

Did You Know...

by Nathan Mineo

Did you know that trees make it rain? Not only do they make it rain, they attract the rain as well. Let's dig into this a bit more.

If you're like me you've likely found yourself awake at 3am pondering ridiculous questions like, "how does water travel from the roots up the trunk of a tree into the leaves?" We all know it happens, but most people just accept it as some unspoken truth about the world. But the water is defying gravity! Well, as it turns out, trees are just like straws. Just like a straw moves water up from a glass to a mouth, trees move water up from the ground into the atmosphere. The process is called transpiration. Here's a very basic description of how transpiration works: Photosynthesis takes place inside the leaves, using up carbon dioxide and producing oxygen. Trees need to keep replenishing the carbon dioxide so they can continue to photosynthesize, and they also need to get rid of the oxygen being produced. Tiny pores on the bottom of the leaves, called stomata, open up to allow for these gases to enter and exit the leaves respectively. Evaporated water in the leaves also exits the stomata. The longer the stomata are open, the more carbon dioxide goes in, and the more water evaporates out of the leaves. As water is lost from the leaves, this creates space for more water, which is drawn in from the branches, which pulls water up the trunk. Essentially, the evaporation of water from the leaves creates a vacuum similar to the vacuum created when a mouth draws water up a straw. So, trees are basically giant straws and the atmosphere is like a giant mouth sucking water out of the ground through the trees.

The majority of the water vapor in the atmosphere has been evaporated from the oceans (around 90%), but researchers estimate that the amount of water vapor in the atmosphere that comes off land surfaces is mostly from transpiration. Measuring the amount of transpiration is difficult and there is disagreement on the best method, so there are wide ranges of estimates. Transpiration is responsible for 35% to as much as 90% of the water entering the atmosphere from land surfaces. Most agree that it is at least 65%, with more recent estimates in the 80-90% range. Furthermore, trees release volatile organic compounds (VOCs) that aid in the formation of clouds. The water vapor and VOCs generate clouds, and then rain. And that's how trees make rain.

But wait, there's more! Remember I said trees attract rain as well. There is a theory called the Biotic Pump theory that explains why water evaporated from the ocean moves inland. The basic idea here is that transpired water from coastal forests creates an area of low pressure over the forests. Moist air from over the ocean



then flows into those low-pressure troughs bringing with it evaporated water from the ocean. The bigger and more contiguous the forest, the further inland that moist ocean air travels.

In short, trees are super important in the water cycle, at least at the regional level, and likely the global level. Disruptions in rainfall is just one more item on the long list of terrible things that result from deforestation and fragmentation. Save the trees. We need them more than we need the land they grow upon.

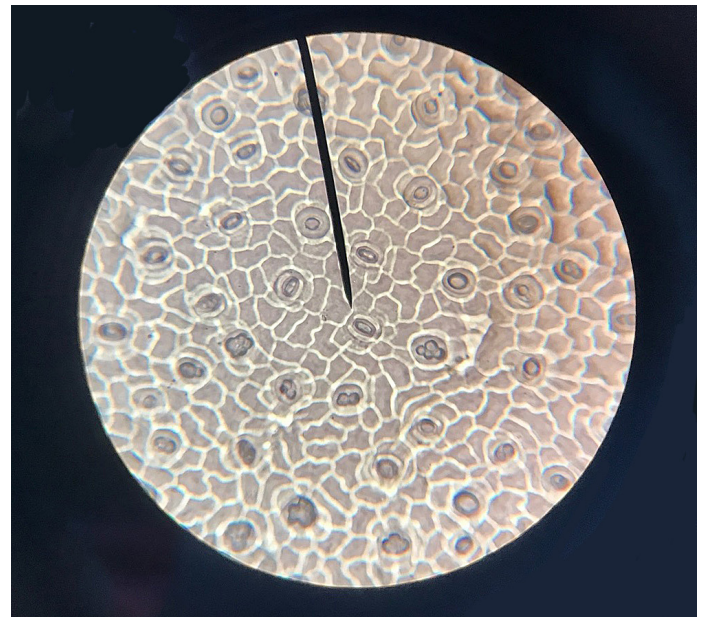
Sources:

