A Rapid Wetland Assessment Method Using Macrvinvertebrates as an Indicator of Wetland Condition for Assessing Everglades Restoration

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Abstract

The U.S. Fish and Wildlife Service recognized a need to develop a rapid assessment tool to evaluate existing benchmark condition and future ecological changes to wetlands associated with Comprehensive Everglades Restoration Plan projects. A Habitat Evaluation Team (HET) was formed to develop a process that balances the need for a scientifically based investigation of wetland biological condition with administrative timelines and cost. Three biological groups - plants, fish, and macrvinvertebrates - were considered critical ecosystem components that can be used to assess biological condition through time. Indices from each of these groups will be combined into a single Ecological Condition Index. The HET formed working groups composed of representatives from government agencies, universities, and environmental for-profit and non-profit organizations to seek advice for each biological group to develop specific methodologies. The multi-agency Invertebrate Working Group was given two constraints in the development of an index: 1) sampling was to be completed within one hour and 2) only field identifiable taxa could be used. A list of field identifiable taxa has been generated and is in the process of being field-tested. Also, a time-limited qualitative dip-net procedure for collecting field-identifiable macrvinvertebrates that will provide a rating of wetland biological condition has been developed. At present, the method requires that one biologist, with an assistant, will sample representative wetland habitats for one hour, and puts no constraints on spatial coverage or number of dip-net sweeps taken. Fifteen macrvinvertebrate metrics are currently being tested for efficacy in discrimination between wetlands in good condition and those impacted by hydroporphic alteration and/or water quality degradation.

Introduction

The Service is developing a method for evaluating existing ecological conditions of wetlands using macrvinvertebrates. Macrvinvertebrates were chosen because they are an important link in the food chain; they are linked to other factors (abiotic and biotic) which can be used to assess ecological conditions and potential impacts; they exhibit a diversity of responses to anthropogenic effects; and macrvinvertebrate community composition can reveal the biological health of aquatic ecosystems. Everglades ecosystem restoration benefits provided by a rapid wetland assessment method using macrvinvertebrates include:

- Provides a rapid and cost-effective method to assess and monitor the effects of Everglades Ecosystem restoration projects on wetlands.
- Evaluates baseline benchmark and post restoration biological condition of wetlands to be affected by Everglades Ecosystem restoration projects.
- Macrvinvertebrates included in this method (e.g., crayfish and shrimps) will be used as performance measures for modeling in the Everglades Restoration: Alternatives Analysis.
- Fifteen macrvinvertebrate metrics are intended to indicate habitat and water quality, ecological function, and hypothetical effects of Everglades Restoration projects are being assessed for effectiveness. Effective wetland indicator metrics will be combined into a single macrvinvertebrate index.
- The macrvinvertebrate index results will be integrated with indices for plants and fish to provide an overall index of wetland condition or quality.

Characterization of Impaired and Reference sites.

Impaired

Monotypic Cattail Stands
Open Water = Airboat
Trash Or Alligator Holes

Reference

Ridge And Slough Mosaic
Floating Mats Of Pemphigus

Method

This qualitative method for wetlands requires one biologist with an assistant to sample for one hour. There are no constraints on spatial coverage or number of dip-net sweeps taken. This method should be conducted by experienced biologists who have the necessary competency in macrvinvertebrate taxonomy.

- Visually survey the wetland for physical and habitat characteristics, and approximate your time among available habitats.
- Photograph the habitat, and record the locality information on the Field Sheet.
- Sample by working the net rapidly and vigorously within vegetation and other habitats. Place a small aliquot of the net contents into a shallow white pick-up with a small amount of water. Identify all organisms to the field-identifiable level as indicated on the Field Sheet.
- The field assistant records taxa on the Field Sheet as they are encountered.
- Use a metric to record the number of individuals for each taxon observed.
- Continue sweeping within a productive location until additional sweeps yield few additional taxa. Generally, up to ten minutes in a productive location is sufficient.
- If the first five sweeps in a new location do not yield new taxa, move on to the next location. Stop sampling when one hour has elapsed.

Summary

- A two-year effort has resulted in development of:
  1) A list of South Florida wetland macrvinvertebrate taxa
  2) A list of field identifiable wetland macrvinvertebrate taxa
  3) A list of potentially effective wetland indicator metrics
  4) A time-limited qualitative sampling method for using field identifiable macrvinvertebrate taxa to assess Everglades wetland quality.
- Preliminary field testing and data analysis indicates that discrimination of impacted wetlands from relatively unimpacted wetlands can be achieved using values of some of the candidate metrics.
- Additional testing for effectiveness of candidate metrics is necessary prior to combining them into a composite Macrvinvertebrate Wetland Index.
- This method is intended to assess effects of Everglades restoration projects.