


## Tools Developed For Wetland Biomonitoring

Version: 1\20\03

Tool Topic	Tool Name	Tool Application	Source\Contact(s)\ Location	Web Address (URL)
Algae: EPA	Using Algae to Assess Environmental Conditions in Wetlands	Discusses field sampling and analytical methods for using algae in wetland bioassessments	<p>EPA Wetland Nutrient Criteria and the Biological Assessment of Wetlands Workgroups</p> <p>✉ EPA National Service Center for Environmental Publications (NSCEP) (513) 489-8190 or toll-free (800) 490-9198</p> <p>Email: <a href="mailto:to:ncepiwo@one.net">to:ncepiwo@one.net</a></p> <p>For conventional mail, please write to NSCEP at 11029 Kenwood Road, Cincinnati, OH 45242.</p>	<p><a href="http://www.epa.gov/waterscience/standards/nutrient.html">http://www.epa.gov/waterscience/standards/nutrient.html</a></p> <p><a href="http://www.epa.gov/owow/wetlands/bawwg/">http://www.epa.gov/owow/wetlands/bawwg/</a></p>
Algae: Florida	Florida Everglades Assemblages Monitored: Sampling Methods and Analysis	<p>This project was initiated to monitor biological assemblages across a nutrient gradient in the Florida Everglades in support of regulatory efforts to define a numeric water quality criterion for Phosphorous.</p> <p>The goal is protection of natural populations of aquatic flora and fauna in the Everglades Protection Area.</p> <p>Phytoplankton, diatoms, and natural substrate (benthic) samples were collected monthly to start, then quarterly. Taxa were determined.</p>	<p>Russel Frydenborg Florida Department of Environmental Protection 2600 Blair Stone Road, MS 6511 Tallahassee, Florida 32399-2400 Phone: (850) 921-9821</p>	<p><a href="http://www.epa.gov/owow/wetlands/bawwg/case/fl2meth.html#alga">http://www.epa.gov/owow/wetlands/bawwg/case/fl2meth.html#alga</a></p>
Algae: Maine	Algae Protocol and Metrics for the Casco Bay Watershed in Maine	<p>Metrics and Protocol developed for semi-permanently or permanently inundated wetlands (reference sites to poor quality sampled)</p> <p>Algal from plants, sediments, and water column were collected and disturbance was assessed using land use, trophic status, and hydrologic and sewage chemical indicators.</p>	<p>■ Jan Stevenson (project lead for algae) Michigan State University Department of Zoology 203 Natural Science Building East Lansing, MI 48824-1115 Phone: (517) 432-8083 Email: <a href="mailto:rjstev@msu.edu">rjstev@msu.edu</a></p>	<p><a href="http://www.epa.gov/owow/wetlands/bawwg/case/me.html">http://www.epa.gov/owow/wetlands/bawwg/case/me.html</a></p>


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Algae: North Dakota	North Dakota Wetland Bioassessment Program	Samples are collected just below the water surface in the middle or deepest area of the wetland basin twice per year. Identification and enumeration of phytoplankton, algae, and diatoms is followed by some sample preservation.	Mike Ell North Dakota Department of Health Division of Water Quality 1200 Missouri Avenue P.O. Box 5520 Bismarck, ND 04333 Phone: (701) 328-5214 Email: mell@state.nd.us	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/nd.html#wo">http://www.epa.gov/owow/wetlands/bawwg/case/nd.html#wo</a>
Algae/Diatoms: Vermont	Vermont Wetlands Bioassessment Project	Algae sampling primarily targeted diatoms; however, filamentous algae was collected when present. Collected both benthic samples (scraping algae from leaves, sticks, and rocks) and planktonic diatom samples from each pool (when available). Wetland Type(s): Seasonal Pools Northern White Cedar Swamps	Doug Burnham VDEC-WQD 103 S. Main St. - 10N Waterbury, VT 05676 802-241-3784 or 244-4520 Email: DOUGB@dec.anr.state.vt.us	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/vt.html">http://www.epa.gov/owow/wetlands/bawwg/case/vt.html</a>
Amphibians: EPA	Using Amphibians in Bioassessments of Wetlands	Discusses field sampling and analytical methods for using amphibians in wetland bioassessments	✧ EPA Wetland Nutrient Criteria and the Biological Assessment of Wetlands Workgroups	<a href="http://www.epa.gov/waterscience/standards/nutrient.html">http://www.epa.gov/waterscience/standards/nutrient.html</a>  <a href="http://www.epa.gov/owow/wetlands/bawwg/">http://www.epa.gov/owow/wetlands/bawwg/</a>
Amphibians: EPA	Amphibian IBI	Wetland Types: Forested Scrub Shrub Depressional	Ohio EPA Mick Micacchion Ohio Environmental Protection Agency	<a href="http://www.epa.state.oh.us/">http://www.epa.state.oh.us/</a>  (Choose Wetlands from Topic Index; then Wetlands Bioassessment)

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Amphibians and Reptiles: Michigan	Michigan Great Lakes Coastal Bioassessments	<p>Baseline data collected on water quality and plant, invertebrate and vertebrate communities</p> <p>Wetland Types: reference and impacted Great Lakes coastal wetlands</p> <p>Amphibian and frogs/toad populations were determined by using calls. Dip net sampling also was used to determine relative abundance of tadpole population.</p>	<p>☑ Tom Burton Michigan State University Department of Zoology 203 Natural Science East Lansing, MI 48824-1115 Phone: (517) 353-4475 Email: burtont@pilot.msu.edu</p> <p>Donald G. Uzarski Michigan State University Department of Zoology 203 Natural Science East Lansing, Michigan 48824-1115 Office: (517) 355-6474 Email: uzarskid@pilot.msu.edu</p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/mi.html#amph">http://www.epa.gov/owow/wetlands/bawwg/case/mi.html#amph</a>
Amphibians: Vermont	Vermont Wetlands Bioassessment Project	<p>Amphibian Survey: visually surveyed each pool for egg masses and spermatophores, identified each egg mass, recorded an approximate number of eggs per mass, counted and identified breeding adults, and described physical parameters of the habitat.</p> <p>Wetland Type(s): Seasonal Pools Northern White Cedar Swamps</p>	<p>Doug Burnham VDEC-WQD 103 S. Main St. - 10N Waterbury, VT 05676 802-241-3784 or 244-4520 Email: DOUGB@dec.anr.state.vt.us</p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/vt.html">http://www.epa.gov/owow/wetlands/bawwg/case/vt.html</a>
Amphibians: Wisconsin	Refinement and Expansion of the Wisconsin Wetland Biological Index for Assessment of Depressionnal, Palustrine Wetlands	<p>Establish a biological integrity rating system for classifying wetlands based on the response of selected biological attributes (metrics) of the above communities to surrogate measures of human disturbance.</p> <p>Amphibian communities sampled twice using frog-toad calling surveys and personal observation/collections during daylight visits.</p> <p>Wetland Type(s): Palustrine Wetlands</p>	<p>Dick Lillie Wisconsin Department of Natural Resources Bureau of Integrated Science Services 1350 Femrite Drive Monona, WI 53716 Phone: (608) 221-6338 Email: LILLIR@dnr.state.wi.us</p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/wi2.html#amphibs">http://www.epa.gov/owow/wetlands/bawwg/case/wi2.html#amphibs</a>

