Volunteer Vernal Pool Monitoring in WV

History & Funding

Our Team

Research & Review

Year 1 - Program Development - 2022

Year 2 - Workshops & Survey Season - 2023

Year 3 - Evaluation and Second Year Workshops - 2024

Year 4 and Tutorial Videos and Survey123 - 2025

Year 5 Workshops/Virtual Training (Planned for 2026)

Lessons Learned

Next Steps LiDAR Vernal Pool Mapping & Volunteer Ground Truthing

Questions?

History & Funding

From an idea...
to a successful volunteer vernal pool monitoring program!

- Wetland Conservation and Education, what's next in WV?
- What do we aim to do? (engage communities in wetland conservation)
- Multiple Objectives in our proposal, wetland educator workshops, wetlands of WV videos, and the development of a citizen science wetland program
- Focus Area (vernal pools)
- Identify Partners & Stakeholders
- Include proposed development of volunteer vernal pool monitoring program in EPA Wetland Program Development Grant
- Receive grant!
- Initiate regular meetings of the new WV Vernal Pool Working Group

Our Team

We have a collaborative working group with representatives from multiple agencies, including the WV Dept. of Environmental Protection, WV Division of Natural Resources, USGS Amphibian & Reptile Monitoring Initiative, National Park Service, and Fish and Wildlife Service.

Research & Review

We reviewed 10 states' vernal pool monitoring programs, including Connecticut, Maine, Massachusetts, Michigan, Ohio, Pennsylvania, Vermont, & Wisconsin. Plus, we looked at programs hosted by other entities, such as City of San Diego, Clarkson U., and right here at the Canaan Valley National Wildlife Refuge.
We compared these to WV's existing Save Our Streams volunteering monitoring program.

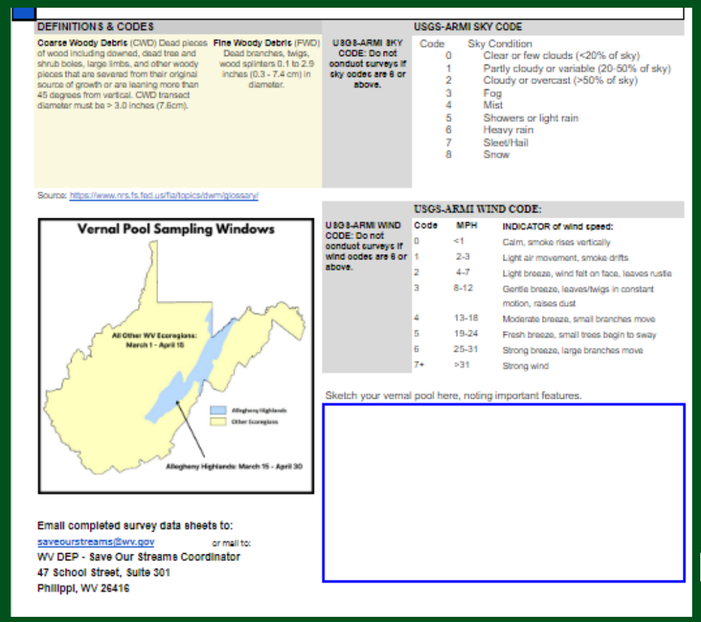
		Other Vernal Pool Programs in Review										Volunteer Certification Levels - WV SOS Vernal Pool Protocol		
	Parameter/Data Point	SOS (stream survey data sheet)	USGS	Connecticut	Maine	Massachusetts	Michigan	Ohio	Pennsylvania	San Diego	Wisconsin	Vermont	Mapping -L1	Monitoring-L2	Advanced Monitoring-L3
General Info	VP Name	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	VP Code	X			X	X	X	X	X	X	X	X	X	X	X
	VP GPS Coordinates	X		X	X	X	X	X	X	X	X	X	X	X	X
	Date	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Weather	X	X		X	X	X	X	X	X	X	X	X	X	X
	Monitor's Contact Info/Associations	X	X		X	X	X	X	X	X	X	X	X	X	X
	Are you the Landowner? Y/N Permission?				X		X		X		X		X		
	City/Town/County	X	X		X		X		X		X	X	X		
	Number of Visits						3						1	3	3
Chemistry	Dissolved oxygen	X							X		X				X
	pH	X	X								X				X
	Conductivity	X	X								X				X
	Nitrates	X													
	Turbidity	X	X												X
	Alkalinity	X													
	Iron	X													
	Fecal/E-coli	X													
	Other	X													
Physical Conditions	Temperature (pool)	X	X				X				X	X		X	X
	Water clarity	X		X							X			X	X
	Water color	X		X							X				
	Sediment/Substrate	X					X				X			X	X
	Algae color	X		X			X							X	X
	Algae abundance	X		X			X				X			X	X
	Ice cover											X		X	X
	Other			X					X			X			Visual Impairment (algae, water color, obstructions)
	Width	X	X				X				X			X	X
	Depth	X	X				X				X	X			
	Circumference										X		X	X	X
	Hydroperiod		X		X		X				X			X	X
	Vegetation		X	X			X				X	X		X	X
Habitat	Riparian Buffer	X					X		X		X			X	X
	Percent of VP that is shaded	X	X				X				X			X	X
	Land Use (Poolside, 1/2 mi, watershed)	X		X			X		X		X			X	X
	Photograph/Sketch the Vernal Pool	X					X				X			X	X
	Landscape setting (Isolated pool, floodplain pool, part of larger wetland complex)				X		X				X			X	X
	Vernal Pool Type				X		X				X			X	X
Biota	Wood Frogs		X	X			X	X	X		X	X	X	X	X
	Salamanders		X	X			X	X	X		X	X	X	X	X
	Fairy Shrimp			X			X	X	X		X	X		X	X
	Caddisfly	X									X	X		X	X
	Dragonfly	X							X		X			X	X
	Damselfly	X							X		X			X	X
	Black flies	X												X	X
	Midges	X									X				X
	Aquatic Worms	X													X
	Mosquito	X									X			X	X
	Other	X					X		X					X	X
	Fish (to rule out VP status)						X						X	X	X
	Did volunteer use polarized glasses?											X		X	X

