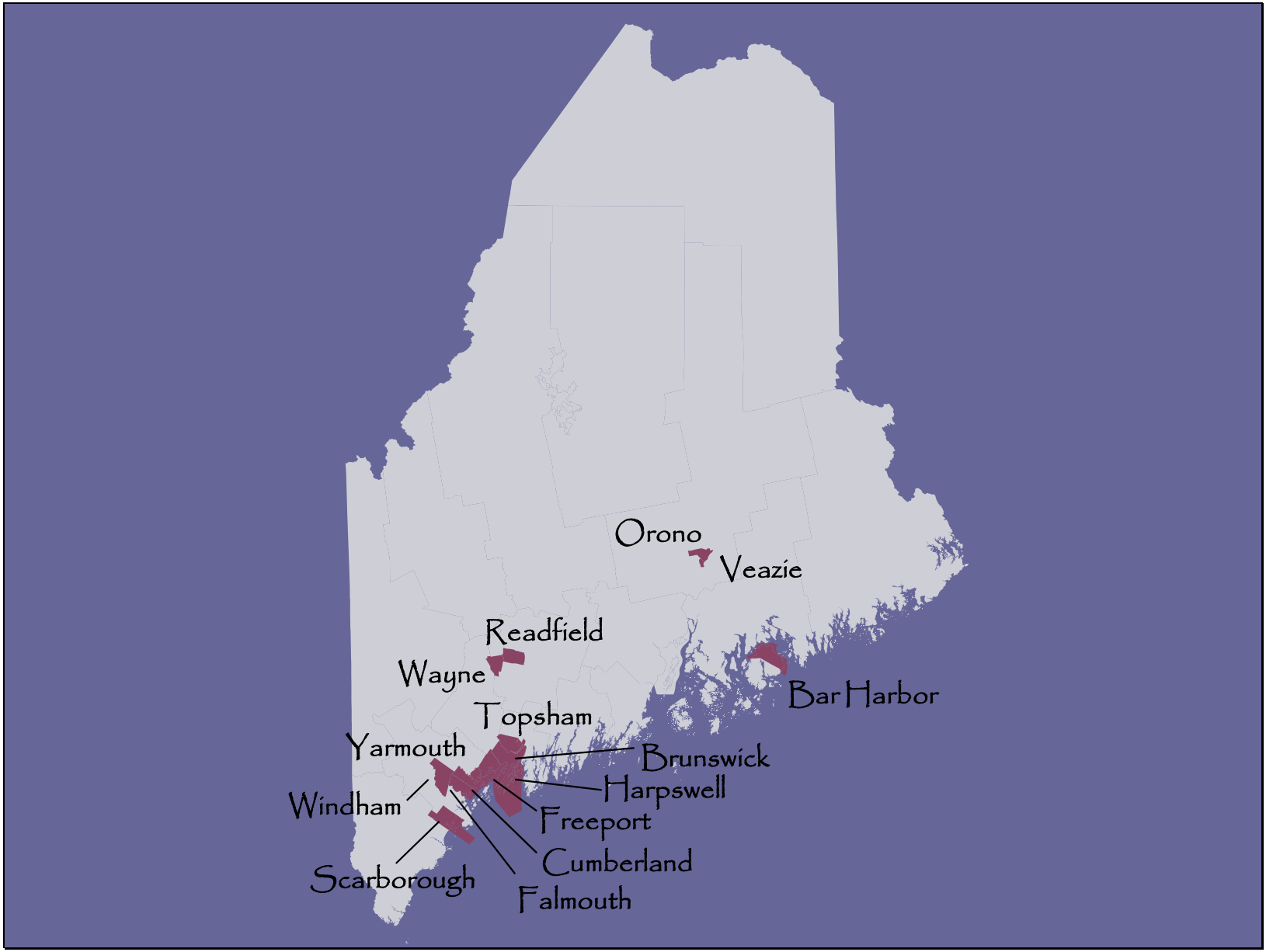
Slide 1


A Community
Based Approach
to Mapping
Vernal Pool Resources

Slide 2



As of Spring 2009, there are 13 towns in the state that are committed to mapping their vernal pools using a community based approach where volunteers are trained to conduct field assessments. The town of Falmouth completed this process in 2004, three years before the Significant Vernal Pool legislation was in place.

In future years, we hope to see towns from Northern, Downeast, and Western Maine participating.

Mapping Vernal Pools at the Municipal Level

Step 1: Acquiring Aerial Photographs

Step 2: Photo Interpretation

Step 3: Map Preparation

Step 4: Landowner Permission

Step 5: Recruiting Volunteers

Step 6: Training Volunteers

Step 7: Field Assessments

Step 8: Formatting Data for use by Town Officials

There are a number of steps involved in the process of mapping vernal pools at the municipal level. The intention of this presentation is to highlight the major components of the process. We are currently working on a manual for towns that will go through this process in greater detail.

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Interpretation of aerial photographs is a first step in the process of mapping vernal pools. At a town-wide scale, this has proven to be the most effective technique for identifying typically small vernal pools.

