



# MASSACHUSETTS ENVIROTHON

2011 Mass Envirothon Current Issue

## Wetland Protection

Background and Strategies for Community Research

The Mass Envirothon Current Issue challenges teams to investigate an important environmental issue as it occurs in their community, to develop recommendations, and to present their findings to a panel of judges at the Envirothon.

The 2011 Current Issue Problem will ask your team to take look at the important roles that wetlands play in your community and the tools available for protecting them.

To prepare for your presentation, your team will need to

- get acquainted with the wetlands of your community, and the people who are working to protect them
- gain a working knowledge of the tools and strategies available for protecting wetlands, and how they are used in your community
- identify a way that you believe wetland protections should be strengthened in your community
- develop a recommendation for the next step your community should take to address this issue and protect the values that wetlands provide your community

These pages identify useful resources and provide guidance as you begin your research into wetlands and wetland protection in your community. Your own web searches of these topics will also turn up useful resources. Helpful information may also be found at <http://www.maenvirothon.org/currentissue11.htm>

**What is a wetland?** Wetlands are places where water is at or near the land surface for significant periods of the year. Wetlands take a wide variety of forms, from coastal estuaries to isolated freshwater vernal pools. For a helpful overview assembled by the U.S. Environmental Protection Agency, see <http://water.epa.gov/type/wetlands/index.cfm> Wetlands in some form occur in every community of the Commonwealth. For more on types of wetlands found in Massachusetts, see: <http://www.mass.gov/czm/wawetype.htm>

**Why are wetlands important?** Although wetlands were viewed unfavorably in the past, we now recognize that these areas provide crucial ecosystem services through their natural functions. Science has given us greater appreciation of the benefits wetlands provide to human society. Commonly cited values include:

- **Flood control.** Wetlands throughout a watershed can reduce flood peaks and slow the velocity of flow.
- **Storm damage control.** Dense wetland vegetation can dampen wave action, help anchor shorelines, and reduce erosion of stream banks.
- **Protection of water supplies.** Wetlands can trap sediments, accumulate nutrients, transform toxic substances such as pesticides and heavy metals, remove microorganisms, contribute to groundwater recharge, and promote more even flow of water in a watershed through the year.

- **Fish and shellfish habitat.** Wetlands provide spawning areas, nursery habitat, food and cover, and access to other bodies of water for important recreational and commercial fish species. They provide substrates and food chain support for shellfish species.
- **Wildlife habitat.** Wetlands provide rich, diverse habitats for wildlife, including areas for breeding, foraging, migration, and over-wintering.
- **Agriculture.** Cranberries, a major Massachusetts agricultural product, depend on wetland conditions.
- **Aesthetics.** Wetland qualities are more valued today than years ago. Property values are higher next to wetlands in many communities, in part because they represent undevelopable open space.
- **Recreation.** Hunting, fishing, boating, birdwatching, are just some of the activities that can provide economic value as well as contribute to a community's quality of life.
- **Education.** The complexity of these ecosystems, their accessibility, and their importance to human and natural communities make wetlands excellent subjects for research and hands-on learning.

Additional discussions of wetland functions and values can be found at <http://www.mass.gov/dep/water/resources/wetcom.htm> and [http://www.epa.gov/owow/wetlands/pdf/fun\\_val\\_pr.pdf](http://www.epa.gov/owow/wetlands/pdf/fun_val_pr.pdf)

**Legal protection for wetlands.** Wetlands on public and private lands are protected by laws at the federal and state level, also by municipal bylaws in many Massachusetts communities. See <http://www.mass.gov/dep/water/resources/protwet.htm>. For more depth, see the links at <http://www.mass.gov/dep/water/resources/wetlands.htm>. The Massachusetts Wetlands Protection Act protects eight public interests (or values) served by wetlands: public and private water supply, groundwater, flood control, storm damage prevention, pollution prevention, land containing shellfish, fisheries, and wildlife habitat. See <http://www.mass.gov/dep/water/laws/rpa01.htm>

**Other ways to protect wetlands.** Citizens and communities have a number of tools and strategies at their disposal for protecting wetlands in addition to enforcement of the law. Your task as a 2011 Envirothon team is gain a working knowledge of these tools and strategies and to recommend ways that your community can use them effectively to strengthen wetland protection.

