



Alien Beetles... (cont. from page 3)

For more information on *Galerucella* beetles and purple loosestrife, visit these Web sites:

John Heinz National Wildlife Refuge at Tinicum
<http://heinz.fws.gov/>

Minnesota Sea Grant
<http://www.seagrants.umn.edu/exotics/purple.html>

National Park Service Alien Work Group
<http://www.nps.gov/plants/alien/fact/lysa1.htm>

Illinois Natural History Museum
<http://www.inhs.uiuc.edu/cbd/loosestrife/bcpl.html>

USGS
<http://www.npwrc.usgs.gov/resource/1999/loosstrf/loosstrf.html>

Contribute to "Keystone Shorelines"

Pennsylvania Sea Grant welcomes contributions or story ideas for inclusion in *Keystone Shorelines*, which is published quarterly. Contact Steve Curcio at 814-898-6358 or via e-mail at xsc2@psu.edu for more information. We'll be glad to include your contributions as space permits. The deadline for submission for the Fall 2002 newsletter is September 30.



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A QUARTERLY PUBLICATION OF PENNSYLVANIA SEA GRANT

Pennsylvania Sea Grant, part of the National Sea Grant Program, is a partnership of Penn State, the Commonwealth of Pennsylvania, and the National Oceanic and Atmospheric Administration dedicated to the sustainable development of coastal resources.

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S U M M E R 2 0 0 2

Edinboro Lake Drawdowns Drastically Reduce Zebra Mussel Population

Nuisance Species Still a Threat to Inland Waterways, French Creek Watershed



The Infamous Zebra Mussel

The almost three-year-old zebra mussel invasion of Edinboro Lake is of great concern to local ecologists for several reasons. Not only does it represent the first documented infestation of an inland Pennsylvania lake, but it also means that one of the most destructive of all aquatic invasive species is now present in the headwaters of the French Creek watershed, the most biologically diverse in the Commonwealth.

In response to the discovery of the invasive mollusks in fall 2000, local scientists and resource managers discussed what could be done to control the zebra mussels in Edinboro Lake and slow their spread. A lake drawdown (lowering of lake water levels) was suggested as one possible control strategy.

In order to evaluate the likelihood that a drawdown would succeed, the Pennsylvania Department of Environmental Protection (DEP) conducted a zebra mussel survey of Edinboro Lake to understand better the size of the zebra mussel population and the distribution of these mollusks throughout the lake. DEP estimated

that over 37 million zebra mussels had become established in the lake as of November 2000. Importantly, virtually all mussels present were within the shallow shoreline area of the lake that would be affected by a drawdown. In consideration of this finding, and after much discussion with local stakeholders, DEP decided to support a drawdown for zebra mussel control.

In December 2000 the Borough of Edinboro initiated a five-foot drawdown of Edinboro Lake to expose the zebra mussels to lethal freezing air temperatures. A post-drawdown zebra mussel survey by DEP the following spring revealed that the lake's zebra mussel population had been reduced by over 41 percent. While these results were encouraging, they also meant that over half of the zebra mussels had survived to reproduce and recolonize the lake. Indeed, over 160 million zebra mussels were present in the lake by the fall of 2001.

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Discover Presque Isle July 26-28

The annual Discover Presque Isle days are scheduled for July 26, 27 and 28 this year at Presque Isle State Park. Hours are noon to 4 p.m. on Friday, 10 a.m. to 4 p.m. on Saturday, and noon to 3 p.m. on Sunday.

This year's major focus is hands-on environmental education activities. Pennsylvania Sea Grant will again staff an information table at the three-day event. **Please visit Pennsylvania Sea Grant and the other environmental education booths located at the Waterworks area.**



Botulism Update February Botulism Workshop Creates Research Agenda

A February workshop on botulism in the Lake Erie region attended by over 100 interested scientists, researchers, educators and legislators set a research agenda that will attempt to establish how and why *Clostridium botulinum* is killing birds and fish along the lake's Canadian and U.S. shores.

