Vernal Pools: Special Places in the Forest

Yu Man Lee Michigan Natural Features Inventory Michigan Society of American Foresters Fall Conference September 26, 2015





What is a vernal pool?



- A wetland that dries up every year or every few years
- Small and shallow
- Lack permanent inlet/ outlet
- No fish!
- Distinctive animals and plants

Hydrology

- Fill in spring, also late fall and winter
- Dry by late summer/early fall
 - Semi-permanent pools
- Water sources
 - Precipitation (rain/snowmelt)
 - Surface runoff
 - Groundwater
 - Overbank flooding e.g., rivers
 - Intermittent streams





Marsh Pools







Shrub Pools





Forested Pools











Unique & Diverse Wetlands



Open Pool - SLP

- Right" set of conditions
 - Topography
 - Water source(s)
 - Geology / Soils
 - Vegetation / Cover
 - Climate



Unique & Diverse Wetlands



Open Pool - UP





Vernal Pool Indicator Species









Fairy Shrimp





- Only found in vernal pools / waters with no fish
- Eggs hatch with pool flooding.
- Adults present only in early spring until water temps reach 65-70°F.
- Eggs can survive and require drying and freezing.
- Eggs can remain viable in sediment for years.

Vernal Pool Amphibians



- "Explosive" breeders & first to arrive in the spring
- Rapid development
- Spend most of the time in adjacent upland forest
- Site fidelity
- Not in all vernal pools

Wood Frog

Spotted Salamander







Blue-spotted Salamander



Invertebrates in Vernal Pools



















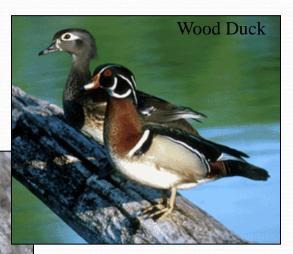
Amphibians and Reptiles in VPs



Critical Habitat for Wildlife

- Invertebrates and amphibians
- Other wildlife species 550-700 species in NE US
- Rare species
- Blanding's Turtle SC





Vernal Pool Plants





- Plants rule!
 - Largest source of nutrients
 - Detritus based leaf litter
- Provide habitat structure for animals and eggs
- High plant diversity across pools & within some pools
 - many pools have low plant diversity

Ecosystem Services

- Organic matter decomposition
- Nutrient cycling
- Water storage
- Recharge aquifer
- Flood control
- May help improve water quality





Vernal Pools in Michigan

- Limited information
- Limited protection
- Loss and degradation
 - Drained/filled for development
 - Excavated detention ponds
 - Converted to permanent ponds
 - Extensive loss of forests
 - Vulnerable to climate change



Vernal Pools in Michigan

- Growing interest in mapping and protecting vernal pools
- Michigan's Wildlife Action Plan has identified ephemeral wetlands as critical and imperiled habitat.
- Michigan's Sustainable Soil & Water Quality Practices and Forest Certification Standards protect vernal pools.



Vernal Pool Protection

- Michigan's Sustainable Soil & Water Quality Practices
 - No disturbance to pool basin
 - Avoid deep ruts within 100 ft or one tree length
 - Use heavy equipment only when soil is dry or frozen
 - Can conduct timber harvesting as long as maintain <u>></u>70% canopy closure



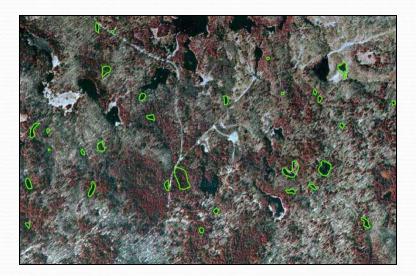
Vernal Pool Mapping and Monitoring

- MDEQ, USEPA 2011 2014
- Develop an effective & efficient approach for identifying, mapping, assessing and monitoring vernal pools
- Baseline data and foundation for statewide vernal pool program
- Additional projects Verso, MFPC, MDNR, USFS



Detecting and Mapping VPs

- Evaluated different methods for detecting and mapping VPs
 - Air photo interpretation
 - Radar / Lidar
 - GIS modeling
 - Field sampling

