Putting NH’s Environmental Literacy Plan into Action

New Hampshire is one of the first states in the country to have an Environmental Literacy Plan (ELP) endorsed by the state Department of Education. Now that the work of creating the plan and getting it accepted is behind us, it’s time to step up to the plate and implement it! The plan outlines how to accomplish this, beginning with the important first steps of creating partnerships with community groups.

Many state agencies and private organizations have educators and programs in place that are ready to help teachers take their students outdoors and incorporate the techniques of inquiry and field investigations into their lessons. This issue explores several programs available in the learning community outside of schools. Some offer professional development workshops and training for teachers, and others offer programming for their classes. They are just a few of the many opportunities available, so read on and get inspired!

Stepping Up to Ensure a Healthy Environment for the Future

by Judy Silverberg, PhD

We have entered an exciting time for using the environment as a context for teaching and learning. On April 18, 2012, the New Hampshire Board of Education endorsed the New Hampshire Environmental Literacy Plan (ELP). The plan was developed during a two-year period by an active group of educational professionals, including members of New Hampshire Environmental Educators (NHEE), teachers, university professors and state agency education specialists, with input from other stakeholders. All involved believe the development of an environmentally literate citizenry is critical for the future of a healthy, sustainable environment.

Environmental literacy requires an understanding of the natural world and the capacity to interpret environmental systems. An environmentally literate citizen can make informed decisions about the environment based on scientific, aesthetic and ethical considerations, while taking into consideration the social, cultural, economic and political systems connections. It is gained through an interdisciplinary approach to education that employs hands-on, outdoor, place-based and inquiry-based learning experiences that foster an understanding of the environment as a whole.
Amoskeag Fishways: 
A Community Resource for Teachers

by Helen Dalbeck, Executive Director, Amoskeag Fishways

Amoskeag Fishways Learning and Visitor Center was created in 1995 as a result of a unique partnership between Public Service of New Hampshire, New Hampshire Audubon, the U.S. Fish and Wildlife Service and N.H. Fish and Game. Its mission is solid: providing cooperative science and environmental educational programs fostering cultural and ecological stewardship of watersheds and riparian systems.

The Amoskeag Fishways location is a standout, right on the Merrimack River, in the city of Manchester. The river attracts diverse wildlife year-round. Fishways educators provide dynamic learning opportunities for students and the general public in this natural, outdoor setting. Adults, children, teachers and students in their school classes are taught to learn about the natural environment through exploring, explaining, questioning and observing. They can then apply what they learn to explore the life around them – in the water and the skies above – every day in their classrooms, parks and backyards.

For nearly seventeen years, Fishways staff have worked hard to develop and present professional development opportunities for elementary and middle school teachers. Workshop presenters embrace current and emerging educational philosophies to help teachers support the evolving state educational frameworks, while focusing on the natural environment. Teacher workshop topics include nature-based engineering design, inquiry-based learning, and using the environment to meet science, math and language arts state educational frameworks. Fishways educators aspire to foster environmental awareness, interconnection, innovation, stewardship and conservation.

Teacher workshops and school programs support many of the key areas included in the New Hampshire Environmental Literacy Plan. For students to understand natural systems, to investigate their surroundings, to be able to read, write and talk about their scientific findings and to have the knowledge to interpret the natural world around them, it is necessary to have a well-trained and inspired community of educators who can teach and model these goals. Amoskeag Fishways is a strong partner working in your community to achieve an environmentally literate citizenry.

For more information about how Amoskeag Fishways educators can help you enhance your teaching about the environment visit amoskeagfishways.org.

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Teachers of environmental education take advantage of real-world experiences to give students the opportunity to explore the outdoor environment through questioning, investigating and discovering answers to their own questions. It is a type of education that not only builds environmental literacy, but is also reported to increase overall student engagement and motivation in learning, leading to improved academic achievement in all subject areas. In addition, learning about and from the environment encourages outdoor activities, which enhance both physical and mental health.

