

# Protecting Wildlife through Community Planning

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Held Wednesday, April 1, 2015

~~~~~3 AICP credits offered~~~~~

This workshop provided information and tools that communities can use to protect wildlife and their habitat. Human-wildlife conflicts were discussed along with actions that municipalities can take to minimize these conflicts, particularly during the planning and development process. Presenters discussed things to consider when **identifying important local habitats** as well as a range of tools to **incorporate wildlife into municipal planning and decision-making**. Following a presentation on these topics, class participants had a chance to explore the application of these tools to a rural setting with a planning/mapping exercise.

**Target Audiences:** Town planners and officials, conservation commissioners, developers, state agency personnel, and other interested parties.

**Speakers:** Amanda Freitas, RI Wildlife Action Plan Community Liaison; Scott Millar, RIDEM

## Presentations & Materials

Agenda

Putting the Rhode Island Wildlife Action Plan to Work (presentation)

Planning Tools to Protect Wildlife (presentation)

Wildlife Habitat Protection Checklist

Group Exercise

RIWAP Executive Summary

Fifteen Small Things that Make a Big Difference for Wildlife

Test Your Knowledge of Rhode Island's Wildlife

Breeding Bird Responses to Land Preservation within Southern New England Cluster Subdivisions

**Questions?** Please contact Jennifer West at [jennifer@nbnerr.org](mailto:jennifer@nbnerr.org) or 401-222-4700, x 7413.

This workshop was cosponsored by the Narragansett Bay Research Reserve, RI DEM, and the RI Natural History Survey. The 2015 Rhode Island Wildlife Action Plan was developed by RI DEM with assistance from the RI Chapter of The Nature Conservancy and the University of Rhode Island, with input from a variety of stakeholders.

# Protecting Wildlife through Community Planning

Wednesday, April 1, 2015, 9:00 am-12:00 pm  
Audubon Society of RI, 12 Sanderson Road, Smithfield, RI

**Objectives:** Increase participants' awareness of the RI Wildlife Action Plan, their understanding of how to identify important habitat, and their ability to apply tools to help conserve habitat.

## AGENDA

- 8:30 am Sign-in and refreshments**
- 9:00 am Welcome**  
*Jennifer West, Narragansett Bay Research Reserve*
- 9:10 am What is the RI Wildlife Action Plan and what does it have to do with me?**  
*Amanda Freitas, Rhode Island Wildlife Action Plan Community Liaison*
- 10:00 am Break**
- 10:15 am Planning Tools to Help Protect Wildlife**  
*Scott Millar, RI DEM*
- 10:55 am Group Exercise**
- 11:35 am Group Exercise Report Out**
- 11:55 am Wrap up and Evaluations**
- 12:00 pm Adjourn**



*The 2015 Rhode Island Wildlife Action Plan was developed by RI DEM with assistance from the RI Chapter of The Nature Conservancy and the University of Rhode Island, with input from a variety of stakeholders.*

# ***Putting the Rhode Island Wildlife Action Plan to Work***



Photo by Chris Raithel

***Amanda Freitas, RI WAP Community Liaison***

*But first a little quiz...*

# *1. Am I Native or Not?*



A black and white striped snake, possibly a water snake, is coiled on a mossy ground. The snake's body is covered in dark, irregular bands on a lighter background. The surrounding environment is lush with green moss and some dry, light-colored plant matter.

*2. Native or Not?*

### *3. Native or Not?*



## *4. Native or Not?*



## *5. Native or Not?*



## *6. Native or Not?*



**1. Native: Black-Throated Blue Warbler**

**Forest interior species**

**Common passage migrants, especially in coastal thickets during fall.**

**One of RI's rarest and most localized species. Entire nesting population found near Sprague Hill (600' asl) in Gloucester.**

## *2. Native: Marbled Salamander*

*Vernal pool breeder; indicator of high-quality amphibian habitats.*

*Records in 17 towns, but common only in certain rural parts of RI with forest tracts  $\geq 1000$  ac.*