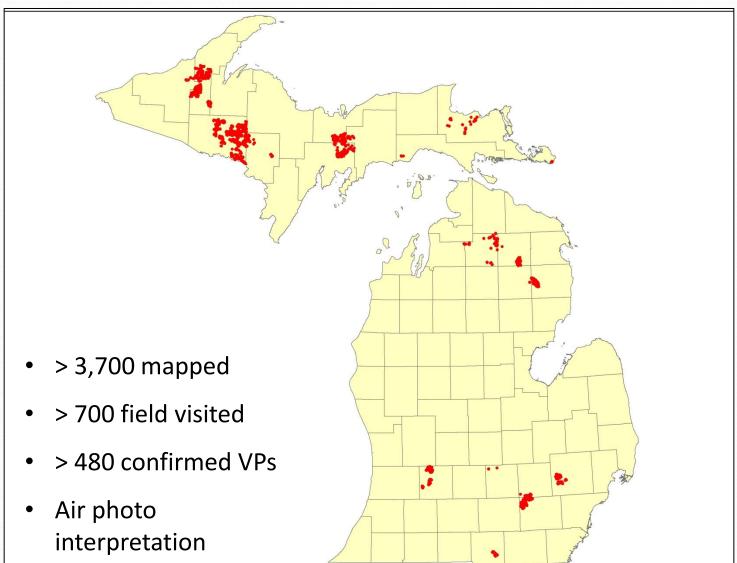




0.1

0.2 Miles

VP Mapping & Monitoring



Citizen Science-based Vernal Pool Mapping & Monitoring



MICHIGAN STATE Extension



Volunteer Training Manual Michigan Vernal Pool Mapping and Monitoring Project











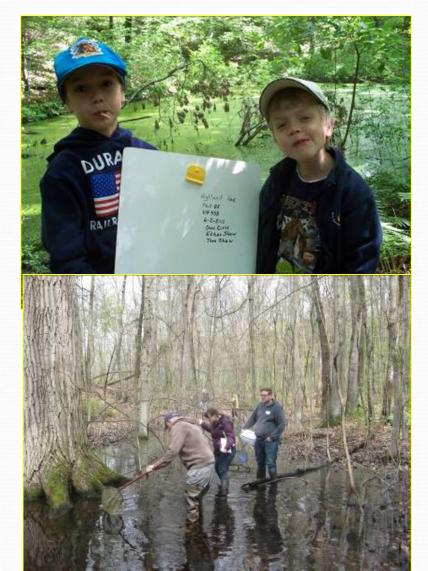




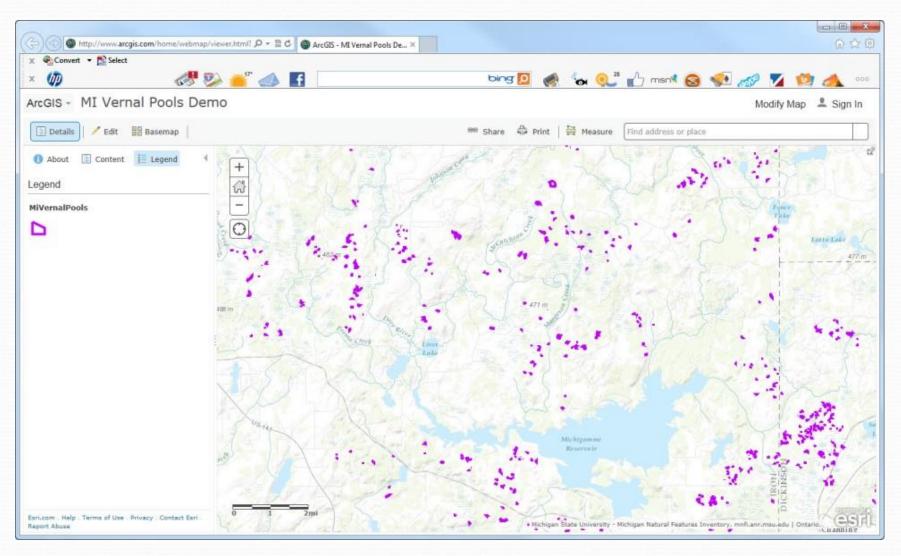








Statewide Vernal Pool Database



VP Research & Assessment



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Q Michigan State University Extension helps people improve their lives by bringing the vast knowledge resources of MSU EXTENSION directly to individuals, communities and businesses. Vernal Pool Patrol: Salamanders, frog eggs, and fairy shrimp, oh my! Home Mapping project aims to educate students about vernal pools. About Posted on May 28, 2015 by Brandon Schroeder, Michigan State University Extension, Michigan Sea Grant; and Meaghan Gass, Huron Pines AmeriCorps **Events** Like 100 Share 100 8+ Share 0 in Share 0 Tweet 2 Pinit Experts A spring walk in the woods may lead you to one of Michigan's more common but lesser known wetlands - a vernal pool (pdf). Counties These seasonal or temporary wetlands are often small in nature vet significant in ecological value. Wet in the spring, vernal pools **Related Topics** characteristically dry up as summer progresses. In fact, those exploring woodlands late in the summer may trek through a vernal pool without realizing they passed through this important wetland Global & Cultural Education ecosystem. Natural Resources As the snow of winter melts giving way to spring, these wetlands fill with water and explode with life. Scientists of Michigan Natural Features Inventory (MNFI) @and Michigan State University Fisheries & Wildlife Extension study the ecology of these vernal pools during this Teachers gain hands-on experiences learning alongside small window of time each spring. Yet this can be a challenge to Lakes, Streams & Watersheds MSU Extension and Michigan Natural Features Inventory visit large numbers of vernal pools each spring when life is most scientists as part of vernal pool training. Brandon active but before these seasonal wetlands dry up. Launching a Schroeder | Michigan Sea Grant

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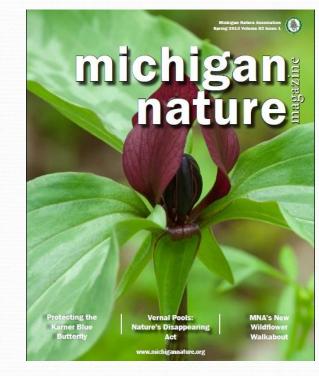
Michigan State University Extension helps people improve their lives by bringing the vast knowledge resources of MSU directly to individuals, communities and businesses