## Getting Started on your Community Research

The following pages introduce four general areas for investigation -- PLACES, PEOPLE, ISSUES, and TOOLS & STRATEGIES -- plus a listing of helpful reference links. To do a good job in your research, your team will eventually need to be acquainted with all these areas. But you can start with any one of them. We recommend that you plunge in without delay!

### PLACES

Where are the wetlands in your neighborhood? What does the water cycle look like -- at the surface and underground -- around them? How much area do they cover? What plant and animal communities inhabit them? How do they interact with nearby uplands and water bodies? To make good decisions for wetland protection in your community, you need to know the specifics of these places and how they fit into the overall picture of your watershed.

**Maps.** There are tools on the web that allow you to explore your community through maps and aerial photographs on your computer screen.

- A fun way to start is with <http://www.bing.com/maps>
- MassGIS has a Viewer where you can view USGS topographic maps: <http://maps.massgis.state.ma.us/MassGISTopos/viewer.htm>
- There is also a wetlands Viewer at: <http://maps.massgis.state.ma.us/WETLANDS12K/viewer.htm>
- Careful observations of historic topo maps can identify changes in streams and water bodies <http://docs.unh.edu/nhtopos/nhtopos.htm>
- MassGIS will post an upgraded version of OLIVER, its on-line mapping program, by early 2011. The link for all the MassGIS mapping, including OLIVER, is: <http://www.mass.gov/mgis/mapping.htm>

The Massachusetts Executive Office of Energy and Environmental Affairs will provide registered Envirothon teams with large scale color printed maps of their communities showing wetland resources for use in research and presentations at the Envirothon.

**Field exploration.** It's time to go outdoors! Walking (and wading) and is an indispensable part of getting to know local wetlands. You may want to start with a visit to a nature center that provides some interpretation. Or find a person who knows your wetland areas well who can help you see what's there. Be sure to get permission from the landowner before visiting wetlands on private property. And be prepared to be outdoors. Chapters 5 and 6 in EPA's *A World in Our Backyard* provide some helpful tips on exploratory field trips: <http://www.epa.gov/region1/students/teacher/world.html>

**More in-depth assessment of your community's wetlands.** For a more in-depth, systematic approach to local wetlands, see *Method for the Comparative Evaluation of Nontidal Wetlands in New Hampshire* (available at [ftp://ftp-fc.sc.egov.usda.gov/NH/Ecological\\_pubs/NH\\_Method\\_Part1.pdf](ftp://ftp-fc.sc.egov.usda.gov/NH/Ecological_pubs/NH_Method_Part1.pdf)). This step-by-step guide provides a way for non-experts to gather useful data on wetlands and to assess the relative importance of these areas for a town. The method involves both map interpretation and field study. **It is highly recommended that Envirothon teams try out this assessment method on at least two wetlands in their watershed.**

Although they are intended for professionals, the following resources can help you gain a deeper understanding of your local wetlands:

- *Delineating Bordering Vegetated Wetlands under the Wetlands Protection Act*  
<http://www.mass.gov/dep/water/laws/bvwmanua.pdf>
- *Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands*  
[http://www.umassextension.org/NREC/images/stories/linked\\_content/pdf\\_files/wildlife-habitat-guidance-3-1-06.pdf](http://www.umassextension.org/NREC/images/stories/linked_content/pdf_files/wildlife-habitat-guidance-3-1-06.pdf)

## PEOPLE

Talking to people is the perhaps the best starting place for your research on local wetlands. Environmental advocates and local officials will be good resources because they have responsibilities, expertise, or special interest in protecting wetlands. At the same time, remember that their points of view about the watershed may be biased by their experiences or their work or the land they own. Talk to lots of people! Don't rely on just one or two perspectives. Start with people you already know by some personal connection. Get them to recommend more people, and follow those leads. As you get more familiar with the issues and get to know the language that is used to talk about wetlands, it will get easier and easier to ask questions.

