



A Quarterly Publication from the RI Department of Environmental Management, Division of Fish & Wildlife

## Fish Passage Restoration Continues on the Pawcatuck River

By Phil Edwards, Supervising Fisheries Biologist



Bradford Construction- weirs with low flow outlets. Photo courtesy of P. Edwards

During this past winter, the construction of a rock ramp fishway was completed at the Bradford Dam on the Pawcatuck River. To date, numerous partners and funding sources have completed fish passage projects and improvements to the White Rock Dam, Potter Hill Dam, Lower Shannock Dam, Horseshoe Falls Dam, and Kenyon Mill Dam. These improvements, along with the completion of the Bradford rock ramp fishway, combine to provide access to over 1,900 acres of spawning (egg deposit) and nursery habitat, with over thirty miles of riverine spawning habitat for river herring and American shad. River herring and shad now have access starting from Little Narragansett Bay in Westerly to the nursery and spawning habitat in the upper sections of the Pawcatuck River, along with several large impoundments including Chapman,

Watchaug, and Worden Ponds. Based on R.I. Department of Environmental Management, Division of Fish and Wildlife's (DFW) projections, these open habitat areas have the potential to support a fish run of hundreds of

[Continued on page 2](#)

### Inside This Issue:

Fish Passage Restoration Continued

2

Vernal Pools Continued

4

New Online Licensing!

6

Kid's Corner!

7

Spring Calendar

8

## The Secret World of Vernal Pools

By Mary Grande, Wildlife Outreach Coordinator

March is the month of wild, unpredictable weather, punctuated by snow, cold rain, sudden thaws, and occasional warmth that hearkens to the approaching spring. It is the month of subtle change on the landscape, as skunk cabbage flowers bloom in otherwise dormant swamps. To me they look like little gnome hats peeking out of the mossy swamp bed, but I tend to be whimsical... As snow melts and rainwater runs along the ground, mysterious, glassy pools appear in the forest. And then, the hush of the forest is broken. *Peep...peep...peep, peep, peep, PEEEEEEEP, PEEP! Cluck-a-cluck-cluck-a-CLUCK-cluck!*



Vernal Pool in Arcadia Management Area, R.I. Photo courtesy of C. Raithe

[Continued on page 4](#)

### THE DIVISION OF FISH AND WILDLIFE MISSION STATEMENT

Our mission is to ensure that the Freshwater, Marine and Wildlife resources of the State of Rhode Island will be conserved and managed for equitable and sustainable use.



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## Fish Passage continued from Page 1

thousands of herring, and thousands of American shad. Increasing populations of river herring and shad will restore this ecosystem's balance in fresh and marine waters, which was disturbed by the construction of dams. Rock ramp fishways mimic natural fishways, and are constructed of a series of weirs and pools made of rocks that allow fish to swim past obstructions. The Bradford project has eight weirs constructed of stones and boulders, with several low-level openings to allow for fish migration during different flow conditions. During construction, a temporary bypass channel and bridge was used for water control and access to the work site.

Following the Industrial Revolution, many dams built to harness energy prevented anadromous fish from reaching spawning and nursery habitat in Rhode Island. In many cases, fish runs diminished or disappeared entirely. Following the passing of the 1965 Anadromous Fish Conservation Act, traditional Denil fishways were constructed at the Potter Hill and Bradford Dams in the early 1970's. Since this time, anadromous fish have utilized the lower Pawcatuck River, but over the past decade numerous projects have increased access to additional spawning and nursery habitat upstream of the Bradford Dam. Over time, the aging and inefficient Bradford fishway and deteriorating dam made it difficult for fish to locate the fishway entrance, therefore, partners proposed the construction of a new rock ramp fishway. In addition to fish passage, the rock ramp project may enhance recreational boating activities and provide flood protection, while also protecting wetlands upstream. The overall goal of implementing fish passage on the series of dams along the Pawcatuck River is to create self-sustaining runs of river herring and shad, which return annually to spawn, as well as providing river connectivity for resident fish species and aquatic organisms.