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Birds: EPA	Biological Assessment Methods for Birds	Discusses field sampling and analytical methods for using birds in wetland bioassessments	✧ EPA Wetland Nutrient Criteria and the Biological Assessment of Wetlands Workgroups	<a href="http://www.epa.gov/waterscience/standards/nutrient.html">http://www.epa.gov/waterscience/standards/nutrient.html</a> <a href="http://www.epa.gov/owow/wetlands/bawwg/">http://www.epa.gov/owow/wetlands/bawwg/</a>
Birds: Massachusetts	Waquoit Bay, Massachusetts Wetland Bioassessment Pilot	Standardized sampling and surveying protocol for birds Wetland Type(s): salt marsh (High tide zone, intertidal zone, subtidal zone) (reference or minimally disturbed sites, and sites with altered tidal hydrology or with impacts from surrounding land use) Point counts, including two expert observers will be used. Sites will be sampled in August to capture migratory bird numbers.	Bruce K. Carlisle Massachusetts Coastal Zone Management 100 Cambridge Street Boston, MA 02202 Phone: (617) 626-1200	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/mapilot.html">http://www.epa.gov/owow/wetlands/bawwg/case/mapilot.html</a>
Birds: Michigan	Michigan Great Lakes Coastal Bioassessments	Baseline data collected on water quality and plant, invertebrate and vertebrate communities  Wetland Types: reference and impacted Great Lakes coastal wetlands  A minimum of four 25m fixed radius plots were surveyed using a method proposed by Reynolds at each site. Number of census plots increased with an increase in forested land.	 Tom Burton Michigan State University Department of Zoology 203 Natural Science East Lansing, MI 48824-1115 Phone: (517) 353-4475 Email: burtont@pilot.msu.edu  Donald G. Uzarski Michigan State University Department of Zoology 203 Natural Science East Lansing, MI 48824-1115 Phone: (617) 353-6474 Email: uzarskid@pilot.msu.edu	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/mi.html#birds">http://www.epa.gov/owow/wetlands/bawwg/case/mi.html#birds</a>
Birds: Pennsylvania	Bird Community IBI for the Mid-Atlantic Highlands		✧ Rob Brooks Penn State University Penn State Cooperative Wetland Center 301 Forest Resources Laboratory University Park, PA 16802 Phones: (814) 863-1596 Email: rpb2@psu.edu	<a href="http://www.wetlands.cas.psu.edu">http://www.wetlands.cas.psu.edu</a> <a href="http://www.epa.gov/owow/wetlands/bawwg/case/pa.html">http://www.epa.gov/owow/wetlands/bawwg/case/pa.html</a>

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Case Study: Bioassessment Methodology for Mid-Atlantic Wetlands: Maryland	Survey of Wetland Mitigation Sites in Maryland, Delaware and Virginia	<p>Metrics designed for restored wetlands on farmlands and existing wetlands (reference). Wetlands surveyed: depressional, semi-permanent, and seasonal</p> <p>Metrics used: macrophytes, macroinvertebrates, and amphibians (larvae, adults)</p> <p>Devised a gradient of physical factors that affect condition (e.g. land use in drainage area, management techniques, landscape features, method of restoration)</p>	<p>Don W. Sparling Project and Amphibian Coordinator U. S. Geological Survey (USGS) Biological Resources Division Patuxent Wildlife Research Center 11510 American Holly Drive Laurel, MD 20708-4017 Phone: (301) 497-5723 Email: don_sparling@usgs.gov</p> <p>Norman Melvin Coordinator for Macrophytes U.S. Department of Agriculture Wetland Science Institute 11400 American Holly Dr. Laurel, MD 20708-4014 Office (301) 497-5933 Email: Norman_Melvin@usgs.gov</p> <p>T. Peter Lowe Coordinator for Macroinvertebrates USGS, Patuxent Wildlife Research Center 11510 American Holly Dr. Laurel, MD 20708-4017 Office: (301) 497-5705 Email: Peter_Lowe@usgs.gov</p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/md.html">http://www.epa.gov/owow/wetlands/bawwg/case/md.html</a>
Case Study: Florida Bioassessment Methodology	Florida Bioassessment Methodology and Biocriteria	<p>Development of an appropriate bioassessment methodology and a list of candidate biocriteria and metrics for Florida.</p> <p>Utilize Geographic Information Systems (GIS) technology for regionalization and to quantify disturbance gradients.</p>	<p>Center For Wetlands, University of Florida Mark Brown Center for Wetlands University of Florida Phelps Lab P.O. Box 116350 Gainesville, FL 32611-6350 Email: mtb@ufl.edu Phone: (352) 392-2309 Systems Ecology, Environmental Engineering Services, University of Florida</p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/fl1.html">http://www.epa.gov/owow/wetlands/bawwg/case/fl1.html</a>