Remote delineation of wetlands done by the National Wetland Inventory (NWI) typically uses photographs taken at a scale of 1:24,000. Identification of small wetlands requires much larger scale photographs. A scale between 1:4,800 (1 inch on the photo represents 400 feet on the ground) and 1:12,000 (1 inch = 1,000) is sufficient for identifying potential vernal pools. For the best results, the largest scale feasible should be used for this process. Use of larger scale photography may result in the detection of some of the smaller more obscure pools; however, the associated increase in number of photographs, each covering a smaller geographic area, will come at a greater cost. Viewed stereoscopically, color infrared imagery make shadows and topographic depressions more easily discernable, and standing water presents as dark blue to black in color. Color infrared images produce the best results for mapping pools; however, true color aerial photographs may be used as well. Acquiring either 9" x 9" stereo contact prints to be viewed under a stereoscope, or a digital photo-mosaic compiled for viewing on screen in a 3-D heads-up display, will provide much better results than identification of pools in 2-D. Images used for photo interpretation should be taken in the spring time before the buds are swollen or leaves are out as water levels are high and pools are most readily detectable.

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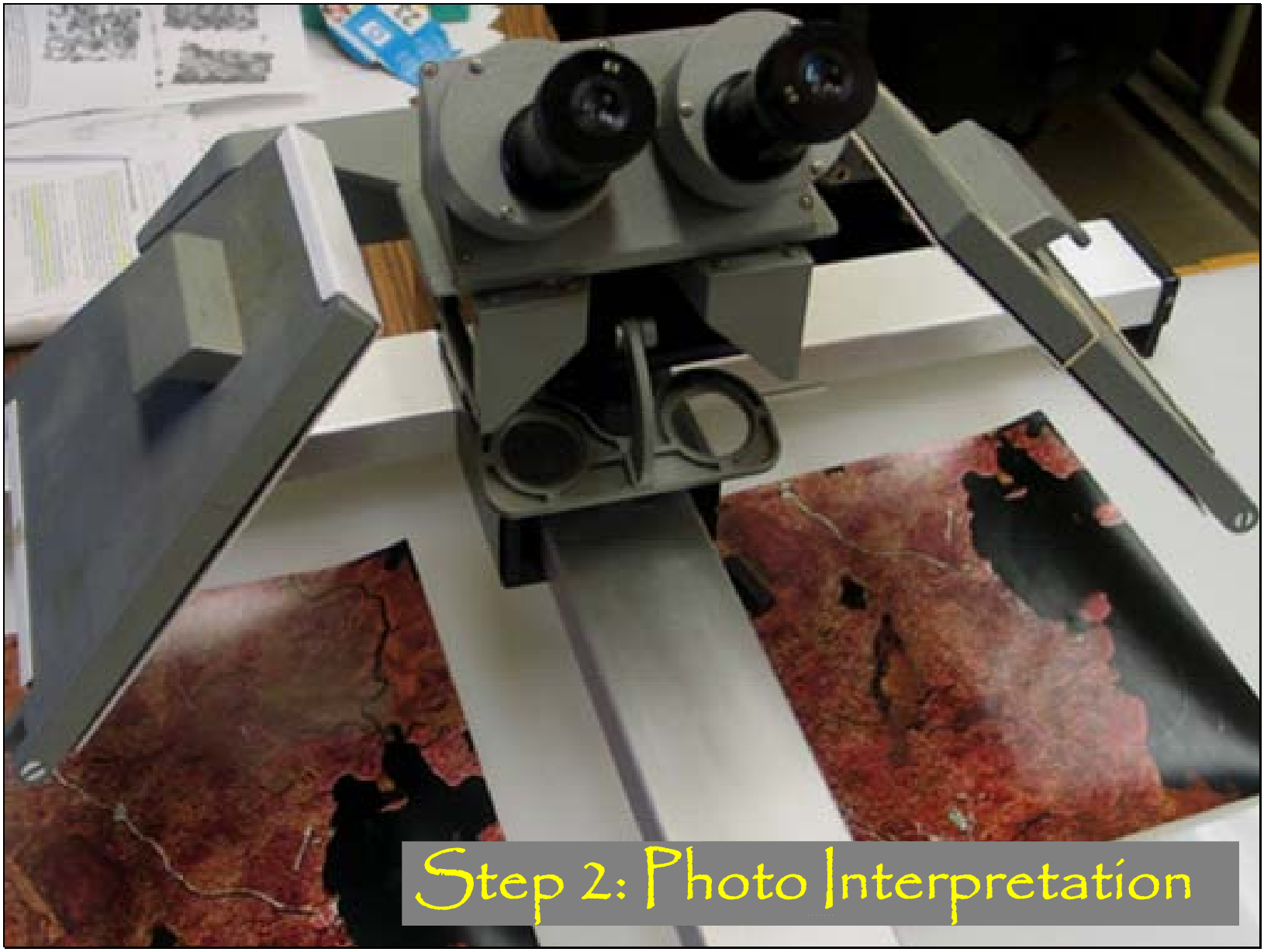

Remote identification of vernal pools and other small wetlands should be done by a trained professional, familiar with vernal pool ecology and wetland regulation, and skilled in identifying signatures of potential vernal pools on aerial photographs. Traditionally, photo interpretation has been conducted using paired 9" x 9" stereo contact prints viewed under a stereoscope, where the perimeters of pools are traced onto clear acetate overlays, and then transferred to a digitized format for use in a GIS.