**Conservation Commission (ConCom).** One first stop should be your municipal Conservation Commission. This is an appointed board of local residents charged with protection of your community's natural resources. Administering the Wetlands Protection Act is a major responsibility. Frequently, in larger communities, the town may employ a Conservation Agent to help with administrative duties. See

[http://www.maccweb.org/about\\_commissions.html](http://www.maccweb.org/about_commissions.html). ConCom meetings are open to the public. You can contact your ConCom by visiting your town hall. The Massachusetts Association of Conservation Commissions has a link to many ConCom web sites here: [http://www.maccweb.org/resources\\_links.html](http://www.maccweb.org/resources_links.html)

**Community Environmental Groups.** Local citizens groups are perhaps the most potent force for environmental protection at the local level. Watershed associations and land trusts are two forms these groups take. These groups would love to hear from Envirothon teams, and will have much to show and tell. Links to local groups are listed by the Massachusetts Land Trust Coalition at <http://www.massland.org/?q=land-trusts/list> and the Massachusetts Rivers Alliance at <http://massriversalliance.org/member-organizations/>

**Professionals.** Scientists, engineers, and natural resource professionals are engaged in wetlands protection through a variety of kinds of work. Some work for government agencies, some are in business, others work for nonprofit organizations. All have expertise that can provide insight into practical forms of wetland protection. Two professional associations that may be helpful are the Environmental Business Council of New England, Inc. at <http://www.ebcne.org/> and the Association of Massachusetts Wetland Scientists at <http://www.amws.org/>. Some government agency links are listed on the last page of this document.

## ISSUES

Most environmental activists start with a focus on a particular burning local issue, then work backwards, learning the necessary law and science as they need it. This can make your research more interesting and meaningful right from the start.

You can start by talking with local activists (see Community Environmental Groups above). You can also watch your local newspaper:

- What water issues are people concerned about? Water supply? Wastewater treatment? Stormwater management? How might these issues affect wetlands?
- What development is planned (or is going on right now)? How might these projects affect the hydrology and ecology of the places where land and water meet?

Below are some topics to be on the lookout for in Massachusetts communities in 2011. This is not an exhaustive list of issues!

**Groundwater withdrawals** can lower the water table in rivers, lakes, ponds, and wetlands, with potential harm to fish and wildlife habitat. See <http://www.buzzardsbay.org/water-withdrawals-management.htm>

**Nutrient loads.** Wetlands, particularly coastal marshes, are valued for their capacity to process nutrients. However, excessive nutrient loading (e.g. from poorly functioning septic systems or as runoff from agricultural uses) can overload a wetland's natural capacity to treat these pollutants. <http://www.mass.gov/dep/water/resources/brochure.htm>. This can result in an advantage for invasive species like *Phragmites*. On the other hand, practical experiments have had success with the use of constructed wetlands as inexpensive and effective sewage treatment systems. See <http://www.epa.gov/owow/wetlands/pdf/Arcata.pdf>

**New wetlands created by beavers.** How is private property affected when beavers build a dam and create a wetland where none existed before? What can be done? See <http://www.maccweb.org/documents/Living%20With%20Beaver.pdf> and <http://www.maccweb.org/documents/Beavers%20and%20the%20Law.pdf>

**Recreation conflicts.** In coastal areas, construction of docks and piers and recreational boat traffic in early summer (with attendant gasoline spills) have a negative effect on shellfish habitat. Inland, recreational activities such as swimming and fishing can conflict with habitat protection. See [http://www.mass.gov/czm/habitat/docs/ahrif\\_report.pdf](http://www.mass.gov/czm/habitat/docs/ahrif_report.pdf) One news story on this hot topic: <http://www.mvgazette.com/article.php?26184>

**Climate Change.** In coastal areas, stronger storms and sea level rise will affect wetlands' capacity to supply several key values. In inland as well as coastal areas, intensification of the water cycle -- in the form of droughts and flooding -- are likely to weaken wetlands' capacity to function effectively. See <http://www.mass.gov/dfwele/der/climatechange.htm> and [http://www.nature.org/initiatives/climatechange/files/mass\\_facts\\_d2.pdf](http://www.nature.org/initiatives/climatechange/files/mass_facts_d2.pdf) [http://www.neaq.org/conservation\\_and\\_research/climate\\_change/climate\\_change\\_in\\_new\\_england.php](http://www.neaq.org/conservation_and_research/climate_change/climate_change_in_new_england.php)

