Questions & Resources for Teams
2006 Massachusetts Envirothon Current Issue

Acting Locally for Climate Protection

This year's Envirothon current issue asks your team to tackle the biggest environmental challenge of our time: global climate change.

"Climate Protection" means reducing our emissions of the greenhouse gases that contribute to climate change. It also means finding ways to minimize the effects that climate change already underway will have on our communities. Prevention and adaptation: both kinds of action are essential.

After refreshing your overall understanding of climate change science and policy, your team will focus your investigation on climate protection in your own community. You will identify one aspect of this many-faceted issue that you believe should be a priority for action in your community. Then you will develop a plan for a response that contributes to a local solution as well as an overall global solution.

There are three parts to this guide:

I. Background on the Climate Protection Issue
II. Questions and Strategies for Community Investigation
III. Putting Your Research to Work

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I. BACKGROUND ON THE CLIMATE PROTECTION ISSUE

A. Overview

1. Climate science is advancing. To get a sense of the scale of the worldwide science research effort, and the questions being addressed, visit the World Climate Research Programme at http://www.wmo.ch/web/wcrp/wcrp-home.html. An overview of research by United States government agencies is at http://www.climatescience.gov. The University of Massachusetts Amherst's Climate System Research Center (see http://www.geo.umass.edu/climate/climate.html) is one among many university-based research centers that focus on climate issues.

2. Climate change is real. The scientific community has achieved consensus that climate change is happening and that human activity is contributing to it. The work of the Intergovernmental Panel on Climate Change (http://www.ipcc.ch), including more than 2,000 climate scientists from around the world, represents the prevailing consensus on climate science. RealClimate

(http://www.realclimate.org) is "a commentary site on climate science by working climate scientists for the interested public and journalists." The site aims "to provide a quick response to developing stories and provide the context sometimes missing in mainstream commentary." The World View of Global Warming site features striking photographs on all continents that illustrate climate change (http://www.worldviewofglobalwarming.org/pages/background.html).

3. There are still significant elements of skepticism and resistance. Some scientists emphasize the need for caution in statements about causation. Some economic interests, such as the fossil fuel industries, have funded studies that cast doubt on the reality of climate change and the connection between human activity and climate change. The current U.S. administration has taken the position of these "climate skeptics". Examples of these positions may be found at:

- **Climate Change Fact Sheet**, the view from the Bush Administration, is at http://www.whitehouse.gov/news/releases/2005/05/20050518-4.html
- **World Climate Report**, "a concise, hard-hitting and scientifically correct response to the global change reports which gain attention in the literature and popular press" is at http://www.worldclimatereport.com/
- **The Global Climate Coalition**, "an organization of trade associations established in 1989 to coordinate business participation in the international policy debate on the issue of global climate change and global warming" is at http://www.globalclimate.org/
- For a current example of the collision of science and politics around climate change, see the **UMass Climate System Research Center response to the U.S. House Energy & Commerce Committee**. Start with background at http://www.geo.umass.edu/climate/natureedit.pdf, then see the actual exchange of letters at http://www.geo.umass.edu/climate/bartonletter.html

4. Even without active resistance, action for climate protection is politically difficult. The scale of climate change and its implications for economy, society, and environment are immense and difficult to grasp. Solutions are likely to require fundamental changes in the way we live our lives. (According to the Pew Center, the IPCC estimates that global carbon dioxide emissions would have to be reduced to 40-75% below baselines by the end of the 21st century in order to stabilize climate). The problem is hard to distinguish from "normal" climate and weather variability in the course of a human lifetime, and this long time frame makes it tempting to ignore the problem in the short term.