Jasechko, S., Sharp, Z. D., Gibson, J. J., Birks, S. J., Yi, Y., & Fawcett, P. J. (2013). Terrestrial Water Fluxes dominated by transpiration. *Nature*, 496(7445), 347–350. <https://doi.org/10.1038/nature11983>

Coenders-Gerrits, A. M., van der Ent, R. J., Bogaard, T. A., Wang-Erlandsen, L., Hrachowitz, M., & Savenije, H. H. (2014). Uncertainties in Transpiration estimates. *Nature*, 506(7487). <https://doi.org/10.1038/nature12925>

M. Makarieva, V. G. Gorshkov. Biotic pump of atmospheric moisture as driver of the hydrological cycle on land. *Hydrology and Earth System Sciences Discussions*, European Geosciences Union, 2006, 3 (4), pp.2621-2673. [hal-00298762](https://hal.archives-ouvertes.fr/hal-00298762)

Leaf Stomata under microscope



Here is a picture of an imprint of the bottom of a leaf. I do this with my students every year. The stomata are the little round mouth looking like things. The imprint was made using clear nail polish. Paint a little patch on the bottom of a leaf, wait for it to dry, stick a piece of clear tape to it and peel it off, stick it on a slide, then under a microscope. This is what you get!

What is all this Talk about Rescue?...

I thought the Cape Ann Vernal Pond Team was all about education, conservation and protecting wetlands. You might not know that our organization works on a number of State, Local, and Private conservation projects including animal surveys and relocation efforts.

CAVPT has a track record of working with reptiles and amphibians that are in harms way or that need a home until they can be released. So, even though some of our rescues are not known for their use of vernal pond habitat, we take these opportunities to help out creatures in distress or otherwise need some sort of rescuing.

Rick, in particular, is uniquely positioned to assist in these calls for help. From rescuing injured or trapped reptiles and amphibians, to reuniting lost pets with their owner, or placing them in a good home, he is qualified to help with these diverse calls.

We do a lot of activities behind the scenes that you might not be aware of and decided it would be fun to showcase a few of these odd calls, and some of the other interesting projects that we get involved in.

We hope you enjoy these photo stories.



This Bearded dragon was found walking around downtown Gloucester, checking out the sights. It was placed with a nice young couple at a New England Herpetological Society meeting. He's native to Australia and a long way from home.



This Northern water snake was found in Beverly on a woman's back step. Rick caught it and brought it to the nearest wetland about a half mile away.



Rick got a call saying there's a snake on the road at the Heights at Cape Ann. When he arrived the snake was surrounded by 5 women and 2 policemen. Rick identified it as a Ball python native to Africa. They're very common in the pet trade and he was able to surmise that it was someone's pet that had escaped. So he took the snake home and left contact information with the 5 women and 2 policemen. The next day he got a call from a woman who said... "I think you have my son's snake." She came by later that day to pick up the snake and I'm sure there was a tearful reunion shortly thereafter.



Butler's Pond, Quincy MA

Last spring we got a call about a dredging project at Butler's Pond in Quincy, MA. It's a storm retention pond, but it was so full of silt that it no longer worked real well. A resident herpetologist was concerned about the turtles... so... a lot of coordination began to happen between a whole bunch of organizations to trap and relocate the turtles.

- Permits were obtained from MA Division of Fish and Wildlife to trap the turtles
- Traps were provided by Zoo New England Grassroots Wildlife Conservation
- Turtle housing in the interim was provided by New England Wildlife Center (NEWC)
- Transportation of the turtles was provided by The Friends of Butler's Pond

