variable
5. % Ephemeroptera	Percent of mayflies	Decrease
6. % Oligochaeta	Percent of aquatic worms	Increase
7. % Hemiptera	Percent of true bugs	?
8. % Gastropoda	Percent of snails	Decrease
9. % Decapoda	Percent of individuals classed as crustaceans	Decrease
10. % Tricoptera	Percent of caddisflies	Decrease
11. % Trombidiformes	Percent of mites	?
12. % Amphipoda	Percent of amphipods	Decrease
13. Florida Index	Weighted sum of intolerant taxa, which are classed as 1 (least tolerant) or 2 (intolerant). Florida Index = 2 X Class 1 taxa + Class 2 taxa.	Decrease

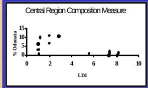
Richness Measures

Metrics	Definition	Response
1. # Taxa	Measures the overall variety of the invertebrate assemblage	Decrease
2. ETO	Number of taxa in the insect orders Ephemeroptera (mayflies), Tricoptera (caddisflies), and Odonata (dragon and damselflies)	Decrease
3. # Trichoptera Taxa	Number of caddisfly taxa	Decrease
4. # Coleoptera Taxa	Number of beetle taxa	Decrease
5. # Diptera Taxa	Number of true flies	Decrease
6. # Odonata Taxa	Number of dragonfly and damselfly taxa	Variable
7. # Ephemeroptera Taxa	Number of mayfly taxa	Decrease
8. # Oligochaeta Taxa	Number of aquatic worms taxa	Variable
9. # Hemiptera Taxa	Number of true bugs	?
10. # Trombidiformes Taxa	Number of mites	?
11. # Gastropoda Taxa	Number of snail taxa	Decrease
12. # Decapoda Taxa	Number of individuals classed as crustaceans	Decrease
13. # Amphipoda Taxa	Number of amphipod taxa	Decrease





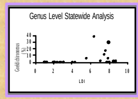


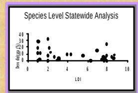


There are currently no Richness Measure metrics that are responding in a predictable and consistent manner along the impact gradient.

4. Phylogenic Analysis: Not all organisms could be identified to species. We analyzed the abundance of each phylogenic level along the disturbance gradient. Genera and species level analyses show promise.

Category	Number identified	Individuals identified (%)
Class	6	100
Order	23	99.57
Family	67	94.33
Genus	149	80.81
Species	88	49.54





Due, perhaps, to climatic and physiological differences between regions, some macroinvertebrate metrics may appear to respond to perturbations in some regions, but not in others. Other explanations include sampling season and hydroperiod.

The small sample size within each region (n=10 to 14) means the regional results are preliminary; additional sites (n=35) are currently being analyzed. Final sample size will be 70 marshes.

5. Summary:

- **Ideally, several metrics from each category (Trophic, Richness, and Composition) can be included in biometric development.**
- **However, with the exception of certain Trophic and Composition measures, little correlation can be made between impact and macroinvertebrate response.**
- **The addition of 35 sites sampled in 2000 will strengthen our analysis (n=70).**
- **Regional and phylogenic analysis will continue with the full dataset.**