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# Mass ENVIROTHON

## 25 Years of Hands-On Environmental Education

by Clif Read, Director, DCR Quabbin Visitors Center

The Mass Envirothon is a statewide, natural resource-based environmental education program. It was founded in 1988 as the fourth Envirothon program in North America, thus the 2013 tournament marked its 25th anniversary. Over the years, the Envirothon has grown in quality and quantity; over 40 teams now participate.



The group picture is a highlight of every Mass Envirothon. Many of the students from the 40 teams participating in the 2013 Envirothon pose in front of the Ames Mansion at Borderland State Park. There are lots of big smiles after a morning of challenging questions about water, forestry, soils, and wildlife, as well as environmental issue presentations.

The Envirothon is available to high school aged students and offers them unique learning opportunities. The Mass Envirothon program challenges students to:

- Get outdoors and explore, gaining hands-on knowledge and experience of Massachusetts ecosystems.
- Engage with their communities, developing skills for investigating local environmental issues and participating in community decisions and actions.
- Test their environmental knowledge and skills in a challenging competition.
- Grow in their commitment to stewardship of the environment and natural resources.
- Cultivate curiosity and a love of learning in science.
- Increase their awareness of career opportunities in the environmental field.

Envirothon teams representing schools and community organizations prepare the entire scholastic year for a statewide event in May that tests their knowledge of forest, wildlife, water, and soil resources, as well as current environmental issues. The program stresses the inter-dependence of human and natural systems, emphasizes hands-on, team-oriented problem solving, and highlights the value of community involvement.

There are opportunities to learn about these topics throughout the school year, including resource materials for use in the classroom, workshops geared to both teachers and students, and the opportunity to encounter environmental professionals in action. The winning team is entitled to compete in the North American Envirothon, a week long event that joins the top teams from the 50 states and 9 Canadian Provinces that run Envirothon programs.

One unique aspect of the Mass Envirothon is the selected Environmental Issue. This portion of the event, intro-

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# Stone Walls Reveal the Past

Have you ever wondered about them?

By Jim Laffey, DCR/DWSP Education Coordinator

Stone walls are everywhere in the Quabbin, Ware River and Wachusett watershed landscape; they even remain under the reservoir surface! Stone walls aren't generally found in other parts of the country, and certainly not in the numbers of central Massachusetts. Stone walls come in different shapes, sizes, and configurations.

Many of the stones now seen as walls were buried by soil that had been created from forest litter after the last ice age. As European settlers removed



This picture is an example of a "dumped wall," where early settlers merely dumped unwanted stones in linear fashion along the edge of an agricultural field.

trees, cultivated land, and grazed livestock, soil was compacted and eroded. These actions allowed winter frost to penetrate deeper into the ground, bringing stones to the surface, where they became a nuisance.

Most early walls were simply linear landfills created to clear the field for plowing and harvesting. These simple walls were little more than a line of stones dumped along the edge of the fields. These dumped walls could be a single stone wide, a double row or occasionally several stones wide.

Later, walls were used to delineate property boundaries, so they were typically stacked more neatly. Stacked walls could also be single, double, or multiple stones wide, if the land yielded a lot of stone over time. This style of wall is the most common in the watersheds and throughout New England. Effort was clearly made to have these walls retain their shape, as the stones were placed more carefully than dumped walls.

Well designed stone walls appeared more recently – about 150 years ago – as property owners had more time to spend on walls and fencing materials became more difficult to find. Fences were originally made of wood, stumps, and other forest debris, but as wood became scarce stone walls were used

as fences. Built walls are usually at least double stone walls, but sometimes it is possible to find a single built wall of flat rocks.

The most effort in creating built walls is the fitting necessary to incorporate naturally occurring stones into the design. Many dumped and stacked walls were rebuilt, especially along the front of properties, when owners had more time or needed a higher wall to act as a fence.

Broad walls are the most interesting to me when I come across one in the woods. Some of these very wide walls were built as "walking walls," like sidewalks for people to get from the house to the barn, mill or workshop in winter or mud season.