Often confined within a forested landscape, vernal pools vary greatly in shape and size. As the only type of wetland defined by the animals that breed in them, rather than by their hydrology or dominant vegetation, vernal pools may occur within silver maple flood plain forests, a depression in a mixed canopy forest surrounded by upland, peat lands (bogs or fens), or under a dense canopy of evergreen trees within an expansive forested wetland. These very characteristics are what make vernal pools so difficult to locate and map. Through photo interpretation the majority of small wetlands that occur on the landscape can be identified, some pools (up to 30%) are not detectable due to their small size, interference of tree or hillside shadowing, their occurrence under a dense canopy of evergreen or mixed trees, or within a larger wetland complex. Using this technique there is the potential for errors of both omission (pools occur on the landscape, but are not remotely detected on imagery), and commission (areas on the aerial photograph that are misidentified as potential vernal pools). Inaccuracy falling under the category of commission may result from non-wetland features such as shadows, or as wetlands that upon inspection do not provide adequate habitat for species dependent upon vernal pools. Although there is potential for error, photo interpretation followed up by assessment in the field is currently the most efficient method for identifying vernal pools at a landscape scale.

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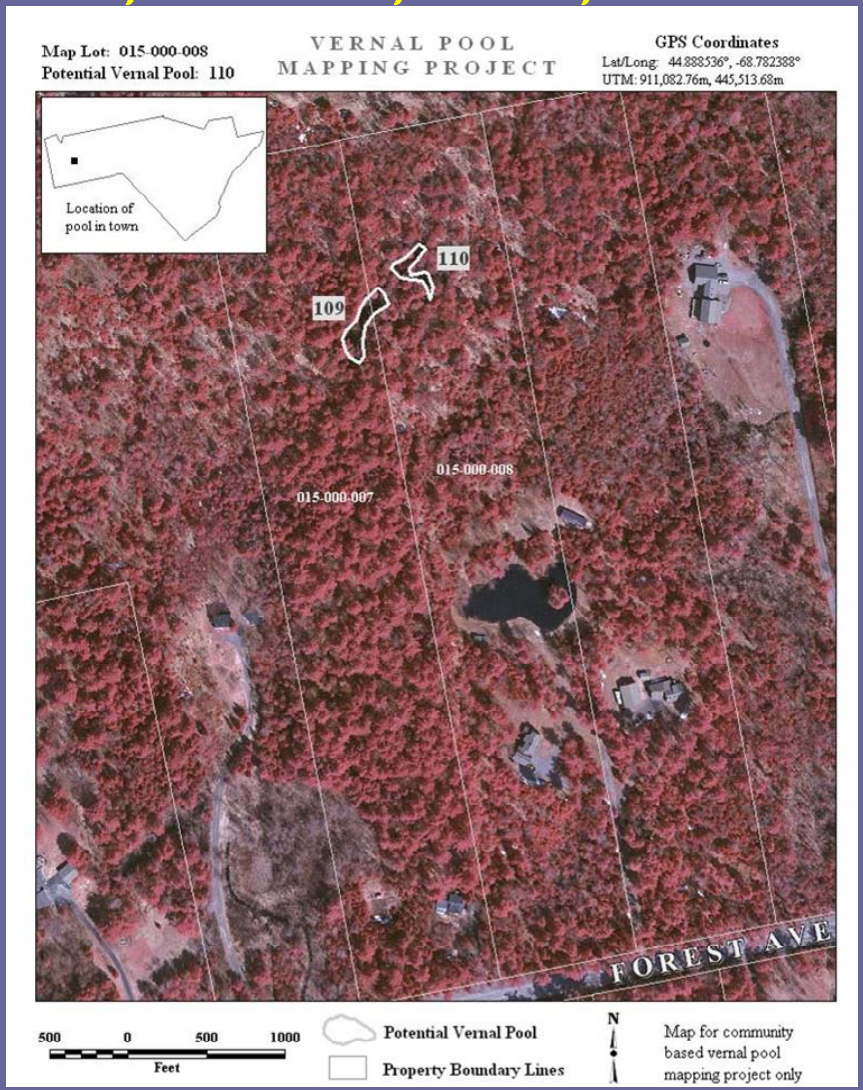
Recent advances in technology have provided the option of on-screen viewing of digital photo-mosaics in 3-D. In some regions of Maine, appropriate scale imagery is available for purchase in digital format, eliminating the cost of purchasing printed images and the time required to transfer data from acetate to a GIS layer.

Step 3: Map Preparation



Using the GIS layer of potential vernal pools in conjunction with town tax maps, the parcel (lot) number, landowner name and contact information may be identified from town records for each potential vernal pool. This information may then be used to create mailing labels for the purpose of requesting access to pools on private property.

Maps similar to this one are provided to volunteers for the purpose of locating potential vernal pools in the field.