### ***3. Native: Bobcat***

***Location: Providence, Kent, Washington Counties and mainland portions of Newport County where suitable habitat exists***



***Adaptable; will utilize a variety of habitat types. They use swamps, forest edges, and agricultural areas for hunting, rocky ledges and outcroppings for resting/den sites.***

*4. Native: Bufflehead  
Cavity nester (Canada , AK)*

*Common winter resident (late-Oct -  
April)*

*Most abundant in coastal ponds, quiet  
coves throughout Narragansett Bay, and  
deeper interior lakes and ponds*

*Conservation concerns include the  
negative impacts of urbanization on  
water quality and human disturbance.*



*5. Not Native!*

*I am a hedgehog*

[OBJ]

## 6. Native: Monarch

Long distance seasonal migrant (winters in Mexico)

More than 90% decline in North America since the 1990s to <33 million today

Threat: declines in milkweed (reduced open habitats, herbicide use) and insecticide use within their breeding range. Extreme weather in the eastern US may also play a role.

Actions: restore breeding habitat and increase the supply of/demand for locally-sourced milkweed.

# ***RI Wildlife Action Plan***

|      |                                                                                         |
|------|-----------------------------------------------------------------------------------------|
| 1937 | Federal Aid in Wildlife Restoration Act (P-R)                                           |
| 1950 | Federal Aid in Sport Fish Restoration Act                                               |
| 1973 | Endangered Species Act (ESA)                                                            |
| 1980 | <b>Fish &amp; Wildlife Conservation Act (“Nongame Act”)<br/>No funding mechanism.</b>   |
| 2000 | <b>State Wildlife Grants (SWG) Program authorized<br/>to fund non-game conservation</b> |
| 2005 | <b>First RI WAP</b>                                                                     |

# ***RI WAP Elements***

**1. Species**

**2. Habitats**

**3. Threats**

**4. Actions**

5. Monitoring/Adaptive Management

6. Review Procedures

7. Coordination w/other agencies, tribes

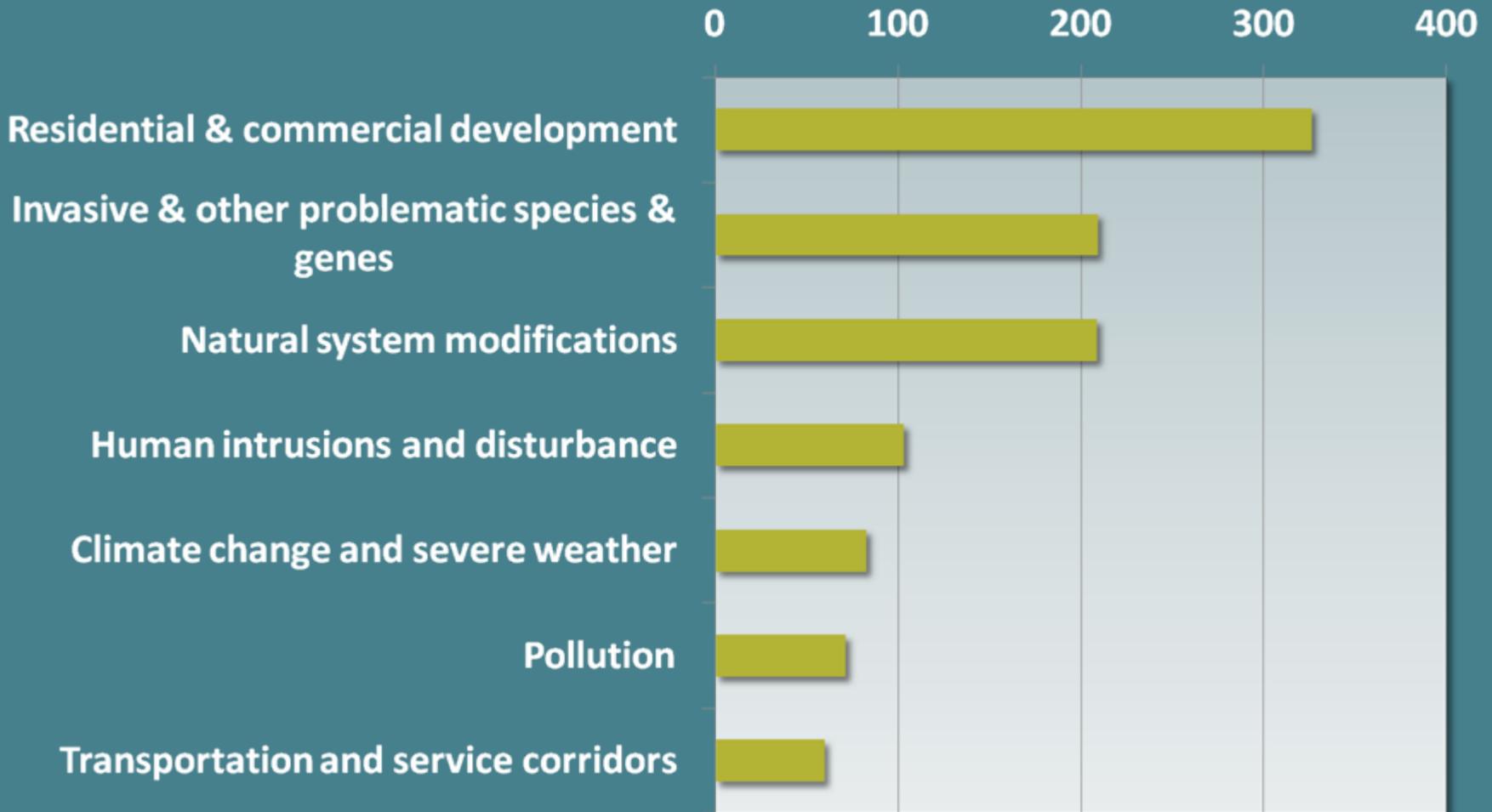
8. Stakeholder involvement



Photo by Jay Osenkowski

# Top Habitat Threats

*Ranked by Threat Level & Sum of Occurrences*



*Ranked Value (# of Occurrences multiplied by rank coefficient\*)*

# ***Development Brings...***

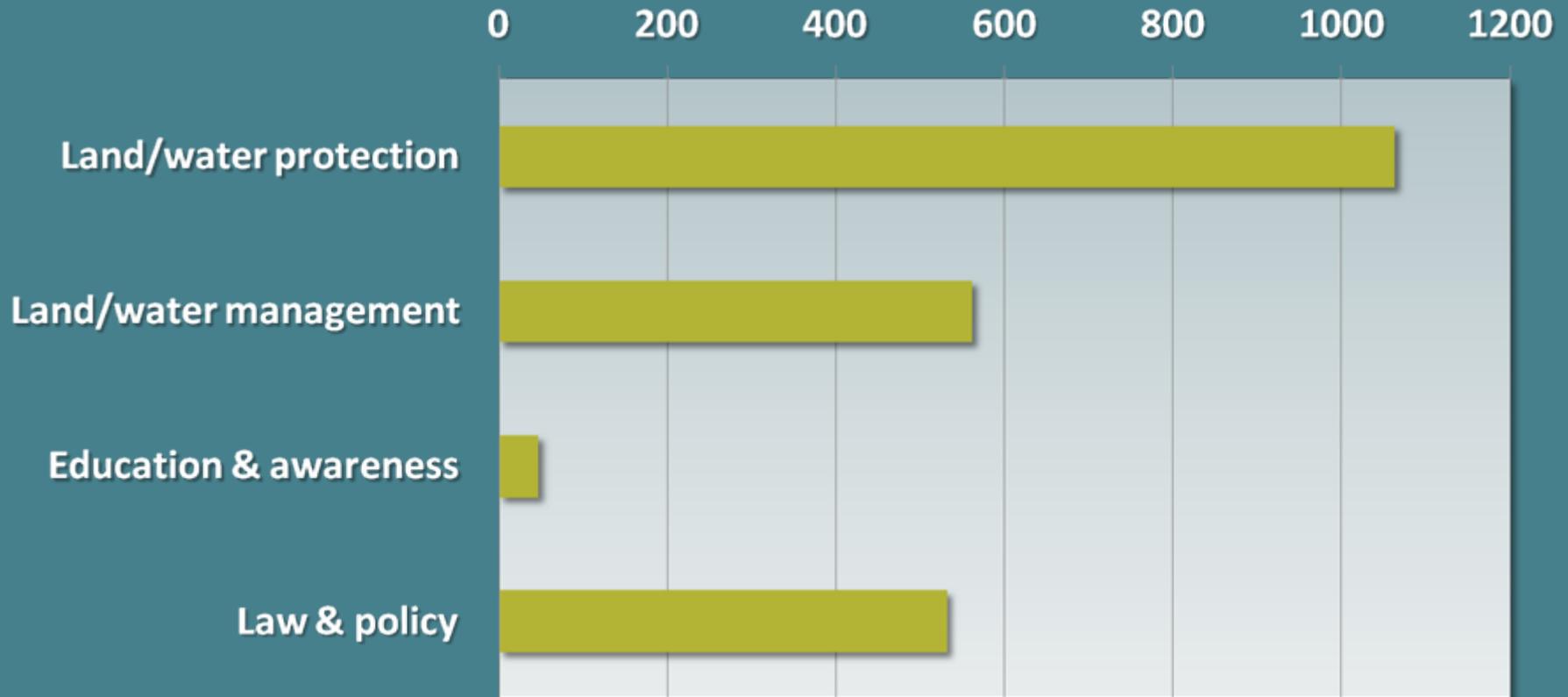
- **Habitat Loss/Fragmentation**
- **Roads/Traffic**
- **Lawns/mowing**
- **Fertilizers/chemicals**
- **Erosion/Stormwater**
- **Pets**
- **Opportunistic predators**
- **Noise/light pollution**



Photo courtesy of Conserve Wildlife Foundation of New Jersey

# *Top Habitat Conservation Actions*

## *Total Ranked Score Across Habitats*



*Ranked Value (# of Occurrences multiplied by rank coefficient\*)*

# *Why Do We Need RI WAP?*

- **60% of lands outside of the urban core are undeveloped & unprotected**
- **No RI regulations specific to habitat**
- **State listed species are not explicitly protected**
- **Partnerships are critical**



Scarlet Tanager photo by Carlos Pedro



Canada warbler photo by Darlene Friedman

# ***Wildlife Conservation Model***



Chris Raithel



2005 RI WAP



Tim Mooney, TNC

# ***Wildlife Conservation Model***



T. Moffatt/Atlantic Salmon Federation



RIDEM SFW



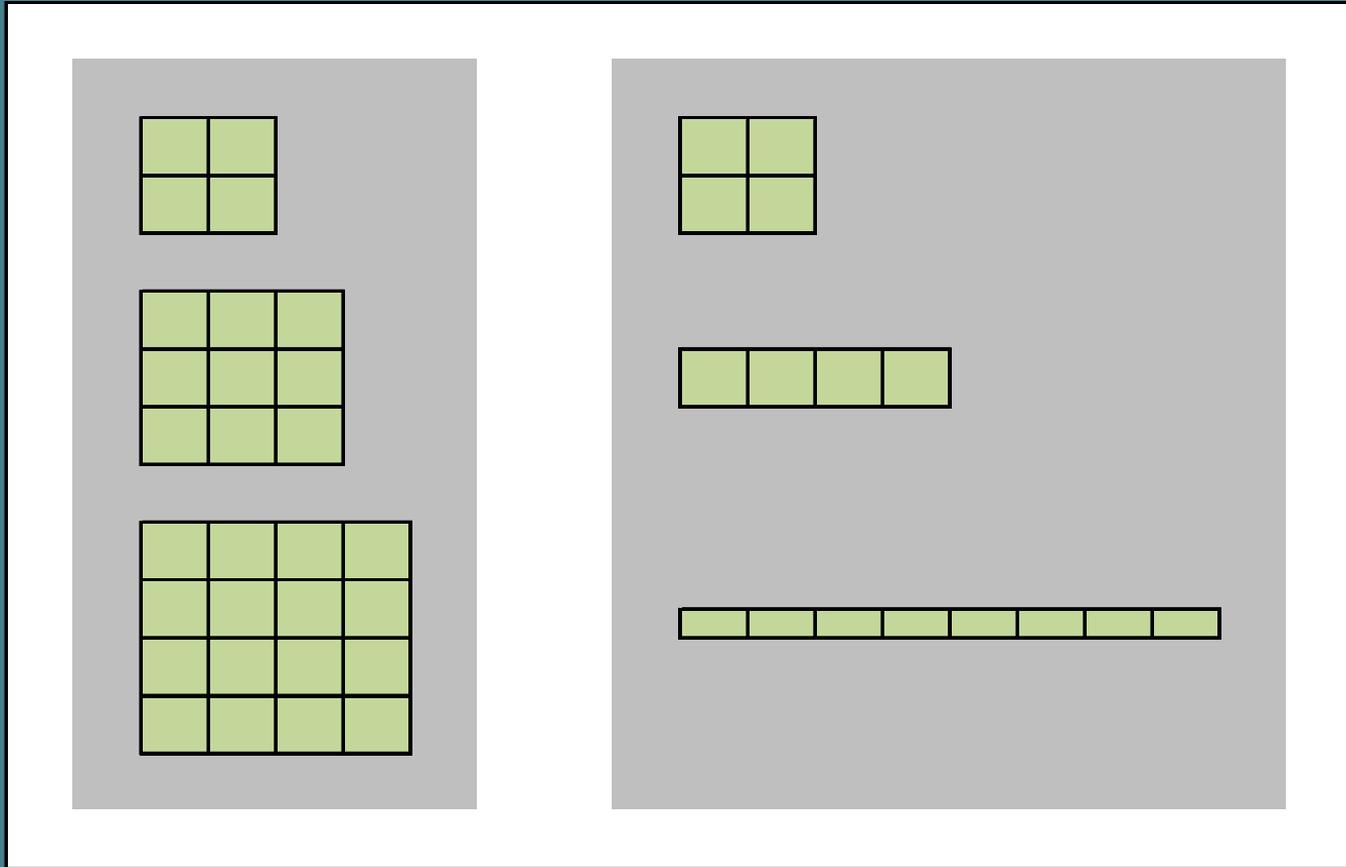
EA Engineering/scholarworks.umass.edu

# *Getting Started*

- **Size**  
(think big)
- **Shape**  
(compact)
- **Context**
  - **Connectivity**
  - **Adjacency**

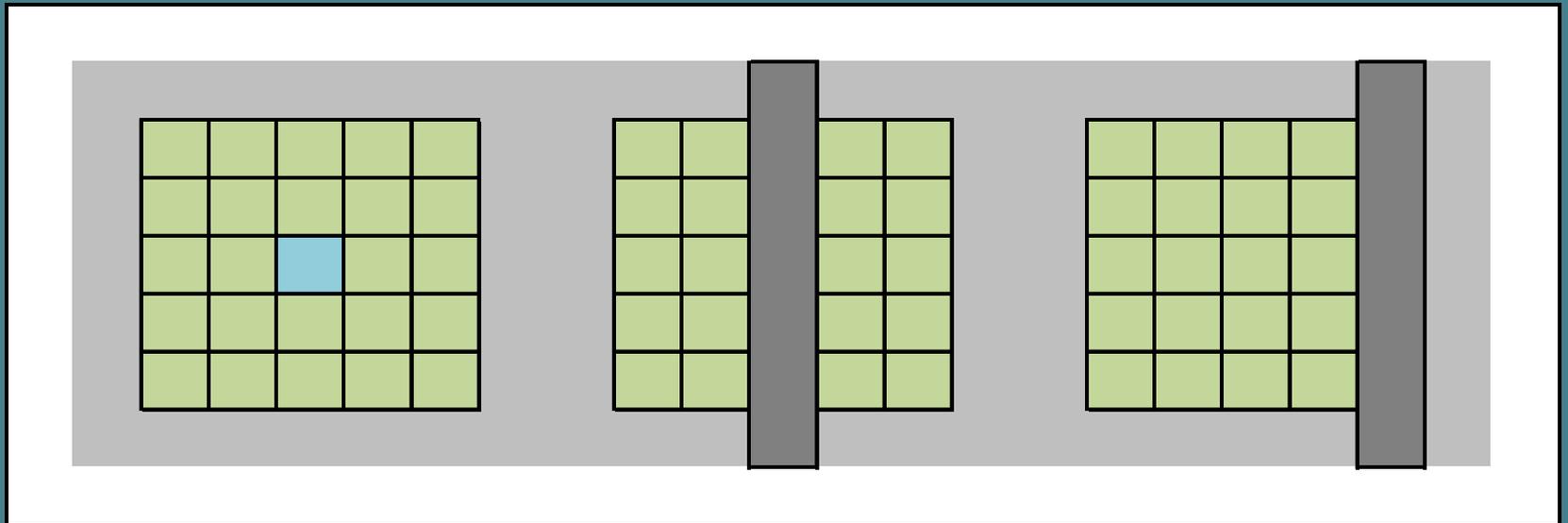


# *Perimeter/Area Ratio*



Source: Raithel, C., 2009 (unpublished)

# *Perimeter/Area Ratio*

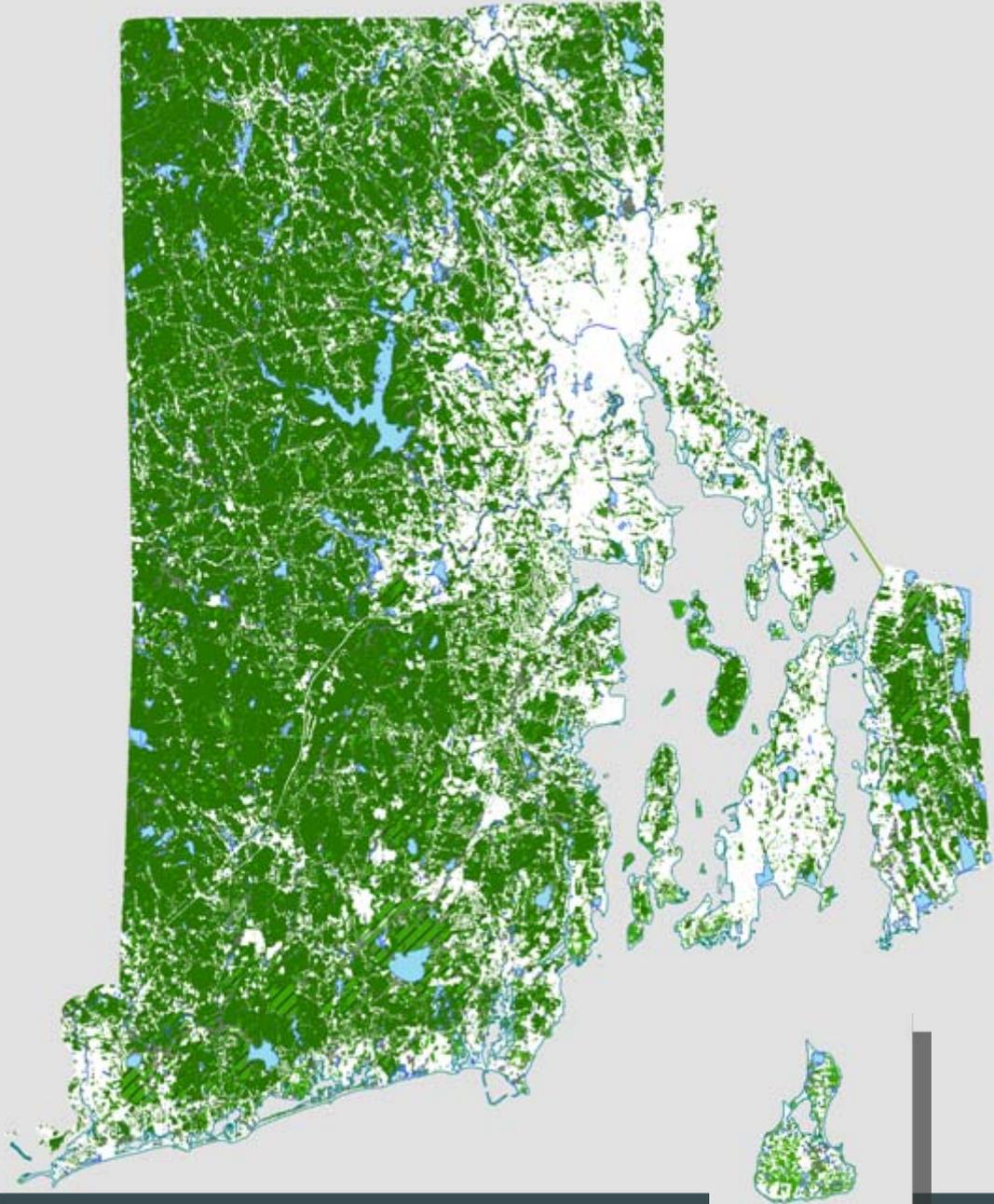


Source: Raithel, C., 2009 (unpublished)

# ***Conservation Opportunity Areas***

- **Core Natural Areas**
- **Corridors**
- **Sites**





## RI Forest

-  Freshwater Lakes/Rivers
-  Upland Forest
-  Upland Shrubland
-  Wetland Forest
-  Wetland Shrubland

Source: RIGIS, 2012. Forest Habitat. URL:  
<http://www.edc.uri.edu/rigis>, Environmental Data Center,  
University of RI , Kingston, RI (last date accessed: 3/3/2012).