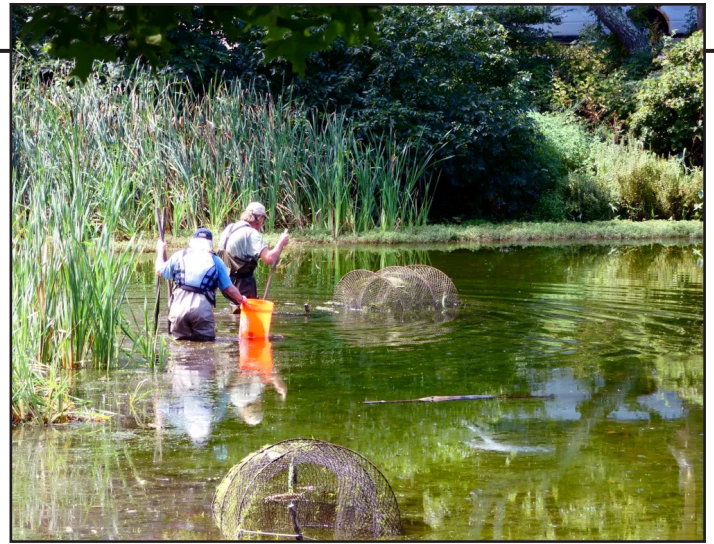
In August we began trapping turtles and successfully captured 29 turtles; including 26 painted, 2 snappers, and one red eared slider. There was a press day at the end and a City Council Member attended along with the local newspaper and about 62 concerned neighbors.... which is really good for a turtle project. The turtles were transported to NEWC to be cared for and will be released into the pond when the dredging is complete.

Butler's Pond Turtle Project was really a neat collaboration of groups:

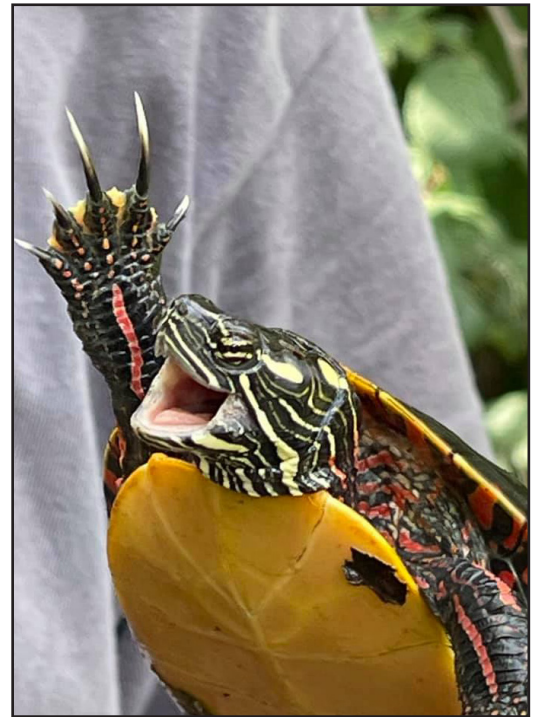
City Council of Quincy
Department of Natural Resources
Friends of Butler's Pond
Natural Heritage and Endangered Species Program
New England Herpetological Society
New England Wildlife Center
Zoo New England Grass Roots Wildlife Conservation
Cape Ann Vernal Pond Team

See more on the Friends of Butler's Pond Website at <https://butlerspond.org/turtle-project>

All photos taken by Friends of Butler's Pond



Joe and Rick checking the traps



"Alriiiiight, I'm finally out of that silty, toxic pond"



A fine bunch of Painted Turtles



Handsome Dapper Snapper

Rainy Nights and Flashlights

Every spring Cape Ann Vernal Pond Team members lead Nighttime Field Trips to vernal ponds to see the amphibian breeding activity. Most people have no idea what vernal ponds are or even that vernal ponds exist, but there are hundreds of them on Cape Ann. A vernal pond is a fishless confined basin depression with no permanent inlet or outlet and a unique ecology. Vernal ponds provide more food for countless forest species than any other type of wetland. Our focus is on educating the public to understand more about this special habitat.

We encourage you to check out a Nighttime Vernal Pond Field Trip if you haven't already. Why at night? Because some of the breeding species are nocturnal and migrate and mate at night. Why all wet? Because some amphibians travel as far as a mile to reach a pond in the spring but only when the ground is wet. If we get a good night, it's an amazing spectacle and really the fun part of vernal ponding.

This is a fun family event. We generally head out about 9pm and stay for 1-2 hours. People drive their own car to the woodlands so they can leave whenever they're ready. Put your rain gear, boots and flashlight on the hook by the door. To be sure you don't miss our e-blasts about our field trips and activities, sign up at cavpt@yahoo.com.