Step 4: Permission from Landowners

TOWN OF BRUNSWICK, MAINE
INCORPORATED 1739
DEPARTMENT OF PLANNING AND DEVELOPMENT
28 FEDERAL STREET
BRUNSWICK, ME 04011

Dear Landowner:

As of September 2007, The Maine Department of Environmental Protection (DEP) began to regulate Significant Vernal Pools (SVPs) in Maine. Vernal pools are shallow depressions that fill with snowmelt and runoff in the spring. They provide essential breeding areas for wood frogs and salamanders, as well as feeding and resting habitats for deer, moose, bear, and a suite of other mammals, birds, and reptiles. Any development or fill activities within 250 feet of a significant vernal pool will now require a permit from the DEP.
This letter will inform you about a free opportunity to learn if your property contains a SVP.

At this time, there is no State list of significant vernal pools and therefore it is the landowners' responsibility to determine if a property contains a SVP if they plan to impact within 250 feet of a pool. Vernal pools are deemed "significant" if they contain a certain number of amphibian egg masses. Therefore, the pools must be assessed during the peak spring breeding season of wood frogs and spotted salamanders, adding both time and expense to a proposed development. If developers want to avoid these constraints, they must assume their vernal pool is "significant" and abide by the permitting guidelines.
The Town of Brunswick plans to proactively inventory SVPs this spring to make it as easy as possible for landowners to meet State regulations when proposing development, and to help landowners learn more about their properties. The Town has created a map of *potential* vernal pools using aerial photographs.
Your property has been identified as one that has a *potential* vernal pool (see attached map).

Each landowner will receive a letter from the town explaining the project and requesting permission to send trained volunteers to conduct field assessments to determine whether their pool(s) meet the State criteria to be mapped as providing Significant Wildlife Habitat. A copy of the map shown on the previous slide will also be included with the permission letter so landowners know the location on their property where a potential vernal pool was identified.

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Step 5: Recruiting Volunteers

University of Maine

(Aram Calhoun and Dawn Morgan)

↓

Town Coordinator

(Town Manager, Natural Resource Planner, Con Com Members, Town Planner)

↓

Volunteer Coordinators

(5 people with field data collection experience)

↓

Volunteers

(25 people)

The University of Maine provides support, training and guidance for towns involved in this project. Each town coordinator is responsible for recruiting 5 volunteer coordinators and roughly 25 volunteers.

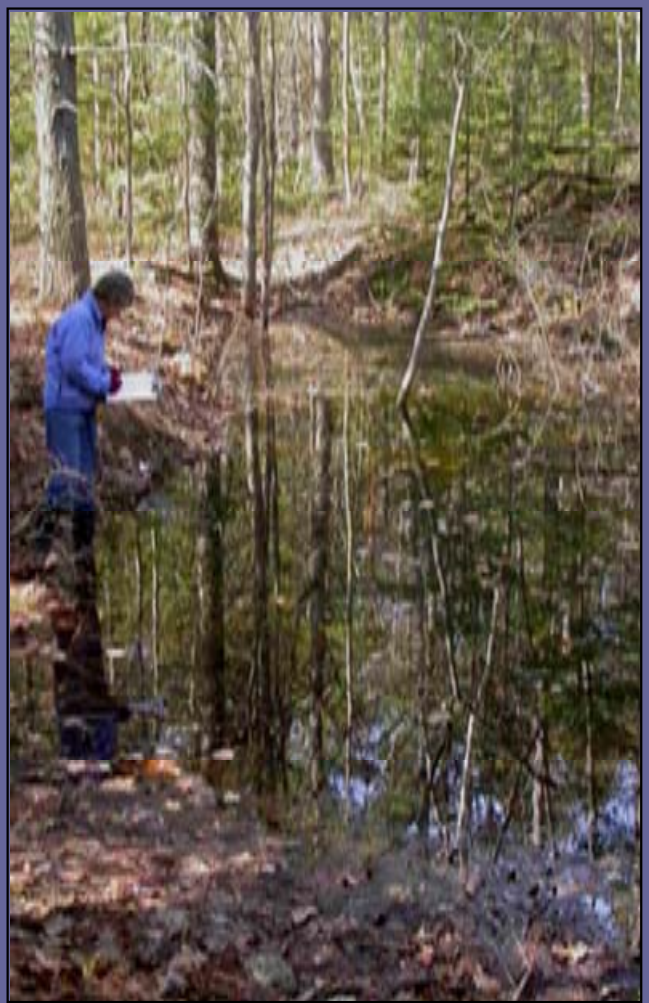
Volunteer Coordinator Responsibilities

- Attend trainings
- Serve as a local resource
- Be responsible for assisting 5 volunteers (on call)
- Make one field visit with each of 5 volunteers
- Be responsible for collecting data forms and returning to town office

Ideally, volunteer coordinators will have experience with the data collection involved in biological field work (but not necessarily with vernal pools).