Another style of broad wall consists of two single or double walls separated by several feet. The section between the walls was filled in with rubble taken from the fields. These walls indicate an incredible supply of stone in the ground that needed to be removed.

Walls had many functions over time, many of which can be seen across the

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The more carefully constructed "stacked wall" was built to endure the ravages if time, and very likely used to de-mark a property boundary.

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# Beware the Emerald Ash Borer

## Latest Threat to Massachusetts Forests

Compiled by Jim Taylor, DCR/DWSP Planner from DCR press release

The Emerald Ash Borer (EAB), *Agrilus planipennis*, was first detected in Dalton, MA in August 2012. Massachusetts is the 18th state discovered to have EAB within its borders. Upon detection of this invasive species, DCR began work with the Massachusetts Department of Agricultural Resources (DAR), the United States Forest Service (USFS), and the United State Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) to formulate a plan for dealing with the invasive insect.

DCR set up more than 700 EAB traps across the Commonwealth. With funding from the USFS, DCR girdled 26 trees, a process known as 'delimiting' that stresses individual trees in an effort to attract and sequester any EAB in the area. After the delimiting survey was completed around the Dalton/Pittsfield area, five trees were found to have EAB larvae present -all located within a 1.5 mile radius of the trap where the first EAB beetle was detected.

DCR also engaged in a public outreach campaign, including meetings,



The Emerald Ash Borer, shown slightly larger than actual size, is identified by its golden green or brassy color body with darker, metallic emerald green wing covers. The mature adult measures 3/8 - 5/8 inches (8.5 - 13 mm) in length, with the female slightly larger than the male.

allowing the public to express their opinions and concerns on the topic of a quarantine. Though most public comments posted in the aftermath of these meetings called for a quarantine as small as scientifically possible, studies concluded that a county-wide quarantine would work best.

The quarantine order means that certain products will be kept from moving outside the regulated area, including all hardwood firewood (any piece of wood smaller than 48"), all ash nursery stock, and any ash lumber that has not been treated. Proper wood treatments include the removal of bark and half an inch of wood, dry kiln sterilization, fumigation, and heat treatments.

The state of New York recently added 22 new counties to their EAB quarantine, including counties that abut the Berkshire County border. This will allow wood to move from quarantined county to quarantined county, including moving regulated wood from Massachusetts to the mills that are just over the border in New York, relieving some of the financial pressure on the wood industry in Berkshire County.

Plans for future surveys are currently being discussed and EAB traps will be utilized again this summer in Massachusetts, as well as the girdling of approximately 100 ash trees to continue to help narrow the infestation.

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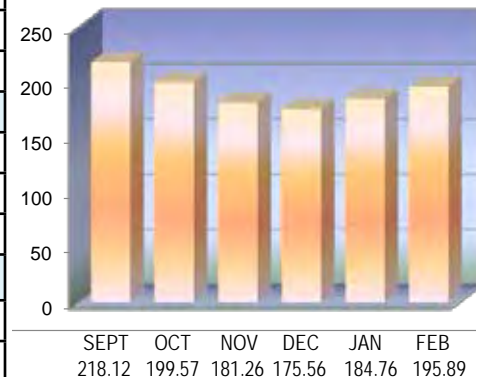
This picture details the bark damage caused by feeding EAB larvae. Note the 'D'-shaped exit hole made by the mature EAB, which kills upper branches of the tree and leaves it vulnerable to disease.

## Reservoir Watch

Reservoir levels and 6-month precipitation

Reservoir	Quabbin	Wachusett
Minimum	522.57'	389.71'
% Full	86.3%	89.5%
Date	12/14/12	10/29/12
Maximum*	524.89'	391.52'
% Full*	90.5%	93.1%
Date	9/1/12	12/10/12
Precipitation	18.87"	20.87"
Seasonal Avg	23.06"	22.28"

## System-wide 6-month Water Usage (in million gallons per day) September 2012 to February 2013



# Envirothon From Page 1

duced in 1991, challenges teams to conduct research in their community, interacting with resource professionals, town officials and local citizens in an effort to address a real-life problem. The team then presents their research, findings and proposals to a volunteer panel of environmental professionals, who serve as judges to select the best proposal at the Envirothon competition.

