

# 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



frogs and toads



salamanders and  
newts



caecilians

# What are Amphibians and Reptiles?

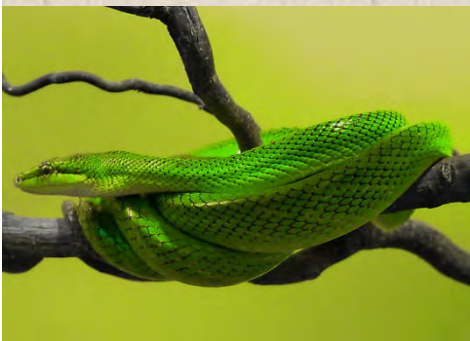
Ectothermic

Reptiles:

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



crocodilians



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

## Streams



Two-lined salamander

## Forest floor



Red-backed salamander



Marbled salamander



Spring salamander



Four-toed salamander



Spotted salamander



Dusky salamander

# Salamanders in Narrow River Watershed

## Ponds, pools



Red-spotted newt



Marbled salamander



Spotted salamander

## Streams



Two-lined salamander



Spring salamander



Dusky salamander

## Forest floor



Red-backed salamander



Four-toed 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



American bullfrog



Green frog



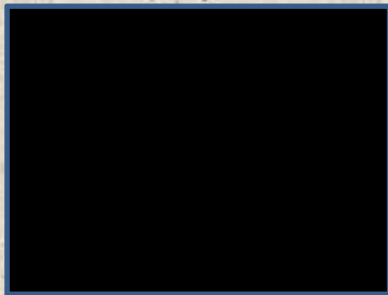
Northern leopard frog

# Frogs in Narrow River Watershed

## Vernal pools



Wood frog



Spadefoot toad



Spring peeper



Gray treefrog

## Permanent ponds



American toad



Fowler's toad



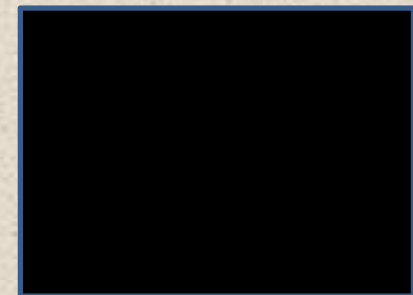
Pickerel frog



American bullfrog



Green frog



Northern leopard frog

# ***Animal Quiz!***



# *Scaphiopus holbrookii*

Eastern spadefoot toad

State Endangered



TODD PIERSON 2010

# 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



Musk turtle



Common snapping turtle

## Streams, rivers



Wood turtle

## Forest



Eastern box turtle

## Estuaries and Salt Ponds



Diamondback terrapin

# Turtles in Narrow River Watershed

## Ponds, pools



Painted turtle



Spotted turtle



Musk turtle



Common snapping turtle

## Streams, rivers



Wood turtle

## Forest



Box turtle

## Estuaries and Salt Ponds



Diamondback terrapin



**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

## Woodland edge



Eastern hognose snake

## Forest



Eastern milk snake



Black rat snake



Black racer



Northern brown snake



Northern ringneck snake



Smooth green snake



Northern redbelly snake



Eastern worm snake



Common garter snake

# Snakes in Narrow River Watershed

## Wetlands



Ribbon snake



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Smooth green 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?