New Hampshire’s Environmental Literacy Plan provides an organized framework to ensure environmental literacy for all people in the state outlined by six specific key areas. The first two key areas ensure that environmental literacy activities support state education goals and are aligned with student graduation requirements. Other key areas address the need for professional development to assist teachers and school district administrators; environmental literacy assessment; implementation and funding of the plan; and finally, stipulate that environmental education opportunities be provided in schools and communities.

If your science and social studies teaching supports the New Hampshire frameworks in those disciplines, then you are already covering the concepts that are necessary for students to understand to become environmentally literate. The ELP advocates providing students with meaningful outdoor experiences each year throughout the learning process using place-based and environmental education techniques. The development of community learning partners is strongly encouraged, as is the creation at schools of easy-access outdoor learning areas. Using the environment as a context for learning is an important component of both the NH Science Technology, Engineering and Math (STEM) initiative and the Next Generation of Science Frameworks. In addition, the ELP encourages the incorporation of place-based and service learning projects into graduation requirements for students, as well as the development of environmental competencies.

To meet the goals of the ELP, it is critical to have well-trained educators who are knowledgeable about ecological and environmental concepts and who know how to integrate the outdoor environment into lessons that support the educational frameworks. University educators of future teachers, state agency educators and environmental organization staffs are working together to develop and provide comprehensive professional development opportunities for teachers statewide.

The future of New Hampshire’s precious natural resources lies in an environmentally literate citizenry that is equipped to make informed decisions. The future of New Hampshire’s precious natural resources lies in an environmentally literate citizenry that is equipped to make informed decisions.
Thanks to a new partnership between Environmental System Research Institute (Esri) and the N.H. Department of Education, public and private schools throughout New Hampshire have access to state-of-the-art Geographic Information Systems (GIS) tools for use in the classroom. We join several states that now provide the GIS software free of charge to schools and non-formal education groups for education and research.

The availability of the software opens many opportunities for students to spatially display, analyze and share data they collect in their classes. Since the signing of the final agreement in May, 37 N.H. schools, representing every grade level from all geographic areas of the state, have installed the software on their school computers.

The Esri partnership was made possible by collaborative efforts of the N.H. Department of Education, N.H. Geographic Alliance, N.H. Fish and Game and UNH Cooperative Extension. It was spearheaded by Plymouth Regional High School science teacher Ina Ahern and Hopkinton Middle School geography teacher Robert Woolner. School teachers and administrators interested in obtaining the software should complete an application and return it to the N.H. Department of Education. A team of GIS specialists is ready to assist with the application form and software installation. Throughout the coming year, a variety of workshops and institutes are planned to help teachers implement the powerful technology in their classrooms.

For more information about the New Hampshire Esri partnership and ArcGIS NH license request for schools, visit nhedgis.org. For information about the license and workshops visit nhedgis.org and nhga.net.

One Example of GIS in Classroom

One program that integrates GIS technology into student learning is N.H. Fish and Game’s Watershed Education Program (WEP) for middle and high school students. Classes participating in the WEP test water quality, sample macroinvertebrates, study fish populations and assess stream habitat to determine the health of the watershed in their community.

Ina Ahern and GIS specialist Rebecca Lilja of the U.S. Forest Service have developed tutorials to show teachers about how to collect and map water quality and fisheries data, analyze the results and share that data with other schools in the watershed using GIS tools and mapping software.

The GIS program enables students to bring in and display layers of data gathered by natural resource professionals to add to their local information. In addition, student-collected data can readily be shared with the professionals. This exciting program is true citizen science in action!

To learn more about Fish and Game’s Watershed Education Program, contact Judy Tumosa at judy.l.tumosa@wildlife.nh.gov.

