IDENTIFICATION & CONSERVATION OF VERNAL POOLS IN PENNSYLVANIA

Pennsylvania Natural Heritage Program

Pennsylvania Natural Heritage Program
Western Pennsylvania Conservancy
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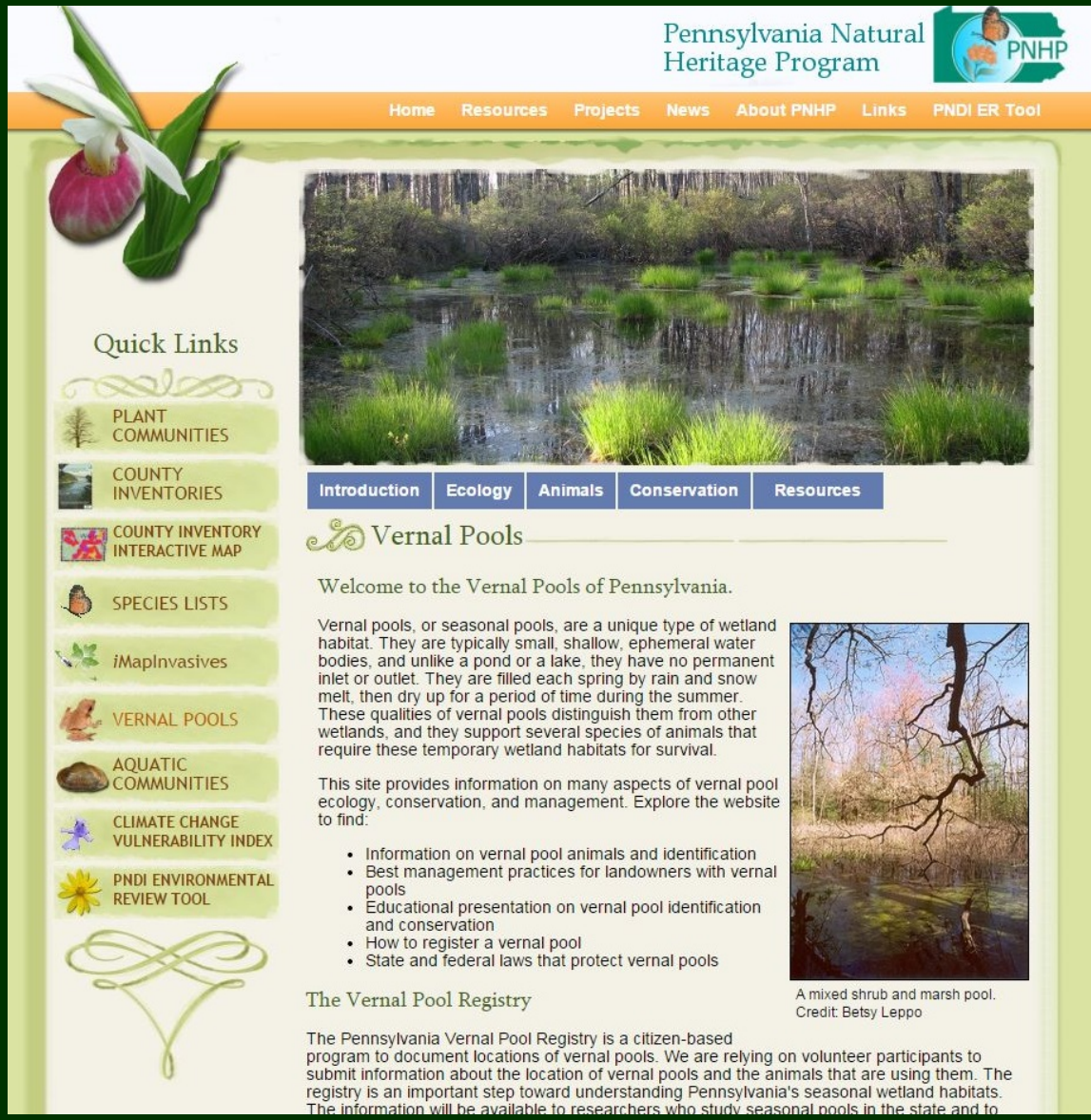
Find Information on Pennsylvania's Vernal Pools

- Educational Materials (including a link to this presentation)
- Field Guides for Vernal Pool Species
- Laws and Regulations
- Conservation and management practices
- Resources for land owners & managers



http://www.naturalheritage.state.pa.us/VernalPools.aspx

WHAT IS A VERNAL POOL?

A true wetland based on soils, hydrology, and often vegetation

Relatively small and shallow with a fluctuating depth and a dry phase in late summer

No permanent stream flowing in or out

Distinctive plants and animals

No fish!!

Definitely NOT one size fits all!

There are many different types of vernal pools in Pennsylvania….

Unvegetated (black leaf) pool

Swamp forest pool

Marsh pool

Shrub and marsh pool

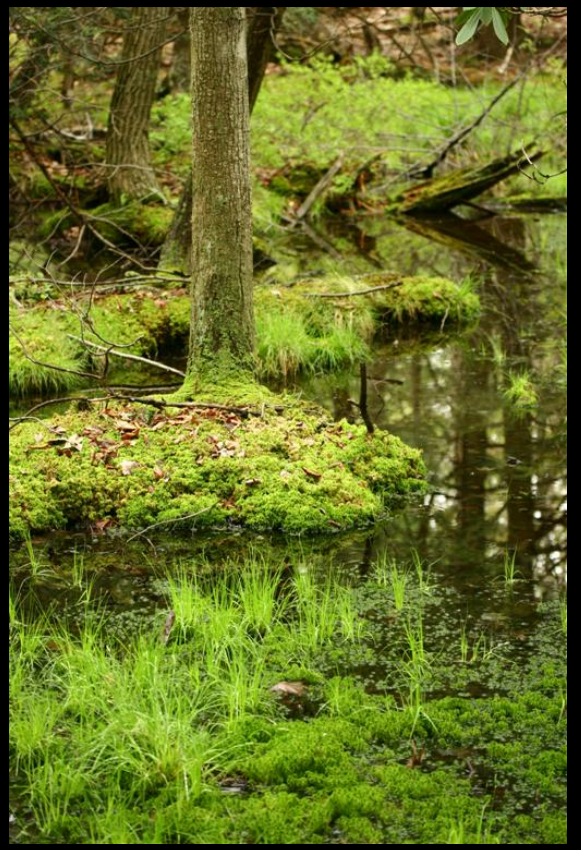
Shrub pool

Recognizing a Vernal Pool in the Dry Phase

- A shallow depression, often without trees or plants in it
- Gray water-stained leaves and mosses at the basin edges

Grasses, sedges, and other herbaceous plants that like moist or wet places

Flood resistant shrubs and trees with ‘high water’ marks and buttressed trunks



Trees and shrubs on hummocks, sphagnum moss, wetland plants

Buttressed tree trunks

- Wetland Soils
- Water-stained Leaves

<u>Evidence of aquatic life</u>:

- Empty amphibian egg masses
- Old caddisfly cases
- Shells of snails or fingernail clams

Unvegetated pool

Swamp forest pool

Marsh pool

Shrub pool

Distinctive Biological Community

Muppet show season one Wikipedia

An immediately recognizable cast of characters…

MEET THE INDICATORS

Vernal pool indicator species are specialists that reproduce most successfully in fishless waters.

In Pennsylvania, there are **six** species of amphibians and **two** types of crustaceans that use seasonal pools almost exclusively for breeding and larval development.

wood frog tadpole


Mole
Salamanders!

1: MARBLED SALAMANDER (*Ambystoma opacum*)

2: JEFFERSON SALAMANDER (*Ambystoma jeffersonianum*)

3: BLUE-SPOTTED SALAMANDER (*Ambystoma laterale*)

Species Spotlight

photo-Brandon Rieke

Salamander Blues

—The Blue-spotted Salamander

by Rob Criswell

They say beauty is in the eye of the beholder, but who could argue the elegance of a sinuous, shimmering piece of onyx encrusted with fine flecks of turquoise. The fact that this gem is not a precious stone but an amphibian should make little difference.

The jewel that is the subject of this description is none other than the blue-spotted salamander, and the status of this diminutive forest dweller is a cause for concern in Pennsylvania. It was not known to occur in the Keystone State until 2000 when it was discovered in

Blue-spotted salamanders, like many other reptiles and

Species highlighted in the May/June 2012 issue of PA Angler & Boater

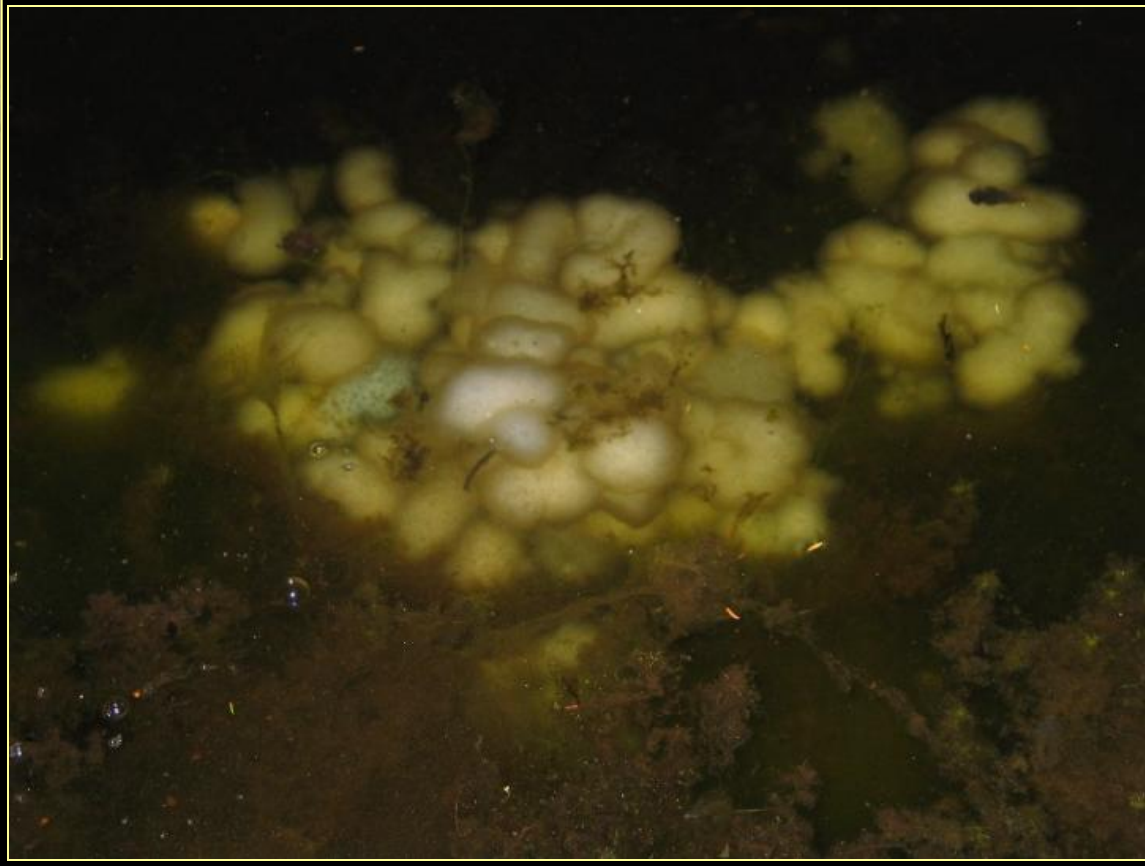
http://fishandboat.com/angon2.htm

4: SPOTTED SALAMANDER (*Ambystoma maculatum*)

5: WOOD FROG (*Lithobates sylvaticus*)

6: EASTERN SPADEFOOT (*Scaphiopus holbrookii*)