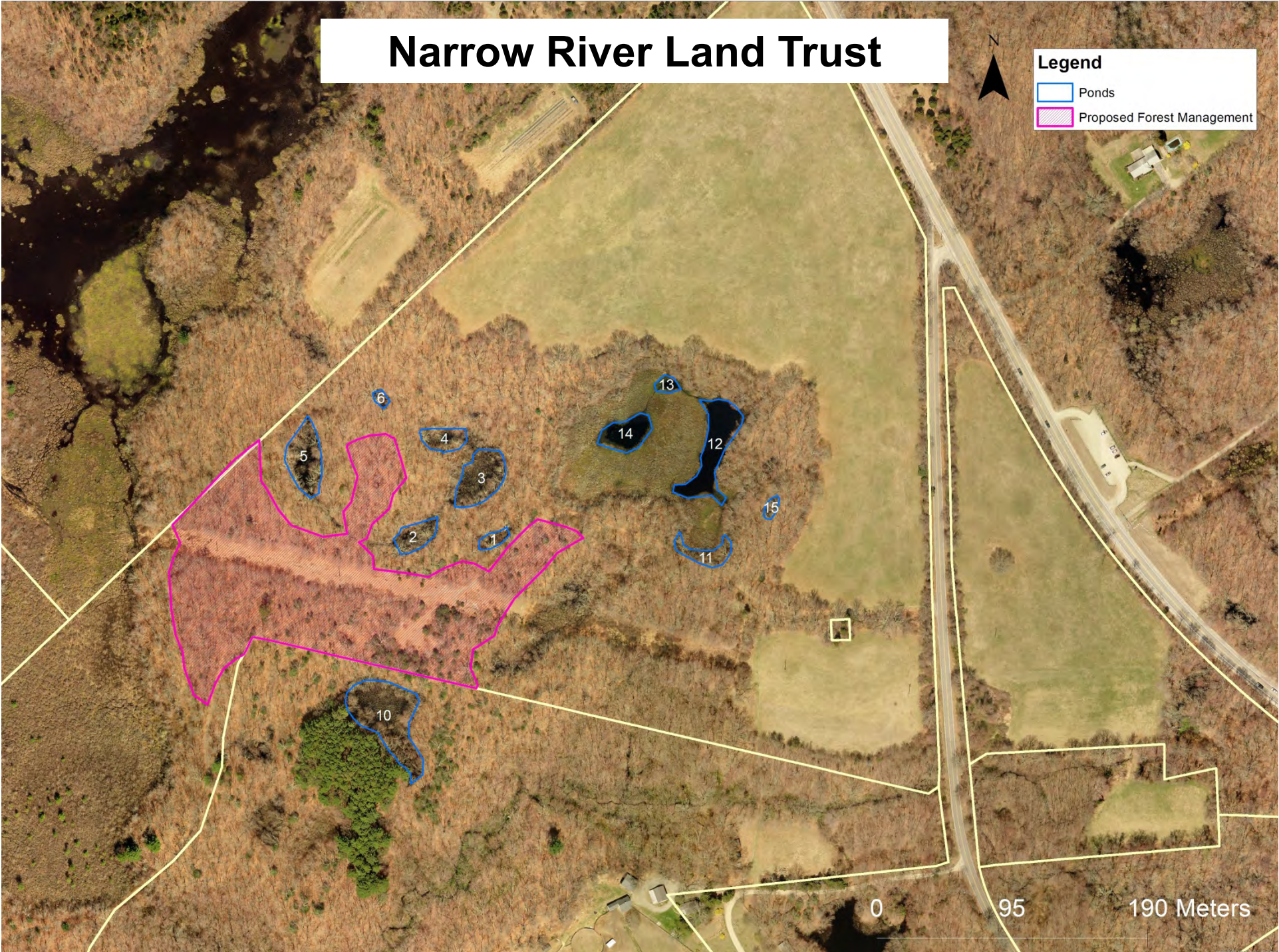
- Spend 50-75% of time out of wetlands and in forest
- Feed on earthworms and other moist forest invertebrates
- Make frequent movements between upland and wetland
- Known to be sensitive to forest disturbance