2022 - Year 1 - Program Development - Developing the Protocol & Survey

WV Vernal Pool Patrol Datasheet
Level 1: Complete light blue section;
Level 2: Complete light & medium blue sections;
Level 3: Complete all lines.
Please also visit iNaturalist and report your observations to the West Virginia Vernal Pools Project. Found at: https://www.inaturalist.org/projects/west-virginia-vernal-pools

Level 1

Vernal Pool Name				Date		
Vernal Pool Code (if known)				Time		
Watershed/Ecoregion/County				Current Air Temp		C or F
Vernal Pool Coordinates	Lat:			Sky Code*		
	Long:			Wind Code*		
Organization & Monitor Name(s)	Org:		Monitors:			
Pool Size (estimate) in meters	Large golf umbrella	Parking space	3-car garage	MLB infield	Walmart	
	1m^2	10m^2	100m^2	1,000m^2	10,000m^2	
(Estimate or measure when dry)	Width		Length		Meters/Feet	
GPS (indicate unit of measure)						
Pool Type	Naturally Occurring	Constructed	Log/Gas/Tire Rut	Other:		Unknown
Egg Masses observed? PHOTO	Yes / No	If yes, how many?	Abundant (>10)	Some (4 - 10)		Few (1-3)
Pool has water?	Yes / No	Full/Nearly Full	Partial	Near Dry	Dry	Unsure
Ice Cover? If yes, est. %	Yes / No	Greater than 75%	25 - 75%	Less than 25%		None
Tree canopy above pool	Yes / No	Greater than 75%	25 - 75%	Less than 25%		None



Level 2

Tree canopy above pool	Yes / No	Greater than 75%	25 - 75%	Less than 25%	None
Woody debris in the pool	Abundant (>50%)	Some (up to 50%)	None	Coarse*	Fine*
Pool vegetation (circle all that are present)	Floating or Submerged	Emergent (grasses, sedges, rushes)	Shrubs	Trees	None
Natural Forest Buffer (10m % Intact)	75% or Greater	25 - 75%	Less than 25%	None	
Forest Buffer Dominant Type	Broadleaf trees/shrubs	Conifers	Both	N/A (Inadequate buffer)	
Forest Buffer Notes:					
Water Clarity/Turbidity	Clear	Slightly Turbid	Turbid/Opaque		
Algae Abundance	75% or Greater	25 - 75%	Less than 25%	None	
Substrate	Broadleaf	Conifer Leaf	Sediment	Other:	Unknown

Identify amphibian adult, tadpole, and egg masses (If known)	Adults	Tadpoles	Egg Masses
Wood frog, L. sylvaticus			☐ #
Spotted salamander, A. maculatum			☐ #
Eastern spadefoot toad, S. holbrookii			☐ #
Marbled salamander, A. opacum			☐ #
Jefferson salamander, A. jeffersoninanum			☐ #
Eastern Newt, Notophthalamus viridescens			☐ #
Spring peeper, Pseudacris crucifer			☐ #
Other:			☐ #
			☐ #

Any stranded egg masses?	Yes	No	Percent of Pool Surveyed (Estimate)		%
Fish or green/bull frogs observed?	Yes	No	(If yes, this may be indication this is not a vernal pool.)		
Other aquatic biota:	Fairy Shrimp	Caddisfly	Dragonfly	Damselfly	Mayfly
	Aquatic Worms	Mosquito	Midges	Water Boatman	Water Strider
	Backswimmer	Predaceous Diving Beetle		Other:	
Other terrestrial biota:	Rusty Blackbird				

Three ways to get involved, to allow a variety of audiences to participate.
Location Data Only - intended for people who work in the field
Level 1 Survey - Location Data + Some observations
Level 2 Survey - More detailed observations
All observations are taken poolside to reduce impact.
Where possible, we aligned parameters with the USGS Amphibian Research & Monitoring Initiative (ARMI) and Canaan NWR protocol.