Spotted Salamander Egg Masses



Spotted versus Jefferson Salamander Egg Masses

Jefferson egg mass

Spotted egg mass left, Jefferson right

Wood Frog Egg Masses

Illustration by
B. & D. Leppo

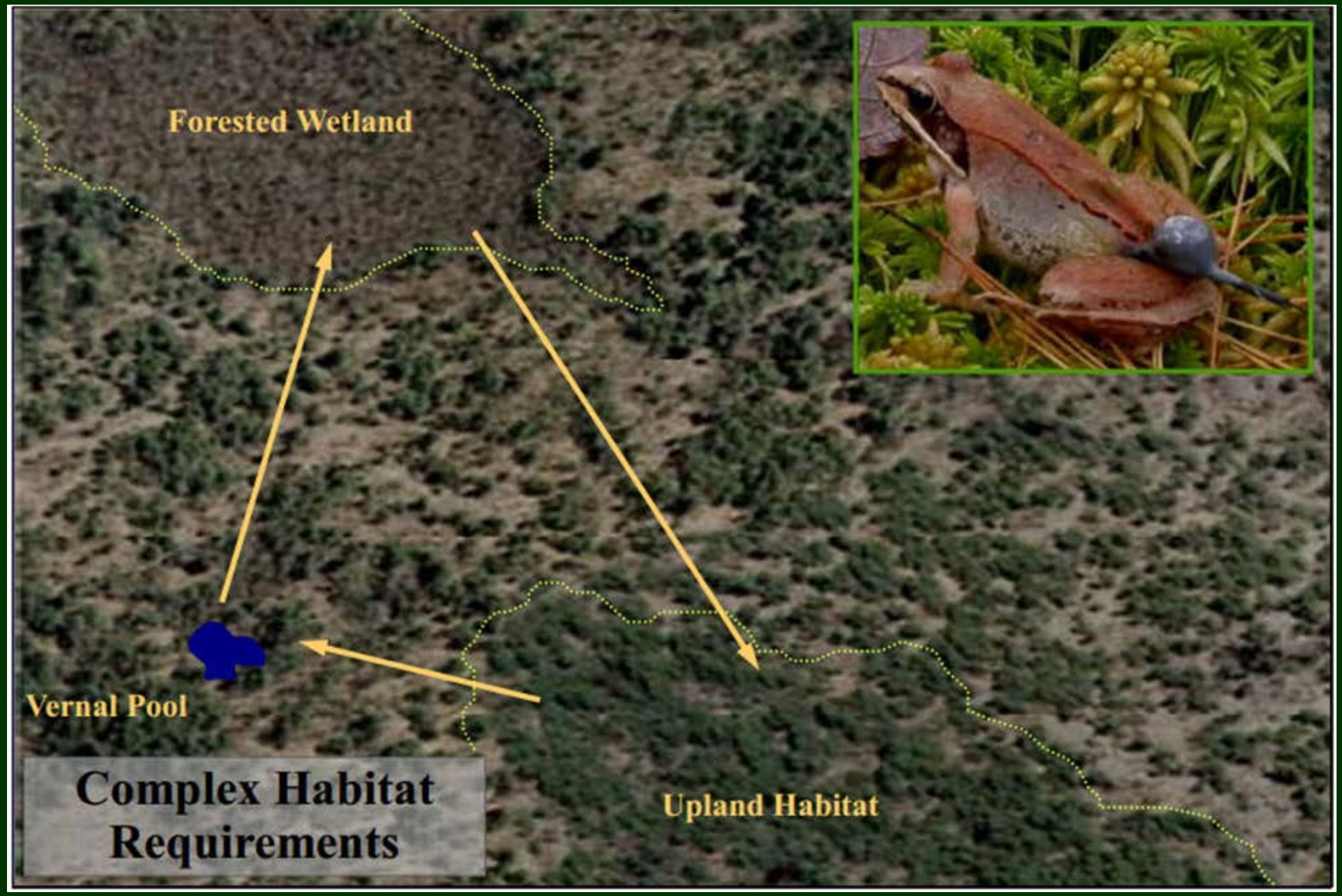


Figure from the New Hampshire Association of Natural Resource Scientists *http://nhanrs.org/Buffer/VPGuide.pdf*

Photo by Totenkopf on Wikipedia

A standard American football field is 300 feet long

Amphibian movement between upland and breeding pool habitats

(Brown & Jung 2005 and Colburn 2004)

Wood frogs commonly move 1,200-1,600 feet

(4-5 football fields)

Spotted salamanders average over 500 feet but will move up to 2700 feet

(1.5-9 football fields)

7. SPRINGTIME FAIRY SHRIMP (*Eubranchipus vernalis*)

Male>>

<<Female

8. CLAM SHRIMP (Spinicaudata - Limnadiidae)

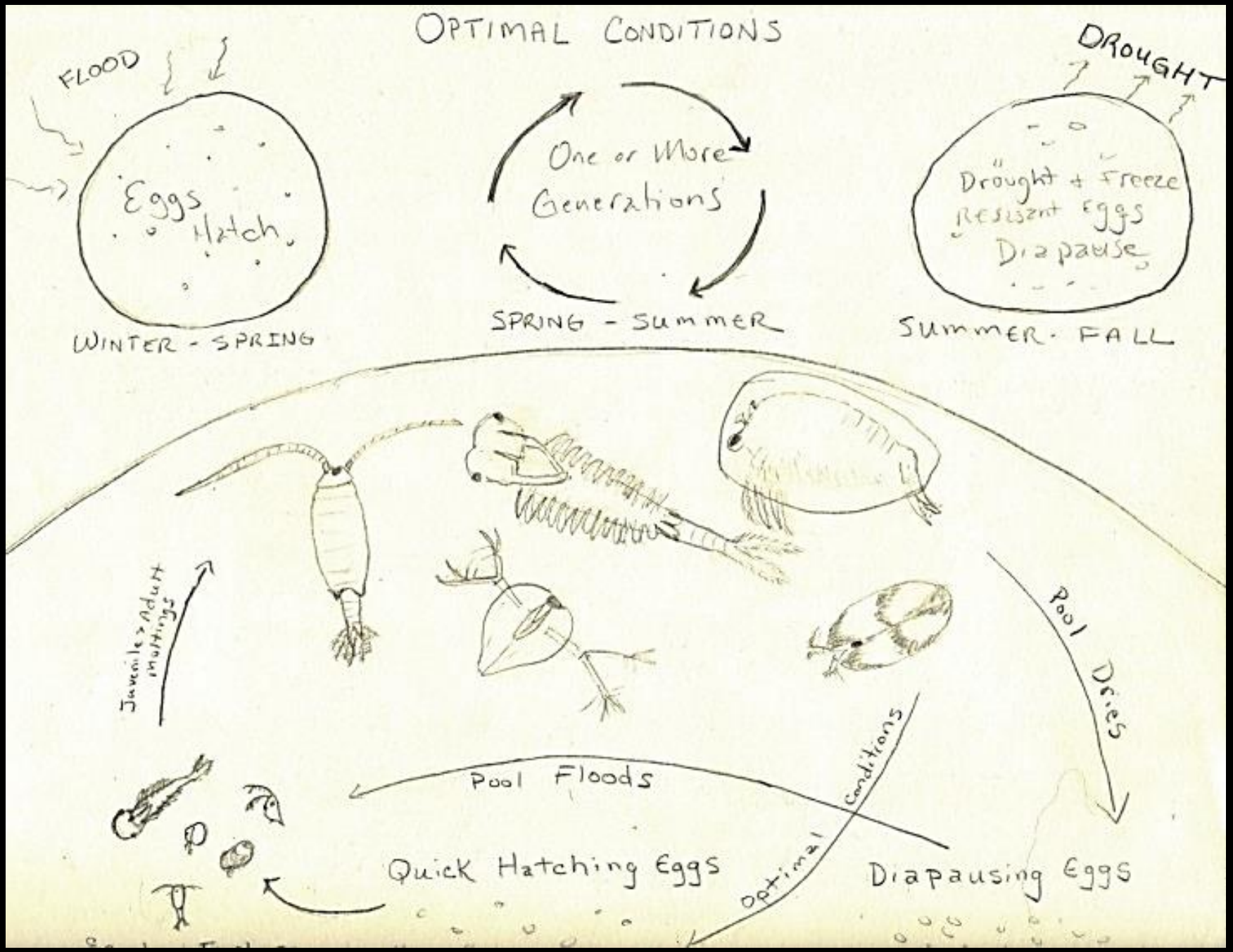


Illustration by B. Leppo

MEET THE ASSOCIATES

Vernal pool facultative species commonly breed in vernal pools

…but they also reproduce successfully in permanent waters

RED-SPOTTED NEWT
(*Notophthalmus viridescens*)

SPRING PEEPER (*Pseudacris crucifer)*

AMERICAN TOAD (*Anaxyrus americanus*)

American toad eggs are laid in long ropy strands

GRAY TREE FROG
(*Hyla versicolor*)

SPOTTED TURTLE *(Clemmys guttata)*

WOOD TURTLE *(Glyptemys insculpta)*

EASTERN BOX TURTLE (*Terrapene carolina*)

THE PREDATORS

Dragonflies and damselflies are found as aquatic nymphs

Pictured: Skimmer dragonfly nymph (Family Libellulidae)

Adults hunt, seek mates, and lay eggs in wet or dry pool basins.

Predaceous Diving Beetles

Photo by Machele White on Bugguide.net

Dysticidae larvae
aka toe-biters

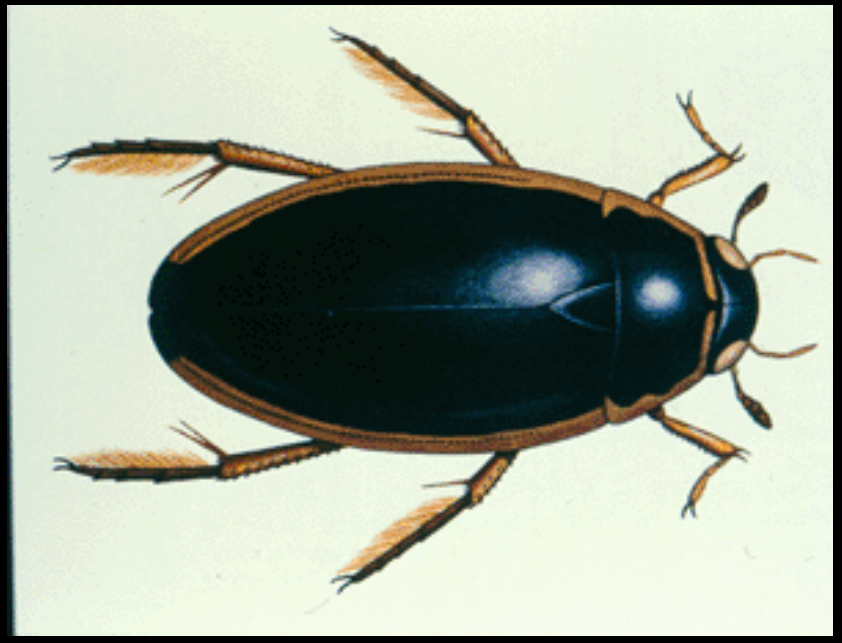


Image from bioweb.uwlax.edu

Dysticidae adult

Backswimmers

Order: Hemiptera
Family: Notonectidae

THE SHREDDERS

Log Cabin Caddisfly
(Family Limnephilidae)

Cigar tube Caddisfly
(Family Phryganeidae)

THE SMORGASBORG

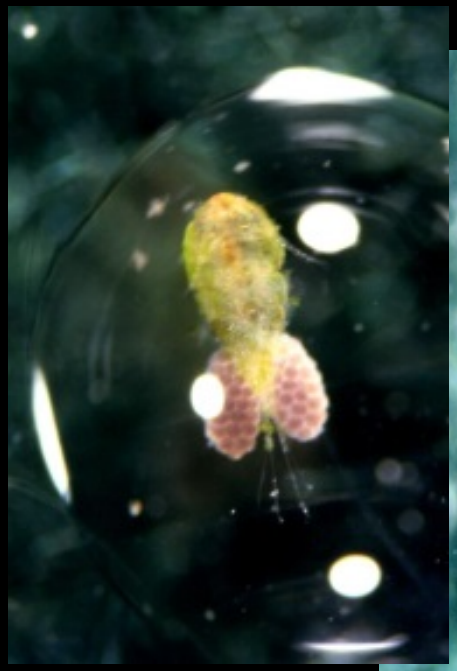
Top 2 photos: Phantom Midges (Chaoboridae)

Bottom left: Mosquito pupa (Culicidae)

Bottom right: midge larvae (Chiron-omidae)

Top Left: Female water flea (Cladocera) with eggs

Top Right: Female water flea with neonates



Bottom Right: Seed Shrimp (Ostracod)

Bottom Left: Female copepod with eggs; Center: Male copepod

WHY ARE VERNAL POOLS IMPORTANT?

