

Citizen Science and the Vernal Pool Patrol



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Michigan Natural Features Inventory (MNFI)

Michigan State University Extension (MSUE)

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**Michigan Natural
Features Inventory**

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➤ Today's Topics

- What are vernal pools?
- Why are they important?
- Citizen Science + Vernal Pools = Vernal Pool Patrol!
- Vernal pool conservation and how you can get involved!



Brandon Schroeder



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What is a vernal pool?

Naturally occurring, seasonal wetlands in small, shallow depressions in forested landscapes that lack fish.



Key Characteristics

- Seasonally flooded – wet in spring, dry in summer and/or fall, some semi-permanent

May 2, 2013



Yu Man Lee

- In MI, hold water for at least 2 months in spring

June 23, 2013



Yu Man Lee



Key Characteristics

➤ Size – Small and shallow

- Generally < 2.5 acres
- Vast majority < 0.5 acre
- Most < 1 m deep



Yu Man Lee

Key Characteristics

- Isolated / no persistent surface water connection to permanent water



Yu Man Lee

- Can be temporarily connected to other wetlands or permanent water bodies
- Temporary inlets/outlets



Open Pool



Shrubby Pool



Forested Pool



Marshy Pool



Key Characteristics

- Plants and animals specialized for life in a vernal pool – “indicator species” OR “obligate species”



Fairy Shrimp (*Anostraca* spp.)



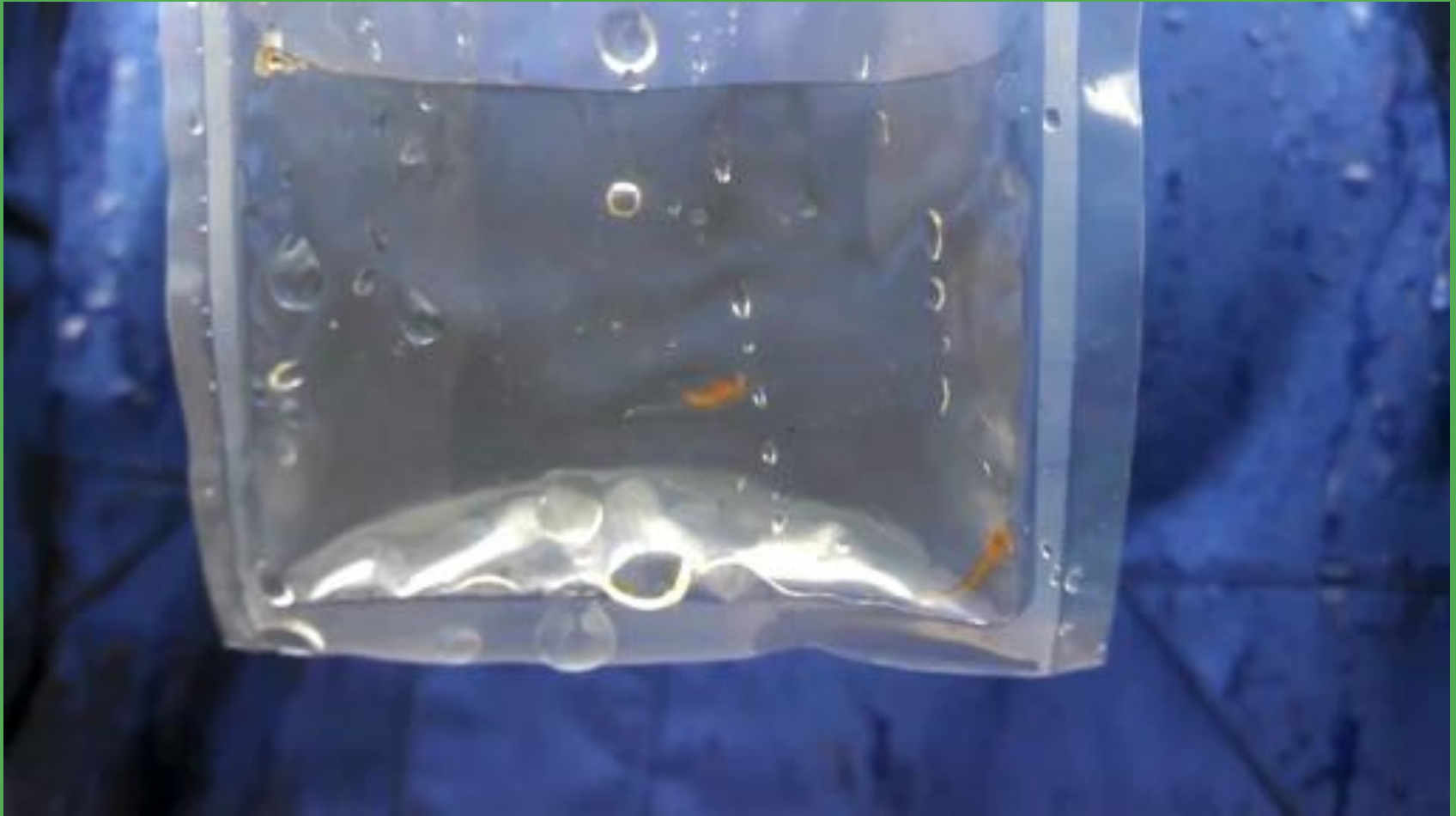
- Only found in vernal pools (no fish)
- Eggs hatch when pool fills with water
- Eggs require drying and freezing to hatch; “summer” eggs – shortage of males
- Adults live only several weeks-month (until mid- to late May, or when water temps reach 68-72°F)