**Invasive species.** Just letting a wetland alone can result in habitat degradation by invasive species. How much and what kinds of management should we undertake to protect wetland values? A fun place to start, which also includes extensive resource links to learn more is at <http://www.massaudubon.org/paddlers/index.php>. Invasive species control is one kind of estuarine restoration project described at [http://www.mass.gov/dfwele/der/wrp/projects\\_pages/projects\\_types.htm](http://www.mass.gov/dfwele/der/wrp/projects_pages/projects_types.htm)

## TOOLS & STRATEGIES

Citizens and communities have a variety of tools available to them for the protection of wetlands and wetland values.

**Certification of vernal pools** will extend legal protection to these important resource areas. See [http://www.vernalpool.org/macert\\_1.htm](http://www.vernalpool.org/macert_1.htm)

Legal protection for all wetland resource areas can be enhanced by passage of a **local wetland protection bylaw, regulation, or policies**. See [http://www.maccweb.org/resources\\_bylaws.html](http://www.maccweb.org/resources_bylaws.html)

Wetland protection is perhaps most effective when it is undertaken as part of a process of **comprehensive community planning** that places an emphasis on sustainability. See links at <http://www.massaudubon.org/shapingthefuture/toolkit.php>

**"Best practices"** have been developed to ensure protection for wetland values in a range of professional work in and near wetlands. For example:

- Agriculture <http://www.mass.gov/dep/water/laws/farman.pdf>
- Forestry [http://www.na.fs.fed.us/spfo/pubs/n\\_resource/wetlands/](http://www.na.fs.fed.us/spfo/pubs/n_resource/wetlands/)
- Land development <http://www.epa.gov/owow/NPS/lid/costs07/>
- Stormwater engineering <http://www.mass.gov/dep/water/essec1.pdf>

**Formal and informal education**, in schools and for the general public, can play an important role in wetland protection. One place to start is [http://water.epa.gov/type/wetlands/outreach/education\\_index.cfm](http://water.epa.gov/type/wetlands/outreach/education_index.cfm)

**Assessment and ongoing monitoring** of wetland resources -- using systematic measures and tracking changes over time -- can enable a community to make informed decisions that protect wetland values. See <http://water.epa.gov/type/wetlands/assessment/index.cfm>. Some assessment methods are very detailed and focused, some are rapid overviews. Some are designed to be undertaken by nonprofessionals. The *Method for the Comparative Evaluation of Nontidal Wetlands in New Hampshire*

(see [ftp://ftp-fc.sc.egov.usda.gov/NH/Ecological\\_pubs/NH\\_Method\\_Part1.pdf](ftp://ftp-fc.sc.egov.usda.gov/NH/Ecological_pubs/NH_Method_Part1.pdf)) is recommended highly in the PLACES section above. EPA has also published an overview and links at <http://www.epa.gov/owow/wetlands/facts/volunteer.pdf> and posted a volunteer monitoring resource guide at <http://www.epa.gov/owow/wetlands/monitor/volmonitor.pdf>

## GENERAL BACKGROUND

The following agencies and organizations play major direct roles in wetland protection in Massachusetts:

United States Environmental Protection Agency

<http://www.epa.gov/>

U.S. Fish & Wildlife Service

<http://www.fws.gov/>

U.S. Department of Agriculture Natural Resource Conservation Service

<http://www.nrcs.usda.gov/>

United States Army Corps of Engineers

<http://www.usace.army.mil/Pages/default.aspx>

Buzzards Bay National Estuary Program

<http://www.buzzardsbay.org/index.htm>

Massachusetts Department of Environmental Protection

<http://www.mass.gov/dep/>

Massachusetts Coastal Zone Management

<http://www.mass.gov/czm/>

Massachusetts Department of Conservation & Recreation

<http://www.mass.gov/dcr/>

Massachusetts Association of Conservation Commissions

<http://www.maccweb.org/>

Massachusetts Audubon Society

<http://www.massaudubon.org/>

UMass Extension Natural Resources & Environmental Conservation Program

<http://www.extension.umass.edu/nrec/>