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Case Study: Florida Everglades Bioassessment	Florida Everglades Bioassessment Project	<p>Monitoring of biological assemblages across a nutrient gradient in the Everglades to define a numeric water quality criterion for phosphorous.</p> <p>Goal: protection of aquatic flora and fauna</p> <p>Data from this and other studies are being used by FDEP in the development of numeric Phosphorus criterion for the Everglades Protection Area.</p>	<p>Russel Frydenborg Florida Department of Environmental Protection 2600 Blair Stone Road, MS 6511 Tallahassee, Florida 32399-2400 Phone: (850) 921-9821</p>	<p><a href="http://www.epa.gov/owow/wetlands/bawwg/case/fl2.html">http://www.epa.gov/owow/wetlands/bawwg/case/fl2.html</a></p>
Case Study: Florida Biological Surveys	Florida Biological Surveys	<p>Testing of the metrics and bioindicators were performed:</p> <p>1998: 24 herbaceous and forested depressional wetlands in north and central Florida and ranked along a disturbance gradient.</p> <p>1999: 36 herbaceous, depressional wetlands in north, central and the southern peninsula (half were impacted by ag, half were reference locations)</p>	<p>Center For Wetlands, University of Florida Mark Brown Center for Wetlands University of Florida Phelps Lab P.O. Box 116350 Gainesville, FL 32611-6350 Email: mtb@ufl.edu Phone: (352) 392-2309 Systems Ecology, Environmental Engineering Services, University of Florida</p>	<p><a href="http://www.epa.gov/owow/wetlands/bawwg/case/fl.html">http://www.epa.gov/owow/wetlands/bawwg/case/fl.html</a></p>
Case Study: General Bioassessment	Wetland Bioassessment Case Studies	Case studies of wetland bioassessment projects around the nation	<p>✧ EPA Wetland Nutrient Criteria and the Biological Assessment of Wetlands Workgroups</p>	<p><a href="http://www.epa.gov/waterscience/standards/nutrient.html">http://www.epa.gov/waterscience/standards/nutrient.html</a></p> <p><a href="http://www.epa.gov/owow/wetlands/bawwg/">http://www.epa.gov/owow/wetlands/bawwg/</a></p>

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Case Study: Maine Bioassessment Project	Casco Bay Watershed Biological Assessment Project	Develop sampling methods for algae and macroinvertebrates. Algal protocols and metrics Develop biological criteria for Maine wetlands. Diagnose stressors degrading wetlands. Considerations for site selection: Hydrologic regime, distribution of sites, landscape position, disturbance gradient, management significance, and accessibility Wetlands: semi-permanently or permanently inundated (reference sites to poor quality sampled)	<p>  Jeanne DiFranco            Maine Department of Environmental Protection            312 Canco Road            Portland, ME 04103            Phone: (207) 822-6424            Email: Jeanne.L.Difranco@state.me.us         </p> <p>           Jan Stevenson            Michigan State University            Department of Zoology            203 Natural Science Building            East Lansing, MI 48824-1115            Phone: (517) 432-8083            Email: rjstev@msu.edu         </p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/me.html">http://www.epa.gov/owow/wetlands/bawwg/case/me.html</a>
Case Study: Massachusetts Bioassessment Projects	Waquoit Bay, Massachusetts Wetland Bioassessment Pilot	Wetland Type(s): salt marsh (High tide zone, intertidal zone, subtidal zone) (reference or minimally disturbed sites, and sites with altered tidal hydrology or with impacts from surrounding land use) Standardized sampling and surveying protocol for biological, chemical and physical data Biological sampling: Macroinvertebrates Vegetation Birds Fish	<p>           Bruce K. Carlisle            Massachusetts Coastal Zone Management            100 Cambridge Street            Boston, MA 02202            Phone: (617) 626-1200         </p>	<p> <a href="http://www.epa.gov/owow/wetlands/bawwg/case/mapilot.html">http://www.epa.gov/owow/wetlands/bawwg/case/mapilot.html</a>   <a href="http://www.state.ma.us/czm/wastart.html">http://www.state.ma.us/czm/wastart.html</a> </p>

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Case Study: Michigan Great Lakes Coastal Bioassessments	Michigan Great Lakes Coastal Bioassessments	<p>Baseline data collected on water quality and plant, invertebrate and vertebrate communities.</p> <p>Wetland Types: reference and impacted Great Lakes coastal wetlands</p> <p>Fish-and-invertebrate IBI developed by plant zone.</p> <p>Assemblages Monitored: Amphibians and Reptiles Birds Fish Invertebrates Macroinvertebrates Vegetation</p>	<p>Tom Burton Michigan State University Department of Zoology 203 Natural Science East Lansing, MI 48824-1115 Phone: (517) 353-4475 Email: burtont@pilot.msu.edu</p> <p>Donald G. Uzarski Michigan State University Department of Zoology 203 Natural Science East Lansing, Michigan 48824-1115 Office: (517) 355-6474 Email: uzarskid@pilot.msu.edu</p>	<p><a href="http://www.epa.gov/owow/wetlands/bawwg/case/mi.html">http://www.epa.gov/owow/wetlands/bawwg/case/mi.html</a></p>
Case Study: Minnesota Bioassessment Project	Minnesota Pollution Control Agency Wetland Bioassessment Program	<p>Wetland Type(s): depressional wetlands of Minnesota</p> <p>Two Indices of Biological Integrity developed</p> <ul style="list-style-type: none"> <li>• Biological reference conditions for depressional wetlands in Central Minnesota. This initial research studied the quantity and quality of macroinvertebrates in both least-disturbed reference sites and known-disturbed depressional wetlands</li> <li>• multimetric biological integrity indexes for depressional wetlands</li> </ul> <p>Assemblages Monitored (across a range of human disturbance): invertebrates vegetation</p>	<p>Mark Gernes Minnesota Pollution Control Agency (MPCA) Environmental Outcomes Division 520 Lafayette Road St. Paul, MN 55155 Phone: (651) 297-3363 Email: mark.gernes@pca.state.mn.us</p> <p>Judy Helgen Minnesota Pollution Control Agency (MPCA) Environmental Outcomes Division 520 Lafayette Road St. Paul, MN 55155 Phone: (651) 296-7240 Email: judy.helgen@pca.state.mn.us</p>	<p><a href="http://www.epa.gov/owow/wetlands/bawwg/case/mn1.html">http://www.epa.gov/owow/wetlands/bawwg/case/mn1.html</a></p> <p><a href="http://www.pca.state.mn.us/">http://www.pca.state.mn.us/</a></p>