Vernal pools are often isolated wetlands in a dry forest. They provide much needed food, water, and shelter to wildlife in the upland forest.

WILDLIFE

Vernal pools are good for

- Amphibians
- Turtles
- Bats
- Insects
- Wetland plants
- Deer
- Bears
- Turkeys
- Wood ducks
- Songbirds

In the winter look for deer and turkey tracks in the snow around pools as they seek fresh water.

ECOLOGICAL SERVICES

Vernal pools do all this for FREE!…

- Slow Flooding & Erosion by trapping RUNOFF
- Remove Pollutants & Sediments by slowly FILTERING water through plants and soils
- Improve the Quality & Quantity of our DRINKING WATER
- Improve the Health of our STREAMS

ARE VERNAL POOLS PROTECTED BY LAW?

YES!

Vernal pool habitats and vernal pool plants and animals are protected under a number of state and federal laws.

US Army Corps of Engineers

Vernal pools can receive protection under section 404 of the Federal Clean Water Act, administered by the U.S. Army Corps of Engineers (USACE):

http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/materials/cwa_sec404doc.pdf

The USACE cannot regulate "isolated wetlands" that lack a connection to a stream or waterway. However, indirect wetland connections may count, if the vernal pool is:

- connected to another wetland which drains into a stream
- located in the floodplain of a stream

With the recent EPA Clean Water Rule, the USACE recovered some jurisdictional authority that was lost with the SWANCC decision of 2001. Learn more at *http://www2.epa.gov/cleanwaterrule/final-clean-water-rule*

PA Department of Environmental Protection

The PA DEP requires a permit to directly impact a body of water under 25 Pa. Code Chapter 105, Dam Safety and Waterway Management. Code viewable at:

http://www.pacode.com/secure/data/025/chapter105/chap105toc.html

Permits are necessary to directly impact
ANY vernal pool or other wetland
by fill or excavation, regardless of the size.

PA Department of Environmental Protection

According to the Chapter 105 Water Obstructions and encroachment General Permit Registration, mitigation (wetland replacement) is only required for alteration of wetlands *over 0.05 acres* in size. For scale, a 46 ft x 46 ft square is approximately 0.05 acres.

http://www.elibrary.dep.state.pa.us/dsweb/Get/Document-99378/3150-PM-BWEW0500_CopiesRev_Feb2014.pdf

REPLACEMENT VALUES

- Minimum 1 to 1 acreage replacement with a wetland of equal function & value (105.20a)
- Minimum 2 to 1 acreage replacement with a wetland of different function & value (105.20a)

Many vernal pools in PA are smaller than 0.05 acres and do not require mitigation.

But their acreage is added to the total acreage of wetlands lost.

PA has a ‘no-net wetland loss’ policy and has programs to create wetlands that offset all lost acreage.

http://www.portal.state.pa.us/portal/server.pt/community/water_obstruction__encroachments/21656/net_gain_strategy/1717775

DEPs PROPOSED ‘PIESCES ILF’

- If approved, the Pennsylvania Integrated Ecological Services Enhancement and Support (PIESCES) In-lieu fee (ILF) program would replace the PA Wetland Replacement Project.

- DEP continue to ensure “no net loss” of acerage and/or functions of wetlands, streams, floodplains, and other bodies of water, but the system would be more adaptable, transparent, scientific, and effective.

- Better ecological results because DEP assumes responsibility for success, rather than leaving it in the hands of the permitee.

- Stay tuned for potential partnerships for wetland restoration.

http://www.lrp.usace.army.mil/Portals/72/docs/regulatory/2014%20Public%20Notices/SPN-14-24_PADEP.pdf

PA Fish and Boat Commission

The Pennsylvania Fish and Boat Commission is responsible for regulations concerning game and non-game fish, reptiles, amphibians, and aquatic invertebrates.

Endangered Species section of the Pennsylvania Code (58 Pa. Code Chapter 75) protects the **Eastern Spadefoot** (PA Threatened) and the **Blue-spotted Salamander** (PA Endangered).
http://fishandboat.com/nongame_concern.htm

Current regulations prohibit the collection or possession of the following species that may be found around seasonal pools:

- Four-toed, Jefferson, and Marbled salamanders
- Mountain, Upland, or Western Chorus Frogs
- Box, Spotted, and Wood Turtles
- Hognose, riboon, mountain earth, shorthead garter, and ribbon snakes

http://fishandboat.com/fishpub/summaryad/z03regs_species.pdf

Wetland Delineation

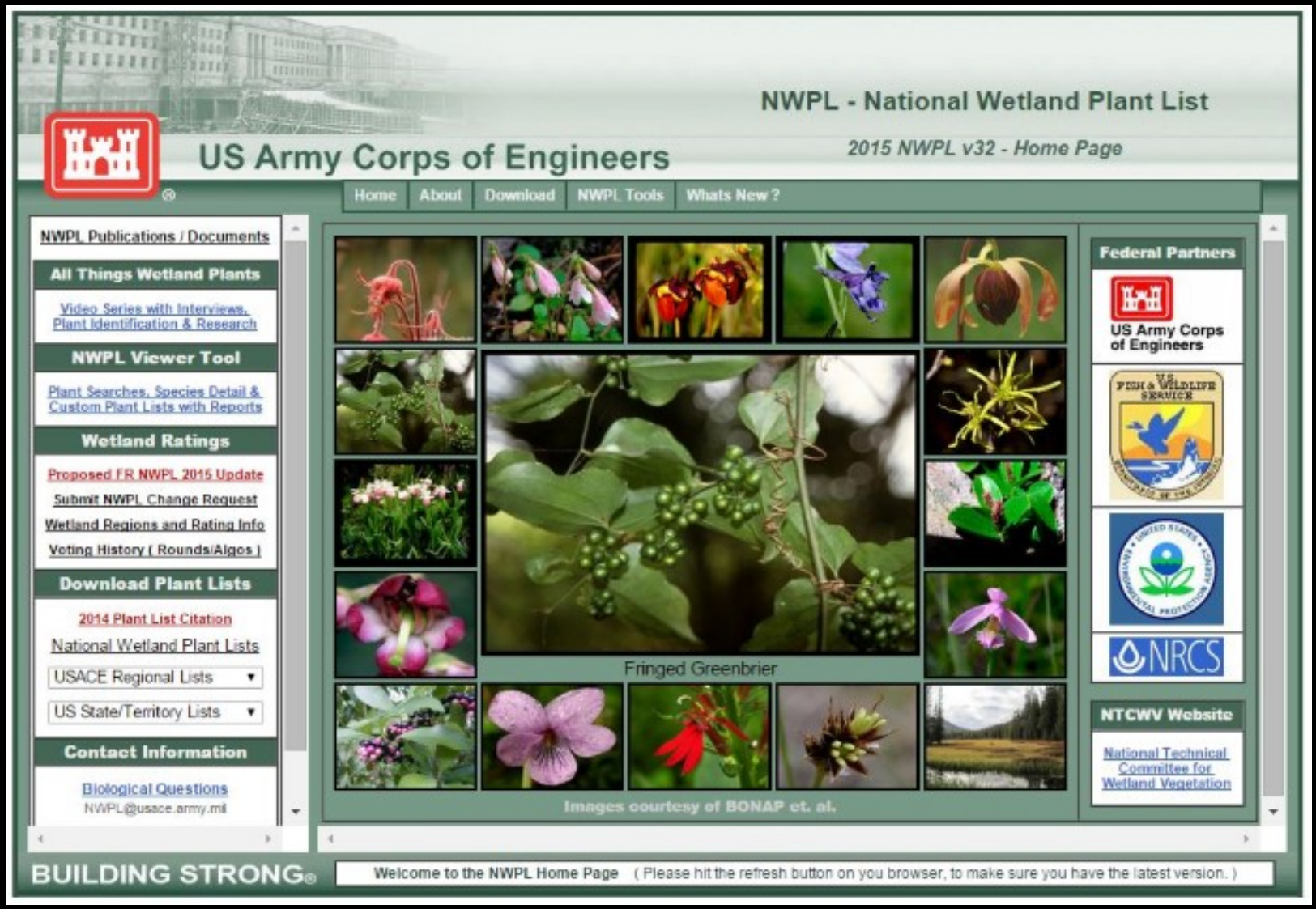
To be defined as a wetland, certain criteria must be met in the soils, vegetation, and hydrology.

- Corps of Engineers Wetlands Delineation Manual
  http://www.bwsr.state.mn.us/wetlands/publications/corpsmanual.pdf

- Clarification and Interpretation of the 1987 Manual
  http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_025086.pdf

- USACE Regional Supplements – two apply in Pennsylvania:
  1. Eastern Mountains and Piedmont, and
  2. Northcentral and Northeast
  http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/reg_supp.aspx