**Trout Live in the Watershed... and in the Classroom**

By Judy Tumosa

Eastern brook trout spawn in the fall, making it the perfect season for teachers in New Hampshire to sign up for the Trout in the Classroom (TIC) Program. As part of the program, students and their teachers raise brook trout from eggs from February through April. They release the fry in May in a nearby river that they have studied with their class. Brook trout are identified in the state’s Wildlife Action Plan and the Eastern Brook Trout Joint Venture as a species of conservation concern.

Many partners are involved in the TIC Program. Fish and Game's aquatic resources educator oversees the program and provides curriculum materials and training to support teachers. Fisheries biologists provide resource information, and hatcheries supply fish eggs and offer advice about raising the young. Trout Unlimited (TU) chapters donate chillers to keep the water in the tanks cool enough for the trout. With dedicated supporters and numerous helping hands, more than 1,700 New Hampshire schoolchildren each year learn about aquatic ecosystems.

TIC is a unique way to teach first-hand about the importance of watersheds. Trout are an indicator species; their abundance directly reflects the quality of the water in which they live. Through the TIC program, students come to care about their trout and the habitat in which they live. As the program progresses, students begin to see the connections between trout, water resources, the environment and themselves.

TIC has applications in many disciplines, from science, social studies, math and language arts to physical education. The program has a three-phase format – water quality/macroinvertebrates, GIS (Geographic Information Systems), and cold and warm water fisheries studies.

TIC is a component of Fish and Game’s Watershed Education Program, supported with federal Sport Fish Restoration funds.

For more information, visit wildnh.com/Education or contact Judy Tumosa at judy.l.tumosa@wildlife.nh.gov. The Trout Unlimited “Trout in the Classroom” curriculum can be found at troutintheclassroom.org.
Our River, the Ashuelot

By Symonds School fourth graders and Janet Altobello, Harris Center School Program Coordinator and teacher/naturalist

October’s “Source to Sea Cleanup” in the Connecticut River Watershed inspired ten fourth grade classes from Keene to lend their hands to the annual sweep along the banks of the Ashuelot River and its tributary, Beaver Brook. This year 375 volunteers from Keene collected more than 2,500 pounds of trash! The opportunity to join community members in taking care of our river was the perfect way to start the fourth graders’ earth science study called “Land and Water.” Below are the reflections of Symonds School fourth graders:

“At Symonds school, we used maps to learn about the course of the river. We found where the river begins and where it contributes its water to the Connecticut River. By reading the contour lines, we saw that Keene is a flat valley surrounded by hills. Aha! So that’s why so much water gathers in our town after several days of rain and snow melt!

“On the day we hiked on the bike path to the river, we dug with soil corers into the river-bottom soil and then again up on top of the bank. We found more clay and moisture down below and more sand and roots and leaves up above. Hmm… it made us think about why this would be. We looked for signs of past flooding. The bridge posts had mud on them above the flowing water. The soil under the bike path was eroded. There were many clues. We became river detectives. We drew our soil samples, took the river’s temperature in both Celsius and Fahrenheit and watched a mallard duck swim by.

“Then we put on our gloves and started the cleanup! We hunted for trash and found it. Check out the graph below that shows what we found. Most of the garbage was made of plastic. We thought about reasons why that was so. Some surprising things we found were a shopping cart, towels, a chair like our school chairs, and a big pickle jar.

“We were surprised by how much trash we found. We felt sad, or mad, or disappointed that there was so much litter. But we really liked collecting it and filling up garbage bags. How would you like it if the wild animals collected the litter by the river and put it in your house? That is what it is like for them when people litter.

“So please help keep our river and river habitat clean! Help the animals! Try your hardest! We hope you read our story, look at our graph, and that you try to keep the river clean too. We can do it together!”

ConVal school district students accompany a N.H. Fish and Game fisheries biologist to learn about stream organism populations, which helps them create detailed food webs.