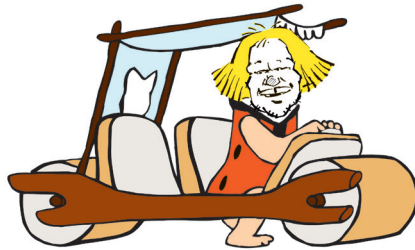
Photo credit Shay Capolet

Spotted salamander and Spring peeper "Hitchin' a Ride"



Photo credit Susan Boyé

Visit our website to review our Field Trip Guidelines. While you're there check out our awesome Activity Photographs from previous Nighttime Vernal Pond Field Trips. Learn a thing or two about what you might see out there... or what you're missing if you don't go.



UPDATE

KEEP ON TRUCKING...actually VANNING

They say a picture is worth a thousand words...well this illustration of Rick in the Flintstone mobile was worth tens of thousands of dollars.

Yes you read that right!

The Echo Charitable Foundation saw our plea and knew just how to help. They gave CAVPT a very generous donation so we could purchase this brand new 2021 Toyota Sienna Hybrid Minivan.

Can you believe it...We are still in awe.

It's wonderful advertising for us, helps to lower our carbon footprint, and we look so very professional at our events.

Be sure to check it out when you see it!



Martin Ray

Our Good Friend and Supporter...

and his Beautiful Photographic work at Halibut Point State Park in Gloucester

Martin Ray is a retired Gloucester landscaper and nature photographer extraordinaire. His calling came about 8 years ago. He has a fantastic blog full of photo essays on the natural and human history of Halibut Point State Park in Rockport. The park isn't that big but the blog is so extensive that it makes it look like it covers thousands of acres.

Martin showcases incredible photos of flora and fauna all found inside the park boundary. Wildflowers, weeds, shrubs, trees... are photographed in different seasons. Microbes, insects, other crawlies, fish, birds, reptiles, amphibians and mammals are identified in a truly comprehensive/artistic/creative/interesting way.

I find that a good percentage of the native human population are not really aware of all the diversity we are blessed with. Subscribe to Martin's Blog.

You'll be glad you did.

Rick



Martin H. Ray by JoAnn Millen

Excerpt from Martin's First Blog Entry - September 23, 2013

Discovery requires reporting. Reporting demands discovery. Such an energy spiral propels the toddler and the scientist to share his novelties. I am an aspiring investigator, bent on extending my curiosity in partnership with you.

*I never thought of myself as an artist, but being more open to noticing things and their connections has been a pleasure. Nothing beats showing up. **Martin Ray***



Photo credit Martin Ray

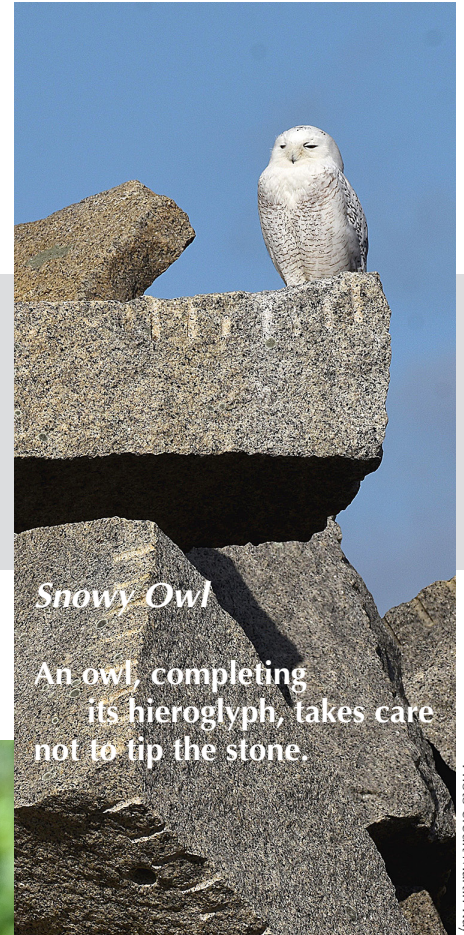


Photo credit Martin Ray

Snowy Owl

An owl, completing its hieroglyph, takes care not to tip the stone.

Offerings

Notes from Halibut Point is the name of the Blog. Subscribe to it by contacting Martin at mandkray1@gmail.com

Quarry Scrolls

This is a portfolio of 25 photographs taken at Halibut Point, each with an accompanying haiku poem. This book is beautiful.