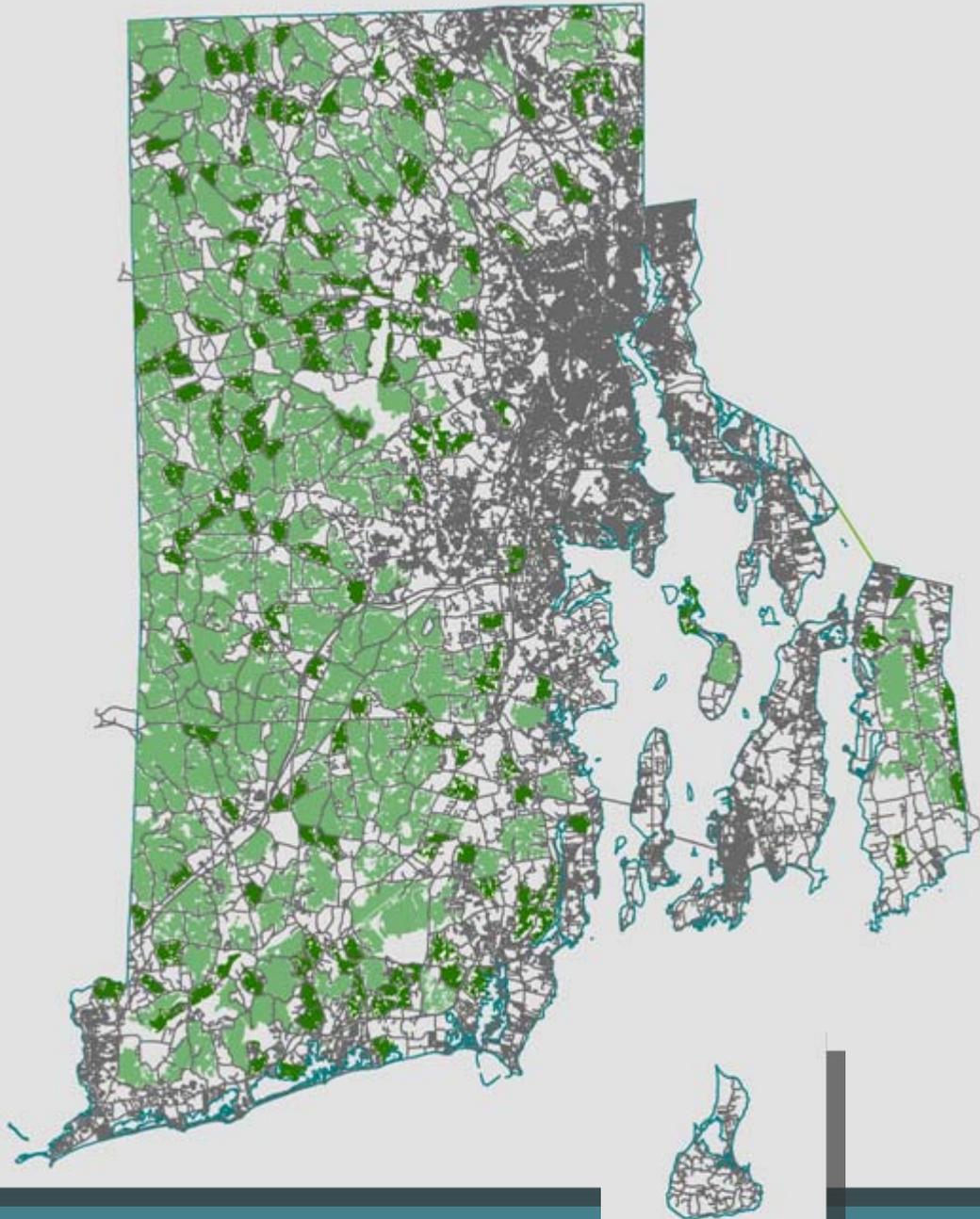
## CORE NATURAL AREAS

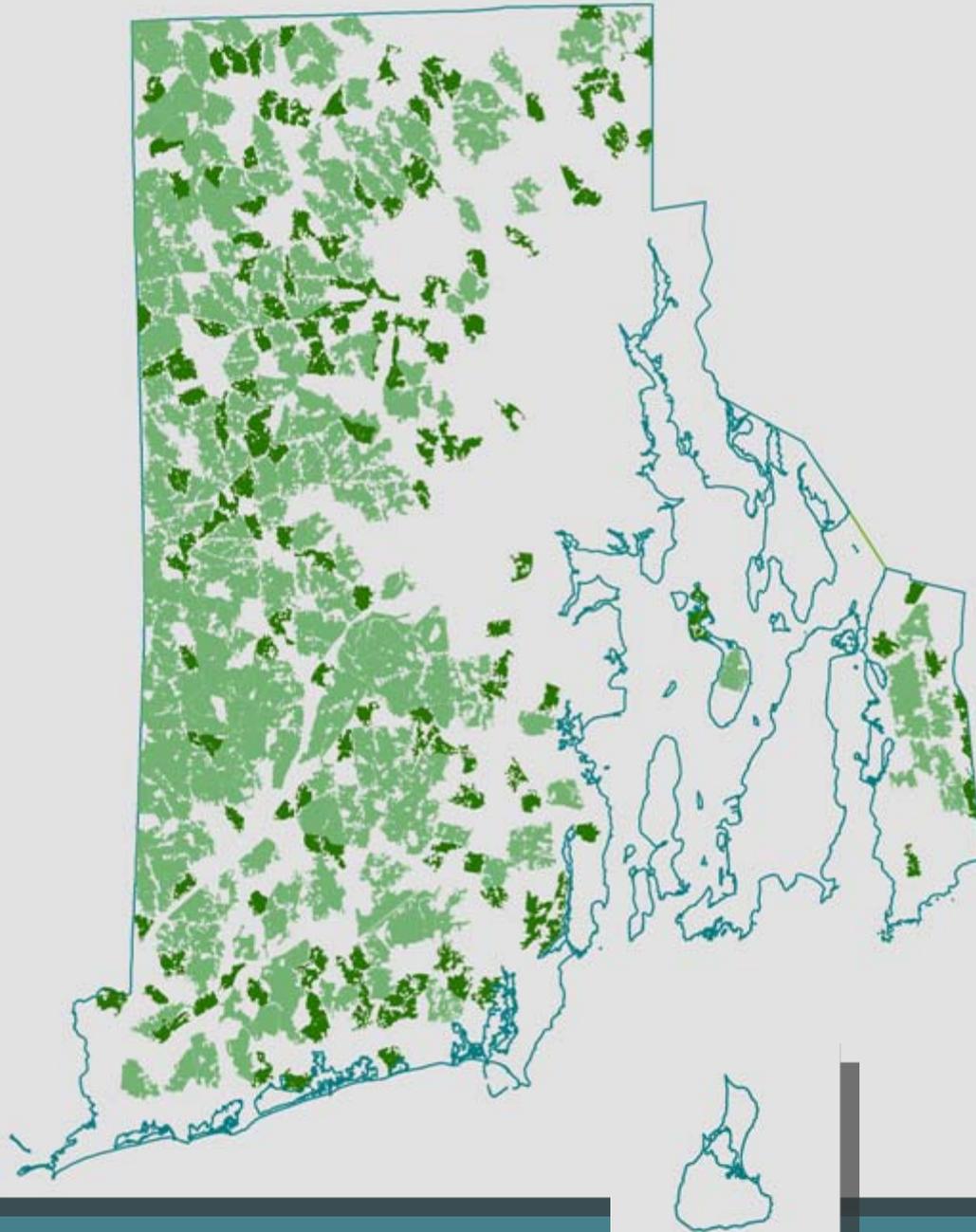
— RoadCenterlines

### Acres

 250-500 acres

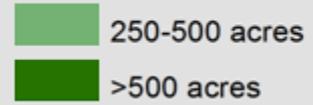
 >500 acres





## CORE NATURAL AREAS

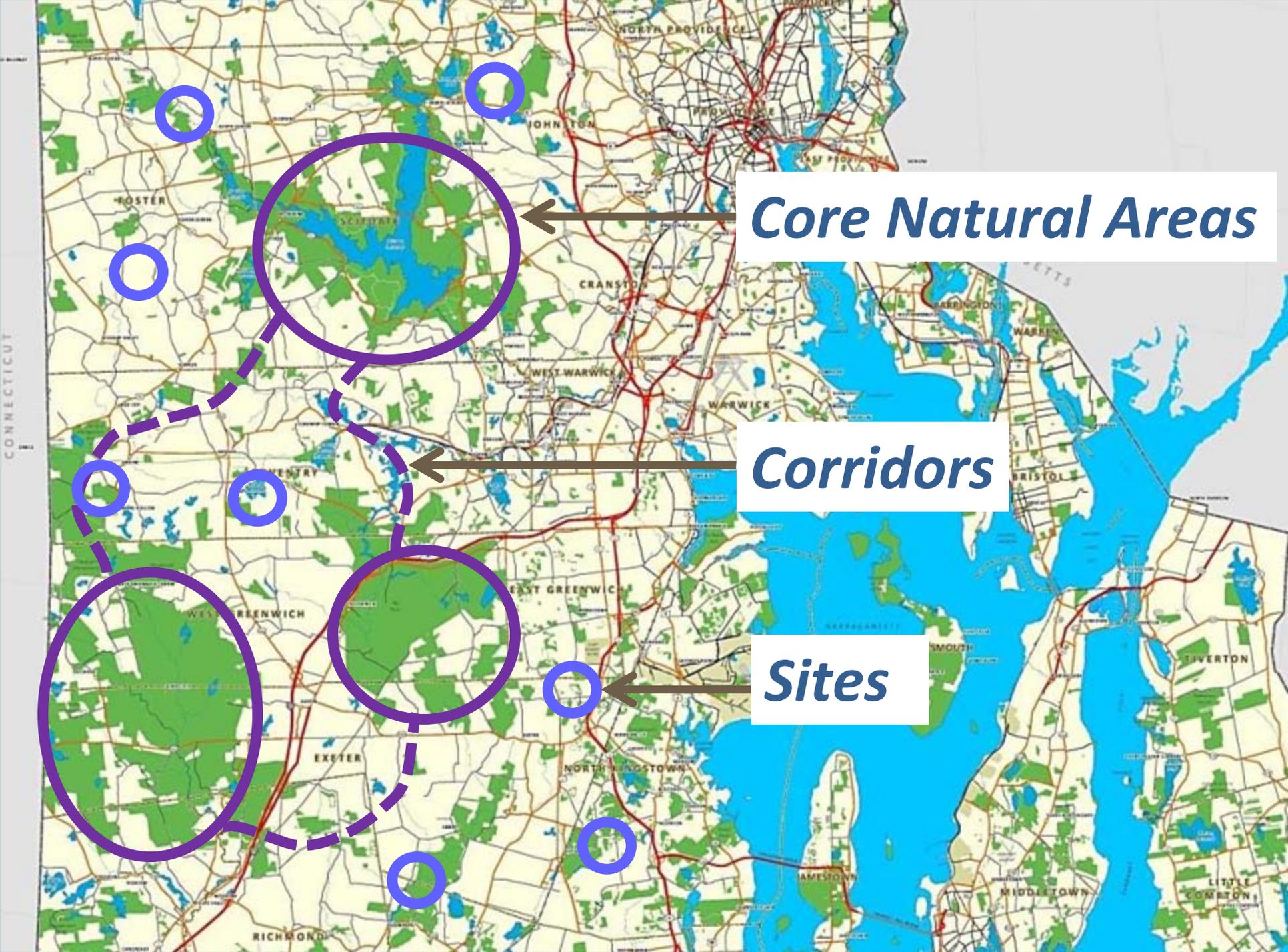
### Acres



# *Riparian Buffers*

- Diversity is high where land and water meet
- Over 70% of all land animals use riparian corridors
- Allow movement between food and cover
- Importance grows with fragmentation

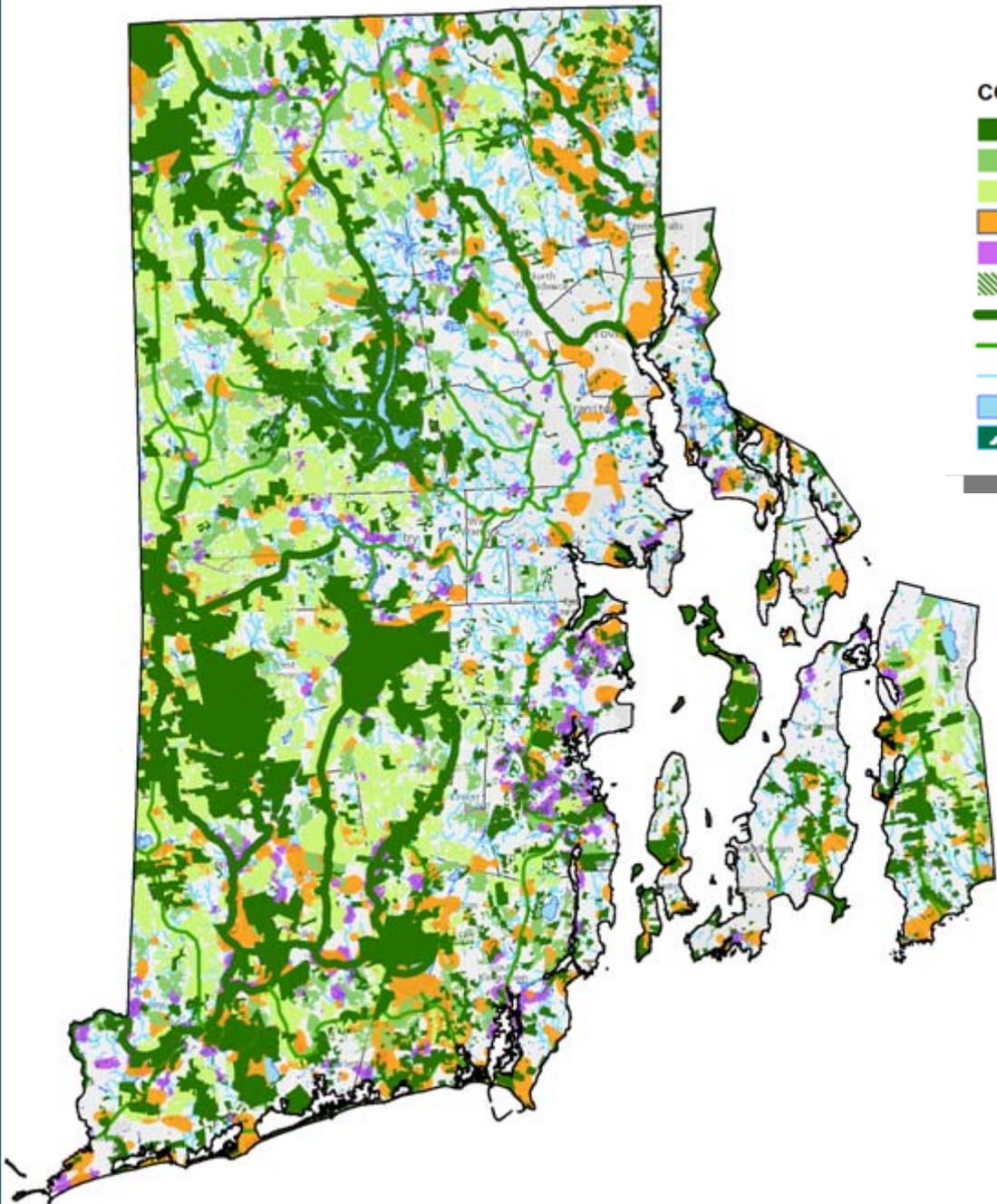




*Core Natural Areas*

*Corridors*

*Sites*



### CONSERVATION OPPORTUNITY AREAS MAP

- Areas Already Protected
- Unfragmented Forest Blocks (500 acres or more)
- Unfragmented Forest Blocks (250 < 500 acres)
- Natural Heritage Areas
- Ecological Land Units (Best & Better)
- Other Important Areas and Sites (from TNC)
- major
- minor
- Streams & Rivers
- Inland Ponds and Lakes
- Wetland & Hydric Soils



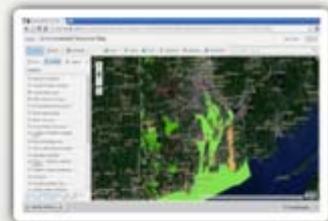
**Data sources: RIGIS, USDA-NRCS, URI-TNC, RIDOA, & RIDEM.**



Gallery



Conserved Lands of RI



Environmental Resource Map



Onsite Wastewater Treatment Cesspool



Onsite Wastewater Treatment Systems - Salt



# RIDEM - Map Room

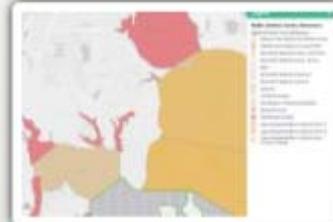
## Gallery



Port of Galilee, Narragansett, Rhode Island



