

Why Study Biological Communities?

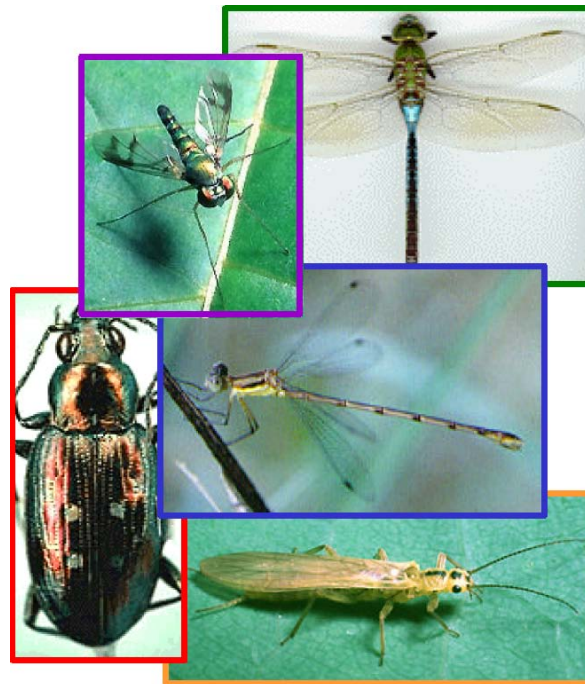
Biological communities are sensitive to stress, both natural and anthropogenic (caused by human activities). When our actions adversely affect the environment, the biological population will change, leading to an impaired or imbalanced community. Much like the “canary in the coal mine,” the response of aquatic insects to changes in water quality gives us an early warning of possible harm to a waterbody. Many common insects spend their juvenile life within aquatic systems including: dragonflies; mayflies; beetles; black flies; and mosquitoes. These organisms show the effects of physical habitat alterations, point and nonpoint source contaminants, and cumulative pollutants over their life cycle.



What is a Bioassessment?

Bioassessments involve field sampling of aquatic biological communities to characterize community structure (i.e. diversity, pollution tolerance). They include measuring water quality indicators such as dissolved oxygen, evaluating habitat conditions, and determining the health of aquatic insect communities. To determine the biological health of a waterbody, we compare it's characteristics to those of communities across a human disturbance

gradient. The system is then evaluated with regard to its designated use to determine if it has been negatively impacted by our activities.



Left to Right from Top:
Common fly (*chironomidae*); Dragonfly (*odonata*); Beetle (*coleoptera*); Damselfly (*odonata*); Stonefly (*plecoptera*)

How Can the Results of Bioassessments be Used?

Biological monitoring allows us to directly assess waterbody health. Most importantly, they let us assess the cumulative effects of all activities occurring within a watershed. These results can be used to establish baseline characteristics for Florida's streams, lakes, wetlands, and estuaries; to characterize the overall condition of watersheds; to identify potential problem pollutants; to target more

intensive diagnostic samplings; and to support land use planning and management decisions. They can also be used to evaluate the effects of management programs on waterbodies and their biological communities. Bioassessments also provide an excellent way of prioritizing waterbodies for special protection, restoration, or rehabilitation.

Bioassessments in Action

The Florida Department of Environmental Protection uses bioassessments to assess the effectiveness of point and nonpoint source pollution controls and to evaluate the health of waterbodies. Bioassessments are currently used in the following DEP programs:

- Basin-Wide Assessments – to evaluate watershed health
- Fifth Year Inspections – to evaluate the discharge of municipal wastewater treatment plants
- Forestry Nonpoint Source Program – to evaluate the effectiveness of forestry best management practices (BMPS)
- Mitigation Assessments – to evaluate the success of created or restored aquatic ecosystems.

Bioassessments are also used as an educational tool in citizen/volunteer monitoring programs to provide basic information about watershed health.

Photo Credits:
Common fly, Stone fly - C. Riley Nelson;
Dragonfly - Forrest Mitchell;
Damselfly - James Laswell and Nathan McConal;
Beetle - David Maddison

Can we afford clean water? Can we afford rivers and lakes and streams and oceans which continue to make life possible on this planet? Can we afford life itself? ... These questions answer themselves.
-Senator Edmund Muskie, 1972

Florida's Watersheds

Watersheds, or basins, are nature's boundaries. They are the land areas that drain to a water body. Florida has over 8,000 lake watersheds and 52 major river basins, each with many smaller tributaries and their associated watersheds. Even the smallest of Florida's creeks represents the beginning of a network of flowing waters that connect in a long, gradual journey to the ocean. To improve the effectiveness of Florida's land and water resource management programs, and to allow better assessment of the cumulative effects of all pollution sources within a watershed, these programs are moving towards an integrated, cooperative watershed approach. This approach will allow better coordination of efforts to control point and nonpoint sources of pollution, to establish total maximum daily loads, to involve the public, and to determine which mix of control strategies will work best within a watershed. Bioassessments will play a major role in helping to define problem areas and evaluate the effectiveness of our pollution control efforts. Remember that "we all live downstream" and that reducing nonpoint source pollution requires all of us to be part of solution. If we all do a little, we can do a lot to help assure future generations have clean water.

Partners in Florida's Bioassessment Programs



Division of Water Resource Management
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Bioassessment of Florida's Aquatic Ecosystems



...using biological approaches to measure and evaluate the consequences of human actions on biological systems