

Vernal Pool Mapping and Conservation Workshop

Held in conjunction with the 2014 Northeast Natural History Conference

Date: Monday, April 7, 2014

Time: Noon to 5:30 pm (includes lunch)

Location: Sheraton Springfield Hotel, One Monarch Place, Springfield, MA

Food and beverages: A buffet lunch will include sandwich wraps (w/ meat-free options), pasta salad with fresh vegetables, soup, chips, and dessert. Snack break will feature veggies & dip, energy bars, nuts, fruits & berries, water, juices, and teas. Coffee will be available all afternoon.

Workshop Goals

The purpose of this workshop is to introduce the North Atlantic Vernal Pool Data Cooperative (VPDC) and provide a forum for participation in its development. Specific goals are to:

1. describe the project's overall approach to managing and mapping vernal pool information;
2. explore the scientific and conservation applications of a regionally coordinated dataset;
3. incorporate your input into the VPDC process and products in order to best meet your information needs; and
4. provide a forum for networking among vernal pool enthusiasts and professionals.

AGENDA

12:00 **Gathering and Luncheon Buffet**

12:45 **Welcome and Introductions** (Steve Faccio and Scott Schwenk)

1:00 **Workshop Goals and Process** (Dan Lambert)

1:15 **Panel 1: What is the North Atlantic Vernal Pool Data Cooperative?**

Compilation of Existing Vernal Pool Location Data

Steve Faccio, senior conservation biologist at the Vermont Center for Ecostudies, will describe a two-year process for identifying and compiling vernal pool location data in the North Atlantic region. He will also propose a general strategy for data integration, management, and dissemination.

Remote Sensing of Vernal Pools

Sean MacFaden, senior geospatial analyst at the University of Vermont Spatial Analysis Lab, will present a method to identify potential vernal pools using Light Detection and Ranging (LiDAR) technology and object-based image analysis. He will also describe plans to pilot this technique in two study areas within the North Atlantic region.

A Handbook for Coordinated Mapping of Vernal Pools

Dan Lambert, consulting ecologist at High Branch Conservation Services, will outline a document that will provide VPDC cooperators guidance on aligning vernal pool mapping efforts. He will also solicit input on the handbook in order to ensure its practical value to wildlife, wetland, and conservation professionals.

2:00 **Facilitated Discussion of the Vernal Pool Data Cooperative**

2:30 Refreshment / Coffee Break

2:45 Panel 2: Vernal Pool Mapping for Science, Management, and Conservation

The North Atlantic LCC Conservation Planning Atlas: A Tool to Deliver Vernal Pool Information

BJ Richardson, Science Applications GIS Coordinator for the North Atlantic LCC, will introduce this online platform, which provides easy access to high-quality geospatial datasets, maps and information to facilitate partner-driven conservation. He will demonstrate the Atlas' various functions (display, analysis, and download), using vernal pool data from Vermont.

Designing Sustainable Landscapes

Scott Schwenk, Science Coordinator for the North Atlantic LCC, will describe how standardized habitat data are being used to assess the region's capability to sustain wildlife populations in the face of urban growth, changing climate, and other disturbances. He will also discuss the potential to enhance landscape-level modeling with vernal pool data.

Scientific and Management Applications of Regional Vernal Pool Data

Dan Lambert will lead an information synthesis and brainstorming exercise to document existing and potential uses of vernal pool data for science, management, and conservation.

3:30 Facilitated Discussion of Scientific, Management, and Conservation Applications

3:45 Survey to Identify Information Sources and Gaps

Participants will be invited to provide basic information about existing vernal pool datasets on a written questionnaire. Respondents will also be asked to identify specific areas (e.g., counties, watersheds, ecoregions) where increased knowledge of vernal pool locations is a critical conservation need. This information will help VPDC project leaders prioritize data recruitment and geospatial modeling efforts.

4:00 Breakout Discussions

Small-group discussions will be organized around the following themes and questions in order to achieve the stated objectives. Participants will be asked to identify their preferred topic and review draft materials before the meeting to ensure that the discussions are productive.

Data and Metadata Standards (Steve Faccio)

Objective: reach consensus on required and optional VPDC data and metadata fields

- What required data fields should form the core of the VPDC?
- What optional data fields should be included to add value?
- What metadata standards would ensure essential documentation w/out discouraging participation?
- What other useful information could VPDC cooperators provide?

Data Access and Visualization (Kent McFarland and BJ Richardson)

Objective: establish unified guidelines for securing, exchanging, and visualizing location data

- What data access and visualization capabilities do stakeholders need?
- Can the NALCC Conservation Planning Atlas provide this functionality?
- How will prospective users learn that restricted data exist and may be available by permission?
- Do the proposed data access levels meet security and accessibility needs?
- Should VPDC participants have the option of obscuring location information in visual displays?