2023 - Year 2 - Workshops & Survey Season

- Workshops consist of presentations on protocol, vernal pool biota, amphibian disease prevention/decon, VP research, plus field practice/ conducting a vernal pool survey
- 4 Workshops -
  - Cacapon State Park,
  - Fox Forest WMA,
  - Kanawha State Forest,
  - Cranberry Mountain Nature Center
- 100+ vernal pool monitors trained
- 15+ vernal pools surveyed using the data sheet to add to our database
- WV iNaturalist Project: 233 observations, 95 observers

2024 - Year 3 - Evaluation and Second Year Workshops

2024 Workshops

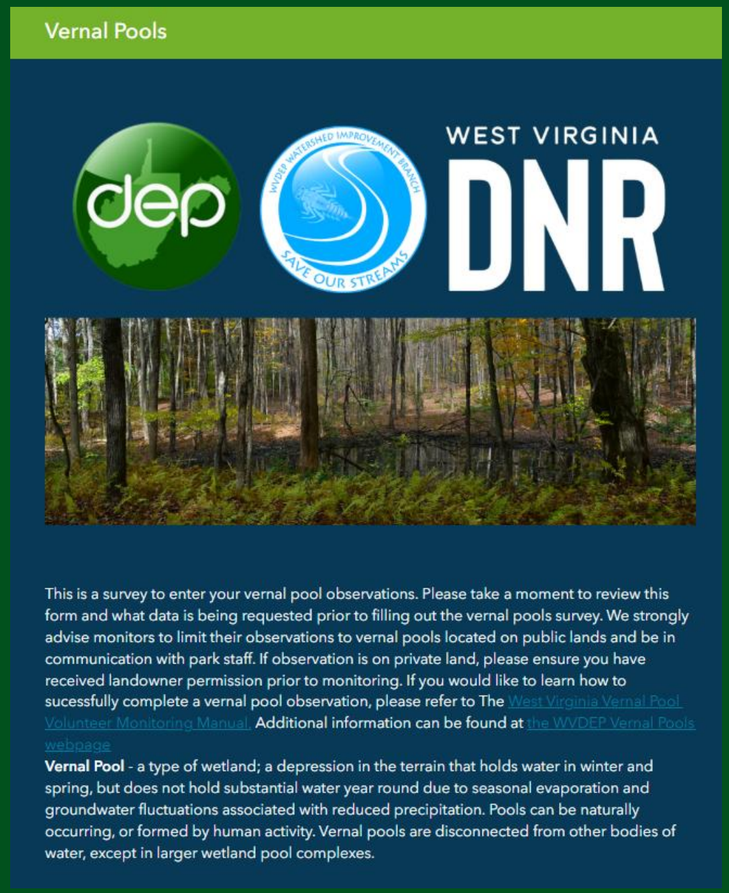
- WV Botanic Garden (in the snowstorm!)
- Fort Mill Ridge WMA/Romney DNR Office
- New River Gorge National Park, Glen Jean
- Kanawha State Forest/Charleston area
- Cranberry Nature Center - Monongahela National Forest - Greenbrier River

Over 100 vernal pool monitoring surveys returned!

2025 Year 4 and Tutorial Videos and Survey123

In 2025, our DEP videographer helped us film tutorial videos for participants who could not attend a workshop in person.

And, DEP and DNR GIS professionals developed a Survey123 vernal pool monitoring tool. Volunteers may use the app or the paper survey starting in 2026.



Vernal Pool Monitoring with Survey123

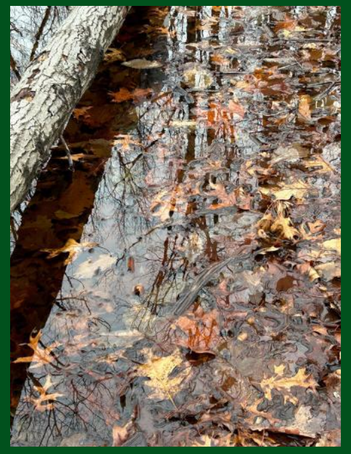
Next Steps

What's next for the program?
Using LiDAR to develop a list of potential pool sites for volunteers to ground truth and monitor.

Creating a pocket egg mass ID guide.

Hosting additional training workshops and recruiting more vernal pool monitors and motivating current volunteers
to continue to monitor.

Analyzing pool survey data to better understand vernal pool ecology, watershed health, and forest ecosystems.



What have we learned?

It's much easier to attract workshop participants than it is to recruit dedicated volunteer monitors.
Be sure to have vernal pools in need of a monitor to assign to volunteers who do not know where to monitor.
Provide multiple ways to submit surveys, paper, online survey123, iNaturalist.

Questions?

WV Vernal Pool Monitoring Page

Volunteer monitors in Monongalia Co. WV

Wood frog

Spotted Salamander egg masses in a vernal pool in the New River Gorge National Park