The Harris Center for Conservation Education in Hancock, N.H., works with 115 teachers each year, helping them connect their curriculum to the local landscape. Three classes from Symonds School in Keene, NH, contributed to this story.
**Working Together to Learn About Water**

*By Alicia Carlson, Project WET Coordinator, DES*

In the mid 1990s, New Hampshire public drinking water suppliers came together with a common interest: educating the state’s young people about drinking water and the issues that affect it. It all started when Manchester Water Works began working with the local elementary schools – visiting classrooms to give presentations, hosting visits to the water treatment facility, and working with teachers to organize science fairs with a water theme.

News of the success of the science fair program in Manchester quickly spread. Other water departments were interested in providing similar programs in their schools.

At the same time, the N.H. Water Works Association and the N.H. Department of Environmental Services (DES) began hosting an annual drinking water festival for schoolchildren during the first week of May. For more than 35 years, the American Water Works Association has encouraged state and local water organizations to offer events during this special “Drinking Water Week.”

In New Hampshire, the drinking water festival was originally held on the State House lawn. Several hundred students attended and were able to visit with a variety of vendors to learn about different aspects of water. More recently, the drinking water festival has been held in a different region of the state each year. Students who attend participate in a variety of water-related activities (many of which are from the Project WET resources), visit an exhibit hall and are entertained by singers and actors, all with a water focus.

A second event held during Drinking Water Week is the New Hampshire Fourth Grade Water Science Fair. During the year, students participate in a science fair at their schools in which student projects are judged by community representatives, water department staffs and other natural resource professionals. Winners from each school then compete in a citywide science fair, often coordinated by local water departments.

Andreas Neumann, the N.H. Drinking Water Coalition coordinator, said the festival is to educate New Hampshire’s youth about water and to encourage them to explore and understand the issues facing our shared water resources.

For more information about the drinking water festival or the N.H. Fourth Grade Water Science Fair, contact Alicia Carlson at 603-271-4071 or alicia.carlson@des.nh.gov.

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**Activities Related to Articles in this Issue**

- **Project WILD Suggests:**
  
  In Planning for People and Wildlife, middle school students imagine and research what the area where they live was like before humans developed it. They design planned communities, and build and evaluate models of their community designs.

  Elementary students have the chance to explore outdoors as they search for signs of wildlife in *Wildlife is Everywhere*!

- **Project WET Suggests:**
  
  In Trees as Habitats, students have the opportunity to observe, discuss and make judgments about attitudes concerning the environments in which they live.

  **Storm Water**

  After participating in the activity A-Maze-Ing Water, students can work with members of the community to start a storm drain stenciling project.

  *New activities can be found in the 2011 edition of the Project WET Curriculum and Activity Guide.*

  Don’t have a copy? Contact Alicia Carlson at alicia.carlson@des.nh.gov.
Happy Retirement to Judy Silverberg

by Mary Goodyear, Wildlife Educator, N.H. Fish and Game

After 34 years of dedicated state service, long-time environmental education advocate Dr. Judy Silverberg has retired from her position as wildlife education program supervisor at N.H. Fish and Game.

She began her state career as Chief of Interpretation for N.H. State Parks, then became an educator for UNH Cooperative Extension before moving to Fish and Game, where she stayed for 27 years. There, she launched many innovative conservation education programs, including Project WILD in 1985, Aquatic Resources Education in 1988, Wonders of Wildlife in 1990, and the Schoolyard Habitat Program (Project HOME) in 1991.

Under Silverberg’s direction, conservation education at Fish and Game began to address the challenges facing science and conservation education statewide. She recognized early on that to ensure a healthy, sustainable natural environment, it was necessary to develop an environmentally literate citizenry.

To that end, Silverberg’s wisdom, energy and vision moved Fish and Game and its conservation education unit into partnerships that have greatly increased their impact on conservation and environmental education in the state. Through the years, Silverberg actively encouraged collaborations that made Amoskeag Fishways Learning and Visitor Center a reality, as well as the Project WILD in 1985, Aquatic Resources Education education programs, including Project WILD in 1985, Aquatic Resources Education in 1988, Wonders of Wildlife in 1990, and the Schoolyard Habitat Program (Project HOME) in 1991.