Rhode Island Conservation Opportunities

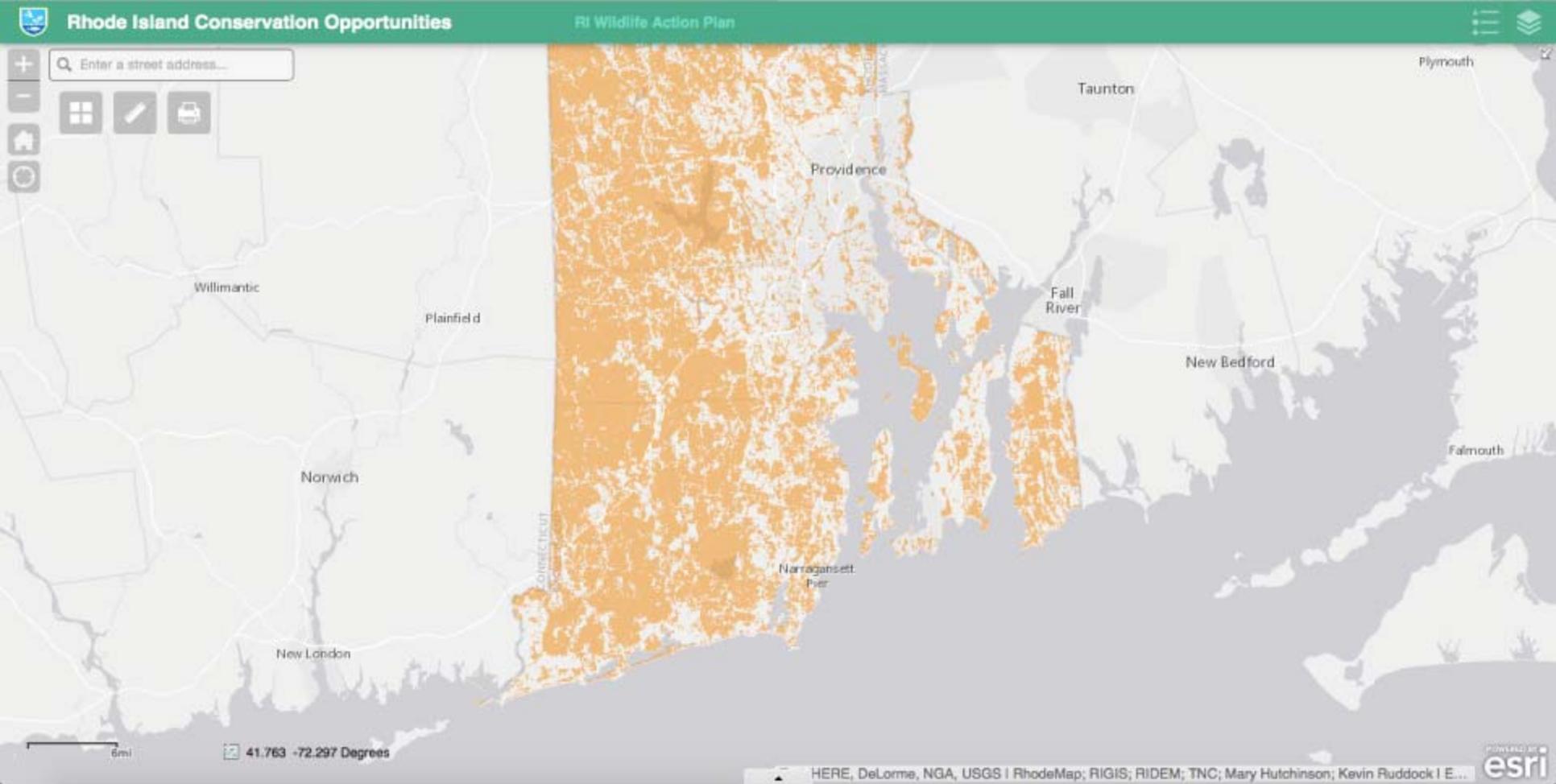


Rhode Island Shellfish Harvest Restrictions

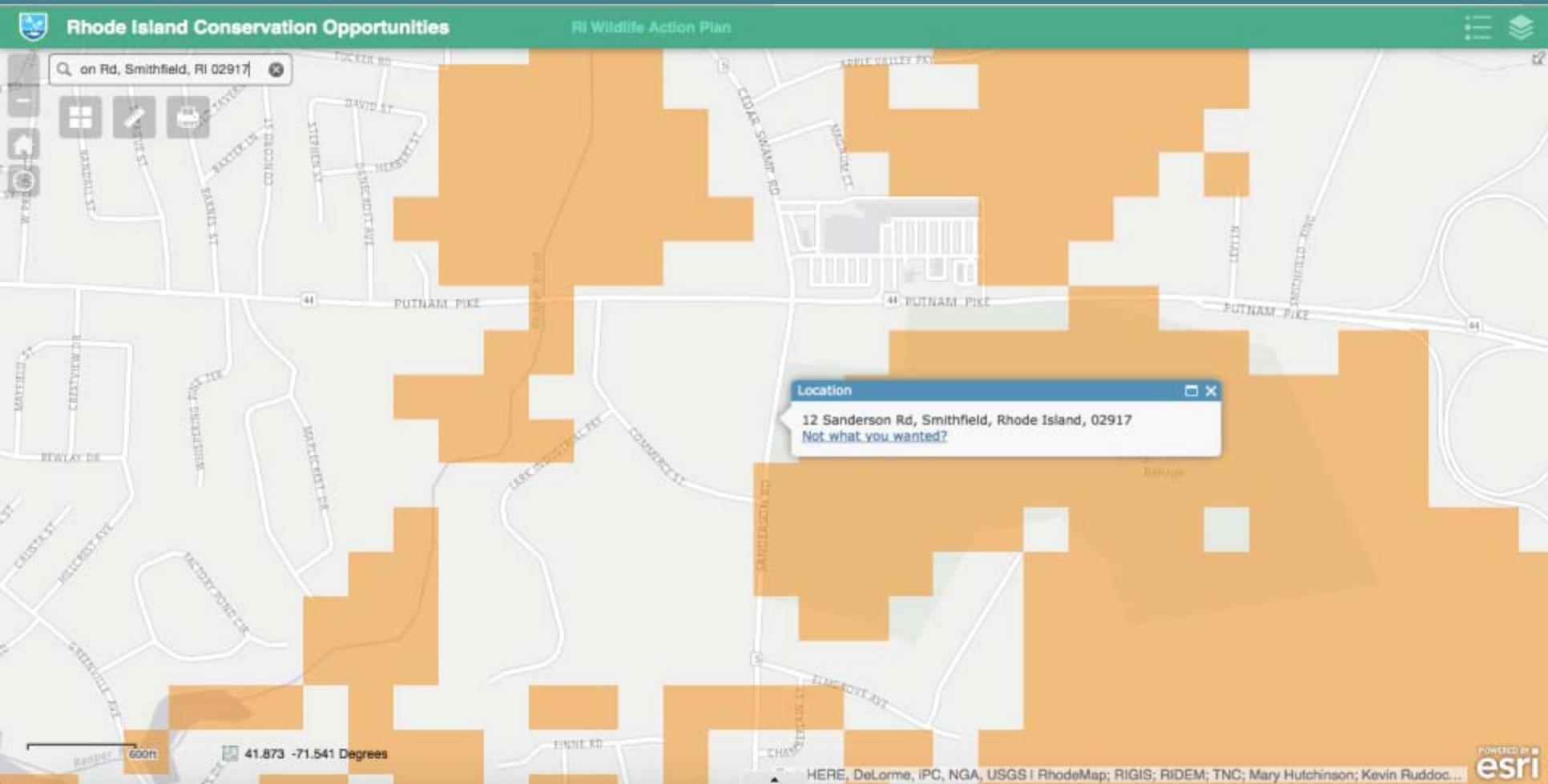


RI CRMC/DEM Wetland Regulatory Jurisdiction

# Conservation Opportunity Areas



# Conservation Opportunity Areas





12 Sanderson Rd, Smithfield



Legend

Conservation Opportunity Area

Composite Conservation Opportunity Area

COA

Location

12 Sanderson Rd, Smithfield, Rhode Island, 02917  
Not what you wanted?

41.863 -71.516 Degrees

HERE, DeLorme, IPC, NGA, USGS | RhodeMap; RIGIS

# Conservation Opportunity Areas

Rhode Island Conservation Opportunities

RI Wildlife Action Plan

12 Sanderson Rd, Smithfield

Layer List

Operational Layers

- Conservation Opportunity Area
- Urban\_Services\_Boundary
- RI Ecological Communities Classification
- State Conservation Land
- Other Conservation Land
- Land\_Use\_2011
- Rhode Island Aerial Photographs (April 2014)

Location

12 Sanderson Rd, Smithfield, Rhode Island, 02917

[Not what you wanted?](#)

600ft

HERE, DeLorme, IPC, NGA, USGS | URI EDC, RIGIS |

# Conservation Opportunity Areas

Rhode Island Conservation Opportunities RI Wildlife Action Plan

12 Sanderson Rd, Smithfield

Location  
12 Sanderson Rd, Smithfield, Rhode Island, 02917  
Not what you wanted?