# Narrow River Land Trust



**Legend**

-  Ponds
-  Proposed Forest Management



# Methods

Trapped spotted turtles in several wetlands in 2013

5 males

4 females

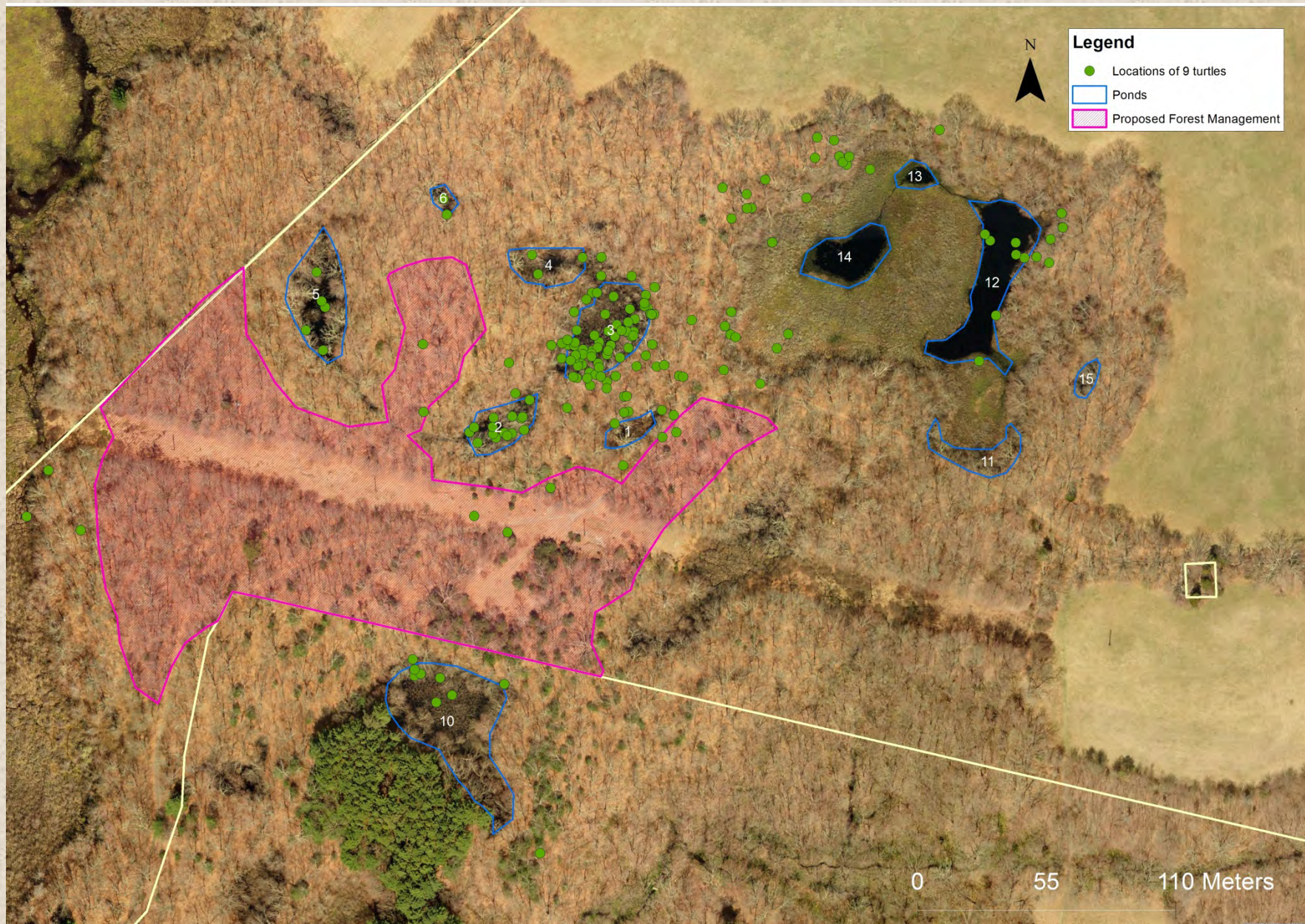
Attached radios and released in same locations

