DEVELOPMENT OF A WETLAND ASSESSMENT INDEX FOR FRESHWATER MACROINVERTEBRATES USING FIELD IDENTIFIABLE TAXA

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Abstract

The U.S. Fish and Wildlife Service (Service) recognized a need to develop a rapid assessment tool to determine the existing ecological condition and monitoring of habitats associated with Comprehensive Everglades Restoration Plan projects. The Service formed an internal technical team; the Habitat Evaluation Team (HET), to develop a handbook for evaluating existing ecological conditions. The mission of the HET is to develop a process for describing existing ecological conditions that balances the need for a scientific based investigation of habitat evaluations with administrative timelines and cost. The Service is developing a method for evaluating existing ecological conditions that focuses on three biological groups - plants, fish, and macroinvertebrates - as critical ecosystem components that can be used to characterize the health and change in condition of their environment. The HET formed working groups composed of representatives from government agencies, universities, environmental for-profit and non-profit organizations, to seek advice for each biological group to develop specific methodologies (e.g., for invertebrates the Invertebrate Working Group; IWG). Indices from each of these individual groups will be combined into a single ecological condition index (ECI). Because of the time and expense generally incurred to conduct macroinvertebrate assessments using currently accepted methods, a more cost effective assessment method is needed. Therefore, when the IWG was formed, two constraints were placed: 1) sampling to be completed within one-hour and 2) only use field identifiable taxa for index development. To aid in field identifications a 10X hand lens could be used if necessary. A list of field identifiable taxa has been generated and is in the process of being field tested. We invite macroinvertebrate specialists attending this meeting to provide input regarding the feasibility of identifying these particular taxa in the field efficiently.

Introduction

The Service is developing a method for evaluating existing ecological conditions of wetlands that focuses on three biological groups - plants, fish, and macroinvertebrates. The use macroinvertebrates was chosen because they are important link in food chain; linked to other factors (abiotic and biotic) which can be used to assess ecological conditions and potential impacts; macroinvertebrate community composition can reveal the health of ecosystem. In development of the macroinvertebrates index, the Service placed two sampling constraints:

1) **a time limited sampling method:**
   - a time-limited qualitative dip-net method (Rutter 1991) is presently under development

2) **use of only field identifiable taxa for index development:**
   - taxa listed on the Field Sheet represent a practicable level of field identification for an experienced biologist. Reliable field identification of macroinvertebrates depends heavily upon the experience of the individual conducting the survey (Klemm et al. 1990; Ross 1990).

Test Field Identifiable Taxa Method

Field Sheet for Qualitative Sampling of Wetland Macroinvertebrates
Timed Dipnet Sampling - 1 Hour

Collection Team (ID by/ assistant):	Bob Rutter / Steve Mortellaro			**Date:**	8/14/2007
Location: County/Local Area	Palm Beach / Water Conservation Area 2, South Florida Water Management District - US			**Sample ID:**	NA
O= observed; NST= no sample taken	**Start Time:** 9:50am	**End Time:**	10:50am	**Water Depth**	**Coordinates**
Habitat type(s)	Everglades Marsh - Ridge and Slough				N26_17.061 W80_24.709
Vegetation: Zone 1	*Eleocharis cellulosa, Rhynchospora sp. sparse saw grass (Cladium jamaicense)*			42cm	
Zone 2					
Zone 3					
Zone 4					

Observations (e.g. adult odonates, zooplankton, terrestrial taxa):
Adult: Cel epomina, Brachy gravida
Hydrobiidae ?
tadpoles

Abundance categories: Present (1-3), Common (4-10), Abundant (11-100), Dominant (>100) *Note: stop tally after 11 counts per taxa*

Taxa	Tally			Taxa	Tally		
	Adult	Larva	Pupae		Adult	Larva	Pupae
Abedus/Belostoma sp.				**Hirudinea**			
Acariformes				Hyalella azteca			
Acariformes Green				Hydaticus sp.			
Acariformes Red				Hydrobiidae			
Aeschnidae				Hydrometra sp.			
Amphipoda				Hydrophilidae			
Anax sp.				Hydroptila sp.			
Ancylidae				Ischnura sp.			
Aphylla williamsoni				**Isopoda**			
Argia sp.				**Lepidoptera**			
Baetidae				Lestes sp.			
Berosus sp.				Lethocerus sp.			
Berosus sp. (L)				Libellulidae			
Bivalvia				Lumbriculidae			
Bryozoa				Macromia sp.			
Buenoa sp.				Marisa cornuarietus			
Caecidotea sp.				Melanoides tuberculata			
Cernio sp.				Mesoveliidae			
Calibaetis sp.				Microvelia sp.			
Carabidae				Mooreobdella sp.			
Ceratopogonidae				Naididae			
Cernotina/Poly centropus sp.				Nasiaeschna pentacantha			
Chaoborus sp.				Nectopsyche sp.			
Chironomidae				Notonidae			
Choroterpes basalis				**Odonata**			
Chrysomelidae				Oecetis sp.			
Coenagrionidae				**Oligochaeta**			
Coleoptera				Orthotrichia sp.			
Collembola				Oxyethira sp.			
Corbicula fluminea				Pachydiplax longipennis			
Corixidae				Palaemonetes sp.			
Corypheschna sp.				Pelocoris sp.			
Crambidae				Pelonomus obscurus			
Crangonyx sp.				Planariidae			
Culicidae				Planorbella sp.			
Curculionidae				Planorbidae			
Cybister fimbriolatus				Platyvelia brachialis			
Decapoda				Pleidae			
Derallus altus				Pomacea sp.			
Dineutus sp.				Porifera			
Diptera				Procambarus sp.			
Dytiscidae				Prostoma sp.			
Elimia sp.				Pseudosuccinea sp.			
Enallagma sp.				Psychodidae			
Ephemeroptera				Ranatra sp.			
Ephydridae				Salvidae			
Erythemis sp.				Scirtidae (L)			
Eulimnadia sp.				Sphaeriidae			
Eupera cubensis				Steinovelia stagnalis			
Gammarus sp.				Stratiomyidae			
Gastropoda				Syrphidae			
Gerridae				Tabanidae			
Gomphidae				Tarebia granifera			
Gyrinus sp.				Thermonectus sp.			
Haitia sp.				Tipulidae			
Haliplidae				Triaenodes sp.			
Hebridae/Microvelia sp.				**Trichoptera**			
Helobata striata				Tropisternus sp.			
Hemiptera				Tubificinae			

Conclusion

- **A two year effort has result in development of a method for using only field identifiable macroinvertebrate taxa to assess wetland quality**
- **Preliminary field testing of the field identifiable taxa indicates that wetland quality or condition (impaired vs. unimpaired) can be discriminate based on water quality and hydrology (Shuford et. al, 2007)**
- **We invite macroinvertebrate specialists attending this meeting to provide input regarding the feasibility of identifying these particular taxa in the field efficiently.**