River herring, a collective term for alewife and blueback herring, and American shad are anadromous fish species that have a unique life history. River herring and shad hatch and mature in freshwater, but then migrate to and spend most of their lives in marine waters. After three or four years they return to their native freshwater ponds and streams to spawn. Once the eggs hatch the larval fish remain in the freshwater until the summer and fall before returning to the ocean, thus completing the cycle.

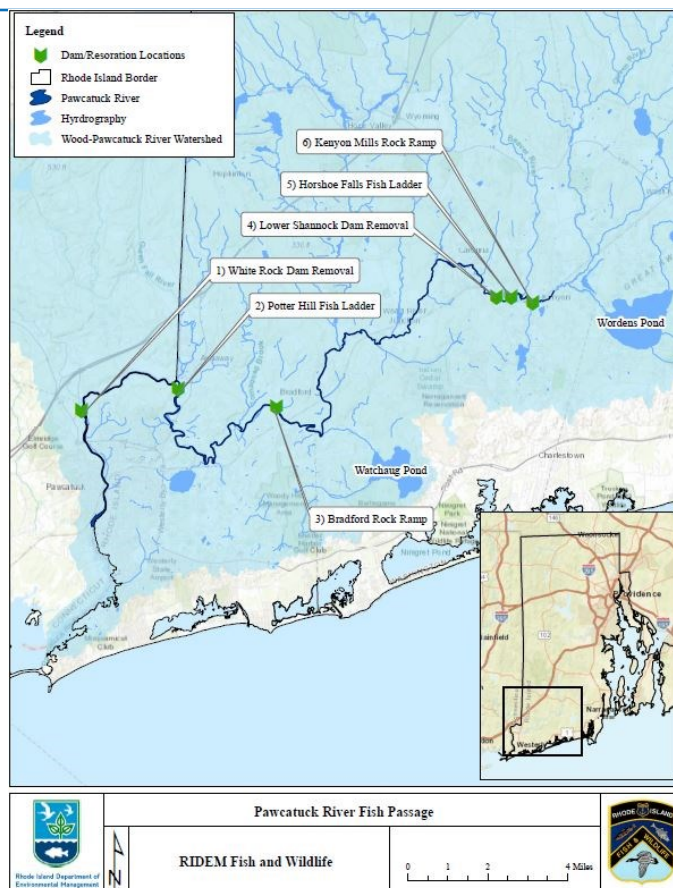
In conjunction with the completion of the habitat restoration projects on the Pawcatuck River, DFW



Bradford Dam finished. Photo courtesy of V. Masson.

## Fish Passage continued from Page 2

continues with fish restoration efforts, including broodstock and fry enhancement projects. Each spring, DFW transfers adult river herring from the lower Pawcatuck River into Worden and Watchaug Ponds, and during the summer, American shad fry are stocked into the main stem river at locations above the Bradford Dam. Partnering with the United States Fish and Wildlife Service (USFWS) North Attleboro Fish Hatchery, adult shad are transported to the hatchery where they spawn in tanks and the eggs are raised until the fry are transferred into the Pawcatuck River. In addition to anadromous fish stocking and habitat restoration efforts, DFW operates and maintains fishways statewide and monitors anadromous fish populations on many Rhode Island river systems. Operation and maintenance at the Pawcatuck River fishways consist of seasonal adjustments to enhance up-stream migration for adults in the spring along with ensuring safe out-migration for juveniles in the fall. Examples of anadromous fish monitoring programs currently conducted on the Pawcatuck River include operating a fishway trap at the Potter Hill fishway since 1979 for returning adults and conducting a juvenile fish seine surveys on the lower Pawcatuck River since 1986.



In the spring video monitoring is planned to estimate adult river herring spawning stock size on the lower river.