Cape Ann Narratives of Art in Life

This book includes twenty-eight profiles of inspiring, creative people in their own words. Just so unusual and lovely.

Quarry Scrolls and Cape Ann Narratives of Art in Life can be purchased by emailing Martin at mandkray1@gmail.com

Or through his postal address at 22 Rockwood Lane, Gloucester, MA 01930

Quarry Scrolls \$15 + \$2 mailing

Cape Ann Narratives of Art in Life \$25 + \$3 mailing

Quantity discounts available.

Our Way to Say Thanks

We would like to express our sincere gratitude for your support and contribution to our organization throughout the year. We recognize the fact that there are wide ranging needs in our community and so many of you have responded to our Annual Appeal with your help.

Your generous response has steadied the ship and provided stability as we move forward this year. It allows us to focus on what we do best, which is fulfilling our mission within the fabric of our community and beyond. Again, we also want to recognize the cornerstone of the Cape Ann Vernal Pond Team, our Volunteers.

Our Mission... the Cape Ann Vernal Pond Team is a non-profit volunteer organization dedicated to vernal pond conservation and education since 1990. Our focus is vernal ponds. The issue is the preservation of wildlife habitat, which is ultimately about the health of the planet.

As a way to say thank you to our GREAT TEAM for supporting us in so many ways, we are planning to Host a Big Team Picnic. If all goes well with the world, the Picnic will take place sometime this summer... with food, drinks, and of course our critters which are an integral part of our Team as well. We know we say it a lot but we can't do it without you!!!

Information about our Team Picnic will be in our e-blasts. If you are not on our email list, be sure to subscribe at www.capeannvernalpondteam.org so you don't miss out on this great event. For those of you who get our mailings but haven't shared your email, please contact us at cavpt@yahoo.com and we'll add you.

A Special Thank You To...

Martha Farnsworth
Mary Lynne Hedley
Noel Mann

Maire Murphy
Anne and Steven Parsons
Anne Rosenfeld
Gerry Swislow

Nick and Leah Taormina
William F. Taylor
Several Anonymous
New England Biolabs
New England Herpetological Society
The Echo Charitable Foundation
Westborough Land Trust

The funding for our programs is provided by:

- Corporate gifts
- Grants
- Sale of our merchandise
- Donations from community members like you
- Memberships

CAVPT thanks the following organizations and foundations for their generous support over the years:

The EnTrust Fund • The Norcross Wildlife Foundation • GoodSearch
New England Herpetological Society • Sweetwater Trust • TD Bank
Toad Hall Bookstore • Gloucester Cultural Council • Sam Park & Company
New England Biolabs • The Bellevue Fund • The William P. Wharton Trust
New England Grassroots Environment Fund • Cell Signaling Technology
Barnes Group • Captain Planet Foundation • The Boston Foundation's Belinda Fund • Brace Cove Foundation • The Echo Charitable Foundation

Last Year We...

- *Led our usual Nighttime Vernal Pond Field Trips*
- *Presented Snakes of New England and the World at:*
Waring School, Beverly
Waltham Land Trust
Riverfest, Concord
Sawyer Free Library, Gloucester
Reading Town Forest
Saugus Iron Works for Saugus Library
Manchester Memorial Elementary
and two Birthday Parties
- *Presented Snakes of New England and the World Exhibits at:*
Gloucester Sidewalk Bazaar
Gloucester Block Party
Breakheart Reservation, Saugus
Magtoberfest, Magnolia
- *Presented New England Snake Exhibits at:*
Mass Reptile Expo, Hanover
Maine Reptile Expo, Lewiston
- *Did the Field Work and completed applications to Certify another 12 Pools*
- *Trapped Salamanders for Manchester Essex Conservation Trust, March 15-April 4*
- *Participated in Turtle Trapping at Butler's Pond in Quincy for a dredging project, August 18-25*
- *Had 60 Volunteers and thousands of volunteer hours*

Strider drawing by Ollie Balf

Keep in Touch With the TEAM!

Check out our website at:

www.capeannvernalpondteam.org

Like Us on  Facebook Cape Ann Vernal Pond Team



The CAVPT newsletter committee is powered by
Delaney's
PIZZA

332 Main St., Gloucester
978-282-7878

If we value wildlife, we must protect vernal ponds.....