Home	Youth study vernal pools in northern Michigan
	The 4-H Student Stewards are wading into a unique opportunity in northeast Michigan to help study vernal pools
About	Posted on June 1, 2015 by Tracy D'Augustino, and Brandon Schroeder
Events	E Lizz { 10 E Share { 10 & Share] 1 In Share 0 WIweet 4 Pick
Experts	As part of the Student Stewards 4-H club in Alcona County, youth
Counties	in elementary through high school are working with scientists from the <u>Michigan Natural Features</u> inventory (<u>MNF</u>) at to study and the science of the sci
	record the ecology of "vernal pools (pdf) before they dry up. The Stewards explored four potential vernal pools in Negwegon State
Related Topics	Park et looking for specific species unique to vernal pools as part of the newly launched place-based education Vernal Pool Patrol
4-H	Project. These youth are contributing to a statewide effort to
	identify, monitor and map vernal pools.
Environmental & Outdoor	Armed with waders and dip nets, these 4-H Student Stewards
Education	tromped through the forest in late April to the first of a series of four potential vernal pools to be explored. The youth used a data
Natural Resources	collection protocol and recording sheets provided by MNFI
Fisheries & Wildlife	researchers to ensure the value of their data. The youth recorded information about the pool temperature, depth, submerged and
	partially submerged trees and vegetation before moving on to a
Lakes, Streams & Watersheds	careful survey for aquatic animals.
	There was an atmosphere of hopeful expectations with the discovery of a cluster of <u>blue-spotted salamander</u> ages, a spectate taxors versal pools for reproduction, followed by disappointment when no fairy shrimp were found. Moving on to the se

new Vernal Pool Patrol Project a aimed at schools and youth,

Presentations

- Training workshops
- Articles
- Websites
- Poster



Michigan Vernal Pool Partnership



How YOU Can Get Involved!

- Learn about vernal pools and help promote conservation of these unique and diverse wetlands.
- Become a local partner and help launch a vernal pool mapping and monitoring program in your community!
- Help map and monitor vernal pools in the state by becoming a trained volunteer, and see some cool wetlands and animals!
- Provide information on vernal pools to MNFI for statewide database.

Questions?



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