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Case Study: Montana Wetland Bioassessment Projects	Montana Department of Environmental Quality (MDEQ) Biocriteria Protocols for Wetland Bioassessment	<p>In conjunction with Montana DEQ's research program, Montana State University (MSU) designed a study in 1997 that focused on development of vegetation biocriteria for western Montana depressional wetlands. The focus on vegetation biocriteria is key in Montana because wetland vegetation is easier to assess than macroinvertebrates or diatoms for depressional wetlands that are seasonally dry.</p> <p>University of Montana is currently designing a study to determine how chemical and physical gradients, and seasonality influence the macroinvertebrate communities of depressional wetlands.</p> <p>Sites were classified using Omernik ecoregions and hydrogeomorphology.</p> <p>Developed a classification framework by sampling for the full spectrum of wetland types in Montana.</p> <p>Assemblages Monitored: Diatoms Macroinvertebrates</p>	<p>Randall S. Apfelbeck Montana Department of Environmental Quality 2209 Phoenix Avenue P.O. Box 200901 Helena, MT 59620-0901 Phone: (406) 444-2709 e-mail: rapfelbeck@state.mt.us</p> <p>Mr. Apfelbeck is the author of Development of Biocriteria for Wetlands in Montana</p>	<p><a href="http://www.deq.state.mt.us/wqinfo/Wetlands/Index.asp">Montana DEQ web site: http://www.deq.state.mt.us/wqinfo/Wetlands/Index.asp</a></p> <p><a href="http://www.deq.state.mt.us/pa/mdm/Wetlands/paper5j.htm">Biocriteria Abstract: http://www.deq.state.mt.us/pa/mdm/Wetlands/paper5j.htm</a></p> <p><a href="http://www.epa.gov/owow/wetlands/bawwg/case/mtdev.html">Description of Study: http://www.epa.gov/owow/wetlands/bawwg/case/mtdev.html</a></p>
Case Study: North Dakota Wetland Bioassessment Project	North Dakota Wetland Bioassessment Program	<p>IBI development for temporary and seasonal wetlands.</p> <p>Assemblages Monitored: Algae (phytoplankton) Macroinvertebrates Vascular Plants</p> <p>Wetland Types: temporary wetlands seasonal wetlands some sampling in seasonal depressional wetlands</p> <p>Used HGM classification</p>	<p>Mike Ell North Dakota Department of Health Division of Water Quality 1200 Missouri Avenue P.O. Box 5520 Bismarck, ND 04333 Phone: (701) 328-5214 Email: mell@state.nd.us</p>	<p><a href="http://www.epa.gov/owow/wetlands/bawwg/case/nd.html">http://www.epa.gov/owow/wetlands/bawwg/case/nd.html</a></p>


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Case Study: Penn State Bioassessment Projects: Pennsylvania	Bioassessment methodology for assessing the integrity of wetlands	<p>Research, monitoring and training on wetlands for Mid-Atlantic and Northeastern States.</p> <p>Includes:</p> <ul style="list-style-type: none"> <li>Bird Community IBI for the Mid-Atlantic Highlands</li> <li>Verified Suitability Index for the Louisiana Waterthrush</li> <li>Amphibian Indicator landscape study</li> <li>Otter and Beaver Interactions in the Delaware Water Gap</li> <li>Using Bioindicators to develop a calibrated index of regional ecological integrity forested headwater streams</li> <li>Evaluating and implementing watershed approaches for protecting Pennsylvania's wetlands</li> <li>Watersheds and Wetlands: Large-scale disturbances and small-scale responses</li> <li>Watershed modeling for water quality effects on wetlands</li> </ul>	<p>→ Rob Brooks Penn State University Penn State Cooperative Wetlands Center 301 Forest Resources Laboratory University Park, PA 16802 Phone: (814) 863-1596 Email: rpb2@psu.edu</p> <p>Denice Heller Wardrop Penn State University Penn State Cooperative Wetlands Center 301 Forest Resources Laboratory University Park, PA 16802 Phone: (814) 863-1005 Email: dhw110@psu.edu</p>	<p>Description of Case Study: <a href="http://www.epa.gov/owow/wetlands/bawwg/case/pa.html">http://www.epa.gov/owow/wetlands/bawwg/case/pa.html</a></p>
Case Study: Vermont Wetlands Bioassessment Project	Vermont Wetlands Bioassessment Project	<p>Gathered chemical, physical, and biological data from seasonal pools to facilitate an ecologically based classification of minimally disturbed (reference) seasonal pools in Vermont.</p> <p>Used both previously and newly collected Nongame and Natural Heritage Program data to identify specific biological attributes to serve as indicators of ecological integrity in northern white cedar swamps.</p> <p>Wetland Type(s): Seasonal Pools Northern White Cedar Swamps</p>	<p>Doug Burnham VDEC-WQD 103 S. Main St. - 10N Waterbury, VT 05676 802-241-3784 or 244-4520 Email: DOUGB@dec.anr.state.vt.us</p>	<p><a href="http://www.epa.gov/owow/wetlands/bawwg/case/vt.html">http://www.epa.gov/owow/wetlands/bawwg/case/vt.html</a></p>

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Case Study: Wisconsin	Wisconsin Department of Natural Resources Bioassessment Methodology	Develop a Biotic Index for Wisconsin's palustrine wetlands. Compare performance of one plant and two macroinvertebrate multimetric indices. Develop biological integrity rating system for classifying wetlands Assemblages Monitored: Macroinvertebrates Plants Wetland Type(s): Palustrine Wetlands	Dick Lillie Wisconsin Department of Natural Resources Bureau of Integrated Science Services 1350 Femrite Drive Monona, WI 53716 Phone: (608) 221-6338 Email: LILLIR@dnr.state.wi.us	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/wi1.html">http://www.epa.gov/owow/wetlands/bawwg/case/wi1.html</a>
Case Study: Wisconsin Refinement of Bioassessment Methods	Refinement and Expansion of the Wisconsin Wetland Biological Index for Assessment of Depressional, Palustrine Wetlands	Test and refine a Biotic Index for Wisconsin's palustrine wetlands. Expand list of assemblages to include macroinvertebrates, zooplankton, diatoms, amphibians, plants, and small mammals. Establish a biological integrity rating system for classifying wetlands based on the response of selected biological attributes (metrics) of the above communities to surrogate measures of human disturbance. Wetland Type(s): Palustrine Wetlands	Dick Lillie Wisconsin Department of Natural Resources Bureau of Integrated Science Services 1350 Femrite Drive Monona, WI 53716 Phone: (608) 221-6338 Email: LILLIR@dnr.state.wi.us	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/wi2.html">http://www.epa.gov/owow/wetlands/bawwg/case/wi2.html</a>
Classification : EPA	Wetlands Classification	Discusses wetland classification systems; how to use them in wetlands monitoring	✧ EPA Wetland Nutrient Criteria and the Biological Assessment of Wetlands Workgroups	<a href="http://www.epa.gov/waterscience/standards/nutrient.html">http://www.epa.gov/waterscience/standards/nutrient.html</a>  <a href="http://www.epa.gov/owow/wetlands/bawwg/">http://www.epa.gov/owow/wetlands/bawwg/</a>
Classification : Florida	Florida Wetland Classification System	Classification of Florida wetland types based on dominant vegetation (forested, shrub, herbaceous), geomorphic position (stream channel, flat topography, sloped topography, lake fringe, depressional) and primary water source (rainfall, surface water, ground water). Database correlates other existing classifications to the simplified classification system developed for bioassessment	Center For Wetlands, University of Florida Mark Brown Center for Wetlands University of Florida Phelps Lab P.O. Box 116350 Gainesville, FL 32611-6350 Email: mtb@ufl.edu Phone: (352) 392-2309 Systems Ecology, Environmental Engineering Services, University of Florida	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/fl.html">http://www.epa.gov/owow/wetlands/bawwg/case/fl.html</a>