5. The good news is that world community is responding at many levels in many positive ways. The following examples include links to many websites that will be useful for Envirothon teams developing plans for Massachusetts communities:

a. **The Rio Climate Change Treaty and the Kyoto Protocol are in now in effect.** Despite the refusal of the United States (the world's largest emitter of greenhouse gases) to ratify the latter, these agreements do provide a basis for coordinated global action by national governments.
   - For an explanation of the Rio Climate Change Treaty and the Kyoto Protocol, see http://www.climate.org/topics/intaction/index.shtml.
   - For a beginner's introduction, see http://unfccc.int/resource/beginner.html
   - For the latest on the United Nations Framework Convention on Climate Change, including the text of the Kyoto Protocol, see http://unfccc.int/2860.php.

b. **State and local governments are taking action**. For example:
   - The **New England Governors and Eastern Canada Premiers** have agreed to work together to curb emissions and bring their states and provinces in line with the Kyoto

Protocol. (See http://www.cleanair-coolplanet.org/information/ne_governors.php

- **ICLEI—Local Governments for Sustainability** is an organization made up of more than 350 cities, towns, and counties worldwide. ICLEI (International Council for Local Environmental Initiatives) advocates for local governments to achieve sustainable environmental goals through local actions (See http://www.iclei.org). There is an office in Boston and a number of Massachusetts municipalities have joined. More information on Massachusetts participation is at http://www.iclei.org/index.php?id=1854.
- **Burlington, Vermont** is an example of a small city taking climate protection seriously. The city aims to raise public awareness about global climate change and to encourage households and businesses to reduce their greenhouse gas emissions through its voluntary "10% Challenge" program". See http://www.10percentchallenge.org/.
- **Climate Change Information Resources for the New York Metropolitan Region** is an example of an approach to climate protection in a large urban area. Its website has resources for "policymakers, educators, and the general public on the impacts of climate change and variability in the tri-state New York metropolitan area, ways to adapt to these changes, and ways to limit their impacts in the future." See http://ccir.ciesin.columbia.edu/nyc/index.html

c. **A broad representation of civil society — including public interest research and advocacy groups, foundations, citizen organizations, and business associations — are working to research, educate, and organize** around the climate issue. For example:
   - **The Pew Center on Global Climate Change** (http://www.pewclimate.org) is "a non-profit, non-partisan and independent organization dedicated to providing credible information, straight answers and innovative solutions in the effort to address global climate change."
   - **Union of Concerned Scientists** is "a nonprofit partnership of scientists and citizens combining rigorous scientific analysis, innovative policy development, and effective citizen advocacy to achieve practical environmental solutions." Resources related to climate change are at http://www.ucsusa.org/global_warming/science/.
   - **Climate Solutions**, in the Pacific Northwest, aims to be a "leading source of ideas and inspiration on ways to act decisively and creatively towards addressing the global warming crisis." The organization offers a searchable database of resources for clean energy and transportation solutions. See http://www.climatesolutions.org/ and click on "practical solutions".
   - **Global Environmental Management Initiative (GEMI)**, an organization of leading companies, has created a website dedicated to "business helping business with climate change" at http://www.businessandclimate.org/
   - **Clean Air-Cool Planet** (http://www.cleanair-coolplanet.org/) is a regional organization in the northeastern United States "dedicated to finding and promoting solutions to global warming". CA-CP creates partnerships with campuses, communities, and companies throughout the Northeast to help reduce their carbon emissions. See http://www.cleanair-coolplanet.org/
   - The **Earth Day Network**, linking over 12,000 grassroots partners and organizations in 174 countries, is beginning a three year Climate Solutions Campaign in 2006. The aim is to put climate solutions into effect beginning with individual citizens at the local level. (See http://www.earthday.org/)

B. Climate Protection in Massachusetts

The following state and regional organizations provide leadership, coordination, and support specifically for local climate protection efforts. It is important to remember that many familiar natural resource and environmental issues have a climate change component. This means that many state, regional, and local organizations in addition to these can be resources for climate protection efforts:

The Massachusetts Office of Commonwealth Development, created by Governor Romney in 2003, integrates the work of agencies concerned with the economy and the environment and so offers an institutional avenue for addressing issues of smart growth and sustainable development. In 2004, the OCD published the *Massachusetts Climate Protection Plan*, online at http://www.mass.gov/Eocd/docs/pdfs/fullcolorclimateplan.pdf.