National Wetland Plant List

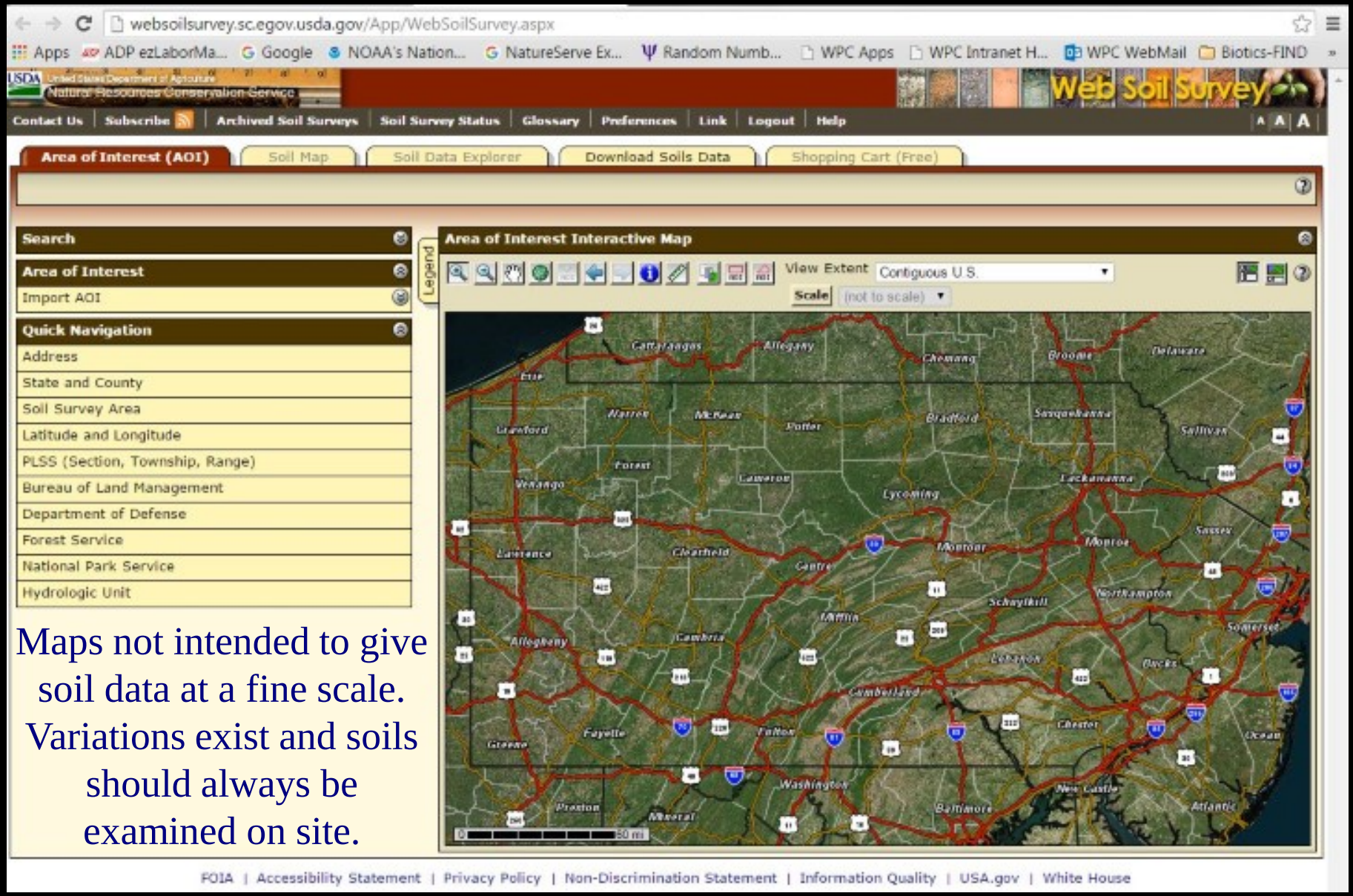


http://rsgisias.crrel.usace.army.mil/NWPL/

Soil Resources

- Soil Survey Manual (3rd Edition, 1993)
  http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054262
- Field Indicators of Hydric Soils in the US: A guide for Identifying and Delineating Hydric Soils (Version 7.0, 2010)
  http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_050723.pdf
- A Guide to the Hydric Soils in the Mid-Atlantic Region ver. 2.0, 2011
  http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052291.pdf
- Printed soil surveys by county were the standard in the past and can be downloaded as pdfs online
  http://www.nrcs.usda.gov/wps/portal/nrcs/surveylist/soils/survey/state/?stateId=PA
- Now soil data is maintained and updated online (next 2 slides).

Web Soil Survey - USDA



Maps not intended to give soil data at a fine scale. Variations exist and soils should always be examined on site.

http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Official Soil Series Descriptions
USDA - NRCS

ANDOVER SERIES

The Andover series consists of very deep, poorly drained soils formed in colluvium. They are on benches, toeslopes, footslopes, and swales along the base of prominent ridges. Slopes range from 0 to 15 percent. Permeability is slow. Mean annual pre

TAXONOMIC CLASS: Fine-loamy, mixed, active, mesic

TYPICAL PEDON: Andover cobbly loam - woodland. (C

Oe--0 to 1 inches; black (10YR 2/1) partially decomposed

A--1 to 3 inches; very dark gray (10YR 3/1) cobbly loam; v very strongly acid; abrupt smooth boundary (2 to 5 inches t

E--3 to 8 inches; grayish brown (10YR 5/2) cobbly loam; w brownish yellow (10YR 6/6) and strong brown (7.5YR 5/6)

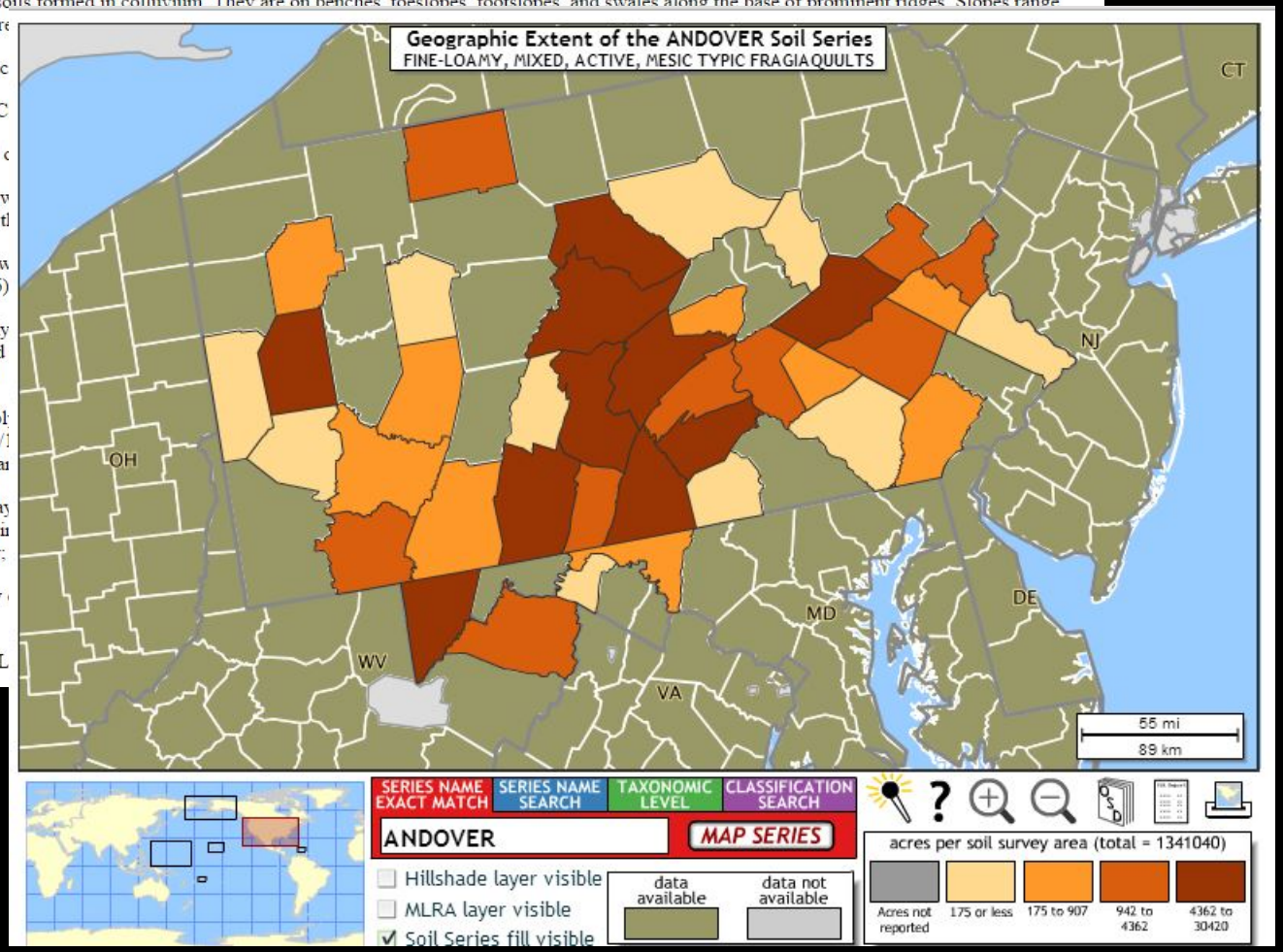
Btg--8 to 19 inches; light brownish gray (10YR 6/2) cobbly fine roots; common distinct clay films on faces of peds and strongly acid; clear wavy boundary. (5 to 12 inches thick)

Btgx1--19 to 35 inches; yellowish brown (10YR 5/4) cobbl prominent clay films on plates and in pores; gray (10YR 6/ 1 to 6 inches in diameter; strongly acid; clear wavy bounda

Btgx2--35 to 49 inches; brown (10YR 5/3) very cobbly clay distinct clay films on plates and in pores; many coarse distir plates; 40 percent rock fragments 1 to 6 inches in diameter;

C--49 to 66 inches; brown (10YR 5/3) very gravelly sandy fragments 1 to 6 inches in diameter; strongly acid.

TYPE LOCATION: Huntingdon County, Pennsylvania; L



Search result for 'Andover'

https://soilseries.sc.egov.usda.gov/osdname.asp

Common Wetland Soil Types in Pennsylvania

A11 Indicator

This type can be found in any soil texture.

A11 applies to any depleted soil found below dark surface indicators.

All soil indicator photos courtesy of Frank Plewa, USACE

A11 Indicator: Significant organic accumulations.

A11 Indicator: Generally, the darker and thicker the surface horizon, the wetter the site.

F3 Depleted Matrix

- Our most common wetland indicator soil
- F series are loamy and clayey soils
- Many also have an A11 indicator
- Often found along the boundaries of wetlands

F3 Indicator

F3 Indicator: the frequency and size of the iron concentrations (mottles) indicates the soil frequently wets and dries.

F6 Redox Dark Surface – A soil indicator commonly found in very wet hillside seeps.

F6 Redox Dark Surface – Iron (Fe) concentrations in the dark surface is a key element

…along with organic accumulations

F19 Piedmont Floodplain Soil Indicator: Common in south central areas where legacy sediments have built up. Allows for brighter colors as the soils are young and developing, but usually have obvious wetland hydrology.

F21 Red Parent Material Soils

Common in south central Pennsylvania in red bed areas where the parent materials or alluvium is from red shales.

F21 Red Parent Material Soils: Note the iron (Fe) concentrations.

F21 Red Parent Material Soils

Compare the soil profiles:
LEFT = WET F21
RIGHT = DRY F21

The wet soil has a bright color an overall red cast which is allowed because the iron in the parent material is very resistant to reduction.

F2 Loamy Gleyed Matrix

F2 soils are found in obvious wetlands near the interiors.

These develop grayish blue to green colors because they are so wet.

They often change color immediately upon exposure to the air. Iron (Fe) oxidizes immediately when they are wet.

ARE CURRENT REGULATIONS ENOUGH??

Federal and state laws regulate impacts to the wetland proper but fail to protect the critical upland habitat.