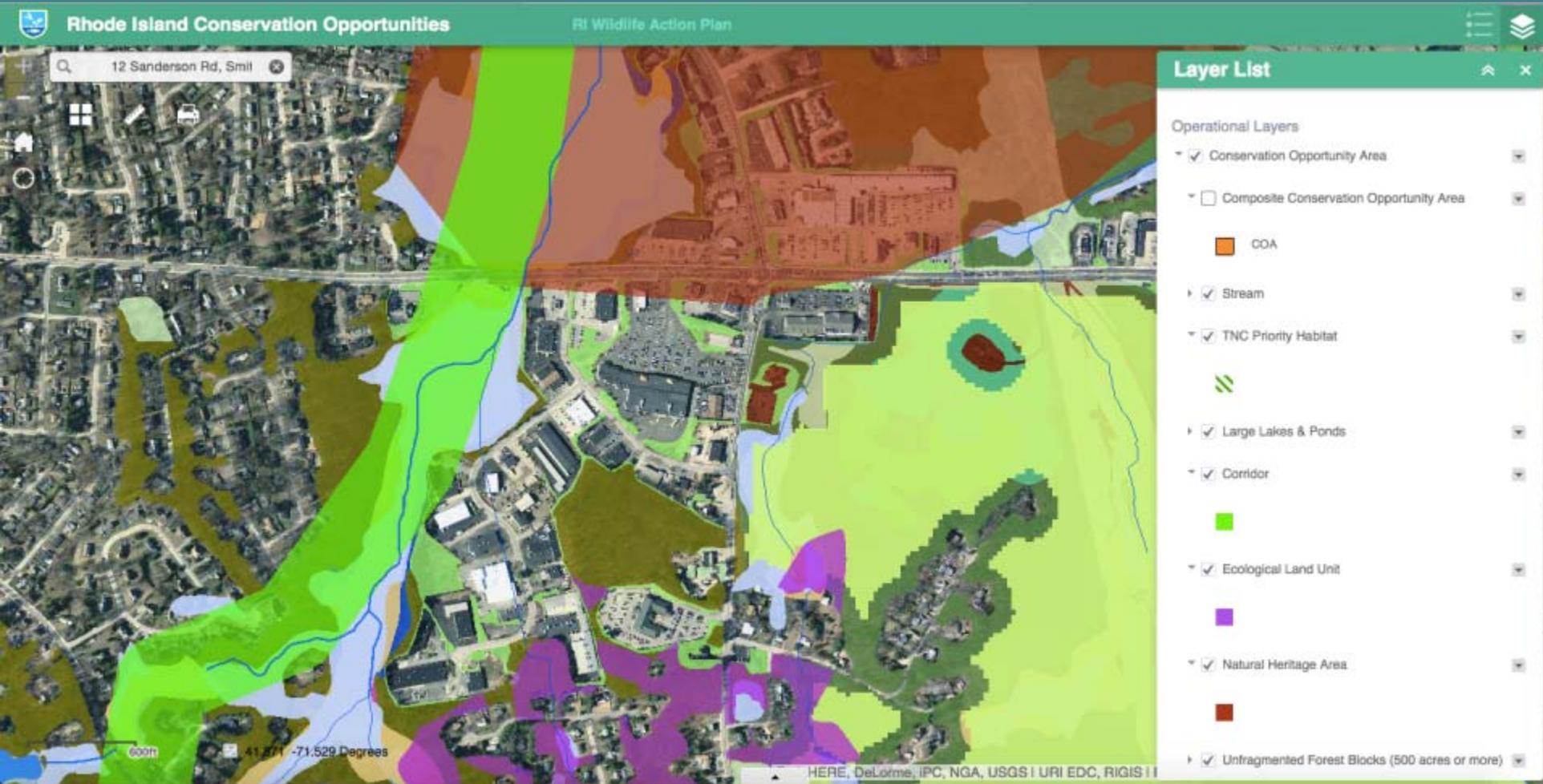
Layer List

Operational Layers

- Conservation Opportunity Area
  - Composite Conservation Opportunity Area
  - Stream
  - TNC Priority Habitat
  - Large Lakes & Ponds
  - Corridor
  - Ecological Land Unit
  - Natural Heritage Area
  - Unfragmented Forest Blocks (500 acres or more)
  - Unfragmented Forest Blocks (250 < 500 acres)
  - Wetland
  - Hydric Soil
  - Urban\_Services\_Boundary
  - RI Ecological Communities Classification
  - State Conservation Land

HERE, DeLorme, IPC, NGA, USGS | URI EDC, RIGIS |

# Conservation Opportunity Areas



# *COAs - not the whole story*

- **Locally important habitats/parcels**
- **Corridors- an imperfect science**
- **Priorities**

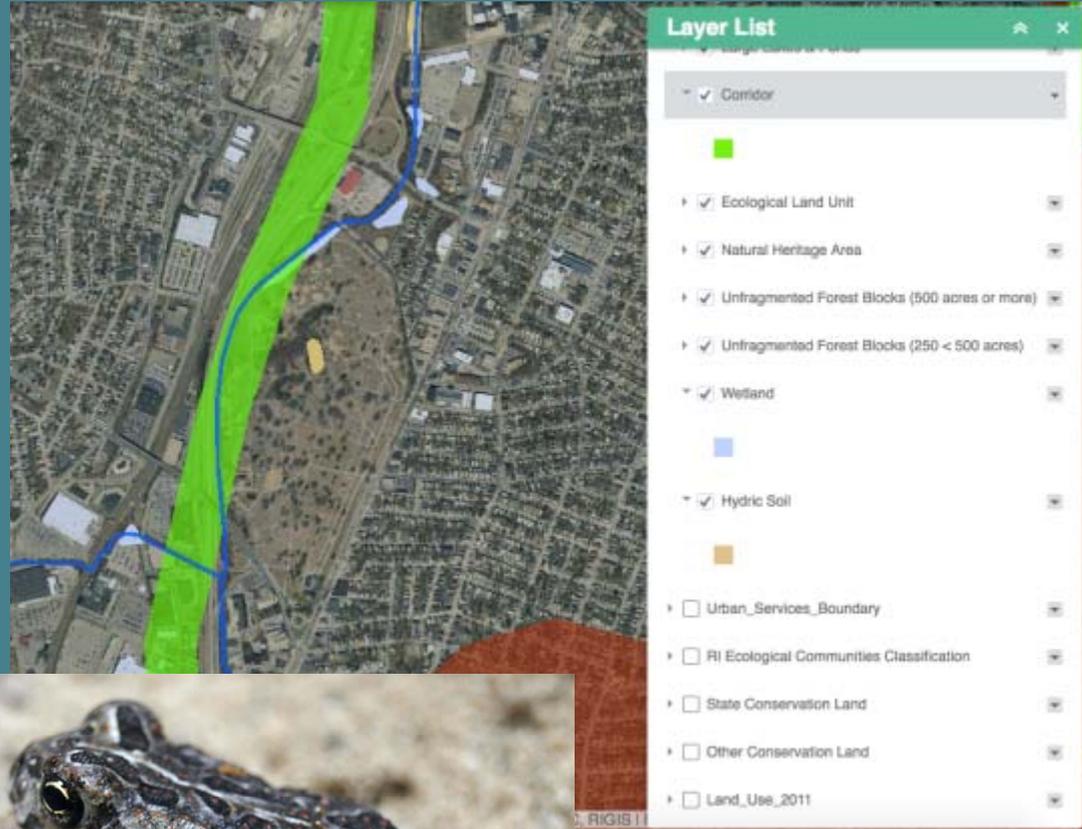
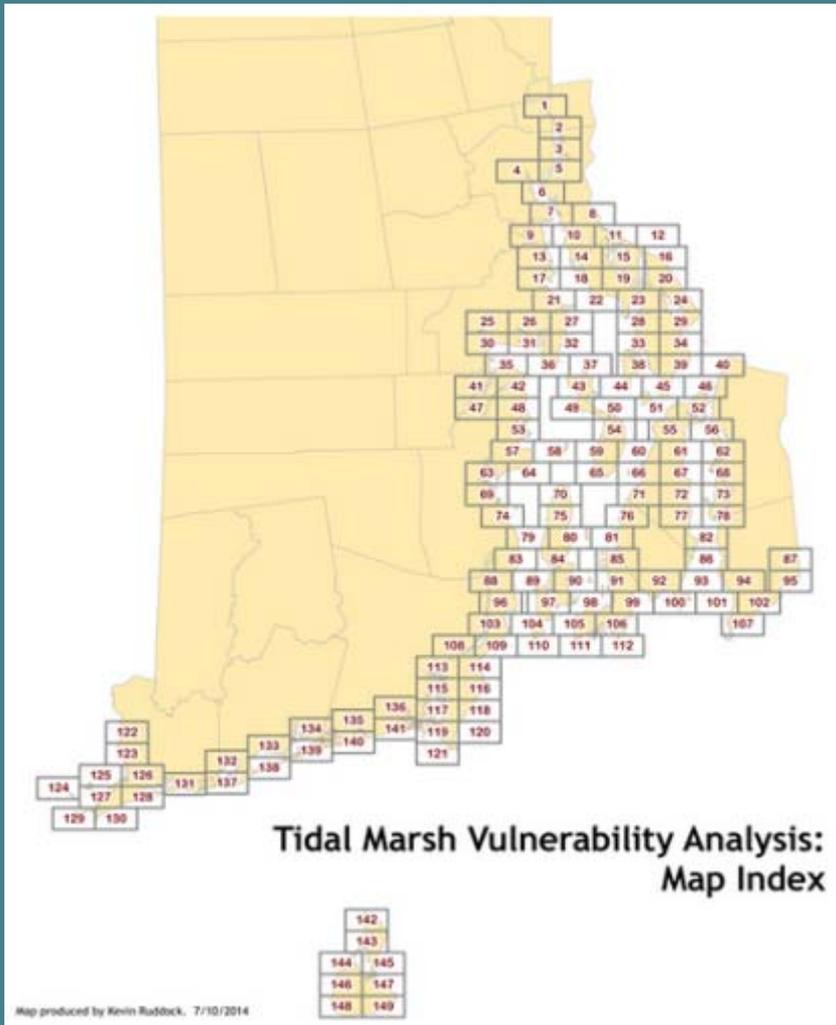
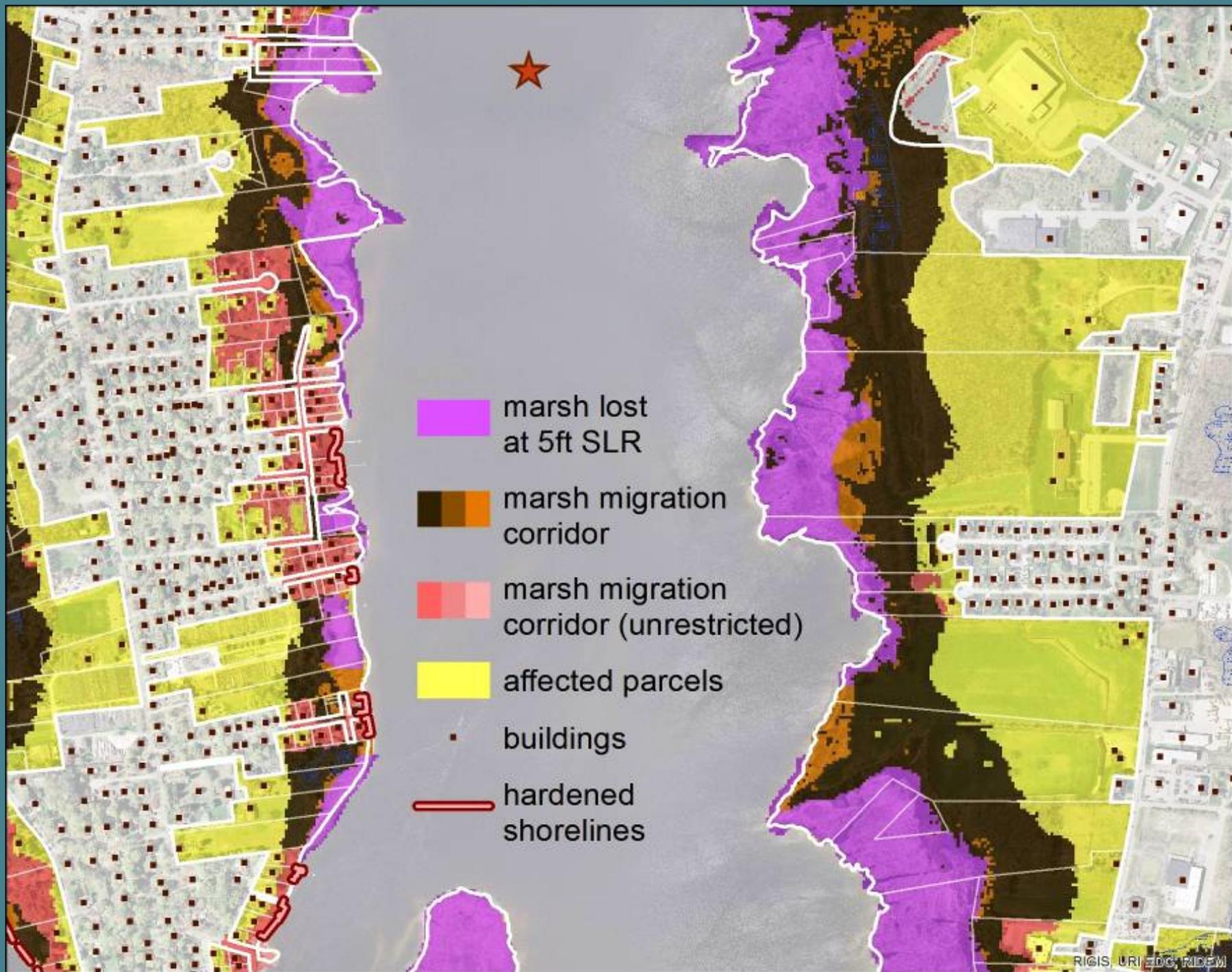


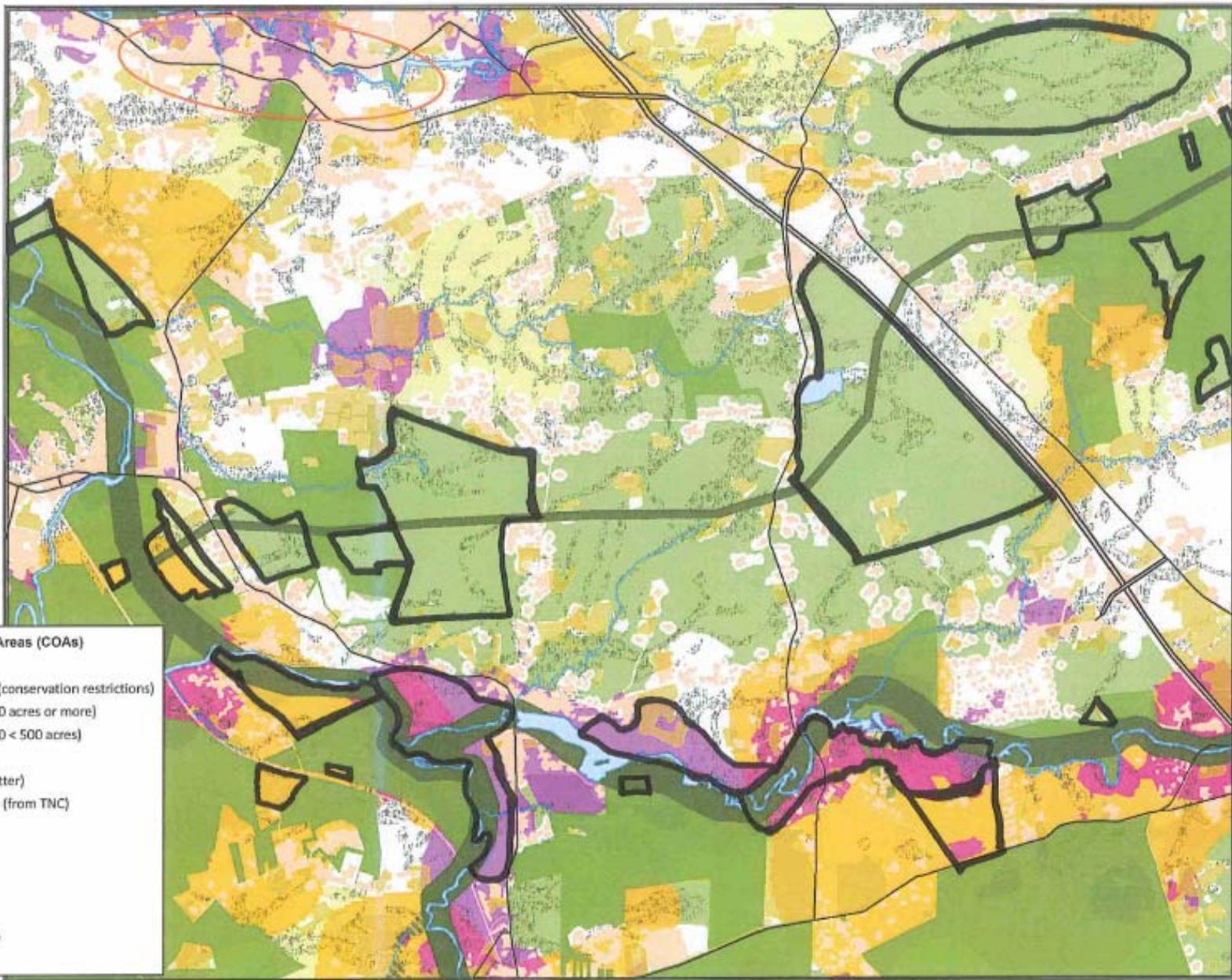
Photo by Chirs Raithel

# Sea Level Affecting Marshes Model (SLAMM)









# **Growing Greener to Protect Wildlife**

**Scott Millar**

**Habitat Loss  
Greatest Threat to  
Wildlife**

**Land Use is the  
Greatest  
Threat to Habitat**

**Communities Have  
Exclusive Control  
Over Land Use**

# Growth Trends

- 1982-2007 RI developed 22% of farms
- Development 9 times faster than population
- Demand for 9,800 housing units by 2017
- Projection for 17,000 housing units by 2027







A photograph of a stream in a forest. The stream flows through a wooded area with many trees and fallen leaves on the ground. The water is clear and reflects the surrounding greenery. In the upper right corner, there is a white text box with a black border containing the text "Watershed with 10% impervious cover." The entire image is set against a solid green background.