Fairy Shrimp

- 3 species in Michigan (found only 1 in 2013)
 - *Eubbranchipus bundyi* (knob-lipped fairy shrimp) G5
 - *Eubbranchipus neglectus* (neglected fairy shrimp) G5
 - *Eubbranchipus vernalis* (springtime fairy shrimp) G4

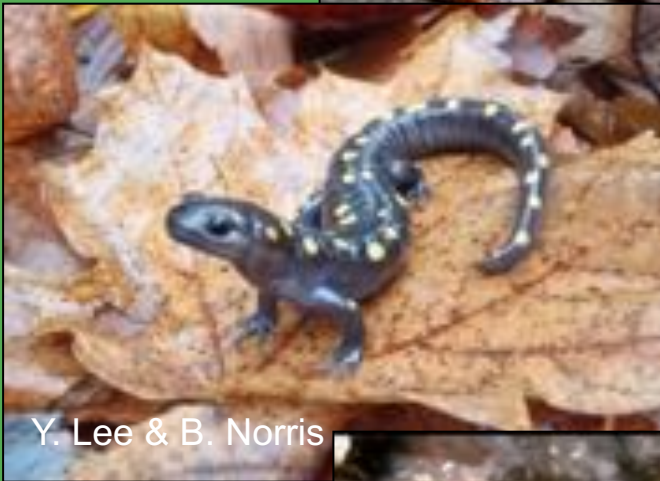


Fairy Shrimp





Jim Harding



Y. Lee & B. Norris



www.vernalpool.org

➤ Critical Habitat for Amphibians and Reptiles

- “Nature’s Nursery”
- Early and “explosive” breeders
- Rapid development: emerge by July/Aug
- Use same pools each year



www.umaine.edu/vernalpools



Semlitsch and Bodie 2003 – Core terrestrial habitat for amphibians = 159 - 290 m, core terrestrial habitat for reptiles = 127 to 289 m (Note: Current buffers ~ 30 m)

Why are vernal pools important?

- Critical habitat for wildlife
 - Invertebrates and amphibians
 - Other wildlife species – 550-700 spp. in NE US



Why are vernal pools important?

➤ Rare species

Northern long-eared bat – LT, SC



Blanding's Turtle - SC



Copperbelly Water Snake – LT, E



False Hop Sedge - T



Red-shouldered Hawk – T



Spotted Turtle - T



Why are vernal pools important?

- Provide food, energy, and nutrients for vernal pool and surrounding ecosystem
 - Incredible biomass
 - Up to 4,000 frog larvae/m² (Woodward 1982, Petranka 1989)





Why are vernal pools important?