THREATS

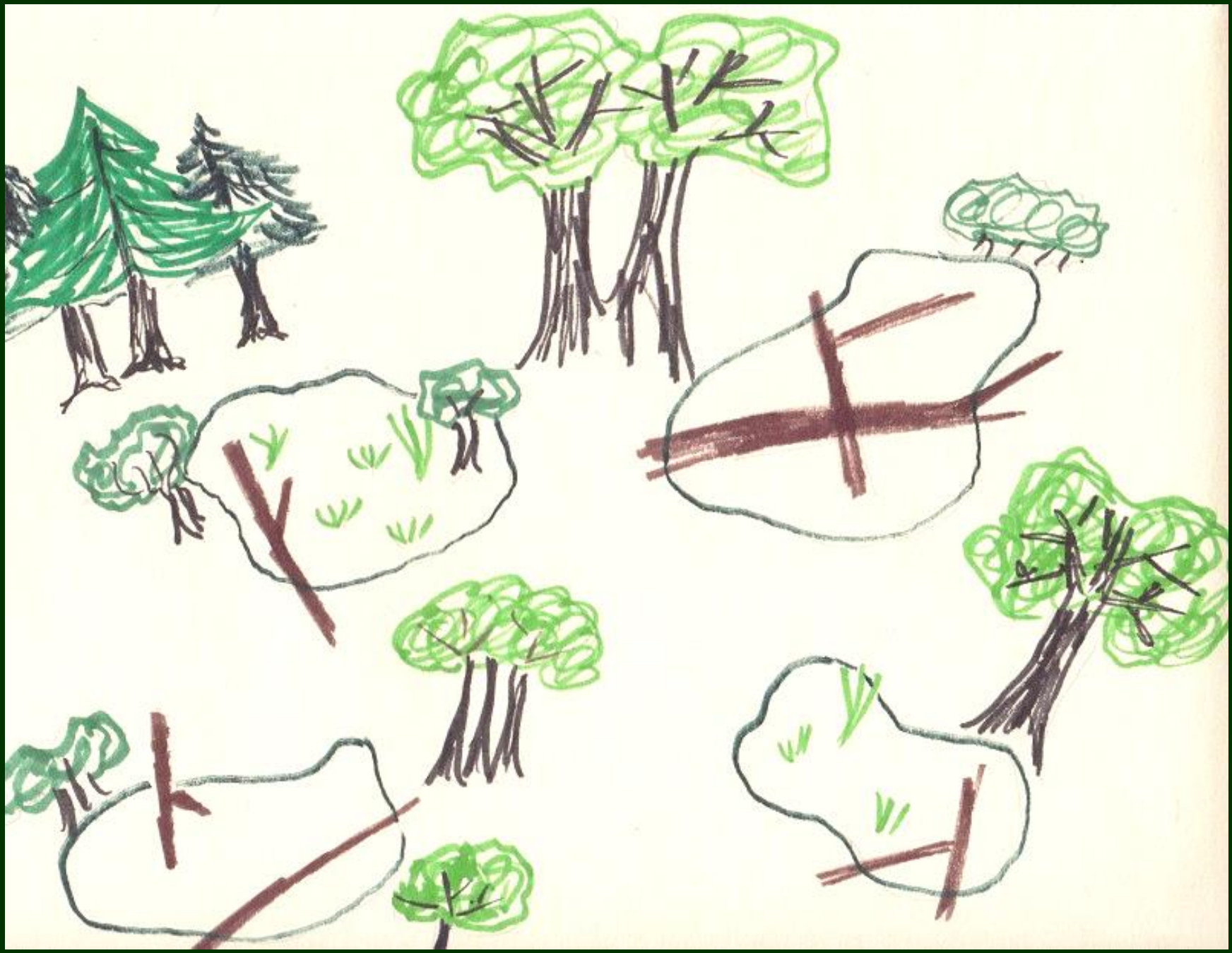
- Habitat Loss (fill and conversion)
- Fragmentation (roads, home and energy development)
- Disturbances to the Vernal Pool and it's Uplands (development, motorized vehicles, logging)
- Changes in Hydrology (ground water, flooding, drought, extreme weather events)
- Changes in Vegetation (mowing, spraying, invasive species, succession)
- Water Quality (lawn and agricultural run-off, fertilizers, herbicides, insecticides, acid rain)
- Diseases (Ranavirus and Chytrid fungus)

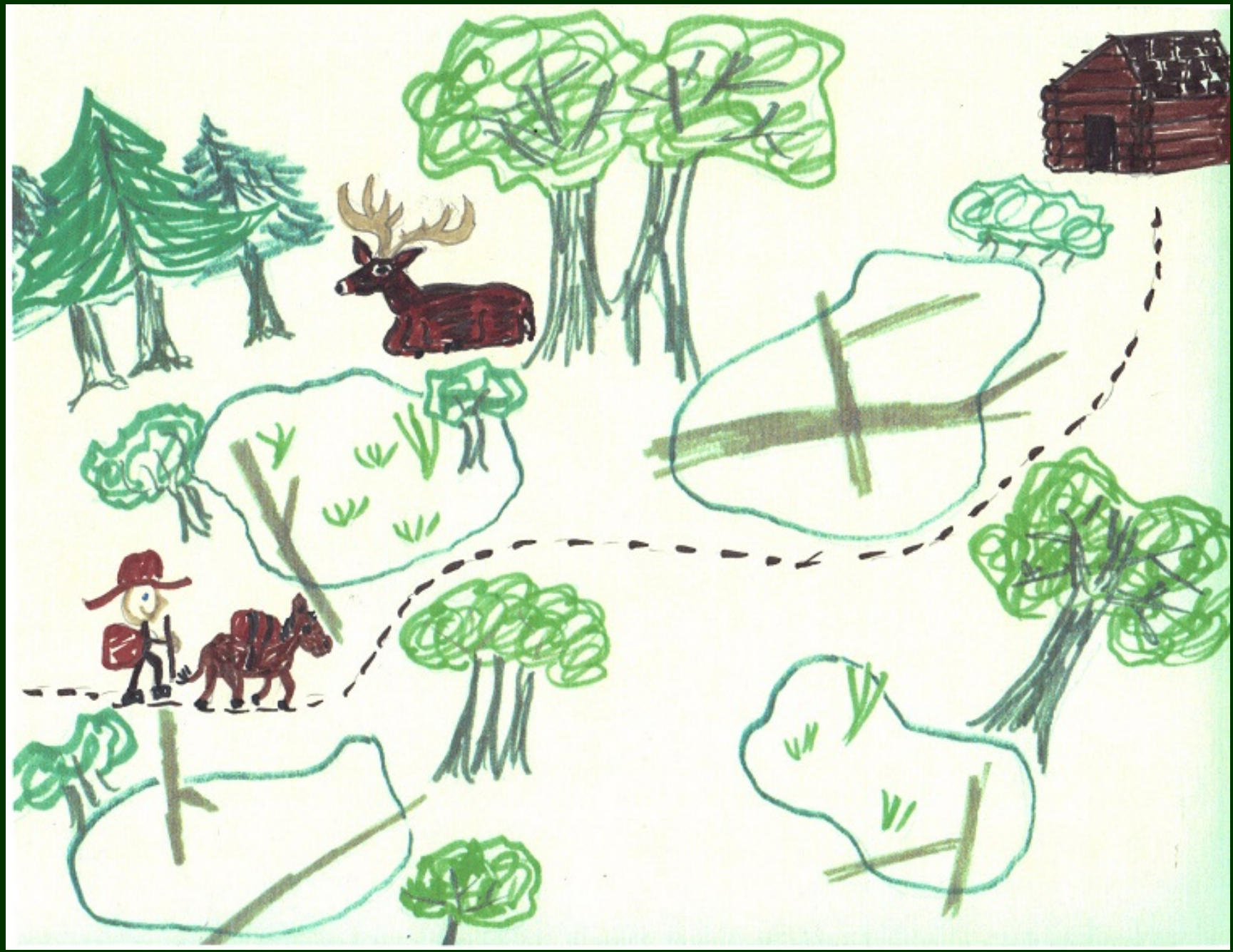
CLIMATE CHANGE

Many threats to wildlife are now being exacerbated by climate change. There is already evidence that the life cycles and geographic ranges of plants and animals are shifting in response to changes in climate.

All aspects of life in a seasonal pool depend on certain environmental cues and conditions:

- amphibian migration
- egg and larval development
- adult feeding & thermoregulation
- reproductive success






TONY'S BAIT SHOP

WHAT'S AT STAKE?

•Vernal pool indicator species depend on vernal pools for successful development and survival of their young.

•In the mid-Atlantic region, 26% of all threatened & endangered amphibians depend upon vernal pools (Colburn, 2004).

Spotted Salamander
(*Ambystoma maculatum*)

VERNAL POOL CONSERVATION

Detailed recommendations available in the Vernal Pool Conservation and Management Guide

Download it from the **Vernal Pools of PA** website at:

http://www.naturalheritage.state.pa.us/docs/Vernal%20Pool%20Conservation%20Mgmt%20Full%20Doc.pdf

VERNAL POOL CONSERVATION

Three management zones to consider
(from Brown and Jung 2005)

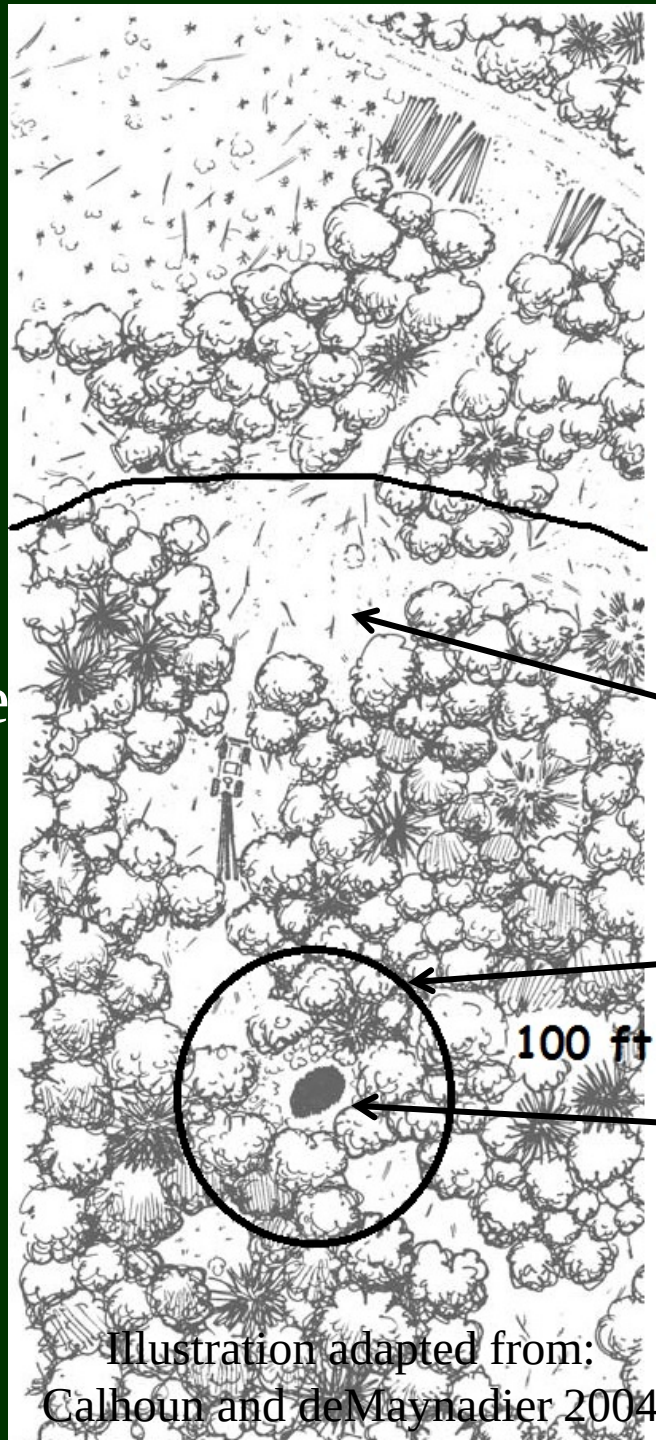
1. Vernal pool basin (or depression)
2. Vernal pool core habitat (or envelope)
3. Vernal pool upland habitat

Habitat Management Zones

1. Vernal pool basin: perimeter of the pool when it is fully flooded in the spring

2. Core habitat: minimum zone from the pool edge out to 100 ft (but up to 200 ft for high quality sites)

3. Upland habitat: minimum zone from the pool edge out to 400 ft (but up to 1000 ft for high quality sites)



Minimum zones of management for amphibians

Illustration adapted from:
Calhoun and deMaynadier 2004

Vernal Pool Basin

- The vernal pool basin is the depression on the forest floor that floods each year.

- This is where vernal pool indicator and facultative animals breed and lay their eggs. Their young hatch, feed, and develop within the vernal pool ‘nursery’.