Watershed with 10%  
impervious cover.

*Photo Copyright 1999, Center for Watershed Protection*

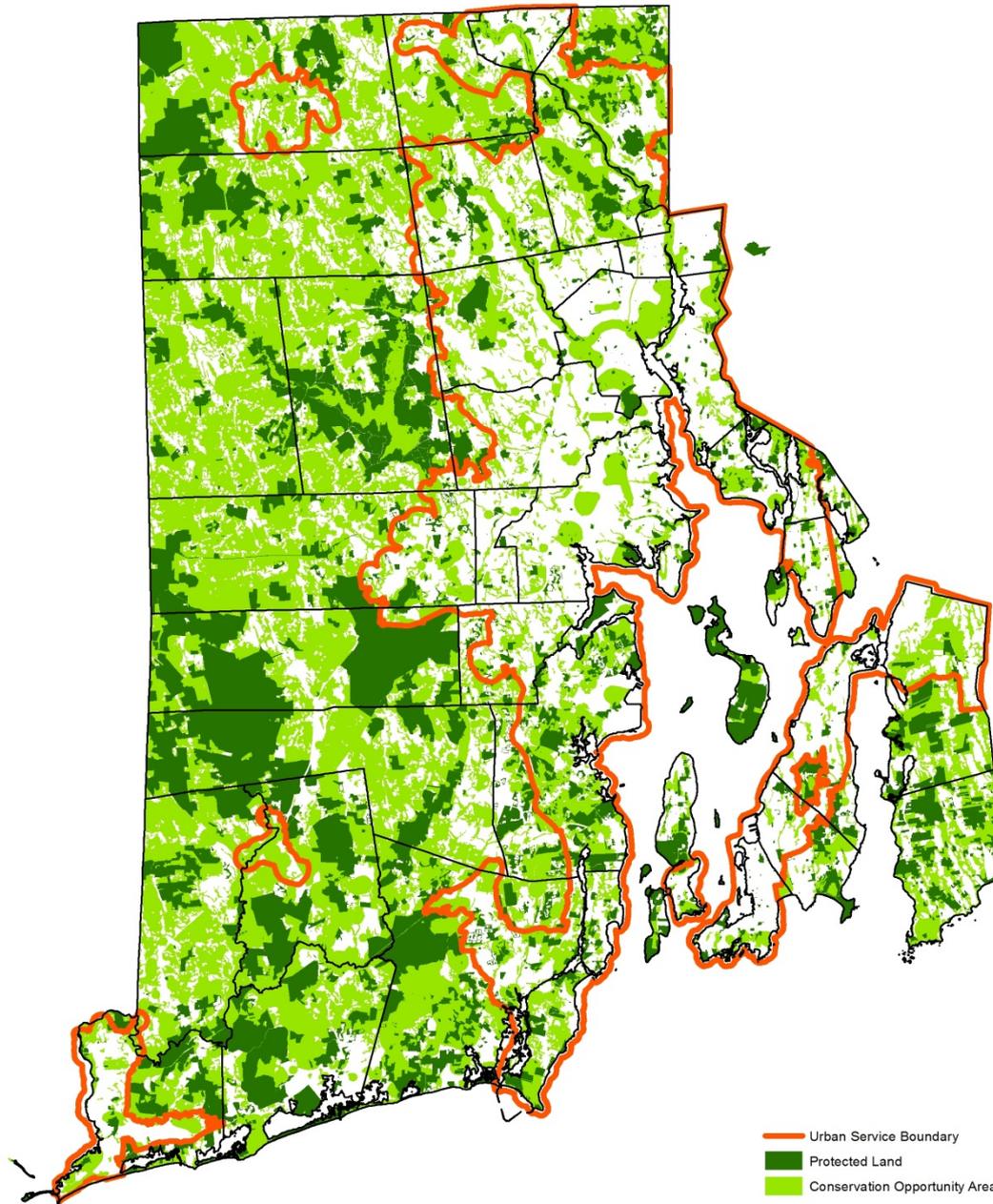
Watershed with 20%  
impervious cover.



A photograph of a stream in a forest. The stream is shallow and flows over a bed of rocks and pebbles. On the left bank, there is a large pile of brush and debris. In the foreground, a white plastic bag is lying on the rocks. In the background, a concrete structure, possibly a culvert or a small dam, is visible. The forest is dense with trees, many of which are bare, suggesting a late autumn or winter setting. The overall scene depicts a natural waterway in a watershed with 30% impervious cover.

Watershed with 30% impervious cover.

*Photo Copyright 1999, Center for Watershed Protection*



-  Urban Service Boundary
-  Protected Land
-  Conservation Opportunity Area

|           |          |
|-----------|----------|
| Title:    |          |
| Scale:    |          |
| Date:     | 3/9/2015 |
| Drawn by: | paj      |



This map was created for informational, planning and guidance use only. It is a general reference, not a legally authoritative source for the location of natural or manmade features. Proper interpretation of this map may require the assistance of appropriate professional services. The cartographic representations depicted have not been verified by a RI Registered Professional Land Surveyor and are not intended to be used in place of a survey.

File: F:\Work\Habitat\ConservationOpportunityAreas\_RhodeMap\USB\_COA.mxd



# Why should communities grow greener to protect habitat?

- Community character is preserved
- Local flooding is reduced
- Saves money

**So what should  
communities do?**

# Comprehensive Plan

- Include habitat map
- Add habitat as a priority for land protection
- Policies to protect habitat from development
- Identify areas for increased density

# Techniques to Preserve Habitat

# Conservation Development



# Existing Conditions

## Dimensional Regs

**Zone R60 - Conservation**

|                        |                                |
|------------------------|--------------------------------|
| MINIMUM LOT AREA       | 20,000 SF                      |
| LOT FRONTAGE AND WIDTH | 80 FT. (20 FT. WITH VARIATION) |
| FRONT YARD SETBACK     | 25 FT.                         |
| SIDE YARD SETBACK      | 16 FT.                         |
| REAR YARD SETBACK      | 30 FT.                         |

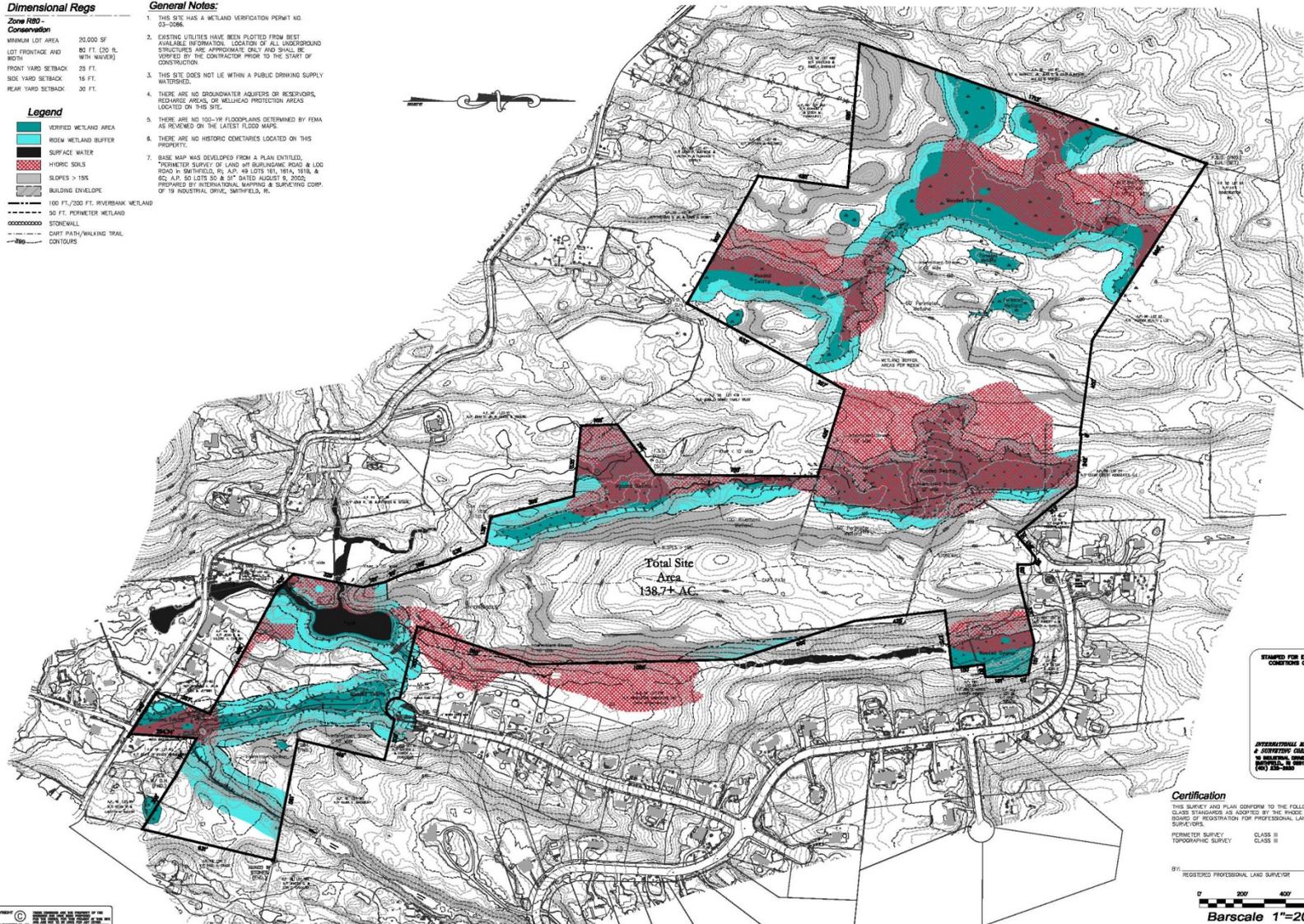
## Legend

|  |                                    |
|--|------------------------------------|
|  | VERIFIED WETLAND AREA              |
|  | RIVER WETLAND BUFFER               |
|  | SURFACE WATER                      |
|  | HYDRIC SOILS                       |
|  | SLOPES > 15%                       |
|  | BUILDING ENVELOPE                  |
|  | 100 FT./200 FT. RIVERSHANK WETLAND |
|  | 50 FT. PERMETER WETLAND            |
|  | STONEWALL                          |
|  | CHART PATH/WALKING TRAIL           |
|  | CONTOURS                           |

## Master Plan Submission

### General Notes:

1. THIS SITE HAS A WETLAND VERIFICATION PERMIT NO. 03-0086.
2. EXISTING UTILITIES HAVE BEEN PLOTTED FROM BEST AVAILABLE INFORMATION. LOCATION OF ALL UNDERGROUND STRUCTURES ARE APPROXIMATE ONLY AND SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION.
3. THIS SITE DOES NOT LIE WITHIN A PUBLIC DRINKING SUPPLY WATERSHED.
4. THERE ARE NO GROUNDWATER AQUIFERS OR RESERVOIRS, RECHARGE AREAS, OR WELLHEAD PROTECTION AREAS LOCATED ON THIS SITE.
5. THERE ARE NO 100-YR FLOODPLAINS DETERMINED BY FEMA AS REVEALED ON THE LATEST FLOOD MAPS.
6. THERE ARE NO HISTORIC CEMETARIES LOCATED ON THIS PROPERTY.
7. BASE MAP WAS DEVELOPED FROM A PLAN ENTITLED, "PERMETER SURVEY OF LAND OFF BURGLINGHAM ROAD & LOG ROAD IN SMITHFIELD, RI, LOTS 49, LOTS 161, 162A, 163B, & 62, A.P. 50 LOTS 50 & 51" DATED AUGUST 8, 2002, PREPARED BY INTERNATIONAL MAPPING & SURVEYING CORP. OF 19 INDUSTRIAL DRIVE, SMITHFIELD, RI.



STAMPED FOR EXISTING CONDITIONS ONLY

INTERNATIONAL MAPPING & SURVEYING CORP.  
A NATIONAL SOCIETY OF PROFESSIONAL LAND SURVEYORS  
(NLS) 232-388-0000

### Certification

THIS SURVEY AND PLAN CONFORM TO THE FOLLOWING CLASS STANDARDS AS ADOPTED BY THE RHODE ISLAND BOARD OF REGISTRATION FOR PROFESSIONAL LAND SURVEYORS.