Consultants, professors, high school teachers, retired biologists or natural historians, college students, or members of Maine Audubon, the local land trust or conservation commission will likely make good volunteer coordinators. Volunteer coordinators will attend training sessions, but will not conduct their own field assessments. Instead, they will serve as a local resource and be responsible for helping 5 volunteers with their field assessments. They will make a minimum of one field visit with each volunteer to make sure their volunteers are on the right track. They will be available to answer questions by phone or email, and will collect data forms at the end of the season and return them to the town office.

Volunteer Responsibilities



- Attend trainings
- Assess 3 to 5 potential pools
- Work with a buddy
- Stay in contact with VC
- Return data forms to VC

Volunteers will commit to attending training sessions provided and agree to visit between 3 and 5 potential vernal pools two times each spring for two years. Volunteers should not work alone, but do not need to bring another trained volunteer as their "buddy." Volunteers should maintain contact with their volunteer coordinator and request assistance when necessary.

A successful vernal pool volunteer is someone who....

- can read a map
- is comfortable in the woods
- can record observations
- likes to wear rubber boots
- doesn't mind getting wet
- will return data

Volunteers are provided with aerial photographs depicting the location of potential vernal pools. Volunteers should feel comfortable using an aerial photograph to navigate through the woods. Counting egg masses often involves wading into pools. Volunteers should be comfortable with the potential of getting wet and dirty. Each town involved in this project is counting on volunteers to record accurate observations and return their data in a timely manner.

Step 6: Training Volunteers

First Training

(community members, volunteers, volunteer coordinators)

- Overview of project
- Vernal pool ecology
- Introduction to resource materials

Second Training

(volunteers and volunteer coordinators)

- Field assessment data forms
- Egg mass identification video
- Training in field

The University of Maine is providing training sessions for each town involved in this project. The first training consists of an informational meeting for landowners, community members, town officials, volunteers, and volunteer coordinators. The steps involved in the project are discussed and an overview of vernal pool ecology is provided.

At the second training, volunteers and volunteer coordinators learn how to conduct a field assessment, what is required to fill out the data form, and the skills necessary to correctly identify vernal pool species and count amphibian egg masses.

Step 7: Field Assessments

Municipal Vernal Pool Mapping Project Data Form Spring 2009

Please refer to reverse side for instruction

1. 

Wood Frog Visit ☐ Date: _____

Salamander Visit ☐ Date: _____

2. Potential vernal pool number (PVP #): _____ 3. Tax map number: _____

4. Volunteer Name: _____ Phone Number: _____ Email: _____

Volunteer Name: _____ Phone Number: _____ Email: _____

5. Is PVP a vernal pool? YES ☐ NO ☐ UNKNOWN ☐ UNABLE TO LOCATE ☐

6. PVP is not a vernal pool, but is it a: FARM POND ☐ DITCH ☐ TIRE RUT ☐ GRAVEL PIT ☐

ACTIVE BEAVER POND ☐ WETLAND TOO SHALLOW TO BE A VERNAL POOL ☐ OTHER: _____

7. Pool(s) found that were not marked on map. YES ☐ NO ☐ (Use separate form for each additional pool found and mark on map.)

8. For each species, indicate the number of egg masses counted

	Indicator Species	Number
EGG MASSES	Wood Frog	
	Spotted Salamander	
	Blue-spotted Salamander	

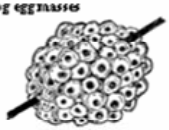
	Indicator Species	Presence/Absence
LARVAE	Wood Frog	
	Salamander	
ADULTS	Wood Frog	
	Spotted Salamander	
	Blue-spotted Salamander	
	Fairy Shrimp	

9. Are spermatophores present?

YES ☐ NO ☐

10. Condition of wood frog egg masses

a. Firm, tight mass where individual eggs are spherical and easily discernable ☐



b. Eggs are swollen with water and mass is beginning to break down ☐

c. Larvae hatched or hatching and egg mass is disintegrating ☐

11. **Photo Documentation**
Data forms **MUST** be accompanied by photographs. Include at least one labeled photograph of each adult, egg mass or larvae for each species.

12. **General comments and/or other wildlife observations** (optional).

Step 7: Field Assessments

Instructions for Municipal Vernal Pool Mapping Project Data Form

Field assessments are not permitted on properties without signed permission from the landowner.

1. When you arrive at a pool, please record the date and make a check in the box next to the wood frog if it is your first visit, and next to the salamander if you are visiting the site for the second time.

2. A potential vernal pool (PVP) number is assigned for each pool and may be found on your map.

3. The property ownership number for each parcel should also be located on your map.

4. It is recommended that you work in **pairs** to conduct field assessments. Please select the person most experienced with field data collection as the contact person. Provide their name, phone number and email address on the data form.

5. Is your PVP a vernal pool, are you unsure, or are you unable to find a pool where you believe the PVP is located?

6. Farm ponds, ditches, active beaver ponds, tire ruts, gravel pits, slow moving streams, and other types of wetlands that may be too shallow, are all examples of features that may be identified as PVPs, but are **NOT** vernal pools.

7. If you encounter additional pools, please mark their location on your map and fill out a separate data form for each one.

8. For each species, indicate the number of egg masses counted and presence or absence of larvae and adults. Please refer to the training materials provided for assistance with egg mass counts.