- The vernal pool basin is very sensitive to any sort of disturbance. Disturbances in the pool basin and can damage adults, juveniles, eggs, or larvae resting in the leaves and degrade the environment the animals require.

- The vernal pool depression is protected by state and federal regulations.

Vernal Pool Core

- The vernal pool core habitat is the uplands immediately surrounding the pool. The condition of this zone strongly influences the condition of the pool and is important for water quality.
- Adult amphibians concentrate in the vernal pool envelope as they move to and from a pool during the breeding season.
- The core also supports high densities of recently metamorphosed amphibians which leave the pool in the summer and fall.

Basin and Core - Management Recommendations

Recommendation 1

Identify the pool basin and core

Recommendation 2

Protect from disturbance year-round during wet and dry phases

Prevent soil compaction or disturbance in the pool basin and core.

Keep out motorized vehicles, heavy equipment, all-terrain vehicles, dirt bikes, mountain bikes, snowmobiles, and horseback riders.

Recommendation 3

Keep sources of food and shelter

Leave trees and branches that fall naturally into pools. They fuel the food web and provide habitat.

Avoid disturbing large fallen logs or cutting all of them for firewood. They provide shelter for many animals. Removing them can injure animals resting underneath.

Basking sites for turtles

Attachment sites for egg masses

Photo by Aura Stauffer

Recommendation 4

Protect the water quality of the vernal pool

- Avoid use of pesticides, herbicides, or other chemicals
- Avoid applying salts to roads and drives in the core habitat.
- Hand cut or mow to control invasive species
- Glyphosate is approved for use in wetlands when herbicides are needed. Seek formulations without surfactants, which are highly toxic to pond-breeding amphibians
- The vernal pool dry phase is the ideal time for any kind of habitat or invasive species management.

Protect Water Quality

The vernal pool core is critical to protecting vernal pool water quality. This pool is degraded by the run-off it receives from a nearby road.

Recommendation 5

Maintain trees and other native vegetation

- Vernal pools may have marshy vegetation, shrubs, and even trees in them. Other pools are naturally absent of vegetation (black leaf pools).
- Native vegetation in the basin and core provides the best food and shelter for wildlife.
- Healthy vernal pools in PA typically have trees around the pool perimeter and 100% canopy cover in the core upland habitat zone (but there are exceptions).

Forest versus Meadows around Pools

Is this okay?

Openings Around Vernal Pools

- Open canopy pools happen naturally when trees die in storms, due to insect outbreaks, or fires. These pools support more wetland vegetation.
- Open canopy pools are preferred by some species (e.g. American toads, spring peepers, red-spotted newts, spring peepers, turtles)
- Clearings near vernal pools provide sunny spots where turtles can nest and lay their eggs.
- Drawbacks – open pools dry out more quickly, may experience algal blooms, and have bigger invasive species problems
- When maintaining an herbacous or low shrub vegetation in the core, don’t over-do it. Mowing every few years will suffice.

Vernal Pool Upland Habitat

Vernal pool animals spend most of the year living in the forests adjacent to vernal pools seeking food, shelter, and overwintering sites.

The uplands form a corridor between pools, allowing animals to safely move between pools and into their upland habitats.

The uplands also help regulate water quality.

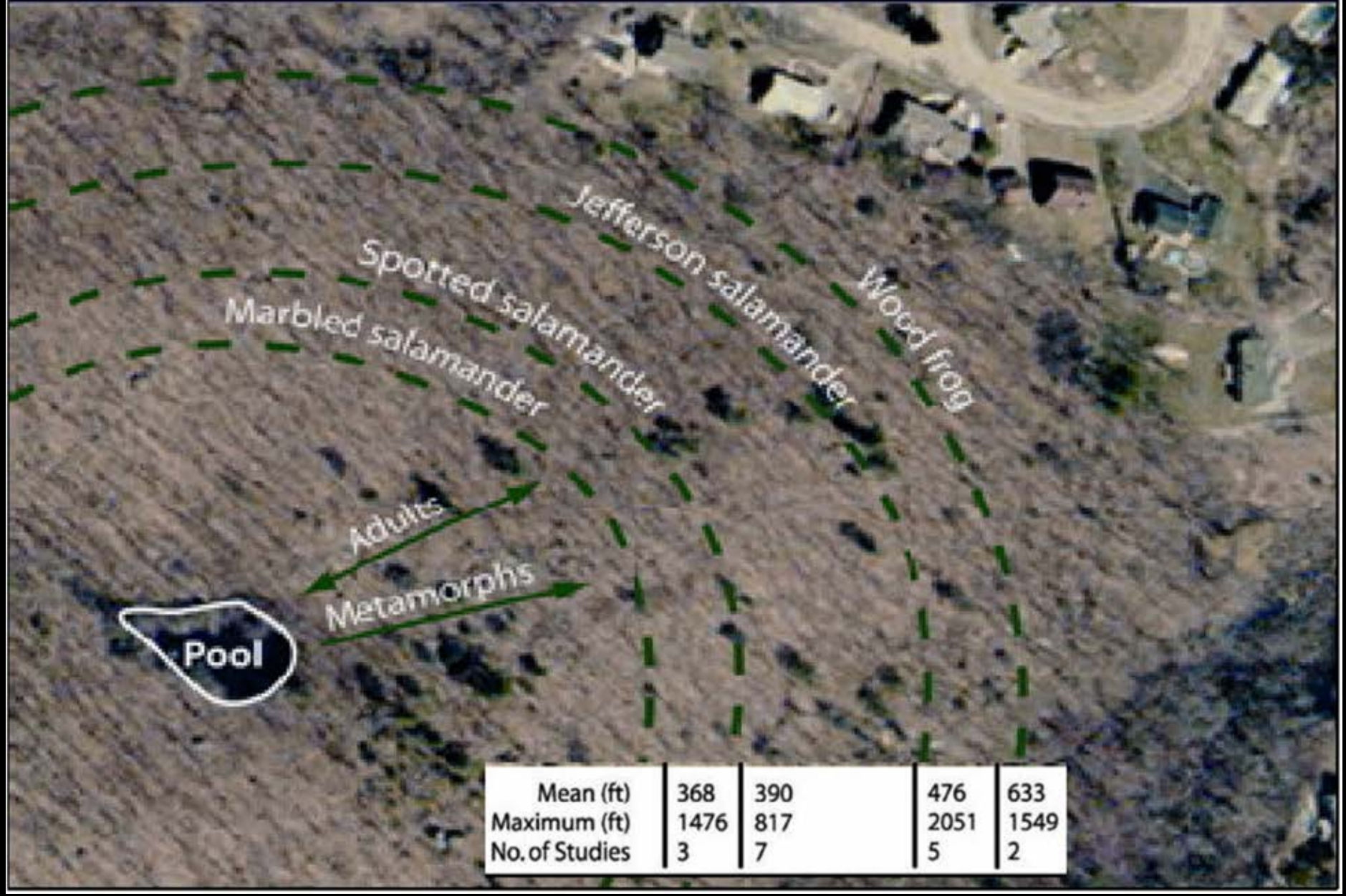


Image from: Calhoun, A.J.K. and P.G. deMaynadier. 2004. Science and Conservation of Vernal Pools in Northeastern North America. CRC Press New York.

UPLAND HABITAT – How Much is Enough?

The EPA recommends managing a **1000 ft radius area** beyond the edge of a vernal pool basin as forested upland habitat. This distance will **protect 95% of a vernal pool's amphibians** in the uplands where they spend most of the year (Brown & Jung 2005).

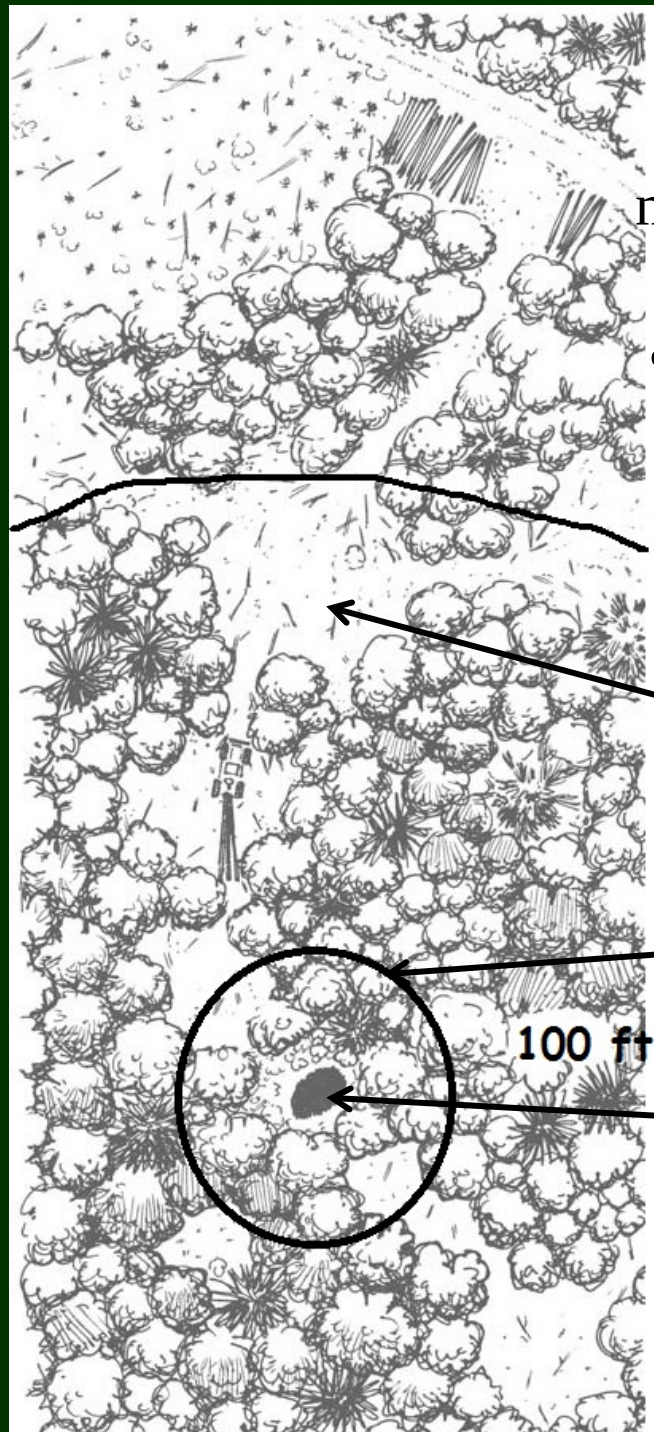
Blue line shows the pool basin perimeter;
Purple line encompasses the terrestrial habitat (1000 m)

1000 ft distance is based on scientific studies of animal movement

Upland Habitat - Managing for Amphibians

Minimum **upland habitat** is defined as the zone located between 100 and 400 feet away from the edge of the vernal pool.

For high quality pools (vernal pools in natural forested settings, vernal pool complexes, and/or sites with rare species), increase the core to 200 feet, and the upland habitat becomes the zone between 200 and 1000 feet from the edge of the vernal pool.