The Massachusetts Climate Action Network ("Climate Protection from the Grassroots Up!") promotes reductions in greenhouse gas emissions through action by local communities and the state. The MCAN website at http://www.massclimateaction.org/ provides links to municipal efforts and plans.

The Massachusetts Technology Collaborative is the state's development agency for renewable energy, bringing together industry, academia, and government to advance technology-based solutions. The MTC sponsors the Renewable Energy Trust (see http://www.masstech.org/renewableenergy/index.htm), which seeks to promote clean energy technologies in the Massachusetts economy.

Regional Planning Agencies in Massachusetts help towns and cities work together on issues like transportation, land use, housing, and environment that are associated with climate protection. The Citizen Planner Training Collaborative website at http://www.umass.edu/masscptc/resources.html includes links to all Massachusetts regional planning agencies, councils, and commissions.

C. Environmental Issues with a Climate Change Component

Climate change plays a role in several familiar environmental issues. It intensifies some existing environmental issues as well as creating new problems:

1. Energy conservation and renewable energy sources. Most of our energy for heating, cooling, lighting, and transportation comes from fossil fuels. Burning these fuels is the major source of greenhouse gases. Improving the efficiency of our energy use, and switching to non-carbon based sources of energy such as wind, solar, and hydropower are ways to conserve fossil fuel resources and reduce emissions of the greenhouse gases that lead to global warming. The U.S. Department of Energy's web site at http://www.eere.energy.gov/ is a gateway to hundreds of sites and thousands of online documents on energy efficiency and renewable energy.

2. Cars and Sprawl. Our automobile-based transportation system our greatest source of carbon emissions. Part of the solution lies in more efficient technologies and alternative fuels for our vehicles (see http://www.ucsusa.org/clean_vehicles/ and http://www.nesea.org/transportation/). Long term solutions must also include public transportation and "smart growth" strategies for land use and development that enable people to get to school, work, shopping, and recreation efficiently. See an

overview of transportation issues from the Sustainable Communities Network at http://www.smartgrowth.org/about/issues/issues.asp?iss=12. A regional example from Washington state is at http://www.transportationchoices.org/.

3. Forest Conservation. Urban and rural forests provide many climate protection benefits. Growing trees remove carbon from the atmosphere. Street trees and hedges provide shade for natural cooling and windbreaks. Parks provide recreation sites that do not require transportation. Rural forests protect water supplies and moderate the effects of an intensified water cycle. Wood products are a form of carbon sequestration. Firewood is a renewable, nonfossil fuel that does not contribute additional greenhouse gases when trees are growing at the same rate that they are being harvested. One place to start is http://yosemite.epa.gov/OAR/globalwarming.nsf/content/ImpactsForests.htm. How many trees would it take to offset your contribution to climate change? The Global ReLeaf project offers a calculator at http://www.americanforests.org/.

4. Waste Prevention and Recycling. The production and transportation of consumer goods in a "throwaway" society is a major source of greenhouse gas emissions. Landfills produce methane, a potent greenhouse gas. Waste incineration produces carbon dioxide. Start at http://yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsWaste.html. What's happening in Massachusetts? See the Department of Environmental Protection at http://www.mass.gov/dep/recycle/.