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Classification of Bioregions: Florida	Florida Bioregion GIS Methodology	<p>A GIS-driven methodology for classifying bioregions within the state of Florida that identify climatic, geologic and geophysical provinces that are sensitive to wetland classes</p> <p>GIS use: Created a spatial hydrologic budget equation; output of model for Potential Soil Moisture Index</p>	<p>Center For Wetlands, University of Florida  Mark Brown  Center for Wetlands  University of Florida Phelps Lab  P.O. Box 116350  Gainesville, FL 32611-6350  Email: mtb@ufl.edu  Phone: (352) 392-2309  Systems Ecology, Environmental Engineering Services, University of Florida</p>	<p><a href="http://www.epa.gov/owow/wetlands/bawwg/case/fl.html">http://www.epa.gov/owow/wetlands/bawwg/case/fl.html</a></p>
Designing Monitoring Plans	Study Design for Wetlands Monitoring	<p>Discusses available study designs for monitoring wetlands</p>	<p>✧ EPA Wetland Nutrient Criteria and the Biological Assessment of Wetlands Workgroups</p>	<p><a href="http://www.epa.gov/waterscience/standards/nutrient.html">http://www.epa.gov/waterscience/standards/nutrient.html</a></p> <p><a href="http://www.epa.gov/owow/wetlands/bawwg/">http://www.epa.gov/owow/wetlands/bawwg/</a></p>
Diatoms: Montana	Diatom Assemblage Analysis	<p>The multivariate approaches that ANSP used to investigate relationships between Montana wetland diatom assemblages and environmental variables (mostly water-column chemistry) was Detrended Canonical Correspondence Analysis (DCCA) and two-way indicator analysis (TWINSPAN).</p> <p>Montana DEQ collected diatoms as composite grab samples. The algae was identified to the lowest taxonomic level possible. Samples were collected using a 250-ml plastic container and then preserved with Lugol's solution. Samples were collected from a location determined to best represent the wetland. These locations were restricted to areas that were easily accessible when wearing hip boots. Each site was sampled once from April through September.</p>	<p>Randall S. Apfelbeck  Montana Department of Environmental Quality  2209 Phoenix Avenue  P.O. Box 200901  Helena, MT 59620-0901  Phone: (406) 444-2709  Email: rapfelbeck@state.mt.us</p>	<p><a href="http://www.epa.gov/owow/wetlands/bawwg/case/mtdev.html#diatom">http://www.epa.gov/owow/wetlands/bawwg/case/mtdev.html#diatom</a></p>

Tool Topic	Tool Name	Tool Application	Source\Contact(s)\ Location	Web Address (URL)
Diatoms: Wisconsin	Refinement and Expansion of the Wisconsin Wetland Biological Index for Assessment of Depressional, Palustrine Wetlands	Establish a biological integrity rating system for classifying wetlands based on the response of selected biological attributes (metrics) of the above communities to surrogate measures of human disturbance. Diatoms are collected in one-dram vials from five sites in each wetland. Samples are kept iced until taxa are identified Wetland Type(s): Palustrine Wetlands	Paul Garrison Wisconsin Department of Natural Resources Bureau of Integrated Science Services 1350 Femrite Drive Monona, WI 53716 Email: garrip@dnr.state.wi.us	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/wi2.html#diatoms">http://www.epa.gov/owow/wetlands/bawwg/case/wi2.html#diatoms</a>
Fish: Florida	University of Florida-Assemblages Monitored: Sampling Method and Analysis	A Land Development Intensity Index is being used to quantify disturbance gradients for wetlands in agricultural and urban landscapes throughout the state. Fish are caught using traps and samples are examined for DELTs (deformities, ecoparasites, lesions, or tumors). All fish with DELTs are kept and those without anomalies are released	Mark Brown Center for Wetlands University of Florida Phelps Lab P.O. Box 116350 Gainesville, FL 32611-6350 Email: mtb@ufl.edu Phone: (352) 392-2309 Systems Ecology, Environmental Engineering Services, University of Florida	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/fl1meth.html#fish">http://www.epa.gov/owow/wetlands/bawwg/case/fl1meth.html#fish</a>
Fish: Massachusetts	Waquoit Bay, Massachusetts Wetland Bioassessment Pilot	Throw traps and seines are used for sampling both channel and march habitats. One sample will be conducted each month from April to October. Fish are identified to lowest taxa possible.	Bruce K. Carlisle Massachusetts Coastal Zone Management 100 Cambridge Street Boston, MA 02202 Phone: (617) 626-1200	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/mapilot.html#fish">http://www.epa.gov/owow/wetlands/bawwg/case/mapilot.html#fish</a>

