Amphibians and Reptiles of the Narrow River Watershed

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Outline of Today’s Talk

• Biology and habitats
• Importance to ecosystems
• Threats to populations
• RI amphibians and reptiles
• Research and conservation in the Narrow River Watershed
• How you can get involved
What are Amphibians and Reptiles?

Ectothermic – do not generate heat from metabolism

Amphibians:
• Smooth, moist skin
• Capable of ‘drinking’ and respiring through skin
• No claws on toes
What are Amphibians and Reptiles?

Ectothermic

Reptiles:
• Rough, scale-covered skin
• Drink water through their mouths
• Claws on toes

snakes lizards turtles tuatara
World Diversity

10,000 species of reptiles
6,000 species of amphibians

Thousands more not yet described?

Darwin’s frogs
Chile, Argentina

Shingleback lizards
Australia
Why study amphibians and reptiles?

• Interesting
• Attractive
• **Important ecological roles** *(Why should you care?)*

Gastric-brooding frogs
Australia

Red-backed salamanders
Eastern US
Threats to Amphibians and Reptiles

~30% of amphibians are threatened, especially frogs
~40% of reptiles are threatened, especially turtles

- Habitat destruction
- Disease
- Pollution
- Climate change
- Invasive species
- Collection for food, pets, medicine
Amphibians of Rhode Island

- 8 species of salamanders
- 10 species of frogs

Inhabit streams, ponds, forest floor, soils
Salamanders of Rhode Island

**Ponds, pools**
- Red-spotted newt
- Marbled salamander
- Spotted salamander

**Streams**
- Two-lined salamander
- Spring salamander

**Forest floor**
- Red-backed salamander
- Four-toed salamander
- Dusky salamander
Salamanders in Narrow River Watershed

Ponds, pools
- Red-spotted newt
- Marbled salamander
- Spotted salamander

Streams
- Two-lined salamander
- Spring salamander

Forest floor
- Red-backed salamander
- Four-toed salamander
- Dusky salamander
Gyrinophilus porphyriticus
Northern spring salamander
RI Species of Concern
Frogs of Rhode Island

Vernal pools
- Wood frog
- Spadefoot toad
- Spring peeper
- Gray treefrog

Permanent ponds
- American toad
- Fowler’s toad
- Pickerel frog
- Northern leopard frog
- American bullfrog
- Green frog
Frogs in Narrow River Watershed

Vernal pools
- Wood frog
- Spadefoot toad
- Spring peeper
- Gray treefrog

Permanent pools
- American toad
- Fowler’s toad
- Pickerel frog
- Green frog
- American bullfrog
- Northern leopard frog
Animal Quiz!
Scaphiopus holbrookii
Eastern spadefoot toad
State Endangered
Reptiles of Rhode Island

19 total species

7 species of non-marine turtles

12 species of snakes

No lizards
Turtles of Rhode Island

Ponds, pools
- Painted turtle
- Spotted turtle

Streams, rivers
- Wood turtle
- Musk turtle

Forest
- Eastern box turtle

Estuaries and Salt Ponds
- Common snapping turtle
- Diamondback terrapin
Turtles in Narrow River Watershed

**Ponds, pools**
- Painted turtle
- Spotted turtle

**Streams, rivers**
- Wood turtle
- Musk turtle

**Forest**
- Box turtle

**Estuaries and Salt Ponds**
- Diamondback terrapin

Common snapping turtle
Spotted turtle
RI Protected Species

Wood turtle
RI Species of Concern
RI Protected Species

Diamond-backed terrapin
RI State Endangered
RI Protected Species

Eastern box turtle
RI Protected Species
Snakes of Rhode Island

**Wetlands**
- Ribbon snake
- Northern water snake

**Forest**
- Eastern milk snake
- Black rat snake
- Black racer
- Northern brown snake
- Northern ringneck snake
- Smooth green snake

**Woodland edge**
- Eastern hognose snake
- Northern redbelly snake
- Eastern worm snake
- Common garter snake
Snakes in Narrow River Watershed

**Wetlands**
- Ribbon snake
- Northern water snake

**Woodland edge**
- Eastern hognose snake

**Forest**
- Eastern milk snake
- Black rat snake
- Black racer
- Northern brown snake
- Northern ringneck snake
- Smooth green snake
- Eastern red belly snake
- Eastern worm snake
- Common garter snake
Eastern ribbon snake
RI Species of Concern

Eastern hognose snake
RI Species of Concern

Eastern worm snake
RI Species of Concern

Extinct in Rhode Island
Timber rattlesnake
RI State Historical (1972)
RI Protected Species
Research and Conservation in the Narrow River Watershed

• Responses of spotted turtles to creation of early-successional habitat (Narrow River Land Trust)

• Mapping vernal pools in RI (Canonchet Farm)

• Creating wetland habitats for endangered spadefoot toads (in planning)
Research on Amphibians and Reptiles in Rhode Island

Effects of forest loss on turtles and amphibians
Scott Buchanan, PhD student
Allen Hamilton, MS student

Vernal pool mapping
Priyanka Patel
Alyssa Peterson
Stefan Bengtson
All MESM students
Research Question

How does management of forests for early-successional habitat affect the spotted turtle?