The United Nations Environment Programme (UNEP) has partnered with cartoonist Jim Toomey — of Sherman’s Lagoon fame — to develop a series of six two-minute videos intended to raise awareness of the importance of oceans and the coastal environment. The videos use animation and humor to explain in clear, simple language the role oceans play in our lives and in our very survival. Check rona.unep.org/toomey for updates as the videos are released during the coming months.


Teachers and community members interested in involving youth to make a difference for wildlife through habitat projects can apply to the Homes for Wildlife Action Grant Program for start-up funds. Mini-grants of up to $300 ($600 with matching funds) are available for projects on schoolyards, public areas or community lands to enhance habitat for wildlife and outdoor learning. For a proposal packet, contact Marilyn Wyzga, Public Affairs, N.H. Fish and Game Department, 11 Hazen Drive, Concord, NH 03301; email marilyn.wyzga@wildlife.nh.gov; or call 603-271-3211. This project is funded through the sale of conservation “moose” license plates.

N.H. Environmental Educators Conference


Northern Woodlands Goes to School

Northers Woodlands provides educators with environmental education resources to help advance a culture of forest stewardship in the Northeast. Sign up for their bi-weekly educator’s e-newsletter at http://northernwoodlands.org/programs/nw_goes_to_school.

Wonders of Wildlife Classroom Programs

Free interactive programs focusing on wildlife and the environment are available for classrooms (grades 3-6). Deadline to submit requests for spring programs is February 24, 2013. For information and a program request form, visit wildnh.com/Education/school_progs.html.

Enter the Junior Duck Stamp Contest

Your students can learn about conservation and develop their artistic talents by submitting original artwork depicting North American waterfowl to the New Hampshire Junior Duck Stamp Conservation and Design Contest. The entry deadline is March 15, 2013. Contact Ellen MacNeil, N.H. Fish and Game, at 603-271-2461 or wildlife@wildlife.nh.gov. Visit wildnh.com/Education/Junior_Duck_Contest.htm.

Naturally Curious with Mary Holland

If you are looking for information about local wildlife and plants, look no further than the “Naturally Curious with Mary Holland” blog at http://naturallycuriouswithmaryholland.wordpress.com. Mary Holland is an accomplished Vermont naturalist, photographer, columnist and author. Blog entries are brief, but powerful and fun!
Environmental Literacy Begins With Connecting To Nature

by Marilyn Wyzga

“It is time for New Hampshire to embrace a comprehensive statewide effort to promote happier, healthier lifestyles in ways that honor our state’s tradition of celebrating and cherishing its diverse and rich natural resources.”

At the recent N.H. Children in Nature Conference, speaker Lenore Skenazy (author of Free-Range Kids) commented on something she’d learned in one of the workshops: how to identify different kinds of pine trees by the numbers of needles in their clusters. White pine, W-H-I-T-E, 5 letters, 5 needles. Children could learn this in a book, she remarked. But, she added, perhaps this learning best takes place after a child discovers what a pine needle is — by picking some up off the ground, crushing them in their hands, smelling their resinous fragrance.

Environmental literacy begins outdoors with free play. From free play in the early years, children can gain an understanding of the natural world, and as they grow, the capacity to interpret environmental systems. As teenage youth, their experience of the community where they live helps them understand the interconnectedness of social, cultural, economic and political systems.

Outdoor free play and exploration can take place at a school, in the backyard, at a local park or on conservation land. Schools provide an ideal landscape, because children spend so much of their time there. The good news is that New Hampshire communities are creating other local opportunities, too, from programs to infrastructure, which will help support the Environmental Literacy Plan (ELP).