Tool Topic	Tool Name	Tool Application	Source>Contact(s)\ Location	Web Address (URL)
Fish: Michigan	Great Lakes Coastal Wetlands Bioassessment	Sampling consists of pulsed, direct-current backpack electroshocking surveys, small fish traps, and fyke traps placed in each vegetation zone for selected 24 hour or longer intervals.	<p>☑ Tom Burton Michigan State University Department of Zoology 203 Natural Science East Lansing, MI 48824-1115 Phone: (517) 353-4475 Email: burtont@pilot.msu.edu</p> <p>Donald G. Uzarski Michigan State University Department of Zoology 203 Natural Science East Lansing, Michigan 48824-1115 Phone: (517) 355-6474 Email: uzarskid@pilot.msu.edu</p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/mi.html#ish">http://www.epa.gov/owow/wetlands/bawwg/case/mi.html#ish</a>
IBI: General	Metrics and Indexes of Biological Integrity (IBI)	Discusses metrics testing and creating an IBI	✧ EPA Wetland Nutrient Criteria and the Biological Assessment of Wetlands Workgroups	<a href="http://www.epa.gov/waterscience/standards/nutrient.htm">http://www.epa.gov/waterscience/standards/nutrient.htm</a>  <a href="http://www.epa.gov/owow/wetlands/bawwg/">http://www.epa.gov/owow/wetlands/bawwg/</a>
Invertebrates : EPA	Developing an Invertebrate Index of Biological Integrity for Wetlands	Discusses field sampling and analytical methods for using invertebrates in wetland bioassessments	✧ EPA Wetland Nutrient Criteria and the Biological Assessment of Wetlands Workgroups	<a href="http://www.epa.gov/waterscience/standards/nutrient.html">http://www.epa.gov/waterscience/standards/nutrient.html</a>  <a href="http://www.epa.gov/owow/wetlands/bawwg/">http://www.epa.gov/owow/wetlands/bawwg/</a>
Macroinvertebrate: Florida	Florida Everglades-Assemblages Monitored: Sampling Methods and Analysis	This project was initiated to monitor biological assemblages across a nutrient gradient in the Florida Everglades in support of regulatory efforts to define a numeric water quality criterion for Phosphorous. Dip Net, Quan Net, and Hester-Dendy samples were taken quarterly and sent to FDEP Central Biological Laboratory for processing and taxonomic identification.	Russel Frydenborg Florida Department of Environmental Protection 2600 Blair Stone Road, MS 6511 Tallahassee, Florida 32399-2400 Phone: (850) 921-9821	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/fl2meth.html#macroinv">http://www.epa.gov/owow/wetlands/bawwg/case/fl2meth.html#macroinv</a>

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Macroinvertebrate: Florida	University of Florida-Assemblages Monitored: Sampling Methods and Analysis	A Land Development Intensity Index is being used to quantify disturbance gradients for wetlands in agricultural and urban landscapes throughout the state. Used a dipnet to perform 20 discrete half meter sweeps, organisms will then be identified.	Mark Brown Center for Wetlands University of Florida Phelps Lab P.O. Box 116350 Gainesville, FL 32611-6350 Email: mtb@ufl.edu Phone: (352) 392-2309 Systems Ecology, Environmental Engineering Services, University of Florida	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/fl1meth.html#macro">http://www.epa.gov/owow/wetlands/bawwg/case/fl1meth.html#macro</a>
Macroinvertebrate: Maine	Macroinvertebrates Sampling in Casco Bay Watershed in Maine	Sampling performed in semi-permanently or permanently inundated wetlands Looking to refine site selection process to resolve classification and data comparability issues. Discovered that the multihabitat method did not work well for collecting chironomid taxa	<p>  Jeanne DiFranco            Maine Department of Environmental Protection            312 Canco Road            Portland, ME 04103            Phone: (207) 822-6424            Email: Jeanne.L.Difranco@state.me.us         </p> <p>           Jan Stevenson            Michigan State University            Department of Zoology            203 Natural Science Building            East Lansing, MI 48824-1115            Phone: (517) 432-8083            Email: rjstev@msu.edu         </p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/me.html#one">http://www.epa.gov/owow/wetlands/bawwg/case/me.html#one</a>
Macroinvertebrate: Massachusetts	Waquoit Bay, Massachusetts Wetland Bioassessment Pilot	Standardized sampling and surveying protocol for macroinvertebrates Wetland Type(s): salt marsh (High tide zone, intertidal zone, subtidal zone) (reference or minimally disturbed sites, and sites with altered tidal hydrology or with impacts from surrounding land use)	Bruce K. Carlisle Massachusetts Coastal Zone Management 100 Cambridge Street Boston, MA 02202 Phone: (617) 626-1200	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/mapilot.html#macro">http://www.epa.gov/owow/wetlands/bawwg/case/mapilot.html#macro</a>

Tool Topic	Tool Name	Tool Application	Source(Contact(s))\ Location	Web Address (URL)
Macroinvertebrate: Minnesota	Minnesota Pollution Control Agency Wetland Bioassessment Program	Use Macroinvertebrate study to assess wetland condition across a range of human disturbances. Dip Nets and activity traps were used during the seasonal index period of June to early July. Dip Netting captured the greatest richness of invertebrates and the activity trap captured the active swimmers and night active predators.	<p>Mark Gernes Minnesota Pollution Control Agency (MPCA) Environmental Outcomes Division 520 Lafayette Road St. Paul, MN 55155 Phone: (651) 297-3363 Email: mark.gernes@pca.state.mn.us</p> <p>Judy Helgen Minnesota Pollution Control Agency (MPCA) Environmental Outcomes Division 520 Lafayette Road St. Paul, MN 55155 Phone: (651) 296-7240 Email: judy.helgen@pca.state.mn.us</p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/mn1.html#macro">http://www.epa.gov/owow/wetlands/bawwg/case/mn1.html#macro</a>
Macroinvertebrate: Montana	Montana Department of Environmental Quality (MDEQ) Biocriteria Protocols for Wetland Assessment	A multimetric approach was used to evaluate wetland macroinvertebrate communities. This approach incorporates many attributes into the assessment process and has the ability to integrate information from the biological communities to provide an overall indication of biological condition or ecological health.	Randall S. Apfelbeck Montana Department of Environmental Quality 2209 Phoenix Avenue P.O. Box 200901 Helena, MT 59620-0901 Phone: (406) 444-2709 e-mail: rapfelbeck@state.mt.us	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/mtdev.html#macro">http://www.epa.gov/owow/wetlands/bawwg/case/mtdev.html#macro</a>
Macroinvertebrate: North Dakota	North Dakota Wetland Bioassessment Program	Sweep or jab method used currently. Samples are cleaned and preserved in jars for taxonomic identification.	Mike Ell North Dakota Department of Health Division of Water Quality 1200 Missouri Avenue P.O. Box 5520 Bismark, ND 04333 Phone: (701) 328-5214 Email: mell@state.nd.us	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/nd.html#one">http://www.epa.gov/owow/wetlands/bawwg/case/nd.html#one</a>