- If so, at what scales should the information be presented?

Defining “Vernal Pool” (Dan Lambert)

Objective: develop standards for classifying the small wetlands that will be considered “vernal pools” for the purposes of this mapping project

- What are the physical and biological attributes of the wetlands that will be mapped as “vernal pools”?
- Which of the region’s diverse wetland types can feature these characteristics?
- How should these wetland communities be defined?

Selecting Variables to Model Potential Vernal Pool Locations (Sean MacFaden)

Objective: develop a list of variables and source datasets that could be incorporated into the regional vernal pool geospatial model

- What landscape and site characteristics influence vernal pool habitat quality?
- Which of the suggested variables should be included in the modeling process?
- What variables should be added?
- What is the role of vernal pool experts in future model development and/or validation?

5:00 **Breakout Reporting and Wrap-Up**

5:30 **Adjourn**

The Vermont Center for Ecostudies is coordinating the Vernal Pool Data Cooperative with funds from the North Atlantic Landscape Conservation Cooperative. The project’s advisors and collaborators include representatives from: Clemson University, High Branch Conservation Services, the Maryland Department of Natural Resources, NatureServe, the New Jersey Department of Environmental Protection, Paul Smith’s College, Siena College, the University of Maine, and the University of Vermont.

Vernal Pool Mapping and Conservation Workshop Background Materials

The following materials will be used as references to frame collaborative dialogue at the workshop. Please determine which breakout discussion is of greatest interest to you, consider the associated questions, and engage in the conversation with constructive ideas and an open mind. Thank you!

Objectives of the Vernal Pool Data Cooperative

The objectives of the VPDC are to:

- 1) compile a comprehensive GIS database of vernal pool locations;
- 2) describe the mapping and verification approaches currently being employed in the region;
- 3) develop a remote sensing method using LiDAR to efficiently identify potential vernal pool locations; and
- 4) prioritize areas for future mapping.

Geographic Scope

The North Atlantic Landscape Conservation Cooperative encompasses all or parts of Virginia, Maryland, Delaware, Pennsylvania, New Jersey, New York, Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire, Maine, Quebec, New Brunswick, Nova Scotia, and Prince Edward Island (see map below right). The VPDC's primary emphasis will be on the US portion of this region, however participation from adjacent areas will be encouraged.

What is the NALCC Conservation Planning Atlas?

After an extensive [information management needs assessment](#) with Northeast partners, the North Atlantic LCC has chosen DataBasin as the information management system and visualization platform for its [Conservation Planning Atlas](#), a platform for easy access to high-quality geospatial datasets, maps and information to facilitate partner-driven conservation. Data will reside in USGS's [ScienceBase](#), a searchable data management and web mapping services platform, and the services will be imported to DataBasin to put into live web maps. This combination of systems will be used by at least 17 of the 22 LCCs nationwide, and will enable consistency across the LCCs for stakeholders and the public to find and use the many data products that have and will continue to come out of the LCCs. Data will also be made available for download through this system, with downloads coming from data owners as much as possible.



Discussion Questions and Reference Materials for Breakout Discussions

Breakout 1: Data and Metadata Standards (Steve Faccio)

Objective: reach consensus on required and optional VPDC data and metadata fields

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- What optional data fields should be included to add value?
- What metadata standards would ensure essential documentation w/out discouraging participation?
- What other useful information could VPDC cooperators provide?

Proposed Minimum and Supplementary Data Field

| Minimum Fields Required | Notes |
|--|-------------------------------------|
| Unique ID | |
| Remotely Mapped? | Yes/no |
| Remote mapping source | CIR, orthophoto, etc. |
| Remotely Mapped by? | necessary? |
| Date remotely mapped | |
| Field Visited? | Yes/no |
| Date of field visit | |
| Original Data source | Description of original data source |
| Institutional code | linked to metadata |
| Town | |
| State | |
| LocationComments | |
| Coordsource | GPS/Google Earth/topo map, etc. |
| Lat | specify datum? |
| Long | specify datum? |
| LandOwnerPermmision? | Yes/no |
| Data Restriction Category | TBD |
| | |
| | |
| | |
| Supplementary Fields (Optional) | |
| PoolType | |
| InletType | |
| OutletType | |
| UplandHabitat | |
| ForestType | |
| MaxDepth | |
| HydroPeriod | |
| MaxWidth | |
| MaxLength | |
| Pool Disturbance | |
| Biological indicators | Yes/no |
| Species | |
| No. of Eggs | |
| Larvae? | Yes/no |
| Adults? | Yes/no |
| SpeciesComments | |

Breakout 2: Data Access and Visualization (Kent McFarland and BJ Richardson)

Objective: establish unified guidelines for securing, exchanging, and visualizing location data

- What data access and visualization capabilities do stakeholders need?
- Can the NALCC Conservation Planning Atlas provide this functionality?
- Do the proposed data access levels meet security and accessibility needs?
- How will prospective users learn that restricted data exist and may be available by permission?
- Should VPDC participants have the option of obscuring location information in visual displays?
- If so, at what scales should the information be presented?