➤ Ecosystem services

- Nutrient cycling
- Water storage
- Groundwater recharge
- Flood control
- May improve water quality



Michael Kost

Why are vernal pools important?

➤ Social / Educational Value

- Good way to get involved in wetland science & conservation
- Accessible and easy to study
- People enjoy making a contribution
- Nice change from invasive species control
- Vernal pools are fascinating!!



VP Mapping, Monitoring & Conservation

- Growing interest and awareness of vernal pools
- Vernal pool mapping and monitoring – 15+ states
- Number of states/programs use volunteers to map and monitor vernal pools



Citizen Science

➤ “The collection and analysis of data relating to the natural world by members of the general public, typically as part of a collaborative project with professional scientists” Oxford Dictionary

➤ Citizen Science Efforts:

- North American Butterfly Association
- Christmas Bird Count
- Hawkwatch
- Project Budburst

➤ Technology and crowd sourcing

- Mobile apps - Examples
 - I-naturalist
 - MISIN (invasive species)
 - Fieldscope Data Collector
 - Marine debris tracker



Citizen Science – NatureServe

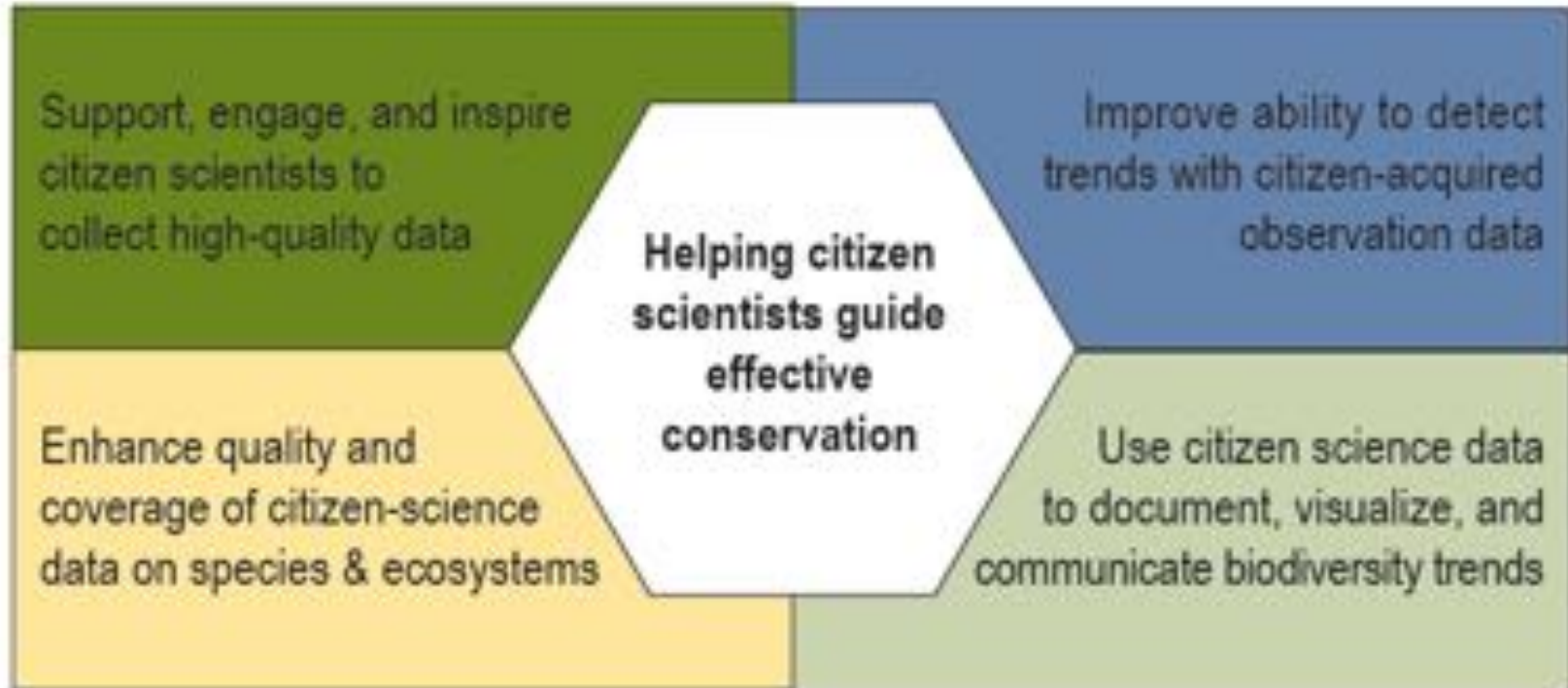


Figure 1. NatureServe proposes to pursue four strategic results that will increase the use of citizen science observations in guiding effective conservation action.

Attributes of Projects Suited for Citizen Science

- Data collection is labor intensive , collected from field
- Quantitative measurements/observations needed
- Protocols are well designed, easy to learn and execute
- Broad spatial and/or temporal extents , often large data sets
- Internet-accessible data submission and results acquisition
- Guide materials and/or professional assistance are available



Citizen Science

- Limitations/Challenges

- Data quality concerns
- Legal and ethical issues



- Citizen Science Association

<http://citizenscience.org/>

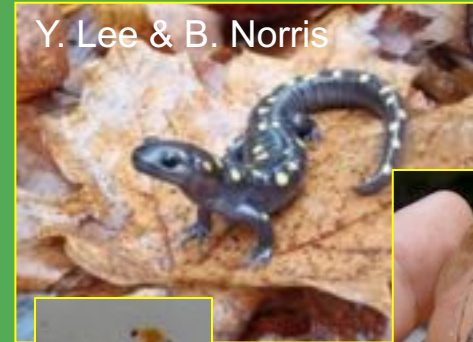
... to bring together the expertise of diverse practitioners working in this field, in order to share the breadth of resources and best practices across different citizen science project types.