Fishery experts have identified the removal of the Bradford Dam as the next step to improving connectivity in the Lower Pawcatuck River. The total cost for the Bradford Rock Ramp Project, including engineering, permits, and construction, was approximately two million dollars. The primary funding source was provided by USFWS under the Hurricane Sandy Disaster Relief Appropriation Program through their Coastal Program. The USFWS Coastal Program carried out an agreement with the Rhode Island Chapter of The Nature Conservancy (TNC) to provide project management services, including fiscal management and technical assistance. TNC also provided, through various grants and foundations, matching funds to the project. The project team consisted of staff from DFW, TNC, and USFWS, as well as the contractor SumCo Eco-Contracting and the engineering contractor Fuss & O'Neill. Other project partners included the Wood Pawcatuck Watershed Association, Town of Hopkinton, Town of Westerly, the NOAA Restoration Center, and local land owners. Funding, in addition to USFWS grant, was made possible by The Nature Conservancy, through grants received from The Rhode Island Coastal and Estuary Habitat Trust Fund, Rhode Island Department of Environmental Management – Bay and Watershed Restoration Habitat Fund, The National Fish and Wildlife Foundation – New England Forest and Rivers Fund, and The Atlantic Coastal Fisheries Habitat Partnership. In addition, various foundations contributed to the project including: The Rhode Island Foundation, The Kimball Foundation, The Champlin Foundation, The Bafflin Foundation, The Forest and Frances Lattner Foundation, and the Lattner Family Foundation.

For more information on fish passage restoration and other projects like this, please email the Division of Fish and Wildlife at [DEM.DFW@dem.ri.gov](mailto:DEM.DFW@dem.ri.gov).

## Vernal Pools continued from page 1

After a long, silent winter, the spring peepers (*pseudacris crucifer*) and wood frogs (*Rana sylvatica*) have awoken! These small frogs are the earliest to begin their yearly breeding cycle; if temperatures cooperate, wood frogs can be heard calling as early as February! But where have they been all this time? For critters that lack fur, they are surprisingly good at surviving the winter. Wood frogs and spring peepers spend the winter underneath leaf litter or in rotting logs, which aren't the coziest places to wait out the snowy months. Many frog species hibernate underwater, which provides much more insulation, but wood frogs and peepers use another survival strategy.

Their bodies can withstand freezing. This amazing ability to tolerate becoming a "frogsicle" is a complex metabolic process that involves the accumulation of glucose (sugar) within the heart and liver. The high concentration of glucose in these vital organs makes them have a lower melting point. So, when temperatures rise even slightly, the

heart unfreezes and begins pumping, even if the frogs' other organs and limbs are still frozen. Understandably, if winter throws prolonged periods of extreme cold our way, wood frog and spring peeper populations may suffer, but this strategy seems to have worked well over the course of thousands of years – they're still peeping and clucking away!

For their annual breeding cycle, these two species are dependent on vernal pools—small, forested, fish-less ponds that hold water less than six months out of the year. As soon as the pools thaw out, the frogs make their way through the surrounding forest to lay their eggs. During the breeding frenzy, you can see frogs paired in a position called amplexus.

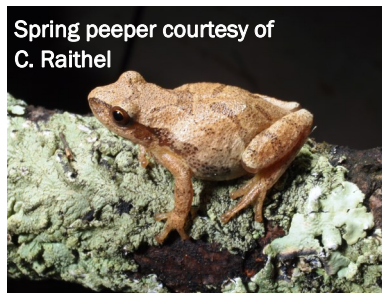
When males find a suitable female, they cling tightly to her with their forelegs until she lays her eggs, which will then be externally fertilized by the male. Wood frog egg masses resemble a bunch of grapes, and can have a bluish tint. To maximize warmth, wood frogs will congregate and lay their eggs at the northern end of the pool. You can usually see them floating close to the surface, attached to sticks and other debris.

Many other amphibians may use vernal pools for breeding sites, such as the marbled salamander (*Ambystoma opacum*), the state-threatened Eastern spadefoot toad

(*Scaphiopus h. holbrooki*) (a mysterious and unpredictable critter), and the red-spotted newt (*Notophthalmus v. viridescens*), to name a few. My personal favorite is one of the most common vernal pool-dependent species in the Northeast— the spotted salamander (*Ambystoma maculatum*).

The spotted salamander is in the family

Ambystomatidae, which contains the mole salamanders. This family is aptly named because these slimy, charismatic amphibians spend most of their lives in tunnels and burrows on the forest floor. Emerging in March and early April, they travel to vernal pools to breed. On rainy nights, spotted salamanders and other amphibians will bravely cross roads to reach their destination, which means we humans should keep our eyes peeled and drive carefully! *If you assist a traveling amphibian, be sure to move it in the direction it was heading towards.* They know where they are going!