The 2013 Current Issue was Trees, Forests, and Sustainability. Previous years topics have included: Sustainable Stormwater Management; Wetland Protection; Groundwater Protection; Renewable Energy: Getting it Right, Ecologically & Economically; Outdoor Recreation and the Environment; Energy Conservation and Renewable Energy; Acting Locally for Climate Protection: Protecting Cultural Landscapes; Natural Resource Management in the Urban Environment; Strengthening Local Food Systems; Introduced Species and Biodiversity Conservation; Open Space Planning; Watershed Management; Pest Management; Community Wastewater Treatment and Disposal.



The learning is always mixed with fun at the Envirothon. Participants during the 2003 event at Heifer International's Overlook Farm in Rutland take a break to enjoy a hayride.

The Department of Conservation and Recreation has been actively involved with the planning and

implementation of the Mass Envirothon program dating back to the first years of the program. The Envirothon



Envirothon participants rely on teamwork to study, discuss, and learn at the soil pit.

## 25 Years of Massachusetts Envirothon History

Year	Focus	Location	Winning Team
2013	Trees, Forests, & Sustainability	Borderland SP	Newton North HS
2012	Stormwater Management	Blackstone River SP	Newton Community Farm
2011	Wetland Protection	Great Brook Farm SP	Lexington HS
2010	Groundwater Protection	Otter River SP	Lexington HS
2009	Renewable Energy	Doyle Conservation Ctr	Tantasqua Regional HS
2008	Recreation & Environment	Hopkinton SP	Lexington HS
2007	Energy Conservation	Mount Wachusett CC	Bristol County 4H
2006	Local Climate Protection	Blackstone River SP	Bristol County 4H
2005	Cultural Landscapes	Essex Aggie	Bristol County 4H
2004	Nat. Resource Protection	Cochituate SP	Acton Boxborough HS
2003	Local Food System	Overlook Farm	Bristol County 4H
2002	Biodiversity	Borderland SP	Needham Area Home Sch
2001	Stormwater Management	Mass. Electric	Needham Area Home Sch
2000	Wetland Conservation	Gore Place	Needham Area Home Sch
1999	Open Space Planning	Hampshire College	Barnstable HS
1998	Watershed Management	Mount Wachusett CC	Lawrence Academy
1997	Pest Management	Borderland SP	Patriot Trail Girl Scouts
1996	Wastewater Treatment	Quabbin Visitors Ctr	Pittsfield HS
1995	Groundwater	Great Brook farm SP	Pittsfield HS
1994	Acid Rain	Buck Hill Cons Area	Lunenburg HS
1993	Non-Point Source Pollution	Buck Hill Cons Area	Lunenburg HS
1992	Wetlands Protection	Buck Hill Cons Area	Lunenburg HS
1991	Water Resources	Buck Hill Cons Area	Lunenburg HS
1990	None Specific	Buck Hill Cons Area	Lunenburg HS
1989	None Specific	Buck Hill Cons Area	Lunenburg HS
1988	None Specific	Buck Hill Cons Area	Lunenburg HS





A Barred Owl looks on as participants scramble to answer the challenge at the Envirothon's wildlife station.

competition was held at Quabbin Reservoir in 1996; since then the State Parks Division has hosted the event at various facilities, including Borderland State Park, Lake Cochituate State Park, Great Brook Farm, Otter Brook BP, Blackstone Heritage State Park and Hopkinton State Park.

The connection between DCR – as well as its sister agencies within the Executive Office of Energy and Environmental Affairs – and the Mass Envirothon is a natural link. The program encourages environmental stewardship and protection while supporting community service among our youth. Everyone who participates in the Mass Envirothon comes out a winner! 💧



Proud champions: the team from Newton North High School was the overall winner of the 2013 Mass Envirothon.