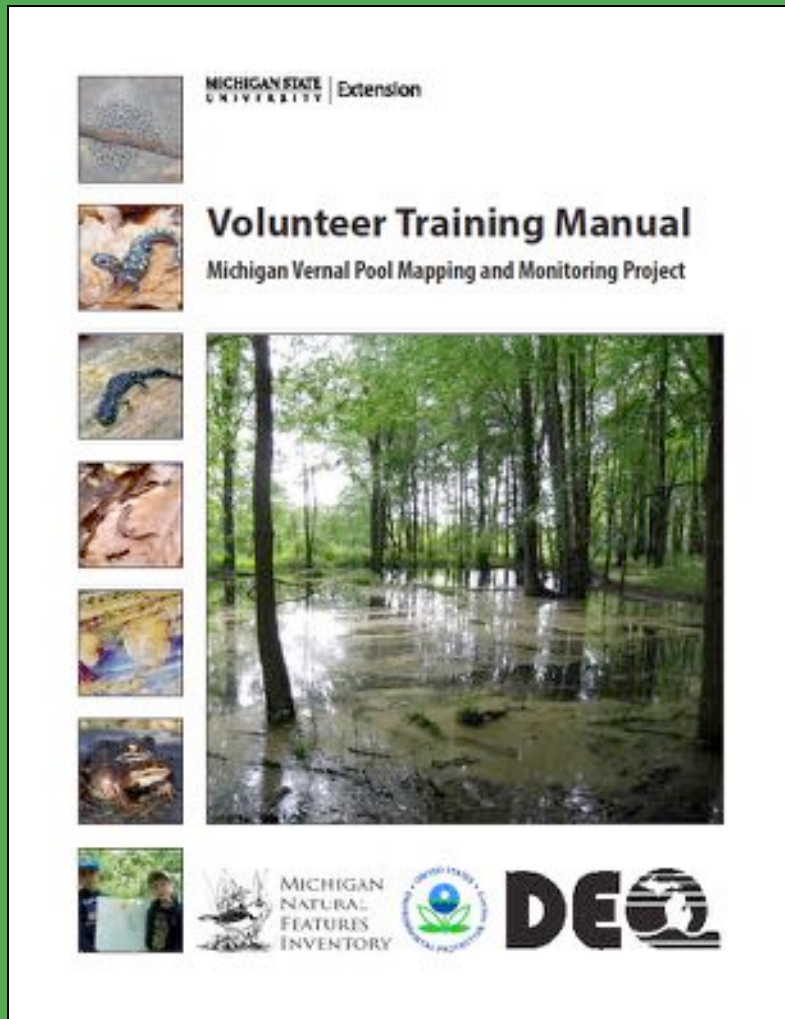
Vernal Pool Patrol

➤ Goals of the Program

- Verify, map, & monitor status and distribution of VP in MI
- Collect info on ecology of VP's
- Contribute to statewide vernal pool database
- Facilitate management and conservation of these unique wetlands



Vernal Pool Patrol



- Volunteers attend training
- Standardized methodology for data collection/reporting
- Commit to 3 visits per year

Vernal Pool Patrol

- Network of partners and citizen scientists is key!
 - Promote and host training and coordinate volunteers
 - “Train the trainer” model – e.g. Kalamazoo Nature Center



Mid-Michigan Stewardship
Cluster

Meridian Township



OAKLAND
COUNTY PARKS



Kalamazoo
Nature Center

The Stewardship Network



Vernal Pool Patrol

- 2012 - 2014 Pilot - Adult and family volunteers monitored VP's in 4 State Recreation Areas in SE MI
- Visited 75 PVPs
- Logged over 440 hours
- High data return rate and good data quality
- 100% - adequately trained
- 55% - mentor others





➤ Amphibians & Reptiles

- Blue spotted salamander
- Spotted salamander
- Chorus frog
- Green frog
- Leopard frog
- Spring peeper
- Wood frog (MANY!)
- Blanding's turtle
- Garter snake
- Northern water snake
- Ribbon snake

➤ Invertebrates Documented (28 groups)

- Amphipods
- Aquatic worms
- Backswimmer
- Caddisfly case
- Clam shrimp
- Cocapod
- Crayfish
- Damselfly
- Daphnia with eggs
- Dragonfly
- Fairy shrimp
- Fingernail Clams
- Fly larvae
- Freshwater snails
- Isopods



- Leech
- Mayfly
- Midge larvae
- Millipede
- Mosquito larvae
- Ostracod
- Slug
- Springtails
- Water beetles
- Water fleas
- Water mite