Spring peeper courtesy of C. Raithel



Wood frog in Hope Valley., RI  
Courtesy of C. Raithel



Red-spotted newts in Carolina, RI.  
Courtesy of C. Raithel

## Vernal Pools continued from page 4



Spotted salamander in Plainfield.  
Courtesy of C. Raithel



Marbled salamander.  
Courtesy of C. Raithel.

Once they reach the pool, the salamanders perform their annual courtship “dance” and lay their eggs. And by dance, I mean the male pokes the female with his nose and wiggles around her...Very romantic if you’re a salamander. Unlike the wood frog, spotted salamanders fertilize their eggs internally. Females are “courted” by a male, and if he is suitable, they pick up his spermatophore and lay their eggs. Spermatophores are tiny deposits of sperm left on the pool bottom – look for small, white spots on the leaf litter about the size of a grain of rice. Spotted salamander egg masses are a little

tougher to spot, as they are usually on the pool bottom or suspended on twigs underwater. Like wood frog eggs, they look like a bunch of grapes, but the difference lies in an envelope of gel that encloses the salamander eggs. The egg masses can be clear or completely opaque, a phenomenon which still puzzles scientists.

Vernal pools and the habitats that surrounds them are incredibly important not only to amphibians, but also for reptiles, insects, birds, and mammals. Not to mention, they help reduce flooding, purify water, and act as a holding place for carbon dioxide. So, what should you do if you have a vernal pool on or near your property?

- Leave them be!
- Don’t fill or excavate in or around them, as this could alter the flow of water that fills the pools.
- Be sure to leave brush and twigs in and around the pools, as frogs and salamanders use these to anchor their egg masses.
- Don’t stock them with fish. You will be introducing a predator to eggs and developing tadpoles and since there is not water year-round, the fish will not survive.
- Leave at least a 300-yard buffer around pools. Amphibians use this surrounding habitat throughout the rest of the year, and trees provide shade during warmer spring and early summer months.

### Vernal Pool Fun Facts

- An easy way to remember the difference between wood frog and spotted salamander egg masses: Wood frog eggs look like a bunch of grapes. Spotted salamander eggs look like a bunch of grapes in a Ziploc bag.
- A single spotted salamander egg mass can contain up to 250 eggs!
- Marbled salamanders breed in the fall, instead of the spring.
- The scientific name for the wood frog, *Lithobates sylvaticus*, in Latin means “stone that walks or haunts amidst the trees”
- Remember, amphibians can absorb air, water, and chemicals through their skin. If you are handling frogs or salamanders, make sure that you haven’t recently used hand sanitizer or lotion, and that your hands are wet. The oils or chemicals from your hands aren’t good for these critters!
- Many vernal pool species are included in the State Wildlife Action Plan as Species of Greatest Conservation Need. That means the Division is taking steps to better research and protect these species and the places they call home!



FROM WOODS TO WATER,

# FIND YOUR NEXT ADVENTURE

WITH YOUR

## RHODE ISLAND HUNTING & FISHING LICENSE

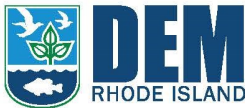
DEM is proud to join states across the country in providing hunting and fishing licenses online. It's easier than ever to purchase Rhode Island hunting and fishing licenses, permits, tags and stamps, so you can get outdoors and enjoy the many recreational opportunities made possible through conservation and management of Rhode Island's natural resources.

Starting March 1, 2018, you can go online or visit vendors across the state to purchase hunting and fishing licenses and permits. This service expands on the current online offering of fishing licenses to include hunting licenses, permits and tags, as well as waterfowl and trout stamps.

DEM.ri.gov/huntfish is your entry point to help plan your next adventure and make the most of Rhode Island's great outdoors. There you can find maps of hunting areas and fishing access points, answers to frequently asked questions, and more!