Minimum zones of management for amphibians

Upland

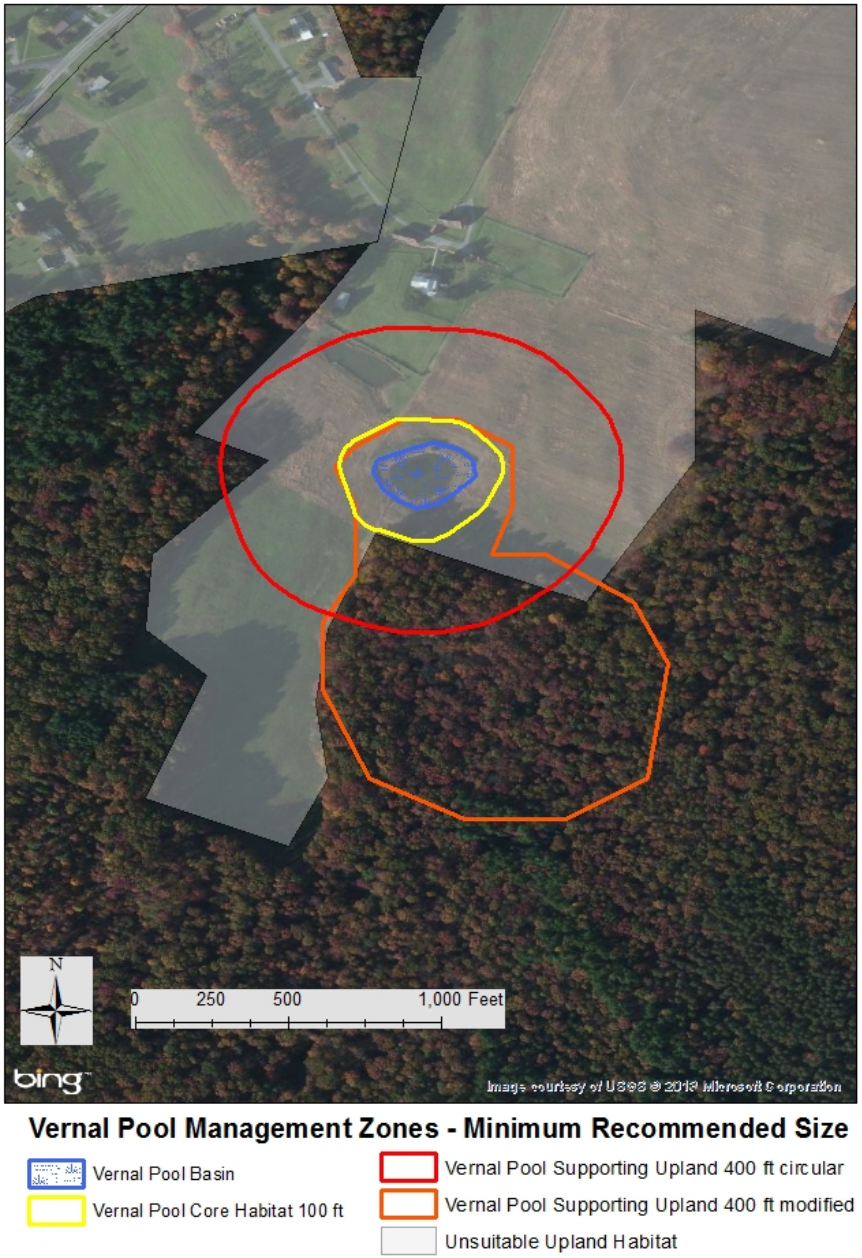
Core

Basin

Adapted from: Calhoun and deMaynadier 2004

Example 1. Minimum habitat sizes, lower quality vernal pool

1. Minimum core habitat at 100 ft from pool edge (yellow)
2. Minimum upland habitat at 400 ft from pool edge (red).
3. Final upland habitat (orange) is adjusted to include more forest and less farmland.



Example 2. Maximum habitat sizes, high quality vernal pool complex

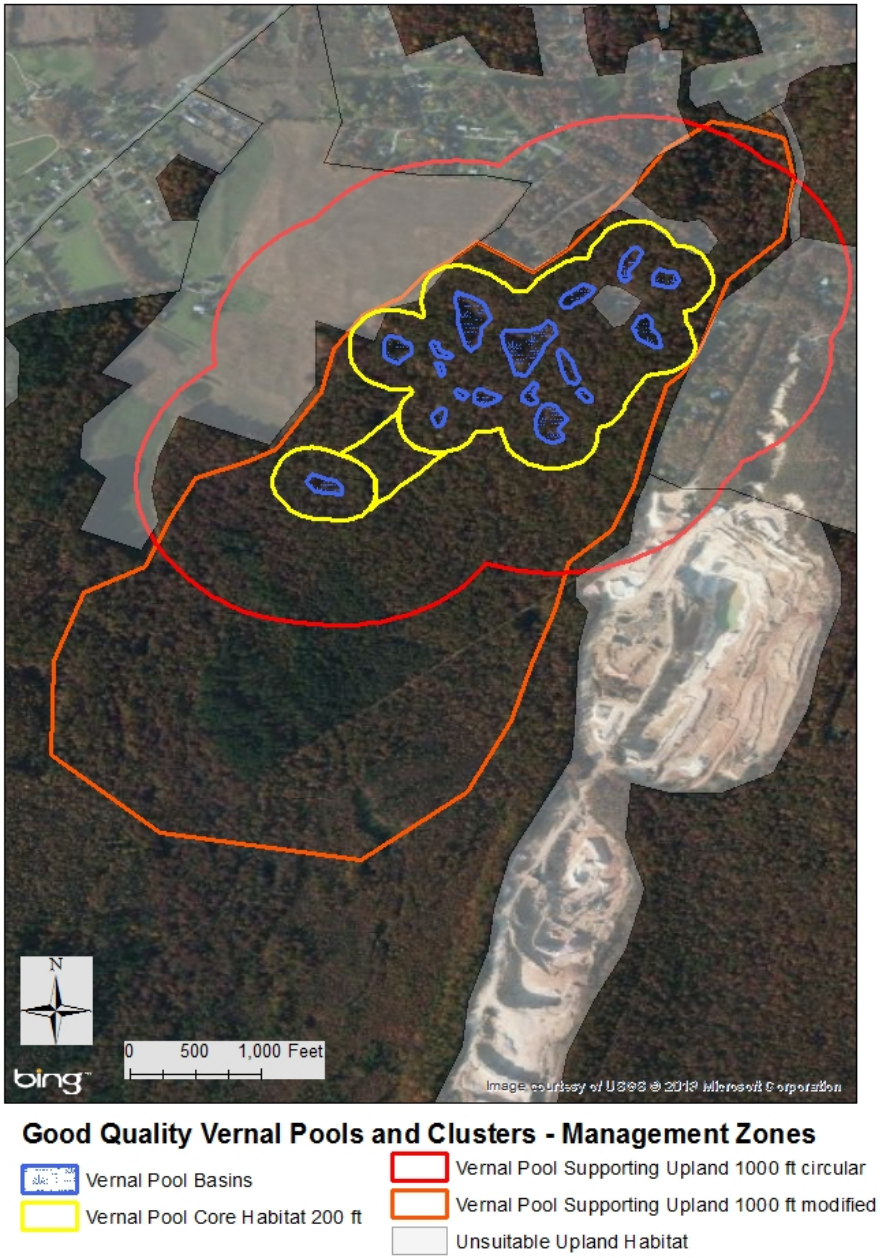
1. Larger core habitat at 200 ft from pool edge (yellow).

(Merge overlapping polygons and connect outliers to the other pools).

2. Larger upland habitat of 1000 ft (red).

(Merge overlapping polygons).

3. Final upland habitat (orange) is adjusted to include more forest and less farm and quarry land.



Upland Habitat

Recommendations:

- Mostly the same as for the vernal pool basin and core habitat.
- Main difference is the upland habitat is treated as a ‘limited disturbance zone’.
- If harvesting timber, maintain at least 50% canopy cover and follow forestry best management practices*.
- Look for threats to migrating amphibians as the move through the upland habitat.

**See the PNHP Vernal Pool Conservation and Management Guide for detailed recommendations.*

Prevent and Repair Tire Ruts

Keep Dead & Downed Woody Material

- Nutrient Recycling
- Small mammals
- Grouse
- Amphibians/Reptiles
- Invertebrates
- Fungi

Vernal Pools – Management Summary

- Maintain closed canopy in the vernal pool core.
- Maintain at least 50% canopy cover in the upland habitat
- Maintain natural litter: avoid significant shifts in forest cover types and control invasives
- Leave dead standing trees and fallen logs and branches
- Protect the forest floor from soil compaction and tire ruts: harvest when soils are frozen or under dry conditions
- Protect water quality: minimize the use of chemicals and prevent run-off

FRAGMENTATION

The smaller the forest patch around a pool, the less food and shelter is available.

Roads and other barriers located between pools and uplands increase the odds of mortality during migration to and from a pool.


SLOW
SALAMANDER
XING

Always move an animal across the road in the direction it was headed.

Head Cuts

There is a headcut downstream, poised to impact this very nice floodplain vernal pool.

<< Outlet end of the vernal pool.

A headcut is located a short distance downstream along the vernal pool outflow channel>>

<<There is another headcut below the confluence of the outflow of a constructed pond and a small floodplain wetland.

<< The headcut will advance up both branches. It will be stop at the culvert for the constructed pond, but will progress unhindered into the floodplain wetland, eventually draining it.

DISEASES

Ranavirus

http://www.nwhc.usgs.gov/disease_information/other_diseases/ranavirus.jsp

and

Chytrid Fungus

(*Batrachochytrium dendrobatidis*)

http://www.amphibianark.org/the-crisis/chytrid-fungus/

Impact reptiles and amphibians

Cause large die-offs

Environmental stress may contribute to outbreaks (pesticides)

Spores and contaminated soils can be spread on equipment (nets, waders, boots)

Ranavirus: Wood frog larvae have the highest mortality (≥ 95% following exposure) and infection rates of northeast amphibians. Vernal pools may be the main source of the disease for other affected species (e.g., box turtles, spotted salamanders).

Craig Patterson

Gear Cleaning Protocols

Dry Gear Technique

- If only visiting one site and not going to another for several days, take your gear home. Scrub away loose dirt, vegetation, algae, etc. with soapy water.
- Let equipment dry completely at less than 70% relative humidity for a minimum of 48 hours.
- Equipment includes boots, clothing, or sampling gear that came in contact with the pool water.

Dilute Bleach or Nolvasan Technique:

If you visit multiple wetlands or streams in a day, you should disinfect your gear between sites.

Take your equipment (nets, boots, etc.) away from the wetland or stream. Rinse equipment with water and scrub away loose dirt, vegetation, algae, etc.

Spray all equipment that has contacted water with a disinfectant (see next slide for options).

Rinse with plain water and let dry (in the sun if possible) for 5 minutes.

Learn more at: *http://www.northeastparc.org/products/pdfs/NEPARC_Pub_2014-02_Disinfection_Protocol.pdf*

Disinfectant Solutions

Household Bleach*

1/2 cup added to
1 gallon water

- Cheap and convenient
- Solution lasts 1 month if kept in an opaque container
- Solution only lasts 5 days if exposed to sunlight/air.
- Bleach is more damaging to clothing and equipment

**1:32 dilution (bleach:water) for a 3% solution using 6% concentration household bleach*

Nolvasan S*

2 Tbsp added to
1 gallon water

- More expensive
- Solution made with tap water lasts 1 week (up to 6 weeks with deionized water)
- Doesn't damage gear like bleach can

**1:127 (Nolvasan:water) for a 0.75% solution using 2% concentration Chlorhexidine diacetate*

Applying the Disinfectant

- Easy Application: Mix disinfectant solution in a 1 gallon pump spray bottle. Fill a second pump sprayer (2 gallons works well) with water.
- Stand in a shallow, sturdy tub and spray disinfectant onto boots. Use a long handled brush to scrub the bottom and sides of boots. Excess spray creates a layer of solution in the tub to help soak the bottom of boots.
- Place other gear into the disinfectant tub. Add more solution as needed to effectively clean remaining gear.
- After 5 min, step into an empty tub. Rinse boots with water. Move other gear from the disinfectant tub to the rinse tub and flush with water.