9. Male salamanders that breed in vernal pools deposit packets of sperm called spermataphores on the pool bottom which are later picked up by females for internal fertilization. During a field assessment if you do not find any salamander egg masses, but spermataphores are observed attached to sticks or on leaf litter, this is an indication that salamanders breed in the pool, but you are too early to count their egg masses. A follow up visit should be scheduled.

10. Wood frog masses are easiest to count shortly after they are laid when eggs appear as tightly packed spheres and individual masses are easily discernable. Using the sketches on the data form as a guide, please indicate the condition of the wood frog egg masses in each pool.

11. Photographic documentation will be used to verify the observations recorded on each data form. Data forms filled out by trained volunteers **MUST** be accompanied by photographs for species identification and habitat verification. Towns are not able to accept data from citizen scientists without photo-documentation. If you do not have access to a digital camera, please work with a volunteer who has access to a camera. For vernal pool species seen, include at least **ONE** photograph of each adult, egg mass or larvae. Photographs will be used to be sure that you identified species correctly.

For each potential vernal pool that is visited, download and include all images within a computer file folder with a name that reflects the pool identification number (PVP #), the observer's last name, the year, and the name of your town. Photos for EACH of the two visits may be included within the same computer folder. Once digital images are downloaded onto a computer please re-name each image to reflect site specific information. Please include (1) title information for each pool that reflects the pool identification number, (2) the subject of the photograph (WF tadpole, SS egg mass, etc.), and (3) whether the photograph was taken on the first or second visit.

sample computer file name for digital photos

examples of photo names

- PVP 44 Fairy Shrimp - 1st visit.JPG
- PVP 44 SS egg mass a - 2nd visit.JPG
- PVP 44 SS egg mass b - 2nd visit.JPG
- PVP 44 WF egg mass - 1st visit.JPG
- PVP 44 WF egg mass -1st visit.JPG
- PVP 44 WF tadpole - 2nd visit.JPG
- PVP 44 WF adult - 1st visit.JPG

12. (Optional) You may include comments about the pool, surrounding habitat, or additional wildlife observations. Please provide photos of rare, threatened, and endangered species, including ribbon snakes, wood, spotted, or Blanding's turtles.

When field assessments are complete, please turn in data forms, digital photographs, and field maps to the town office.

Photo Documentation




Photographic documentation will be used to verify the observations recorded on each data form. Data forms filled out by trained volunteers **MUST** be accompanied by photographs for species identification and habitat verification. Towns are not able to accept data from citizen scientists without photo-documentation. A minimum of one photograph is required of each adult, egg mass or larvae for each species present.

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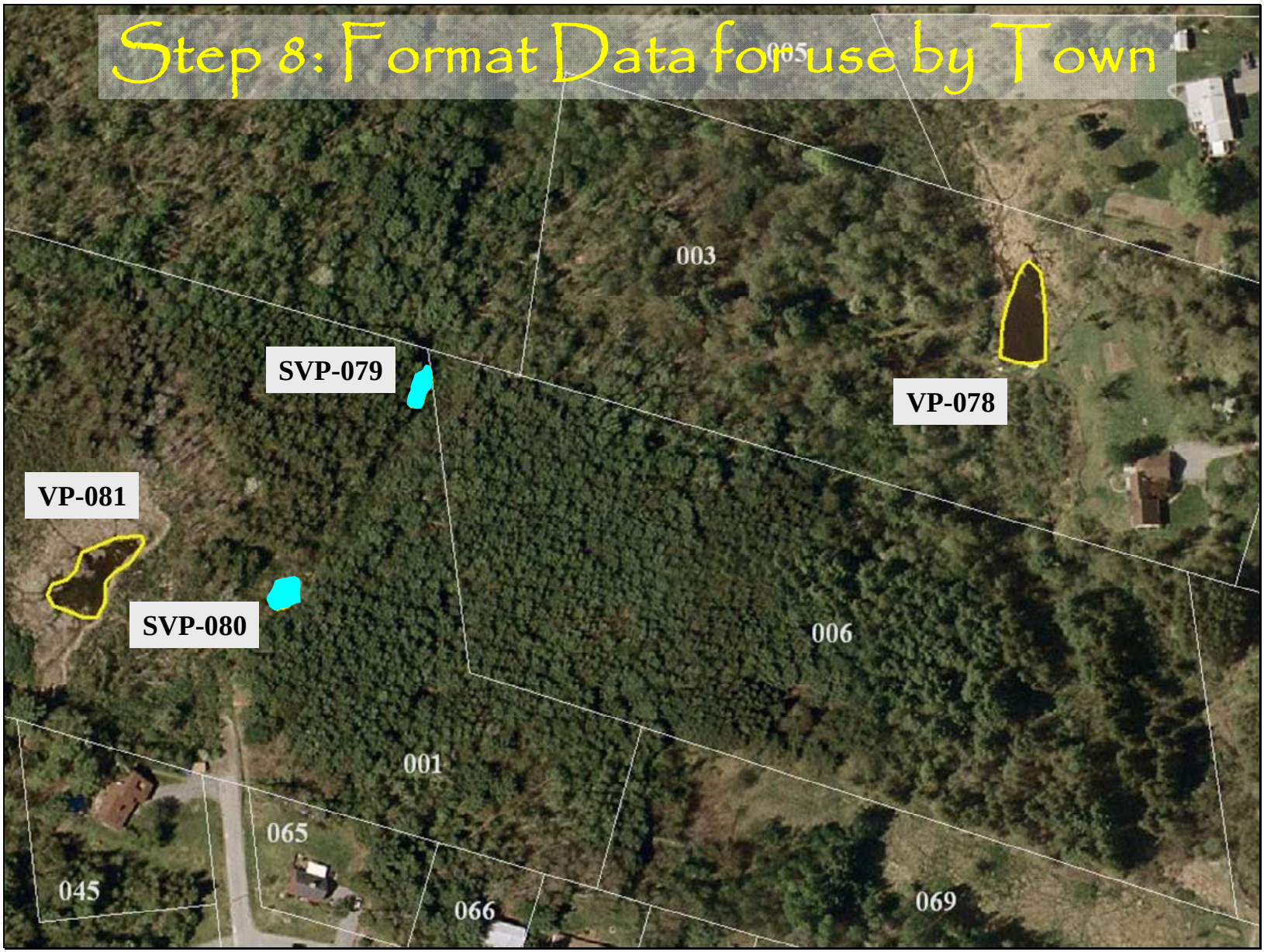