Die-offs of gulls, loons, grebes, and mergansers have been blamed on type E botulism; type C affects mainly ducks and bottom-feeding waterfowl. Type E botulism infection has been documented in alewives and round gobies, and is the suspected culprit behind this summer's massive mudpuppy kill along Erie County's coastline.



Round Goby

Botulism bacteria produce a neurotoxin that eventually paralyzes its host. Humans are affected by types A and B botulism bacteria, which are usually found in improperly canned or stored foods.

The research agenda for 2002-2003 decided on at the workshop includes investigations of:

- the link between round gobies, quagga mussels, and botulism-infected fish;
- how low water levels and warmer lake temperatures affect the activation and transfer of botulism;
- how botulism relates to broader ecological and human health concerns.

Ward Stone, a New York State Department of Environmental Conservation senior wildlife pathologist, told workshop participants that he has identified the type E botulism bacteria in several species of dead birds, including a dead bald eagle collected along Lake Erie. Stone believes that the round goby, an exotic fish that is a food source for many species of birds, plays a key role in the transfer of the disease.

Pennsylvania Sea Grant will continue to monitor and report on botulism research findings.

— Information supplied by
New York Sea Grant

Edinboro Lake... (cont. from page 1)

DEP biologists suspected that the thick ice and snow pack on Edinboro Lake during the severe winter of 2000-2001 may have insulated the mussels in the deeper water, thereby reducing the potential zebra mussel kill. In order to test this hypothesis, the Borough of Edinboro conducted a second drawdown trial in November of 2001. In contrast to the prior drawdown, temperatures were much milder and no snow pack covered the lake. A follow-up survey this past May revealed that the most recent drawdown eliminated over 98 percent of the zebra mussels. The current zebra mussel population is estimated to be slightly more than two million individuals — a fraction of the population originally discovered in fall 2000.

The results of the winter lake drawdown are a good news-bad news proposition: drawdowns can effectively manage the zebra mussel population in Edinboro Lake, but demonstrate that complete elimination of the invader is highly unlikely. Unfortunately, Edinboro Lake will remain a source of zebra mussel contamination for other regional water-bodies. It's up to all of us who use zebra mussel-infested lakes to prevent the further spread of zebra mussels throughout the Commonwealth.

— Jim Grazio
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Coastal Connections: Celebrating Land, Water and You

Join us at Liberty Park on September 14 from 10 a.m. to 5 p.m. to learn about your watershed and help us celebrate the new partnership among environmental education leaders in our community!

The Lake Erie Environmental Education Partnership seeks to coordinate education efforts in our region to enhance the effectiveness of available programming for educators. This event will feature hands-on activities for kids, a scavenger hunt, information booths, boat rides, music and food. Transportation will be provided to the two satellite locations, Frontier Park and Presque Isle State Park. Celebrate with us and learn about the important role each of us play in caring for and protecting our environment.



Multipurpose Trail Extension Wins Award

A four-mile extension of Presque Isle State Park's Multipurpose Trail has won the 2002 Seaway Trail National Trails Day Award given annually by The Seaway Trail Inc.

Presque Isle State Park and the Pennsylvania Department of Conservation and Natural Resources will share the award, which honors the 13-mile paved path following a portion of the park's perimeter. The trail begins at the entrance of the park and curves around Presque Isle Bay to the open lake waters, and includes stops at Perry Monument and Presque Isle Lighthouse. The trail has been a favorite of walkers, runners, bikers and in-line skaters since

the original 5.6-mile portion opened in 1980. An initial extension in 1997 lengthened the path to nine miles.

Overall, the Seaway Trail is a 454-mile scenic route paralleling Lake Erie, the Niagara River, Lake Ontario and the St. Lawrence River. A well-marked alternative to super highways and modern toll roads, the Seaway Trail leads to eye-opening treasures you might otherwise overlook. Traveling the trail takes you to sophisticated cities, quaint villages, your favorite fishing port, and dozens of family attractions, restaurants, accommodations and shops.

The Erie Area Convention & Visitors Bureau nominated the multipurpose trail for the award.

School Notes



Environmental Rediscoveries sailing dates for fall are booking fast! Call Anne Danielski now at 814-898-6421 to reserve dates for your class.