Spectracide
Regular Bleach

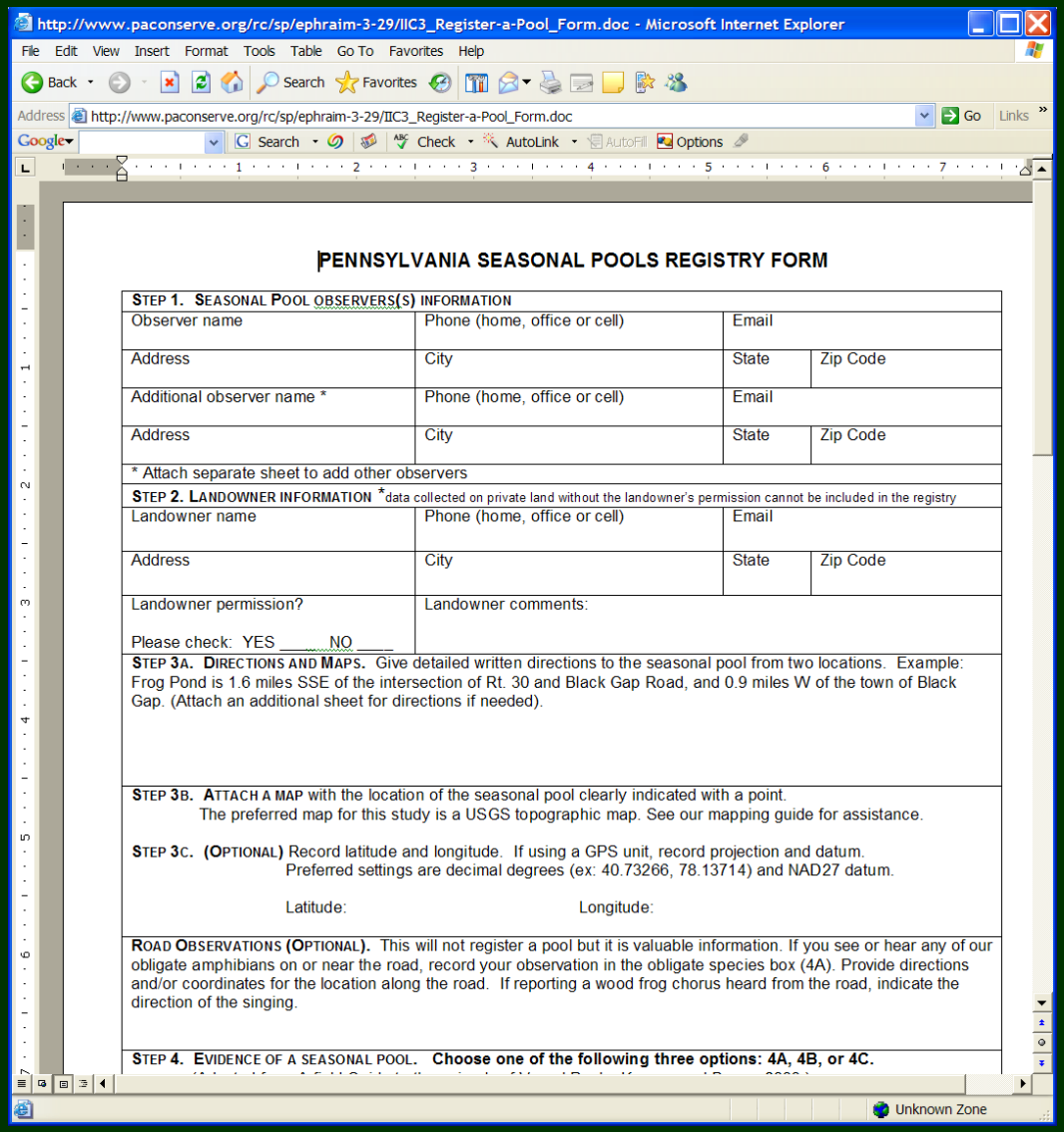

Guaranteed VALUE
regular bleach
Nolvasan S

Woodcrafting for Wildlife

http://www.portal.state.pa.us/portal/server.pt?open=514&objID=622397&mode=2

Register a Pool!

- Registry forms and instructions can be downloaded from the Vernal Pools of PA website
- Submit forms via snail mail or email



http://www.paconserve.org/rc/sp/ephraim-3-29/IIC3_Register-a-Pool_Form.doc - Microsoft Internet Explorer

File Edit View Insert Format Tools Table Go To Favorites Help

Back Search Favorites

Address http://www.paconserve.org/rc/sp/ephraim-3-29/IIC3_Register-a-Pool_Form.doc Go Links

Google Search Check AutoLink AutoFill Options

PENNSYLVANIA SEASONAL POOLS REGISTRY FORM

STEP 1. SEASONAL POOL OBSERVERS(S) INFORMATION			
Observer name	Phone (home, office or cell)	Email	
Address	City	State	Zip Code
Additional observer name *	Phone (home, office or cell)	Email	
Address	City	State	Zip Code
* Attach separate sheet to add other observers			
STEP 2. LANDOWNER INFORMATION *data collected on private land without the landowner's permission cannot be included in the registry			
Landowner name	Phone (home, office or cell)	Email	
Address	City	State	Zip Code
Landowner permission? Please check: YES _____ NO ____	Landowner comments:		

STEP 3A. DIRECTIONS AND MAPS. Give detailed written directions to the seasonal pool from two locations. Example: Frog Pond is 1.6 miles SSE of the intersection of Rt. 30 and Black Gap Road, and 0.9 miles W of the town of Black Gap. (Attach an additional sheet for directions if needed).

STEP 3B. ATTACH A MAP with the location of the seasonal pool clearly indicated with a point.
The preferred map for this study is a USGS topographic map. See our mapping guide for assistance.

STEP 3C. (OPTIONAL) Record latitude and longitude. If using a GPS unit, record projection and datum.
Preferred settings are decimal degrees (ex: 40.73266, 78.13714) and NAD27 datum.

Latitude: Longitude:

ROAD OBSERVATIONS (OPTIONAL). This will not register a pool but it is valuable information. If you see or hear any of our obligate amphibians on or near the road, record your observation in the obligate species box (4A). Provide directions and/or coordinates for the location along the road. If reporting a wood frog chorus heard from the road, indicate the direction of the singing.

STEP 4. EVIDENCE OF A SEASONAL POOL. Choose one of the following three options: 4A, 4B, or 4C.

Unknown Zone

http://www.naturalheritage.state.pa.us/VernalPool_Register.aspx

RESULTS OF THE REGISTRY

- Increases understanding of seasonal pools
- Identifies high quality vernal pool sites
- Documents the variety of types of seasonal pool communities
- Helps landowners manage their vernal pool resources
- Builds a database of seasonal pool locations and associated wildlife throughout Pennsylvania
- Reduces accidental destruction of vernal pools which might be overlooked during permit reviews.

REPORT RARE SPECIES!

These rare species may be found around vernal pools. Please report findings to the PA Natural Heritage Program

Jefferson Salamanders
Blue Spotted Salamanders
Marbeled Salamanders
Eastern Spadefoots
Spotted Turtles
Wood Turtles
Box Turtles

Required information: Date of observation, location (GPS point preferred), observer name, photos of the animal and habitat
Bonus information: Related observations and field notes.
Must have: landowner permission to collect data on private property.

The Pennsylvania Amphibian and Reptile Survey is a Partnership between Mid-Atlantic Center for Herpetology (MACHAC) and the PA Fish and Boat Commission

http://paherpsurvey.org

Contacts for more information:

Western PA Conservancy
Attn. Betsy Leppo
PA DCNR
PO Box 8552
Harrisburg, PA 17105-8552
phone: (717) 705-2814
bleppo@paconserve.org

Western PA Conservancy
Attn. JoAnn Albert
800 Waterfront Drive
Pittsburgh, PA 15222
phone: (412) 586-2330
Jalbert@paconserve.org

The Nature Conservancy
Attn. Elizabeth Johnson
2101 North Front Street
Building #1, Suite 200
Harrisburg, Pa 17110
phone: (717) 232-6001
Elizabeth_johnson@tnc.org

ClearWater Conservancy
Attn. Katie Ombalski
2555 North Atherton Street
State College, PA 16803
(814) 237-0400
Katie@clearwaterconservancy.org

State Resources

Game Commission Private Landowner Assistance Program (PLAP)
http://www.portal.state.pa.us/portal/server.pt?open=514&objID=620396&mode=2

Department of Conservation & Natural Resources Service Foresters
http://www.dcnr.state.pa.us/forestry/yourwoods/serviceforesters/

Department of Environmental Protection Bureau of Conservation and Restoration
http://www.portal.state.pa.us/portal/server.pt/community/bureau_of_conservation_and_restoration/10593

Department of Agriculture Pennsylvania Invasive Species Council
http://www.invasivespeciescouncil.com/

Local Resources

County Conservation Districts: Contact information listed by county at: *http://pacd.org/your-district/find-your-district/*

Penn State University (PSU) Cooperative Extension: Contact information listed by county at: *http://extension.psu.edu/counties*

Land Trusts: Find a local conservancy at the PA Land Trust Assocation website: *http://conserveland.org*

Watershed Organizations: a Pennsylvania Directory is available online at: *http://pawatersheds.org/membership/watershed-groups/*

Federal Resources – Many Programs!!

US Forest Service (USFWS)

http://www.fs.fed.us/openspace/current_tools.html

http://www.fs.fed.us/openspace/resources_and_tools.html

To get started with the USFWS, contact the Northeastern Area Office

http://www.na.fs.fed.us/

US Department of Agriculture (USDA)

Farm Service Agency (FSA)

http://www.fsa.usda.gov/

Natural Resource Conservation Service (NRCS)

http://www.nrcs.usda.gov/wps/portal/nrcs/site/national/home/

To get started with USDA, contact your local Service Center

http://offices.sc.egov.usda.gov/locator/app?service=page/CountyMap&state=PA&stateName=Pennsylvania&stateCode=42

NRCS Programs

Conservation Reserve Enhancement Program
http://www.fsa.usda.gov/programs-and-services/conservation-programs/index

Conservation Stewardship Program
http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/csp/

Environmental Quality Incentives Program
http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/

Conservation Reserve Program
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/mi/programs/?cid=nrcs141p2_024527

Agricultural Conservation Easement Program and Wetland Reserve Enhancement Partnership
http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/easements/acep/?cid=stelprdb1242695

Healthy Forests Reserve Program
http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/forests/

Great Websites!

- Amphibians and reptiles of Pennsylvania – PA Fish and Boat Commission http://www.fish.state.pa.us/amp_rep.htm
- Amphibian Research and Monitoring Initiative: http://armi.usgs.gov/
- Frogwatch USA - National Wildlife Federation: https://www.aza.org/frogwatch/
- Mid-Atlantic Region Seasonal Pools - U.S. Environmental Protection Agency: http://www.dnrec.delaware.gov/fw/dplap/information/Documents/Mid-Atlantic%20Seasonal%20Ponds%20-%20EPA.pdf
- New Jersey Vernal Pools: http://www.state.nj.us/dep/fgw/ensp/vernalpool.htm
- Rhode Island Vernal Pools: http://www.uri.edu/cels/nrs/paton/vernal_pool_def.html
- The Vernal Pool Association: http://www.vernalpool.org/
- Upper Susquehanna Coalition: http://www.u-s-c.org/html/vernalpoolpage.htm
- Vernal Pools of Pennsylvania – PA Natural Heritage Program: http://www.naturalheritage.state.pa.us/VernalPools.aspx

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Download a copy of this presentation as an Adobe PDF file

http://www.naturalheritage.state.pa.us/VernalPool_Education.aspx

Listen to a recording of the presentation

(a similar but not identical version)

http://extension.psu.edu/natural-resources/forests/courses/pa-forests-web-seminar-center/archive/forestry-series/2015/vernal-pools

THE END