What a CAVPT membership offers:

- A really neat CAVPT car decal
- CAVPT hats and T-shirts
- Subscription to our annual newsletter
- Email updates of vernal pond activities and events
- Guided field trips to local vernal ponds
- The satisfaction of knowing you are helping preserve these unique and vital habitats

Our programs & activities include:

- Vernal pond certification
- Exhibits & presentations
- Daytime & nighttime field trips
- Certification workshops
- "Intro to Vernal Ponds" Presentation
- Website: capeannvernalpondteam.org
- Scout patch program
- Snakes of New England & the World

Salamander linoleum cut by Isabel Natti



Photo by Victoria Rolf

Our Team participated in the 2017 Rockport Millbrook Meadow and Mill Pond Restoration Project. Residents concerned about the animals in the pond petitioned the city and that began a number of State, Local, and Private efforts to save some of the creatures... turtles, fish, eels, and other aquatics. Water quality and animal surveys, netting, and turtle trapping resulted in numerous relocations upstream. Many organizations and schools participated in this project including these Essex Tech students.

Amazon Smile

In this day and age of virtual technologies, donating to your favorite charity is easier than ever. Most of us frequently make purchases through Amazon. It's fast, convenient, and can be done pretty much anywhere at any time with your smartphone. Thanks to Amazon Smile, when making your online purchases you can choose a favorite charity and Amazon will donate a percentage of your total to them at no cost to you.

Please support what we do and consider selecting the Cape Ann Vernal Pond Team as your charity of choice.



Support the Cape Ann Vernal Pond Team. Become a member or renew today!

Membership and donations can also be completed on our secure website, www.capeannvernalpondteam.org

Membership levels

- ☐ **Family - \$35.00 (USD)**
Subscription period: 1 year
Yearly membership to CAVPT for a family (2 adults and children)
Gift includes a CAVPT decal & bumper sticker
*Please list names of adults and names/ages of children
- ☐ **Family - Lifetime - \$350.00 (USD)**
Subscription period: Unlimited
Lifetime membership to CAVPT for a family (2 adults and children).
Gifts include CAVPT decal & bumper sticker, Vernal Pond Field Guide
Shirt or hat
*Please list names of adults and names/ages of children
- ☐ **Individual - \$20.00 (USD)**
Subscription period: 1 year
Yearly membership to CAVPT for an adult (17 years and older)
Gift includes a CAVPT decal & bumper sticker
- ☐ **Individual - Lifetime - \$200.00 (USD)**
Subscription period: Unlimited
Lifetime membership to CAVPT for an adult (17 years and older).
Gifts include CAVPT decal & bumper sticker, Vernal Pond Field Guide,
Shirt or hat
- ☐ **Junior (under 16) - \$10.00 (USD)**
Subscription period: 1 year
Yearly membership to CAVPT for juniors (16 years and younger)
Gift includes a CAVPT decal & bumper sticker

This is quick
Use a click
To send your donation
To our location

DONATE



capeannvernalpondteam.org



You can use our secure website to make your donation online. It's quick and easy!

If sending a check, please fill out the following:

Name _____

Street _____

City, State, Zip _____

Phone _____ Email _____

Please detach this form and mail your donation to:

Cape Ann Vernal Pond Team
366 Main St. #2
Gloucester, MA 01930



CAVPT is a 501(c)(3) nonprofit organization. Your contribution is tax deductible.

Cape Ann Vernal Pond Team
366 Main Street #2
Gloucester, MA 01930

Return Service Requested



The Need for Protection...

The temporary nature of vernal ponds often belies their importance. Countless plants and animals live in vernal ponds. Insects, amphibians, reptiles, birds and mammals visit to drink, feed, breed and nest. Some species, such as spotted salamanders, wood frogs and fairy shrimp are totally dependent on this habitat.



Photo credit: Victoria Rolf

Male spring peeper. "Singing for a mate"

How to Protect...

The best way to protect vernal ponds is to own the property. The next best way to protect them is to certify ponds with the Natural Heritage & Endangered Species Program. Certification applications are now done online and include photographs and field observation data. To learn more go to www.capeannvernalpondteam.org or check out the Vernal Pool Association's website at www.vernalpool.org



Salamander print by Isabel Natti

Block print by Isabel Natti