Workshop update: If you expressed interest in the Exotic Species workshop or the Environmental Rediscoveries workshop posted in the last newsletter, please contact Anne for more information regarding workshop changes. The workshops will be organized through Pennsylvania Sea Grant.

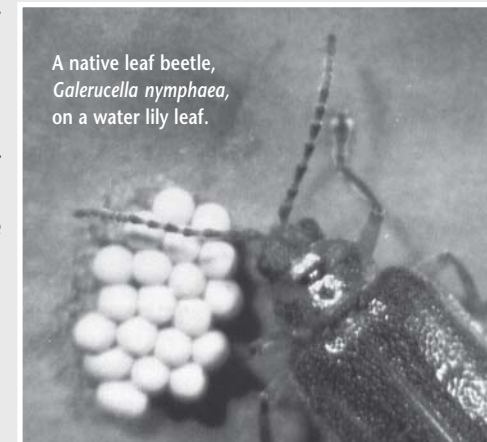
Pennsylvania Sea Grant Establishing E-mail Mailing Lists

Pennsylvania Sea Grant is in the process of establishing e-mail mailing lists of people interested in issues affecting the Lake Erie and Delaware River watersheds. The e-mail lists will be used to send information of interest and Sea Grant announcements. If you are interested in receiving these updates, please send an e-mail to Steve Curcio at xsc2@psu.edu. In your message, please specify which watershed you are interested in.



Alien Beetles Battle Invasive Purple Loosestrife

No, honestly. The beetle in this headline is not from another solar system, just another ecosystem. The story is unfolding across the Delaware estuary as wetland managers breed and release their newest weapon against purple loosestrife, *Galerucella* beetles. *Galerucella calmarensis* and *Galerucella pusilla* naturally graze on purple loosestrife in Europe; now they are being released in America for biological control of this invasive plant. Once



A native leaf beetle, *Galerucella nymphaea*, on a water lily leaf.

established, the tiny leaf beetles can munch stands of purple loosestrife into oblivion, helping to protect wetland plant diversity. The John Heinz National Wildlife Refuge is one of the many marshes in the Delaware Valley where *Galerucella* beetles have been drafted to combat this alien invader.

Native to Europe, purple loosestrife is an attractive flowering member of the loosestrife family that hitchhiked to America over 200 years ago. As the story goes with so many introduced species, no one really knows if the plant was intentionally brought to the new world or if the seeds were stowaways with crops and livestock of the European settlers. What is known is that purple loosestrife was popular with beekeepers for honey production, and the showy purple blooms made it a favorite landscaping plant for horticulturists and amateur gardeners.

Now found in 47 states, this weedy super-tramp tops many states' least-wanted invasive plant lists because of the wetland damage it can cause. Infestations of purple loosestrife are particularly common in old and new wetlands where the soil has been disturbed. Capable of rapid spread, this plant chokes out diverse native vegetation serving as food and cover for wildlife and waterfowl. Once purple

loosestrife becomes established across a large area, eradication becomes difficult. Thus, control programs today focus on limiting the impact and further spread of this exotic plant.

Only in the past 10 years have wetland managers in the Delaware estuary begun using biological control with beetles to halt the march of purple loosestrife.

While the use of European *Galerucella* for biological control has been

intensively studied and the risk to the environment is extremely low, unintended problems can arise from the introduction of non-native insects to control an invasive plant. The author of a recent study suggests an American species of *Galerucella* beetle may provide an alternative to introducing a non-native herbivore. A series of food preference experiments published in the *Journal of the North American Benthological Society* (Cronin et al. 1999) indicates that a native species, *Galerucella nymphaea*, is very selective in its choice of food. However, its favorite food can differ dramatically in different wetlands. For example, wild beetles in a Michigan wetland avoided eating a pond lily (*Nuphar adena*) while North Carolina and Indiana populations favored the same pond lily. The opinion of the authors was "given that native North American *Galerucella nymphaea* shows some inclination to use purple loosestrife as a host food, it seems wiser to attempt biocontrol with a native herbivore before resorting to the use of exotic species to control another exotic species."

— Ann Faulds
Pennsylvania Sea Grant
Urban Coastal Environmental Agent

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