## Thoughts from the new Envirothon Water Station Coordinator

by Kelley Freda, DCR/DWSP Environmental Analyst

I took over the water portion of the Mass Envirothon for 2013 and introduced new topics related to the ever evolving field. I wanted students to be aware that water quality and watershed management are dynamic, and that scientists don't always have all the answers. Regardless of whether they win or lose the competition, they need to be aware of the issues that they will be facing in their world for years to come.

New topics that were inserted into the Envirothon water curriculum include: pharmaceuticals and personal care products (PPCPs), stormwater pollution, watershed forest management, and climate change. Students will now learn how these different issues are interdependent, all playing an important part in water quality. Federal and state laws that work to ensure water quality are also now part of the Envirothon's water station. These new issues have already raised the kids' understanding of water quality.

Many students were shocked to learn what is, and is not, removed during the water treatment process. They found out about PPCPs and how they persist in the environment once they are flushed down the drain. Some of these chemicals end up in our streams and rivers, affecting everything from drinking water to aquatic life.



Clockwise from above: Students collect and identify benthic macroinvertebrates with Kelley Freda. Dan Giza from Alden Labs works with students to analyze data. Students collect water quality data with a digital meter.



Climate change is a hot topic (pardon the pun). Students now have the opportunity to focus on how this major issue in their lives impacts water resources. They are able to discuss how climate change is causing more frequent and intense storms, changing water quality, diminishing fresh water supplies, drying up streams, and adding pollutants into our drinking waters.

These new topics enhance the existing information on the hydrologic cycle. The revamped water station provides a wide perspective that will help Envirothon participants become good stewards of water quality.



## Stonewalls - continued from Page 2

DCR watershed system. Retaining walls keep property or roads in place. Boundary walls indicate the edges of an owner's property. Estate walls are more impressive built walls, usually created by a stone mason to enhance a property. Cattle guides were used to

keep animals moving in the right direction and pens were created to contain animals. Foundation walls and cellar walls were built to support a house, barn or other building. Walking walls made shoveling snow in winter and moving around during mud season easier.

Check out the variety of stone walls as you drive or walk around the watershed, or any portion of rural New England, and contemplate the effort that went into creating these historical landmarks. As a bonus, see if you can determine the purpose of the wall. 💧



This nicely constructed estate wall, below, shows how a skilled mason took the time to give careful attention to form and fit of the stones as a statement to the landowner's prosperity.



Above is an ideal example of a "filled wall." Two outer walls retain space in between which is filled with stones and debris that erupted from the soil over successive years of use.

## Emerald Ash Borer - continued from Page 3

First found in the Chicago area in the 1990s, EAB inhabits only White ash (*Fraxinus americana*), black ash (*F. nigra*), red ash (*F. pennsylvanica*), green ash (*F. pennsylvanica* var. *sub-integerrima*) and several horticultural varieties of ash. This tree type is a vital part of the New England forestscape.

EAB is identified by its golden green or brassy color body with darker, metallic emerald green wing covers. The adults measure 3/8" - 5/8" (8.5 - 13 mm) in length, with females being larger than males. Adults are present from mid-May to late July. They feed on leaves, leaving irregularly shaped patches with jagged edges. Larvae are flattened in appearance, consisting of 10 cream-colored, bell-shaped segments with a pair of brown pinchers



This picture shows bark damage to an Ash tree that has been seriously harmed by the Emerald Ash Borer. The tree will now become weakened, misshapen and vulnerable to fatal disease.

at one end and measure about 1- 1¼" (26 - 32 mm) in length when fully developed.


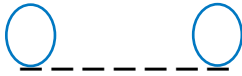



The damage EAB inflicts includes distinct 'S'-shaped tunnels formed beneath the bark from larval feeding, with vertical splits in the bark caused by callus tissue forming in response to larval feeding. Adult emergence leaves 'D'-shaped exit holes (3-4 mm in diameter) in the bark. Eventually, the upper third of the tree dies back and numerous shoots arise below the dead portion of the trunk, leaving the tree misshapen, weak, and vulnerable to disease and other natural challenges.