[DEM.RI.GOV/HUNTFISH](http://DEM.RI.GOV/HUNTFISH)



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## *Kid's Corner!* Presented by the Aquatic Resource Education Program

Each state has its own state bird, and many also have a state mammal, fish, insect, tree and/or flower that represents it in some way . It may be that that animal or plant is unique to that region, or it is picked to raise awareness of those animals or plants. Let's take a look at Rhode Island's state bird, mammal, fish and insect!

### Rhode Island state bird: Rhode Island Red

The Rhode Island Red is a breed of domestic chicken which was first bred in Little Compton, R.I. and nearby towns in Massachusetts. Our state bird is not a "native species", which means it was not originally found in the United States. There are only two other state birds that are not native to the U.S.: South Dakota's ring-necked pheasant and Delaware's Blue Hen chicken.



### Rhode Island state mammal: Harbor Seal

The harbor seal was just chosen as Rhode Island's official state marine mammal in 2016. Their torpedo shaped bodies and highly adapted flippers make them excellent swimmers. Harbor seals can be seen in many different places around Narragansett Bay in the winter and spring.



### Rhode Island state fish: Striped Bass

Striped bass are one of the most prized sports fish in Rhode Island, they are important to both commercial fishing and to sport fishing! They are migratory fish, living most of the time in the salt water of the Atlantic Ocean but swimming up into freshwater to lay their eggs.



### Rhode Island State Insect: American burying beetle

You may not have even heard of this beetle before and it's no surprise, as this beetle has been listed as endangered. The American burying beetle is found in only six states including R.I. It is in a family of carrion eating beetles that help break down natural materials so that the nutrients can be recycled and reused by other species. They are also one of the very few insect species that raise their young as a mated pair!

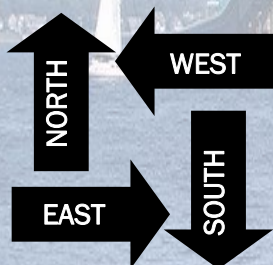


Mapping out the answer : Use the arrows on the left to guide you. Whenever you land on a letter write it down on the blank space. Then continue down the list of directions until you discover the answer to the following question: What is Rhode Island's state shell? Q \_\_\_\_\_.

This is a hard clam that Rhode Island is known for historically, and it is commonly eaten today as a beloved seafood.

- Start with the letter in the center: Q
- Move 1 space West and 1 space South:
  - Move 2 spaces North:
  - Move 1 space East:
  - Move 1 space West:
  - Move 2 spaces South:
  - Move 2 spaces North and 2 space s East:

A	H	G
S	Q	V
U	O	L



## Save the Date!

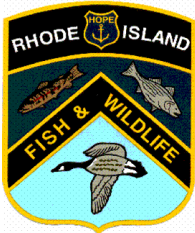
- 🌸 March 15<sup>th</sup>—June 20<sup>th</sup>: Community Fly Tying Programs (various locations)
- 🌸 April 7<sup>th</sup>: Turkey Hunting 101 at Camp E—Hun Tee
- 🌸 April 14<sup>th</sup>: Trout season opens
- 🌸 April 26<sup>th</sup>: Spring turkey season opens
- 🌸 April 29<sup>th</sup>: Local Fish Cooking Class at Camp E—Hun Tee
- 🌸 May 1<sup>st</sup> & May 8<sup>th</sup>: Cinder Worm Fly Tying Workshop (Fishing date: May 19)
- 🌸 May 5<sup>th</sup>: Archery Day at Trader Jan's Archery Pro-Shop
- 🌸 May 5<sup>th</sup> & 6<sup>th</sup>: Free Fishing Weekend
- 🌸 May—September (dates TBA): Come Clam with Me
- 🌸 Hunter Education Courses (Must attend all dates for each session)
  - 🌸 April 28<sup>th</sup> & 29<sup>th</sup> at Manville Sportsmen's Club
  - 🌸 May 5<sup>th</sup> & 6<sup>th</sup> at Tiverton Rod & Gun Club
  - 🌸 May 14<sup>th</sup>, 15<sup>th</sup>, & 16<sup>th</sup> at the Charlestown Police Department

Please visit our website or Facebook page for more events and information:

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[www.facebook.com/RFishWildlife](http://www.facebook.com/RFishWildlife)

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