- Water striders
- Wolf spider

Vernal Pool Patrol

➤ Adult programs

- Stewardship Clusters
- Local & State Park Volunteers
- Nature Center members
- UM-Flint - Biology Class
- Conservation Districts/Clubs

➤ Impacts

- Provided 11 (1-day) trainings
- 250 citizen science volunteers participated in the program
- 200 adult/family volunteers mapped & collected VP data



Vernal Pool Patrol

➤ School Programs

- NLP pilot – 2015 – 2017
 - 17 middle and high school teachers from 13 schools and 420 students
- SE MI- 2017-2018
 - 2 H.S. in Monroe & Wayne Co.
 - 4 teachers, ~180 students
- Lessons and Impacts
 - Students very engaged in learning
 - Place-based education – YES!!
 - Teachers excited about VP Patrol
 - Need transportation resources
 - Local community partners critical!!



Vernal Pool Patrol



- Three visits within school year following standard protocol
 - 2 Spring visits, 1 Fall visit
- Students collect, enter, analyze & summarize data
 - Smart phone/tablet apps
- MNFI conducts QA/QC of data
- Data entered into statewide vernal pool database
- Try to minimize impacts

Vernal Pool Patrol

- Sharing information & knowledge
 - School & local community
 - Other schools/classes – e.g., online data sharing platform
 - Goal: develop network of schools across MI (and other states potentially)



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! (Spring 2018)
- Provide information on vernal pools to MNFI for statewide database.
- Join the Michigan Vernal Pools Partnership: contact Garret Johnson/MNA, Amy Lounds/MDEQ, or Yu Man Lee/MNFI



Questions?



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