5. Water. Scientists expect that climate change will increase the intensity of the hydrologic cycle, resulting in stronger storms, bigger floods, more intense droughts. This raises concerns for **water conservation**, **water resources protection**, and **integrated watershed management**, including **stormwater management**. The international Cooperative Programme on Water and Climate has published an excellent summary resource for the climate change impact on water resources, *Climate changes the water rules: how water managers can cope with today's climate variability and tomorrow's climate change,* available at http://www.wac.ihe.nl/report.htm. This and other climate/water related resources have been gathered and organized into a guide for Envirothon teams by George Zoto, Mass DEP (george.zoto@state.ma.us). See:

6. Sea Level Rise. Melting glaciers and warming oceans are already causing measurable sea level rise. With a large proportion of the human population living close to the coast around the world, even a small rise in sea level will have a major impact. See "sea level rise reports" at http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublications.html and http://www.mass.gov/czm/shorelinechange.htm.

7. Human Health. Global warming is associated with increased air pollution, longer hotter summers, and extreme weather. Effects on human health can include respiratory diseases, heat-related illnesses, threatened water supplies, and infectious diseases in new regions. See http://chge.med.harvard.edu/ and http://yosemite.epa.gov/OAR/globalwarming.nsf/content/ImpactsHealth.html.

8. Food Production. Agriculture and fisheries are vulnerable to climate change, although some argue that agriculture may benefit from increased carbon dioxide levels or from longer growing seasons. See http://yosemite.epa.gov/oar/globalwarming.nsf/content/ImpactsAgriculture.html and http://yosemite.epa.gov/OAR/globalwarming.nsf/content/ImpactsFisheries.html.

9. Ecosystem Health and Biodiversity. Ecosystems have adapted to changing climate throughout Earth's history. However, the expected rapid pace of current change is expected to put tremendous stresses on natural systems that are already weakened by human activity. See http://www.climate.org/topics/ecosys/index.shtml.

II. QUESTIONS & STRATEGIES FOR COMMUNITY INVESTIGATION

A. Plan Your Research!

Get started early. Most successful Envirothon teams start early and pace themselves in their preparations for Current Issue presentations. Plan your work with a calendar. Here are some suggestions:

- Start by making a list of research tasks. The criteria for the Community Research Award can be used as a guide.
- Leave more time than you think you will need to arrange visits and interviews. Arrangements with town boards and busy resource people can take time.
- There is more warmth and longer daylight for outdoor explorations in the fall months.
- Use teamwork: Split up the tasks and share what you find.
- Begin planning service projects by early winter.

B. Re-acquaint yourselves with climate change and climate protection concepts.

Why are these concepts important for an understanding of climate protection? The sites listed below are not necessarily the best places to learn these concepts. Can you find better explanations?

- The greenhouse effect and global systems (http://www.exploratorium.edu/climate/index.html)
- The carbon cycle and fossil fuels (http://www.cotf.edu/ete/modules/carbon/earthfire.html)
- The water cycle (http://ga.water.usgs.gov/edu/watercyclesummary.html)
- Watershed management (http://www.epa.gov/owow/watershed/)
- Renewable and nonrenewable energy sources & technology (http://www.nrel.gov/clean_energy/)
- Ecological footprint (http://www.myfootprint.org/)

C. Familiarize yourselves with current climate science and politics.

What would you include in an outline or concept map of the climate change issue?
In addition to sites described in the Overview above, the following sites offer general background and many starting points for exploration:

- http://www.climateark.org (A hub site with lots of links, a search engine, discussions)
- http://en.wikipedia.org/wiki/Global_warming (an overview with many links)
- http://yosemite.epa.gov/oar/globalwarming.nsf/content/index.html (EPA's Clinton-era site)
- http://www.autobahn.mb.ca/~het/enviro/globalwarming (a compendium of links)
- http://www.climatechangeeducation.org/ (a hub site dedicated to education resources)
- http://www.envirothon.org/competition/Canon2006/index.php

D. Investigate climate-related issues in your community.

Look back at the list of "Environmental Issues with a Climate Change Component" in section I.C. of this guide. What are your hunches about which issues will be most important in your community?

Interview a long term resident about changes they have seen in human activities related to climate change, such as sprawl, resource protection, and energy conservation.