About 7 acres cut in winter 2013-2014

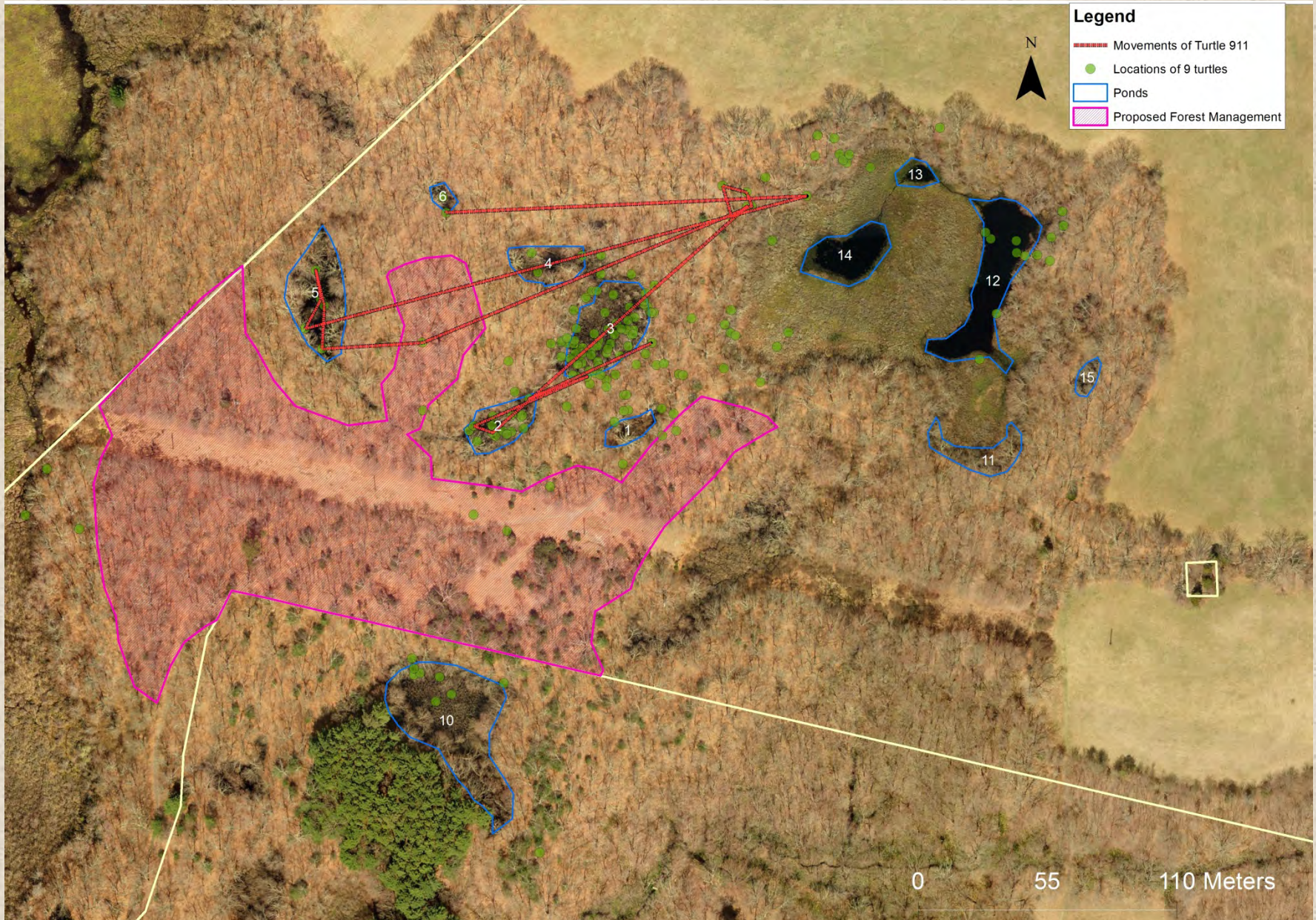
Tracked turtles April – October 2013 and 2014