Once field assessments are complete, egg mass data will be evaluated and potential Significant Vernal Pools will be entered as a GIS layer for municipal planning purposes. Final decisions on pool status are made by Maine DEP.

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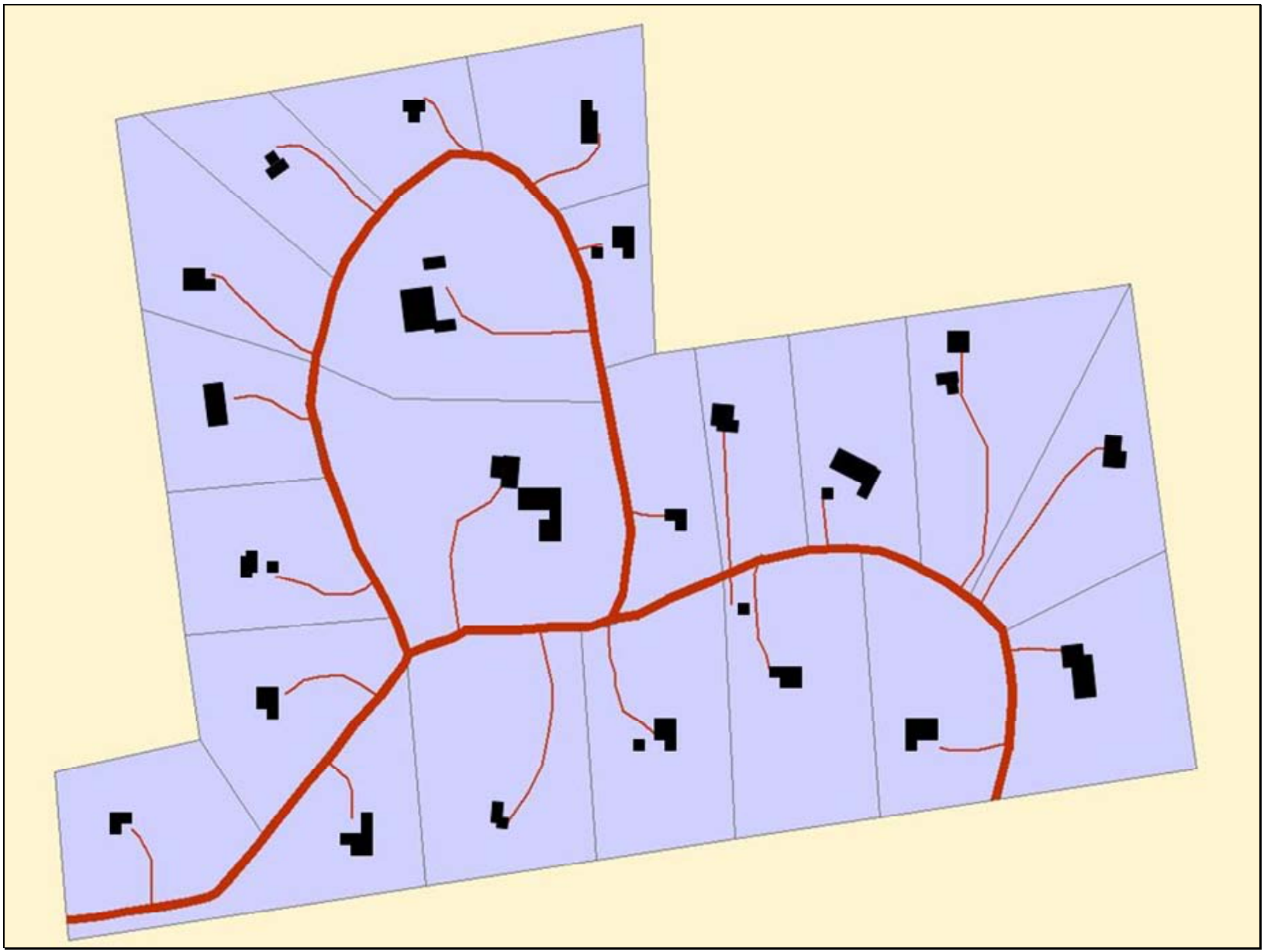

Example of a proposed subdivision without knowledge of the location of Significant Vernal Pools.