Scan your local newspaper for articles related to climate protection. Are people you know thinking about climate change issues emerging in your community? Is climate change being addressed directly? Indirectly? Who is already working toward climate protection in your community, whether they call it this or not? What do they see as the most important issues?

What are the most important natural resources in your community? Map your community's forest, water, agriculture and fisheries, soils, wetland, and wildlife and biodiversity resources, using topographical and other map resources, and your own knowledge of land use. Interview a member of your town conservation commission or other local natural resource expert about the ways these resources are used today. How might these resources be threatened by changing climate? Interview an employee of the Department of Public Works about drinking water, stormwater, and snow removal issues in town.

What human activities in your community are adding greenhouse gases to the atmosphere or otherwise contributing to climate change? Interview members of your town select board or city council. How would they rate your community's efforts to develop sustainably? For example, what is being done to resist sprawl? reduce energy use for transportation? encourage energy conservation? recycle and prevent waste?

What is your school (including the student body) doing to reduce emissions of greenhouse gases?

E. Research existing plans and programs that relate to climate protection in your community.

Has your community already begun to plan for climate protection? Check the Massachusetts Climate Action Network website (http://www.massclimateaction.org/) to find out. While you are there, look at the case studies and suggestions for action that are posted.

What parts of the Massachusetts Climate Protection Plan are relevant to your community? The Plan is online at http://www.mass.gov/Eocd/docs/pdfs/fullcolorclimateplan.pdf. The Office of Commonwealth Development (http://www.mass.gov/ocd) also places an emphasis on Smart Growth in Massachusetts communities. What Smart Growth resources and initiatives are relevant to climate protection and available to your community?

Regional planning agencies in Massachusetts help communities work together on issues like transportation, land use, housing, and environment. The Citizen Planner Training Collaborative at http://www.umass.edu/masscptc/resources.html includes links to these RPAs. Which agency serves your community? What initiatives are they engaged in related to climate protection?

Massachusetts towns and cities are required by law to develop Municipal Master Plans that provide a basis for decision making about the long term physical development of the municipality. An up-to-date Master Plan must often be in place before a town can apply for funding from the state. Plans address such issues as historic & cultural resources, natural resources, open space & recreation, transportation, housing, infrastructure, land use, economic development. Visit your local library or town offices to look at the master plan. Interview a member of the planning board about whether the plan addresses issues that relate to climate change. What might be added to the plan so that it did a better job of addressing climate protection?

III. Putting Your Research to Work

A. Developing Your Recommendations

Through your Current Issue research you have accumulated information and resources in your own community and beyond. You have made connections with people and organizations. You have begun to generate your own informed opinions about actions you recommend.

The Envirothon Current Issue Problem will ask you to identify one aspect of climate protection that you believe should be a priority for action in your community, and to develop a plan that contributes to a local solution as well as an overall global solution.

1. Make a list of potential actions your community can take for climate protection.
   What possible actions can you list for reducing greenhouse gas emissions in your community, helping to prevent climate change?
   What possible actions can you list for adapting to climate change and mitigating its effects in your community?

2. Compare these potential actions.
   - Which of these actions
     are new initiatives? Which are follow-through on initiatives already begun?
     will have the most significant impact?
     will show the most visible results?
     offer the best opportunities for involving citizens (including high school students) in climate protection?
     cost the most? least?
     are most likely to be supported by the voters of your community?
   - What specific steps must be taken to put each of these plans into action?
   - Who will be involved?
   - What will they cost?
   - How long will they take?

3. In your judgment, after weighing these questions, which action do you recommend as the highest priority for your community?

4. Describe and explain the action you are recommending.
   - What changes will this require?
   - What impact will it have on prevention of climate change? protection from effects of climate change? other issues?
   - What do you estimate are the economic/ecological costs and benefits? Who will bear them?
   - Who should be involved in making your proposed changes happen? What is the role for government? Non-governmental organizations?
   - Will educating the public play a significant role? What messages would be effective in persuading the community to take on this issue?
   - What role can high school students play?