# 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

**Obligate**



Fairy shrimp

**Facultative**



Spotted turtle



Spotted salamander



Wood frog

# 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

## Present

- wood frogs
- spotted turtles

## Not detected

- marbled salamanders
- spotted salamanders

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**

**1939**



**2014**





# Canonchet Farm Conclusions



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***

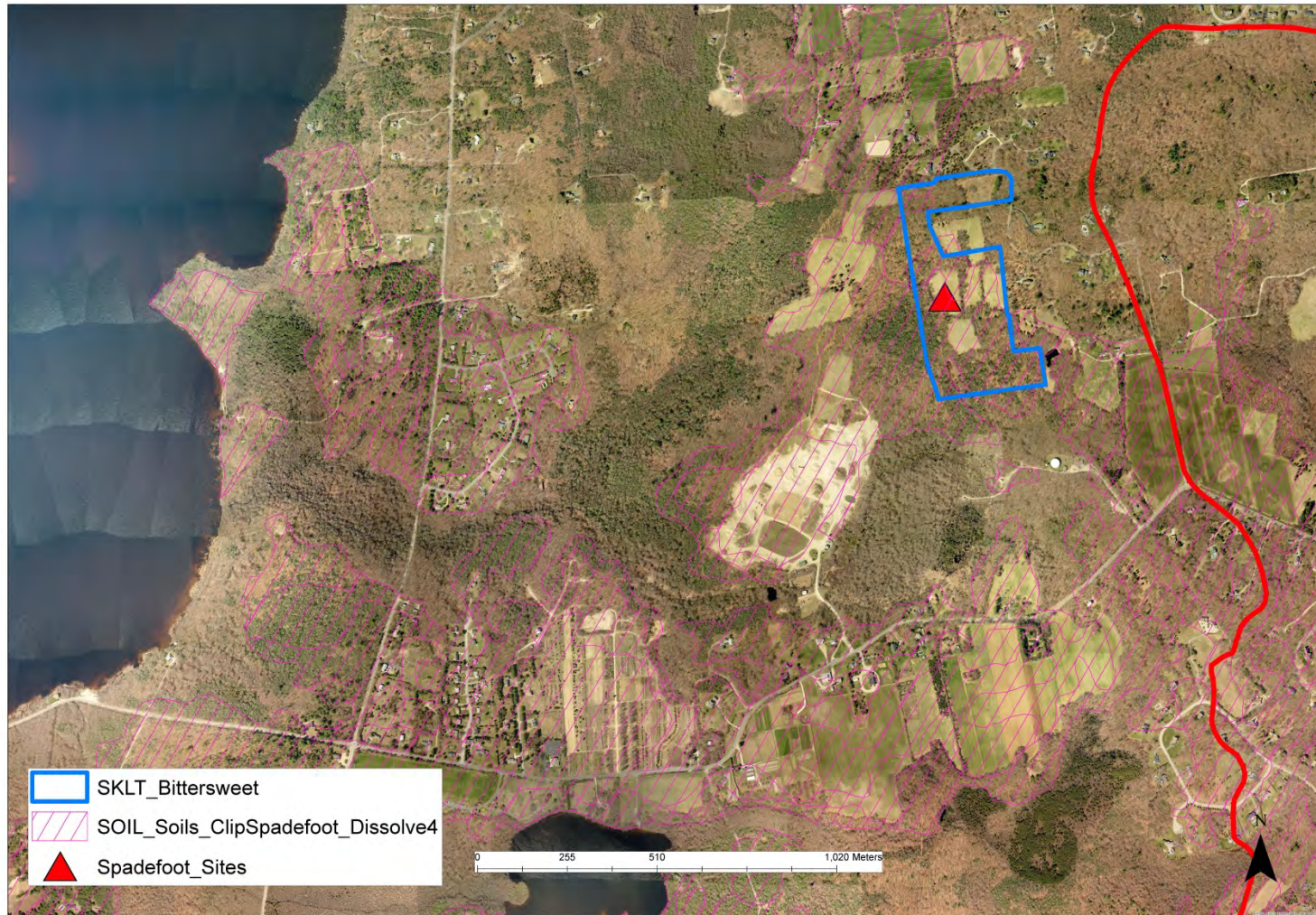
Eastern spadefoot toad

**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!**



**Tom Biebighauser**



**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](mailto: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