Proposed Data Access Levels

Level 1: Unrestricted - Vernal pool data are unrestricted and can be made available for visualization and download through Data Basin.

Level 2: Visualization only – Vernal pool data can be used for visualization in Data Basin. Anyone wishing to download and use the data must contact the original data source.

Level 3: Restricted – Vernal pool data cannot be used for visualization in Data Basin. Anyone wishing to obtain the data must contact the original data source.

Breakout 3: Defining “Vernal Pool” (Dan Lambert)

Objective: develop standards for classifying the small wetlands that will be considered “vernal pools” for the purposes of this mapping project

- What are the physical and biological attributes of the wetlands that will be mapped as “vernal pools”?
- Which of the region’s diverse wetland types can feature these characteristics?
- How should these wetland communities be defined?

Proposed Definition

“Vernal pools are temporary to semi-permanent pools occurring in shallow depressions that typically fill during the spring or fall and may dry during the summer or in drought years. [These pools are usually associated with forested landscapes in glaciated northeastern North America.] They may have intermittent inlets or outlets, but are not otherwise hydrologically connected through surface waters to permanent bodies of water that support predatory fish. Vernal pools occur in a diversity of landscape settings including isolated upland depressions, depressions in floodplains, as part of headwater streams and seepage systems (pools “strung” like pearls on a temporarily intermittent chain), or embedded in larger wetland complexes (e.g., shrub or forested swamps, peatland lags). Vernal pools provide the primary breeding habitat for wood frogs, spadefoot toads, ambystomatid salamanders, and numerous invertebrate taxa adapted to temporary, fishless waters.” - from *Science and Conservation of Vernal Pools in Northeastern North America* (Calhoun and DeMaynadier 2007)

Matrix of vernal pool characteristics used in this and other definitions

| | Temporary / seasonal | isolated | lack predatory fish | In/ near forest | Small | Shallow | min. hydro-period | Naturally occurring | Provide habitat |
|------------------------------|----------------------|---------------------|---------------------|-----------------|-------|--------------|-------------------|---------------------|-----------------|
| Calhoun and DeMaynadier 2007 | x | can be / not always | x | “usually” | | x | | | x |
| Kenney and Burne 2000 | x | x | x | | | | | | x |
| Colburn 2004 | x | x | x | x | x | x | x | | x |
| Morgan and Calhoun 2012 | x | | x | | | “tend to be” | | x | x |
| Maryland DNR 2005 | x | x | x | “typically” | x | | | | |

Rationale for using “vernal pool” as an imprecise designation that includes true vernal pools and other wetland types

- It is familiar to practitioners and the public
- It is well-established in the literature
- It is commonly used in conservation planning and environmental regulation

Breakout 4: Selecting Variables to Model Potential Vernal Pool Locations (Sean MacFaden)

Objective: develop a list of variables and source datasets that could be incorporated into the regional vernal pool geospatial model

- What landscape and site characteristics influence vernal pool habitat quality?
- Which of the suggested variables should be included in the modeling process?
- What variables should be added?
- What is the role of vernal pool experts in future model development and/or validation?

Possible Inputs for Remote Sensing-based Modeling of Vernal Pools

(Data availability and quality dependent on location)

LiDAR Data and Derivatives

Original LiDAR Point Data

LiDAR Intensity

Digital Elevation Model

Hydrological Flow Accumulation

Normalized Digital Surface Model

Percent Canopy Cover

Slope

Aspect

Imagery and Derivatives

Multispectral Satellite or Aerial Imagery (e.g., 4-band National Agricultural Imagery Program)

Orthophotography (e.g., black & white leaf off photos)

Land-cover Maps (e.g., National Land Cover Dataset)

Thematic

Soils

Bedrock

Surficial Geology

Road Centerlines

Building Points

Hydrography – Polygons (Lakes and Rivers)

Hydrography – Lines (Streams)

Landscape Context (Derived from above inputs)

Size

Shape

Depth

Vegetation Density

Distance to Other Potential Pools

Distance to Water

Distance to Developed Features

Size and Configuration of Surrounding Forest Patches

Others?

Workshop Participant List

| | | | | | |
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