B. Preparing a Winning Presentation

Your Current Issue presentation is an important part of your Envirothon participation. The Current Issue represents 100 points, or one quarter of the team's total Envirothon score.

Approximately four weeks before the day of the Envirothon, your team will receive a copy of the Current Issue Problem, including specific guidance on what you should include in your presentation. When this information arrives

- make an outline of your presentation, based on the recommendations you have developed
- identify any information you need to fill in the gaps
- consider what visual aids will best make your points
- practice your presentation as a dress rehearsal three or four times - enough so you can be relaxed and conversational with the judges.

At the Envirothon, your team will be assigned and place for your Current Issue presentation. The session is approximately 30 minutes. Teams have 15 minutes to present to a panel of five judges. The presentation is followed by a 10 minute period for formal questions from the panel.

With the Current Issue Problem you will also receive a copy of the scoring sheet that the judges will use to evaluate your presentation. Judging criteria will include:

- evidence of first hand knowledge of climate change issues in your community, from contacts and interviews with people and organizations in your community and from visits to places.
- background knowledge of the science of climate change
- knowledge of a variety of climate protection strategies that have been proposed or implemented
- the quality of your proposal for the next step your community should take for climate protection, including a compelling reason why this is the most important step to take now.
- the quality of your presentation, including organization, speaking skills, teamwork, effective use of visual aids, time management, and response to questions
- overall quality, including evidence of curiosity, critical thinking, effort, depth, honesty, and creativity

C. Qualifying for the Massachusetts Envirothon Community Awards

If your team does a thorough job in your Current Issue investigations, you will not only score well but you can qualify for Mass Envirothon's Community Research Award. And if you use what you learn in a service project in your community, you can qualify for Mass Envirothon's Community Service Award.

These awards are optional and noncompetitive, and can be earned by any team that meets the high standards established for the awards. Teams and their coaches are responsible for certifying the quality and completeness of their work. Both awards are presented on the day of the Envirothon.

The Massachusetts Envirothon Community Research Award recognizes teams who have done thorough and wide-ranging community investigations in preparation for their Current Issue presentations. To meet the standard for the award, a team must show that they have been resourceful in using a variety of research strategies, including field study, interviews, map use, web research, library research, and queries to state agencies, local boards, and/or nongovernmental organizations. Teams who prepare diligently for the Current Issue portion of the Envirothon competition are likely to find that their work fulfills the requirements for the Community Research Award.

The Massachusetts Envirothon Community Service Award recognizes teams who take what they learn in preparation for their Current Issue presentations and apply that knowledge in service to their community. To be eligible for this award, a team must first meet all the requirements for the Community Service Award. Teams who have done thorough research on the issue are more likely to identify an important need and to develop a service project that is meaningful to them and useful to the community. Service projects do not have to be completed by the day of the Envirothon, but teams should be able to show substantial progress toward their service goals.

More information is at the Massachusetts Envirothon website at http://www.maenvirothon.org .

D. Planning a Roundtable

At lunchtime on the day of the Envirothon, after the testing is over but before the awards ceremony begins, all Envirothon teams are invited to offer a roundtable. Teams who have qualified for the Community Research Award or the Community Service Award are especially encouraged to plan a roundtable.

Roundtables are freewheeling small group discussions around a place, a question, or an idea of your choice. This is a great time to display and discuss interesting things you learned in your current issue research and/or any service projects you have undertaken. Elaborate displays are discouraged! If you want, you can simply bring your Current Issue presentation materials. When you think of items to display, ask yourself: What will help start a good conversation about the work we have done?

All Envirothon participants will be invited to visit informally at these tables. Team members at roundtables take turns sitting at the home table and visiting other tables.

More information on planning your roundtable will be sent a month before the Envirothon with the Current Issue Problem.