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Macroinvertebrate: Vermont	Vermont Wetlands Bioassessment Project	Sampled macroinvertebrates using three different methods: funnel traps to sample the actively swimming invertebrates (i.e., beetles, bugs, mosquitoes, crustaceans), a D-net to sample benthic invertebrates in the leaf litter and muck (i.e., snails, bivalves, chironomids, oligochaetes, caddisflies), and a qualitative search for any taxa we might have missed with the previous two methods. Wetland Type(s): Seasonal Pools Northern White Cedar Swamps	Doug Burnham VDEC-WQD 103 S. Main St. - 10N Waterbury, VT 05676 802-241-3784 or 244-4520 Email: DOUGB@dec.anr.state.vt.us	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/vt.html">http://www.epa.gov/owow/wetlands/bawwg/case/vt.html</a>
Macroinvertebrate: Wisconsin	Wisconsin Department of Natural Resources Bioassessment	Macroinvertebrate Sampling: Two-tiered approach: The first stage consisted of a fixed, 100-count sample (sense Hilsenhoff Biotic Index procedures) using a grid-marked tray with 24 cells. Following completion of the 100-count sample, Wisconsin processed the balance of the sample in its entirety, except for subsampling dominant taxa.  Wetland Type(s): Palustrine Wetlands	Dick Lillie Wisconsin Department of Natural Resources Bureau of Integrated Science Services 1350 Femrite Drive Monona, WI 53716 Phone: (608) 221-6338 Email: LILLIR@dnr.state.wi.us	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/wi1.html#macro">http://www.epa.gov/owow/wetlands/bawwg/case/wi1.html#macro</a>
Macrophytes: Florida	Florida Everglades-Assemblages Monitored: Sampling Methods and Analysis	A Land Development Intensity Index is being used to quantify disturbance gradients for wetlands in agricultural and urban landscapes throughout the state.	Russel Frydenborg Florida Department of Environmental Protection 2600 Blair Stone Road, MS 6511 Tallahassee, Florida 32399-2400 Phone: (850) 921-9821	<a href="http://www.epa.gov/wetlands/bawwg/case/fl2meth.html#macroph">http://www.epa.gov/wetlands/bawwg/case/fl2meth.html#macroph</a>
Mammals: Wisconsin	Refinement and Expansion of the Wisconsin Wetland Biological Index for Assessment of Depressional, Palustrine Wetlands	Establish a biological integrity rating system for classifying wetlands based on the response of selected biological attributes (metrics) of the above communities to surrogate measures of human disturbance. Forty-six baited traps per wetland were set. Bait consisted of peanut butter and oats. Specimens were identified and placed in labeled freezer bags.	R. Bautz Wisconsin Department of Natural Resources Bureau of Integrated Science Services 1350 Femrite Drive Monona, WI 53716 Email: bautzr@dnr.state.wi.us	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/wi2.html">http://www.epa.gov/owow/wetlands/bawwg/case/wi2.html</a>

Tool Topic	Tool Name	Tool Application	Source(Contact(s)) Location	Web Address (URL)
Vegetation: EPA	Using Vegetation to Assess Environmental Conditions in Wetlands	Discusses field sampling and analytical methods for using plants in wetland bioassessments	✧EPA Wetland Nutrient Criteria and the Biological Assessment of Wetlands Workgroups	<a href="http://www.epa.gov/waterscience/standards/nutrient.html">http://www.epa.gov/waterscience/standards/nutrient.html</a>  <a href="http://www.epa.gov/owow/wetlands/bawwg/">http://www.epa.gov/owow/wetlands/bawwg/</a>
Vegetation: Florida	University of Florida-Assemblages Monitored: Sampling Methods and Analysis	<p>A Land Development Intensity Index is being used to quantify disturbance gradients for wetlands in agricultural and urban landscapes throughout the state.</p> <p>Fish are caught using traps and samples are examined for DELTs (deformities, ecoparasites, lesions, or tumors). All fish with DELTs are kept and those without anomalies are released</p>	<p>Mark Brown Center for Wetlands University of Florida Phelps Lab P.O. Box 116350 Gainesville, FL 32611-6350 Email: mtb@ufl.edu Phone: (352) 392-2309 Systems Ecology, Environmental Engineering Services, University of Florida</p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/fl1meth.html#plant">http://www.epa.gov/owow/wetlands/bawwg/case/fl1meth.html#plant</a>
Vegetation: Michigan	Michigan Great Lakes Coastal Bioassessments	<p>Baseline data collected on water quality and plant, invertebrate and vertebrate communities</p> <p>The plant community is described for two transects per bird census plot for each of the elevations sampled per wetland. These transects extend the full 50 m diameter of the census plot at right angles to each other so that the transects intersect at the center of the plot. Diameter at breast height (dbh) is recorded for each living and dead tree and shrub stem within 1 m of the center of the two transects.</p>	<p>Tom Burton Michigan State University Department of Zoology 203 Natural Science East Lansing, MI 48824-1115 Phone: (517) 353-4475 Email: burtont@pilot.msu.edu</p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/mi.html#plant">http://www.epa.gov/owow/wetlands/bawwg/case/mi.html#plant</a>

Tool Topic	Tool Name	Tool Application	Source\Contact(s)\ Location	Web Address (URL)
Vegetation: Minnesota	Minnesota Pollution Control Agency Wetland Bioassessment Program Vegetation Sampling	Cover classes were determined for each plant species. Ten vegetation metrics were developed and validated, using methods similar to the invertebrates. Each promising attribute of the plant community was plotted against a suitable disturbance gradient. Metrics were also plotted against selected chemical variables to demonstrate their response to traditional water chemistry concerns.	<p>✦Mark Gernes Minnesota Pollution Control Agency (MPCA) Environmental Outcomes Division 520 Lafayette Road St. Paul, MN 55155 Phone: (651) 297-3363 Email: mark.gernes@pca.state.mn.us</p> <p>Judy Helgen Minnesota Pollution Control Agency (MPCA) Environmental Outcomes Division 520 Lafayette Road St. Paul, MN 55155 Phone: (651) 296-7240 Email: judy.helgen@pca.state.mn.us</p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/mn1.html#vege">http://www.epa.gov/owow/wetlands/bawwg/case/mn1.html#vege</a>
Vegetation: Massachusetts	Waquoit Bay, Massachusetts Wetland Bioassessment Pilot	Standardized sampling and surveying protocol for vegetation, relying mainly on 1m quadrants Wetland Type(s): salt marsh (High tide zone, intertidal zone, subtidal zone) (reference or minimally disturbed sites, and sites with altered tidal hydrology or with impacts from surrounding land use). Vegetation surveys are conducted one at each site during July-September.	Bruce K. Carlisle Massachusetts Coastal Zone Management 100 Cambridge Street Boston, MA 02202 Phone: (617) 626-1200	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/mapilot.html#vege">http://www.epa.gov/owow/wetlands/bawwg/case/mapilot.html#vege</a>
Vegetation: North Dakota	North Dakota Vegetation IBI	A qualitative sample inventory of plant species present within each wetland was taken. Also, point and quadrant quantitative samples were taken, usually one per year in either July or August.	Mike Ell North Dakota Department of Health Division of Water Quality 1200 Missouri Avenue P.O. Box 5520 Bismarck, ND 04333 Office: (701) 328-5214 Email: <a href="mailto:mell@state.nd.us">mell@state.nd.us</a>	<a href="http://www.epa.gov/osos/wetlands/bawwg/case/nd.html#hree">http://www.epa.gov/osos/wetlands/bawwg/case/nd.html#hree</a>