PERMETER SURVEY CLASS III  
TOPOGRAPHIC SURVEY CLASS III

BY: \_\_\_\_\_ REGISTERED PROFESSIONAL LAND SURVEYOR DATE: \_\_\_\_\_



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# Large Lot Plan

## Dimensional Regs

**Zone R80**  
 MINIMUM LOT AREA 80,000 SF  
 LOT FRONTAGE AND WIDTH 200 FT  
 FRONT YARD SETBACK 40 FT  
 SIDE YARD SETBACK 25 FT  
 REAR YARD SETBACK 75 FT

## Development Data

AREA OF PARCEL 138.7 ACRES  
 AREA OF R.O.-W 114.7 ACRES  
 OPEN SPACE AREA 1.88 ACRES  
 AREA OF LOTS 129.29 ACRES  
 # PROPOSED LOTS 42  
 AVERAGE LOT AREA 3,031 ACRES  
 LENGTH OF R.O.-W 9,059 LF

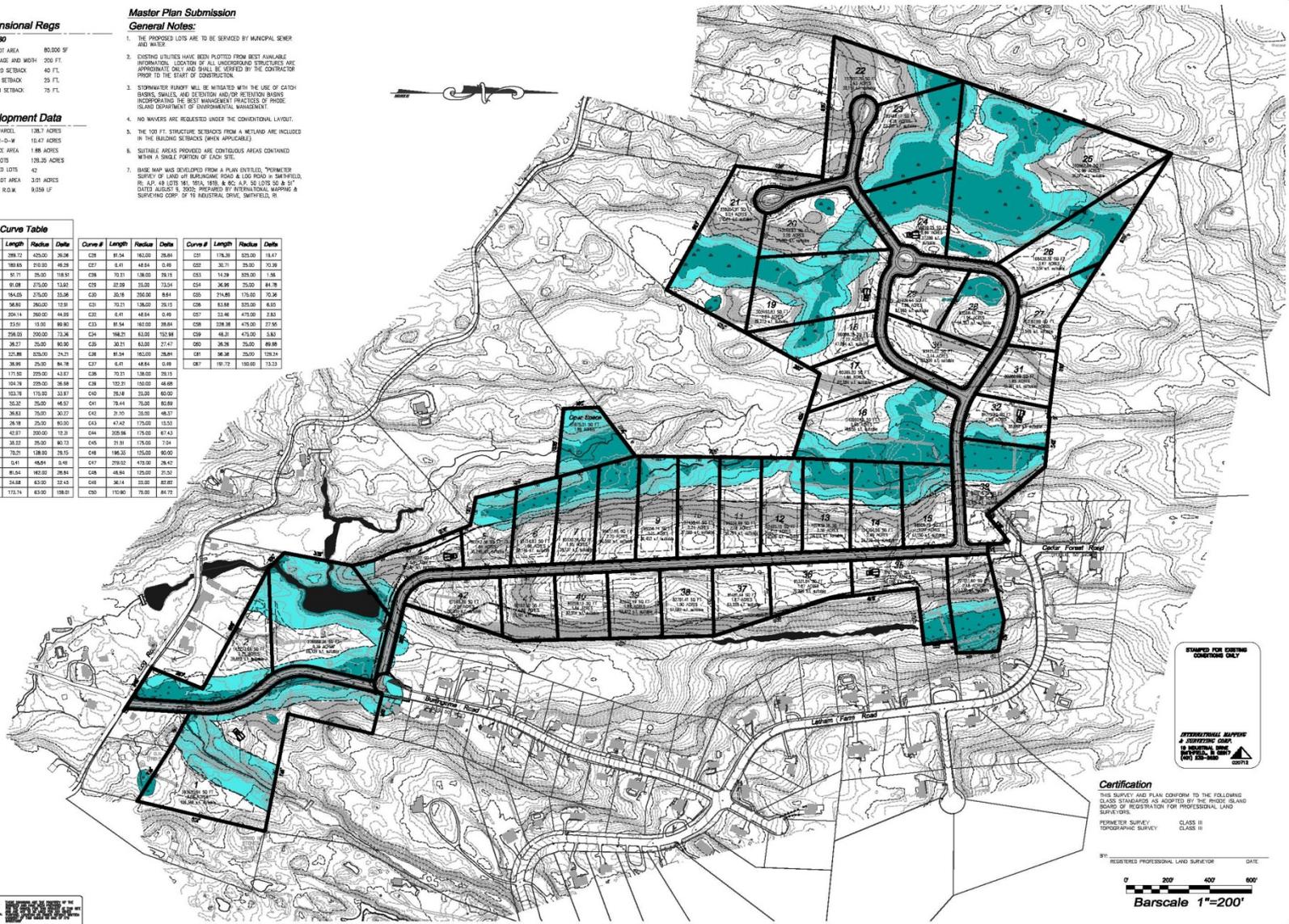
## Master Plan Submission

### General Notes:

1. THE PROPOSED LOTS ARE TO BE SERVICED BY MUNICIPAL SEWER AND WATER.
  2. EXISTING UTILITIES HAVE BEEN PLOTTED FROM BEST AVAILABLE INFORMATION. LOCATION OF ALL UNDERGROUND STRUCTURES ARE APPROXIMATE ONLY AND SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION.
  3. STORMWATER RUNOFF WILL BE MITIGATED WITH THE USE OF CATCH BASINS, SWALES, AND DETENTION AND/OR RETENTION BASINS INCORPORATING THE BEST MANAGEMENT PRACTICES OF BRIDGE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT.
  4. NO WORKERS ARE REQUESTED UNDER THE CONVENTIONAL LAYOUT.
  5. THE USE OF STRUCTURE SETBACKS FROM A WETLAND ARE INCLUDED IN THE BUILDING SETBACKS (WHEN APPLICABLE).
  6. SUITABLE AREAS PROVIDED ARE CONTIGUOUS AREAS CONTAINED WITHIN A SINGLE PORTION OF EACH SITE.
- BASE MAP WAS DEVELOPED FROM A PLAN ENTITLED, "TOPOMETER SURVEY OF LANDS OF BARBARANOWICZ ROAD & LOG POOD IN SHERBROOK, BE. OF 48 LOTS NE1/4 SEC 18S & SEC. 15, T51N LOTS 20 & 21" DATED AUGUST 9, 2002, PREPARED BY INTERNATIONAL MAPPING & SURVEYING CORP. OF 78 INDUSTRIAL DRIVE, SMITHFIELD, RI.

## Curve Table

| Curve # | Length | Radius  | Delta  | Curve # | Length | Radius | Delta  | Curve # | Length | Radius | Delta  |
|---------|--------|---------|--------|---------|--------|--------|--------|---------|--------|--------|--------|
| 01      | 288.72 | 2470.00 | 20.06  | 028     | 81.54  | 140.00 | 20.81  | 051     | 176.28 | 320.00 | 18.47  |
| 02      | 188.65 | 210.00  | 48.29  | 027     | 6.41   | 48.64  | 5.49   | 052     | 30.71  | 25.00  | 30.39  |
| 03      | 81.71  | 25.00   | 108.31 | 026     | 70.11  | 138.00 | 28.13  | 053     | 14.29  | 205.00 | 1.56   |
| 04      | 81.08  | 270.00  | 13.00  | 025     | 22.98  | 20.00  | 73.54  | 054     | 26.98  | 250.00 | 84.78  |
| 05      | 144.53 | 270.00  | 33.06  | 020     | 30.18  | 200.00 | 8.84   | 055     | 214.83 | 175.00 | 30.36  |
| 06      | 36.81  | 260.00  | 13.81  | 021     | 70.11  | 138.00 | 28.13  | 028     | 83.88  | 320.00 | 6.85   |
| 07      | 204.14 | 200.00  | 44.83  | 022     | 6.41   | 48.64  | 5.49   | 027     | 13.46  | 475.00 | 2.83   |
| 08      | 73.01  | 17.00   | 89.84  | 023     | 81.54  | 140.00 | 20.81  | 026     | 228.94 | 475.00 | 27.56  |
| 09      | 278.03 | 200.00  | 33.36  | 024     | 184.21 | 81.00  | 700.88 | 025     | 48.71  | 475.00 | 5.83   |
| 010     | 26.57  | 25.00   | 80.00  | 025     | 30.21  | 63.00  | 27.47  | 020     | 26.28  | 25.00  | 89.88  |
| 011     | 121.88 | 820.00  | 24.21  | 028     | 81.54  | 140.00 | 20.81  | 018     | 36.38  | 25.00  | 138.14 |
| 012     | 26.95  | 25.00   | 84.78  | 027     | 6.41   | 48.64  | 5.49   | 017     | 19.72  | 100.00 | 33.33  |
| 013     | 171.85 | 270.00  | 43.87  | 026     | 70.11  | 138.00 | 28.13  |         |        |        |        |
| 014     | 104.78 | 220.00  | 28.68  | 028     | 102.21 | 150.00 | 48.68  |         |        |        |        |
| 015     | 103.78 | 170.00  | 33.87  | 040     | 10.18  | 20.00  | 60.00  |         |        |        |        |
| 016     | 10.32  | 25.00   | 48.37  | 041     | 78.44  | 70.00  | 80.89  |         |        |        |        |
| 017     | 38.42  | 70.00   | 20.27  | 042     | 71.29  | 30.00  | 48.27  |         |        |        |        |
| 018     | 26.78  | 25.00   | 80.00  | 043     | 47.42  | 170.00 | 18.33  |         |        |        |        |
| 019     | 42.87  | 200.00  | 13.21  | 044     | 305.88 | 170.00 | 67.43  |         |        |        |        |
| 020     | 38.22  | 25.00   | 80.13  | 045     | 71.31  | 170.00 | 7.34   |         |        |        |        |
| 021     | 70.21  | 138.00  | 28.13  | 046     | 198.22 | 120.00 | 30.00  |         |        |        |        |
| 022     | 1.41   | 84.84   | 51.81  | 047     | 29.00  | 470.00 | 28.42  |         |        |        |        |
| 023     | 81.54  | 140.00  | 20.84  | 048     | 48.94  | 120.00 | 23.22  |         |        |        |        |
| 024     | 24.88  | 83.00   | 32.43  | 049     | 36.14  | 33.00  | 82.82  |         |        |        |        |
| 025     | 173.74 | 83.00   | 188.01 | 050     | 103.80 | 70.00  | 84.72  |         |        |        |        |



STAMPED FOR EXISTING  
 CONDITIONS ONLY

INTERNATIONAL MAPPING  
 & SURVEYING CORP.  
 78 INDUSTRIAL DRIVE  
 SMITHFIELD, RI 02876  
 401-235-2822

**Certification**  
 THIS SURVEY AND PLAN CONFORM TO THE FOLLOWING  
 CLASS STANDARDS AS ADOPTED BY THE RHODE ISLAND  
 BOARD OF REGISTRATION FOR PROFESSIONAL LAND  
 SURVEYORS.  
 PRINTED SURVEY CLASS II  
 TOPOGRAPHIC SURVEY CLASS II

BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
 REGISTERED PROFESSIONAL LAND SURVEYOR

0 200 400 600  
 Barscale 1"=200'



# Conservation Development Plan

## Dimensional Regs

### Zone R20 - Conservation

MINIMUM LOT AREA 30,000 SF  
 80 FT. (20 ft. WITH WADING)  
 FRONT YARD SETBACK 25 FT.  
 SIDE YARD SETBACK 16 FT.  
 REAR YARD SETBACK 30 FT.

## Development Data

AREA OF PROJECT 138.7 ACRES  
 AREA OF A-D-W 4.25 ACRES  
 OPEN SPACE AREA 114.49 ACRES  
 SUITABLE OPEN SPACE 45.8 ACRES  
 AREA OF PROP. LOTS 19.86 ACRES  
 # PROPOSED LOTS 38  
 AVG. LOT AREA 0.52 ACRES  
 LENGTH OF ROADWAY 3,730 LF

## Master Plan Submission

### General Notes:

1. THE PROPOSED LOTS ARE TO BE SERVICED BY MUNICIPAL SEWER AND WATER.
2. EXISTING UTILITIES HAVE BEEN PLOTTED FROM BEST AVAILABLE INFORMATION. LOCATION OF ALL UNDERGROUND STRUCTURES ARE APPROXIMATE. DETAIL AND SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION.
3. STORMWATER RUNOFF WILL BE MITIGATED WITH THE USE OF CATCH BASINS, SWALES, AND A SERIES OF SMALLER DETENTION PONDCTIONS BASED INCORPORATING THE BEST MANAGEMENT PRACTICES OF RIDGE ISLAND DEPARTMENT OF ENVIRONMENTAL MANAGEMENT.
4. THIS PROJECT IS PROPOSED TO BE BUILT IN THE (S) PHASE.
5. THE PLAN FALLS UNDER THE LATEST SUBDIVISION AND DEVELOPMENT AND SUBDIVISION REVIEW REGULATIONS FOR CONSERVATION DEVELOPMENT.
6. MARKERS ARE NECESSARILY REQUESTED FOR THE FOLLOWING:
  - LOT FRONTAGE FOR LOTS 1, 2, & 18
7. THE 100 FT. STRUCTURE SETBACK TO A WETLAND IS INCLUDED WITHIN THE BUILDING ENVELOPE (AS SHOWN).
8. BASE MAP WAS DEVELOPED FROM A PLAN ENTITLED "FORMER SURVEY OF LAND ON BURLINGAME ROAD & LOG ROAD IN SMITHFIELD, RI. A.P. 46 LOTS 101, 104, 105, & 106 A.P. 47 50 LOTS 50 & 51" DATED AUGUST 9, 2002; PREPARED BY INTERNATIONAL MAPPING & SURVEYING CORP. OF 19 INDUSTRIAL DRIVE, SMITHFIELD, RI.