If you think you have seen EAB or its tell-tale damage, you are urged to contact the agencies listed on page 7. 💧

Kids Corner

# Try The Water Supply Jumble

Unscramble the jumbled water-related words and make use of the circled letters to solve the riddle at right. The answers are below...but no peeking!

- ROMTS  \_\_\_\_\_
- NADTWEL  \_\_\_\_\_
- ILALNFAR  \_\_\_\_\_
- IVERSERRO  \_\_\_\_\_
- RYOLDYHOG  \_\_\_\_\_

"This radio is soaked."

"Mine too!"



Where do the Wachusett Reservoir rangers keep their equipment?...

In the \_\_\_\_\_ !

## And another thing...

by J. Taylor



"Hey! Did you read this? They're talking about me!"

WBZ-TV's weekend morning AccuWeather Meteorologist Joe Joyce's dog, Luna, had her picture taken by DCR's Kelley Freda at an Earth Day event. Luna seemed particularly interested in the importance of picking up after ones pet!

For more information about...

The Mass Envirothon:  
**Massachusetts Envirothon Website**  
[www.maenvirothon.org](http://www.maenvirothon.org)  
**North America Envirothon**  
[www.envirothon.org](http://www.envirothon.org)

Stonewalls:  
**The Stonewall Initiative**  
[www.stonewall.uconn.edu](http://www.stonewall.uconn.edu)  
*Exploring Stone Walls*, by Robert M. Thompson.  
 Walker & Sons, New York. 2005.

**Emerald Ash Borer:**  
**MA Dept of Conservation and Recreation**  
[www.mass.gov/dcr](http://www.mass.gov/dcr)  
**US Forest Service**  
<http://na.fs.fed.us/fhp/eab/>  
**USDA Animal and Plant Health Inspection Service**  
[www.aphis.usda.gov/plant\\_health/plant\\_pest\\_info/emerald\\_ash\\_b/](http://www.aphis.usda.gov/plant_health/plant_pest_info/emerald_ash_b/)  
**EAB Coalition**  
[www.emeraldashborer.info](http://www.emeraldashborer.info)

Jumble Answers:

*Storm, Wetland, Rainfall, Reservoir, Hydrology, Watershed*



# The Braccianti Built the Dam

By Rebecca Boronoski, DCR Wachusett Ranger

The Wachusett Reservoir and Dam remain a historic feat of hard work and engineering. These structures are known today as two of the largest hand built water facilities in the world.

This amazing source of drinking water was constructed by hundreds of men who labored for ten years, relying mainly on simple hand tools and horses. The project's time frame, 1896-1906, came just before the availability of gasoline powered hydraulic engines. Only the heaviest work utilized steam powered machines, which still required labor for shoveling coal.



"The Braccianti" take time to pose at the top of the Wachusett Dam while still under construction, around 1905.

About two thirds of the workforce were Italian immigrants, many of whom did not speak English, that came

to America in search of work. They were known as "braccianti" — unskilled labor. However, they displayed their craftsmanship in building the 415 foot high dam while moving over 6.9 million cubic yards of soil, 380 houses, schools, churches, and mills, and several miles of roads and railways.

Many of the Italian laborers settled in the area after the project was finished. As a result, many Italian Americans who live in the region today can proudly say that their ancestors helped build the Wachusett Reservoir and Dam. 💧

## downstream

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*Downstream* is produced twice a year by the Massachusetts Department of Conservation and Recreation, Division of Water Supply Protection. It includes articles of interest to the Watershed System communities. Our goal is to inform the public about watershed protection issues and activities, provide a conduit for public input and promote environmentally responsible land management practices.

Governor: Deval L. Patrick  
EOEEA Secretary: Richard K. Sullivan Jr.  
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DWSP Director: Jonathan L. Yeo  
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