Tool Topic	Tool Name	Tool Application	Source(Contact(s))\ Location	Web Address (URL)
Vegetation: Ohio	Sampling Methods and Analysis of Vascular Plants	The Ohio EPA uses the North Carolina Vegetation Survey method to determine plant species for over 3,000 sites. Standing Biomass is calculated as well.	John Mack Wetland Ecologist Ohio Environmental Protection Agency Division of Surface Water 122 South Front Street P.O. Box 1049 Columbus, Ohio 43216-1049 Office: (614) 644-3076 Email: <a href="mailto:john.mack@epa.state.oh.us">john.mack@epa.state.oh.us</a>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/oh1plant.html">http://www.epa.gov/owow/wetlands/bawwg/case/oh1plant.html</a>
Vegetation: Wisconsin	Wisconsin Department of Natural Resources Bioassessment	A subjective estimate of cover was conducted and an objective survey of percent cover and frequency of occurrence within six equidistantly spaced 20 by 50 cm rectangular quadrants positioned along each of three transects that trisected the wetland basin, for a total of 18 quadrants per wetland.  Wetland Type: Palustrine Wetlands	Dick Lillie Wisconsin Department of Natural Resources Bureau of Integrated Science Services 1350 Femrite Drive Monona, WI 53716 Phone: (608) 221-6338 Email: <a href="mailto:LILLIR@dnr.state.wi.us">LILLIR@dnr.state.wi.us</a>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/wi1.html#plants">http://www.epa.gov/owow/wetlands/bawwg/case/wi1.html#plants</a>
Volunteer Monitoring: EPA	Volunteers and Wetland Biomonitoring	Discusses using volunteers to do wetland bioassessments	✧EPA Wetland Nutrient Criteria and the Biological Assessment of Wetlands Workgroups	<a href="http://www.epa.gov/waterscience/standards/nutrient.html">http://www.epa.gov/waterscience/standards/nutrient.html</a>  <a href="http://www.epa.gov/owow/wetlands/bawwg/">http://www.epa.gov/owow/wetlands/bawwg/</a>

Tool Topic	Tool Name	Tool Application	Source(Contact(s))\ Location	Web Address (URL)
Volunteer Monitoring: Massachusetts Coastal Areas	Volunteer Monitoring of Salt Marshes in Massachusetts	<p>Partnership project to train volunteers in wetland</p> <p>bioassessment procedures developed by Massachusetts Coastal Zone Management for a salt marsh monitoring pilot</p> <p>Volunteer Workshops in water chemistry, land use index (a habitat assessment), aquatic macroinvertebrates, tidal influence, and vegetation</p> <p>Wetland Type(s): salt marsh</p>	<p>Vivian Kooken Salem Sound 2000 201-203 Washington St., Suite 9 Salem, MA 01970 Phone: (508) 741-7900 Email: ss2000@cove.com</p> <p>Jan Smith Mass Bays NEP 100 Cambridge Street – Floor 20 Boston, MA 02202 Phone: (617) 626-1231 Email: jan.smith@state.ma.us</p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/mavolun.html">http://www.epa.gov/owow/wetlands/bawwg/case/mavolun.html</a>
Volunteer Monitoring: Minnesota	Dakota County, Minnesota Volunteer Monitoring Program	<p>The Minnesota Pollution Control Agency is training volunteers from Dakota County towns to assess the biological integrity of wetlands in a pilot project. The volunteers learn sampling methods; quality assurance protocols; and how</p> <p>to identify plants, insects, and other animals living in the wetlands.</p>	<p>Charlotte Shover Environmental Education Coordinator Dakota Co. Environmental Education Program 4100 220th St. West Farmington, MN 55024-9539 Email: cshover@extension.umn.edu</p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/mn2.html">http://www.epa.gov/owow/wetlands/bawwg/case/mn2.html</a>
Water Chemistry: Vermont	Vermont Wetlands Bioassessment Project	<p>Gathered chemical, physical, and biological data from seasonal pools to facilitate an ecologically based classification of minimally disturbed (reference) seasonal pools in Vermont.</p> <p>Water Chemistry ( temperature, pH, apparent color, alkalinity, conductivity, anions, cations, aluminum)</p> <p>Wetland Type(s): Seasonal Pools</p>	<p>Doug Burnham VDEC-WQD 103 S. Main St. - 10N Waterbury, VT 05676 802-241-3784 or 244-4520 Email: DOUGB@dec.anr.state.vt.us</p>	<a href="http://www.epa.gov/owow/wetlands/bawwg/case/vt.html">http://www.epa.gov/owow/wetlands/bawwg/case/vt.html</a>

Tool Topic	Tool Name	Tool Application	Source\Contact(s)\ Location	Web Address (URL)
Zooplankton: Wisconsin	Refinement and Expansion of the Wisconsin Wetland Biological Index for Assessment of Depressional, Palustrine Wetlands	<p>Establish a biological integrity rating system for classifying wetlands based on the response of selected biological attributes (metrics) of the above communities to surrogate measures of human disturbance.</p> <p>Zooplankton was collected from a central basin location in each wetland during June 2000 using a 5-L plastic bucket. A known volume of water was filtered through a No. 10 (60 micron mesh) net to capture zooplankton within. Seven field replicates were collected. Samples were preserved in 70% ethanol until processed.</p>	<p>Dr. Stanley Dodson University of Wisconsin-Madison Zoology Department Madison, WI 53706 Phone: (608) 262-6395 Email: sidodson@facstaff.wisc.edu</p>	<p><a href="http://www.epa.gov/owow/wetlands/bawwg/case/wi2.html#zoo">http://www.epa.gov/owow/wetlands/bawwg/case/wi2.html#zoo</a></p>