1. Frequency of movements
2. Distances moved
3. Areas used
Why the Spotted Turtle?

- Spend 50-75% of time out of wetlands and in forest
- Feed on earthworms and other moist forest invertebrates
- Make frequent movements between upland and wetland
- Known to be sensitive to forest disturbance
Methods

Trapped spotted turtles in several wetlands in 2013

5 males
4 females

Attached radios and released in same locations

About 7 acres cut in winter 2013-2014

Tracked turtles April – October 2013 and 2014
Turtle Locations
Movements of Turtle 911 Before Cut
Results and Conclusions

• Home range 16% larger post-cut (3.0 to 3.5 acres)
  • Potentially needed to travel farther to avoid open areas or to obtain resources

• Turtles spent 85% of time in wetlands pre- and post-cut
  • Abundance of wetlands on the site may result in less use of uplands

• Creation of early-successional habitat may be compatible with maintaining spotted turtle populations if wetlands are abundant
Mapping Vernal Pools

- Vernal pools difficult to identify by aerial photos
- Receive little protection by RI wetlands laws or federal wetlands laws
- Statewide project to locate vernal pools
- Goal: raise public awareness and increase protection
What is a vernal pool?
Ephemeral pool, temporary pool, seasonal pool

• Dries up annually (hydroperiod < 12 months)
Vernal Pool Indicator Species

- Marbled salamander
- Spotted salamander
- Wood frog
- Fairy shrimp
- Spotted turtle

Obligate

Facultative
Mapping Vernal Pools

• Compiled database of about 1,500 records of potential vernal pools in RI

• Visit pool in spring, search for indicator species, photograph pool

• Visit again in August, check to see if pool is dry, photograph pool again
RI Results to Date

- Assessed nearly 300 potential vernal pools
- About 75% are actually vernal pools
- Mapped locations
- Added photographs and species lists to database
- Adding new potential vernal pools to database
Canonchet Farm Results

- Assessed 5 potential vernal pools
- Found wood frog egg masses in 5 of 5
- Found spotted turtles in 1 pool
- No fairy shrimp
- No marbled salamanders
- No spotted salamanders
## Canonchet Farm Results

<table>
<thead>
<tr>
<th>Present</th>
<th>Not detected</th>
</tr>
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<tbody>
<tr>
<td>• wood frogs</td>
<td>• marbled salamanders</td>
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<tr>
<td>• spotted turtles</td>
<td>• spotted salamanders</td>
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Frogs and salamanders need forested area of 290 yards around breeding site to maintain population.

Has there always been enough forest on and around Canonchet Farm to protect these animals?

Hint: It was a farm…
290 yard buffer on a vernal pool

1939

2014
290 yard buffer on a vernal pool
Extensive forest disturbance probably eliminated spotted turtle, wood frog, spotted salamander, and marbled salamander populations by 1939.

Differences in dispersal capability: wood frogs and spotted turtles recolonized; salamanders have been unable.

Solutions?
Creation of Spadefoot Toad Pools

- Only one known breeding site remains in RI
- Few populations remain in MA and CT
- We will lose this animal in the state if something is not done
- Assessing feasibility of creating pools in RI

*Scaphiopus holbrookii*
Eastern spadefoot toad
State Endangered
Currently partnering with:

- South Kingstown Land Trust
- Barrington Land Conservation Trust
Designing Pools for Spadefoot Toads

- Designing 2-3 pools each with wetlands consultant in April
- Pending approval from land trust boards, pools will be built in August or October
- Pending approval from state agencies, translocation of tadpoles to new sites
- Goal: Ensure we keep spadefoot toads in RI where they belong!
How can you help?
Protect Wetlands in Your Community
Help Amphibians and Reptiles Cross Roads
Share Your Vernal Pool with Us!

If you have a vernal pool and want it to be part of our project, let me know!

Nancy Karraker: nkarraker@uri.edu
Wanted:

Observations of Eastern spadefoot toads in RI

If you see or hear one, please contact me at URI
Acknowledgments

• Kathie Kelleher and Rosemary and David Smith for inviting me and arranging my talk

• Narrow River Land Trust and Friends of Canonchet Farm for allowing us access to your beautiful lands

• Graduate students and undergraduates who have helped with research