Community Partners Supporting the ELP

As Key Area 6 in the NH ELP stipulates, environmental education opportunities are to be provided in schools and communities. The success of the ELP relies on this community support. Teachers, school staff and parents will be encouraged to know that a growing national movement to reconnect children with nature is vibrant in our state through the N.H. Children in Nature Coalition (NHCiNC). This initiative, which has been building in New Hampshire since 2007, brings together a diverse group of individuals and organizations around the many benefits of getting children, youth and families outdoors — from improved health and well-being to increased learning and problem solving capacity. The partners involved represent a variety of sectors, and all have an investment in kids being outdoors, whether for their physical health, psychological health or social well-being. The partners in NHCiNC are your neighbors and community members, and the work they are doing to give kids and their families more access to the outdoors can increase success of the ELP implementation.

You’ve read elsewhere in this newsletter how environmental education groups around the state are bridging between traditional science, education and environmental literacy, using the outdoors as a classroom through field investigations and inquiry-based learning. These groups are among the various partner organizations and agencies of the NHGiNC. Other partners represent sectors including health, recreation, arts and culture, and the built environment. Because they know that learning about and from the environment encourages outdoor activities, which improve both physical and mental health, these partners help provide access to outdoor play spaces (like Safe Routes to School and Safe Routes to Play); encourage and help fund outdoor activity (like Upper Valley Trails Alliance and N.H. Healthy Eating Active Living); and offer after-school program opportunities (like the N.H. Recreation and Parks Association).

Making a Case for Connecting Children to Nature

The NHCiNC crafted a white paper to make the case for connecting children, youth and families to nature, addressing the need for this cultural change, how that is taking place in New Hampshire, and what remains to be done. This document aligns with the NH ELP, and will work in tandem with it.

Following is an excerpt from the white paper, Opening Doors to Happier, Healthier Lives: Report and Recommendations from the New Hampshire Children in Nature Coalition:

“[The] research shows that the benefits of embracing an active, outdoor lifestyle are many, and that children who spend time outdoors are healthier and more creative, have better concentration, and even get better grades. For these reasons and others, the New Hampshire Children in Nature Coalition was created to promote and support reconnecting children, youth, and families with nature. Spending time in nature:

• Is fun and safe.
• Reduces stress.

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- Makes children more focused.
- Enhances children’s emotional and social development.
- Improves school performance and cognitive ability.
- Enhances creativity, problem solving ability, self-esteem and self control.
- Reduces obesity and improves health and well-being.
- Gives kids a reason to care about and protect their environment.
- Can promote healthy lifelong lifestyles and open career opportunities.

Of course, the benefits do not end with childhood, nor are they limited to human health and education. Entire communities, cultural organizations and businesses benefit when New Hampshire embraces values that promote and sustain our rich and diverse natural resources and traditions.

The good news is that this can be done easily in New Hampshire, and at little cost. In fact, New Hampshire is well positioned to lead the nation in promoting a healthy, active lifestyle that takes advantage of all the natural beauty, outdoor opportunities and facilities our state offers – attributes that already help make tourism one of the state’s most important economic engines.

Organizations from many fields – health, education, community planning, government, recreation, arts, culture, and social service – are urged to join a growing collaborative to support these seven goals:

1. Increase participation in outdoor learning experiences for children and families.
2. Urge more children and families to get outside on a regular basis.
3. Ensure that every child has the opportunity to experience nature in his or her local community.
4. Provide children with more time for free play outdoors.
5. Increase appreciation and care of the outdoors through organized activities and groups.
6. Improve the health, fitness, and well-being of New Hampshire children.
7. Deepen the understanding of the natural world among children and youth.

There are many organizations that already promote these ideals throughout New Hampshire, and several are profiled in this report. Their work demonstrates what active, engaged citizens can do to promote the benefits of children and families deepening their connections to nature.

With this report, we hope to build on this foundation, and to provide a forum for developing a broader statewide collaboration among our coalition partners, stakeholders, supporters, and others – for the good of New Hampshire’s children, and the nature of New Hampshire.”

To download and read a copy of the NH Children in Nature white paper, go to NHChildrenInNature.org.