The following example of a proposed subdivision is intended to demonstrate how knowledge of the location of Significant Vernal Pools may be used in the development planning process.

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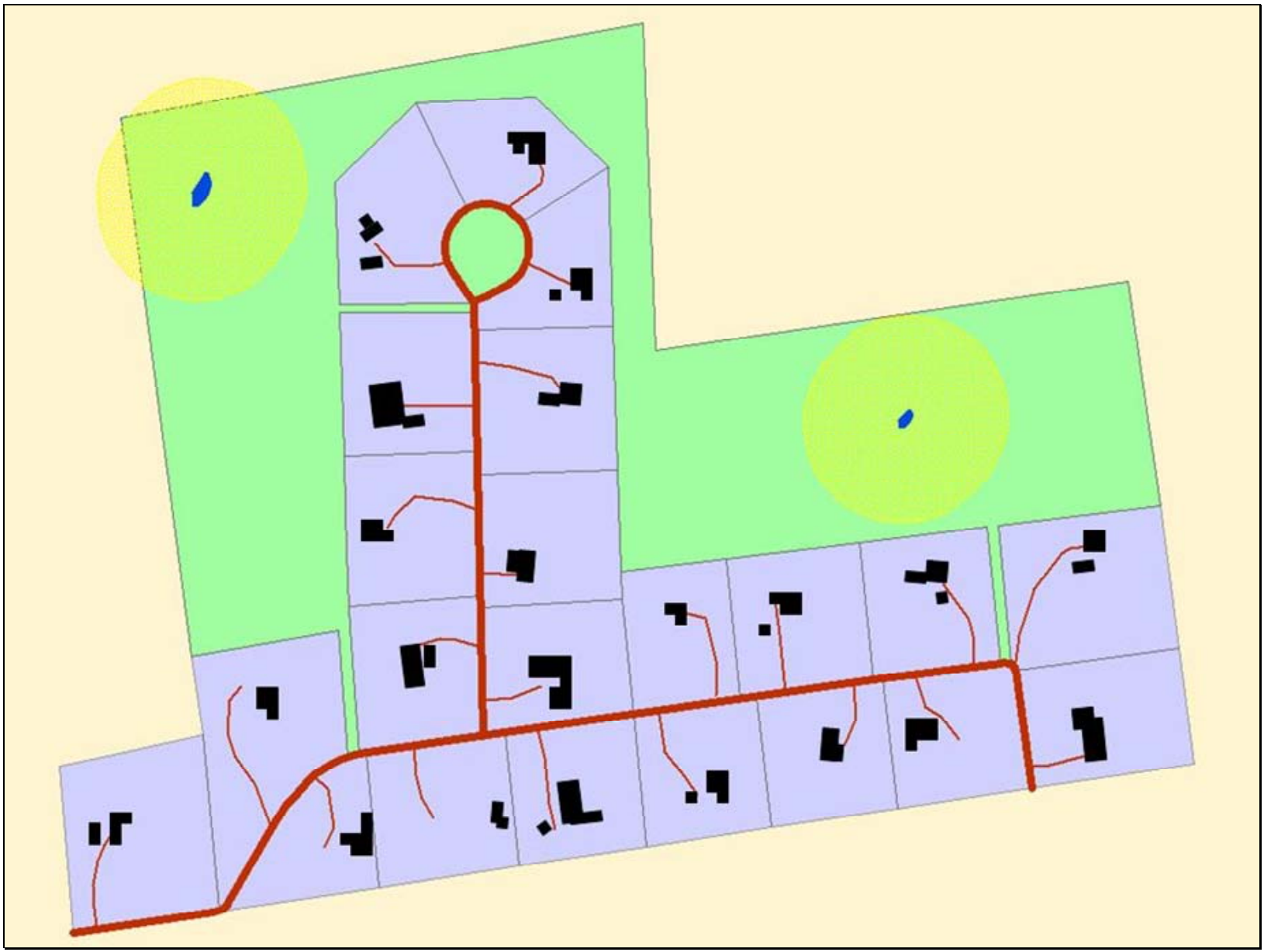
Had the town and developer known the location of significant vernal pools before investing in the subdivision design, they could have planned accordingly and saved both time and money involved in subdivision design, surveying and permitting.

Slide 20



Knowing where pools are in advance, one option might be to work around the Significant Vernal Pools. In this slide you notice that one of the pools is lost because it is not always feasible to conserve all significant pools. The original number of house lots is maintained in this example, but they are smaller in size. You can see that many lots abut green space and all property owners have access to the common natural areas.