## Conservation Development Calculation:

SUITABLE LAND AREA = TOTAL SITE - WETLANDS - WETLAND BUFFERS - 15% SLOPES AND GREATER = 65.49 ACRES  
 SUITABLE OPEN SPACE TO BE PROVIDED = 60% X 65.49 ACRES = 39.29 ACRES  
 SUITABLE LAND FOR DEVELOPMENT = 65.49 AC. - 39.29 AC. = 26.20 ACRES

## Parcel Table

| Parcel # | Area     | Curve # | Length | Radius  | Date  |
|----------|----------|---------|--------|---------|-------|
| 1        | 31098.72 | C1      | 181.13 | 625.00  | 21.08 |
| 2        | 29847.10 | C2      | 170.00 | 275.00  | 13.16 |
| 3        | 30000.00 | C3      | 5.84   | 225.00  | 1.35  |
| 4        | 26021.82 | C4      | 21.63  | 162.00  | 11.25 |
| 5        | 91805.97 | C5      | 70.34  | 138.00  | 29.16 |
| 6        | 21900.00 | C7      | 113.27 | 675.00  | 6.85  |
| 7        | 21900.00 | C8      | 127.27 | 630.00  | 27.83 |
| 8        | 21900.00 | C9      | 62.67  | 162.00  | 22.53 |
| 9        | 21900.00 | D10     | 50.13  | 83.00   | 45.58 |
| 10       | 20350.71 | C11     | 61.88  | 162.00  | 21.78 |
| 11       | 21906.75 | D12     | 49.70  | 63.00   | 44.70 |
| 12       | 20040.22 | D13     | 119.20 | 1075.00 | 13.30 |
| 13       | 38142.06 | D14     | 34.10  | 15.00   | 32.00 |
| 14       | 20777.75 | D15     | 70.34  | 138.00  | 29.16 |
| 15       | 30000.00 | D16     | 33.25  | 162.00  | 11.76 |
| 16       | 30000.00 | D17     | 130.86 | 1075.00 | 7.70  |
| 17       | 30000.00 | D18     | 115.87 | 1075.00 | 7.26  |
| 18       | 14058.38 | D19     | 5.71   | 175.00  | 10.31 |
| 19       | 10000.00 | C20     | 23.42  | 1025.00 | 0.86  |
| 20       | 30000.00 | C21     | 110.20 | 1025.00 | 4.13  |
| 21       | 30000.00 | C22     | 110.20 | 1025.00 | 4.13  |
| 22       | 21900.00 | C23     | 110.20 | 1025.00 | 4.13  |
| 23       | 29815.38 | C24     | 110.20 | 1025.00 | 4.13  |
| 24       | 23237.04 | C25     | 4.42   | 1025.00 | 0.17  |
| 25       | 21773.63 | C26     | 65.18  | 1475.00 | 3.70  |
| 26       | 27961.26 | C27     | 29.27  | 1475.00 | 6.40  |
| 27       | 21538.31 | C28     | 126.26 | 1025.00 | 3.26  |
| 28       | 10543.33 | C29     | 142.83 | 1750.00 | 17.23 |
| 29       | 21941.46 | C30     | 124.87 | 1750.00 | 18.28 |
| 30       | 24947.30 | C31     | 24.98  | 1750.00 | 4.22  |
| 31       | 30000.00 |         |        |         |       |
| 32       | 30000.00 |         |        |         |       |
| 33       | 30000.00 |         |        |         |       |
| 34       | 30000.00 |         |        |         |       |
| 35       | 30000.00 |         |        |         |       |
| 36       | 30000.00 |         |        |         |       |
| 37       | 30000.00 |         |        |         |       |
| 38       | 30000.00 |         |        |         |       |

## Curve Table

| Curve # | Length | Radius  | Date  |
|---------|--------|---------|-------|
| C1      | 181.13 | 625.00  | 21.08 |
| C2      | 170.00 | 275.00  | 13.16 |
| C3      | 5.84   | 225.00  | 1.35  |
| C4      | 21.63  | 162.00  | 11.25 |
| C5      | 70.34  | 138.00  | 29.16 |
| C7      | 113.27 | 675.00  | 6.85  |
| C8      | 127.27 | 630.00  | 27.83 |
| C9      | 62.67  | 162.00  | 22.53 |
| D10     | 50.13  | 83.00   | 45.58 |
| C11     | 61.88  | 162.00  | 21.78 |
| D12     | 49.70  | 63.00   | 44.70 |
| D13     | 119.20 | 1075.00 | 13.30 |
| D14     | 34.10  | 15.00   | 32.00 |
| D15     | 70.34  | 138.00  | 29.16 |
| D16     | 33.25  | 162.00  | 11.76 |
| D17     | 130.86 | 1075.00 | 7.70  |
| D18     | 115.87 | 1075.00 | 7.26  |
| D19     | 5.71   | 175.00  | 10.31 |
| C20     | 23.42  | 1025.00 | 0.86  |
| C21     | 110.20 | 1025.00 | 4.13  |
| C22     | 110.20 | 1025.00 | 4.13  |
| C23     | 110.20 | 1025.00 | 4.13  |
| C24     | 110.20 | 1025.00 | 4.13  |
| C25     | 4.42   | 1025.00 | 0.17  |
| C26     | 65.18  | 1475.00 | 3.70  |
| C27     | 29.27  | 1475.00 | 6.40  |
| C28     | 126.26 | 1025.00 | 3.26  |
| C29     | 142.83 | 1750.00 | 17.23 |
| C30     | 124.87 | 1750.00 | 18.28 |
| C31     | 24.98  | 1750.00 | 4.22  |

## Legend

- VERIFIED WETLAND AREA
- PROB WETLAND BUFFER
- SURFACE WATER
- HYDRIC SOILS
- SLOPES > 15%
- BUILDING ENVELOPE
- 100 FT./200 FT. RIVERBANK WETLAND
- 50 FT. PERIMETER WETLAND
- STONEWALL
- CART PATH/WALKING TRAIL
- CONTOURS



STAMPED FOR EXISTING CONDITIONS ONLY



## Certification

THIS SURVEY AND PLAN CONFORM TO THE FOLLOWING CLASS STANDARDS AS ADOPTED BY THE RIDGE ISLAND BOARD OF REGISTRATION FOR PROFESSIONAL LAND SURVEYORS.

PERIMETER SURVEY CLASS II  
 TOPOGRAPHIC SURVEY CLASS II

BY: REGISTERED PROFESSIONAL LAND SURVEYOR DATE:



# Comparisons

Conventional

Conservation

Wetland Lots: 24

0

Average Lot: 3 acres

.52 acres

Street Length: 9,059

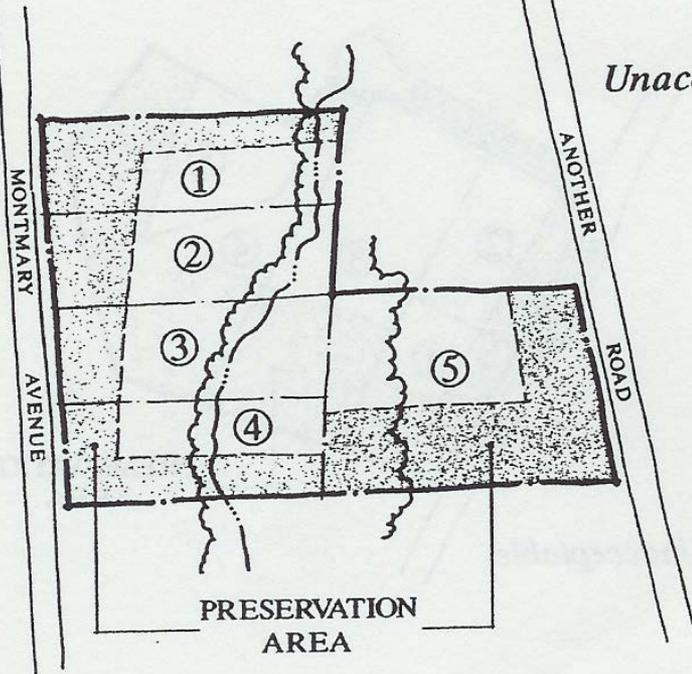
3,720

Open Space: 1.4%

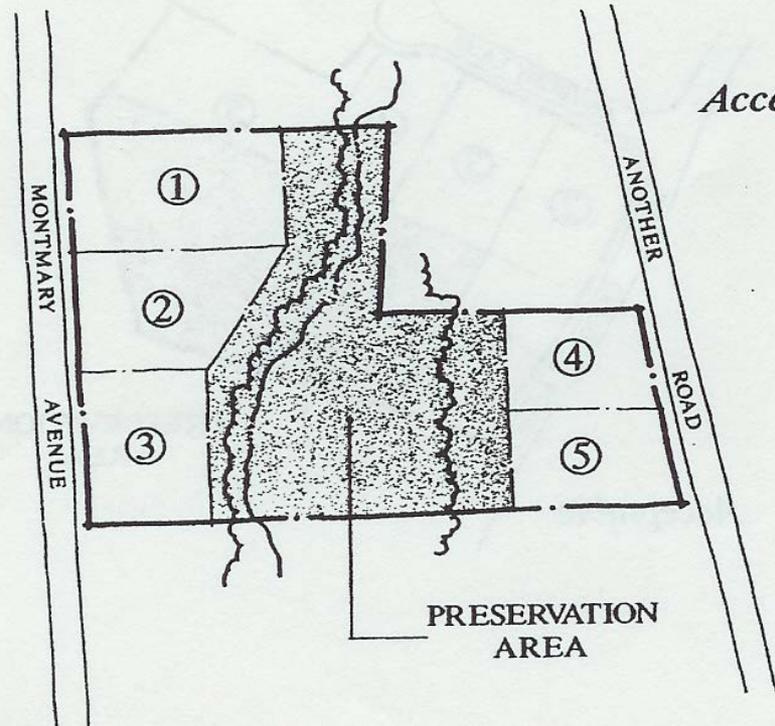
82%

# Habitat Design

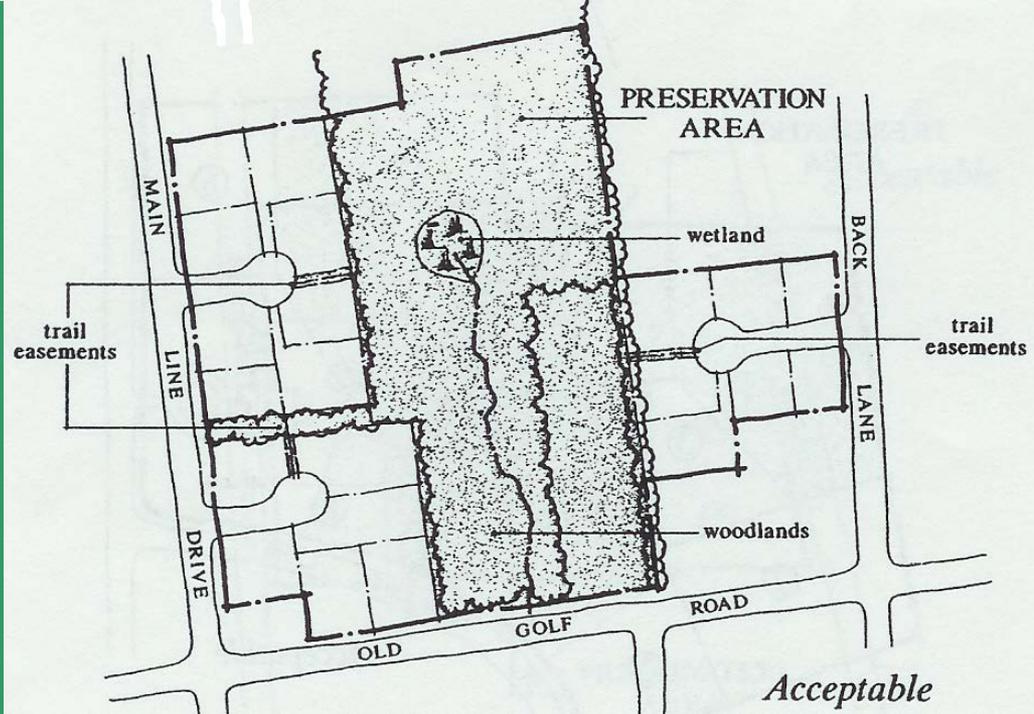
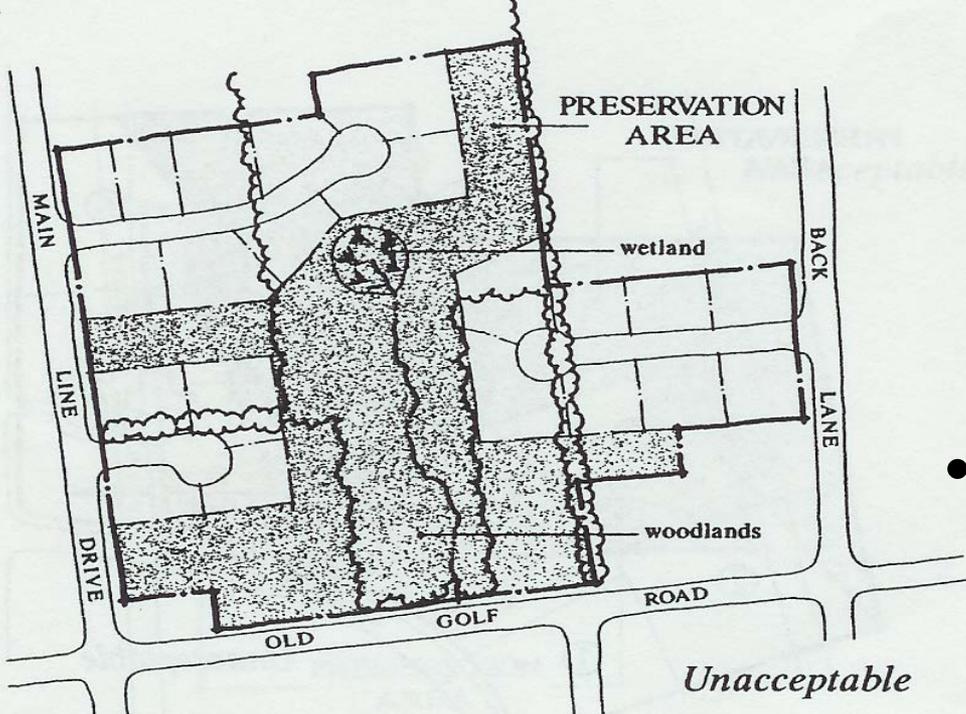
*Unacceptable*



*Acceptable*

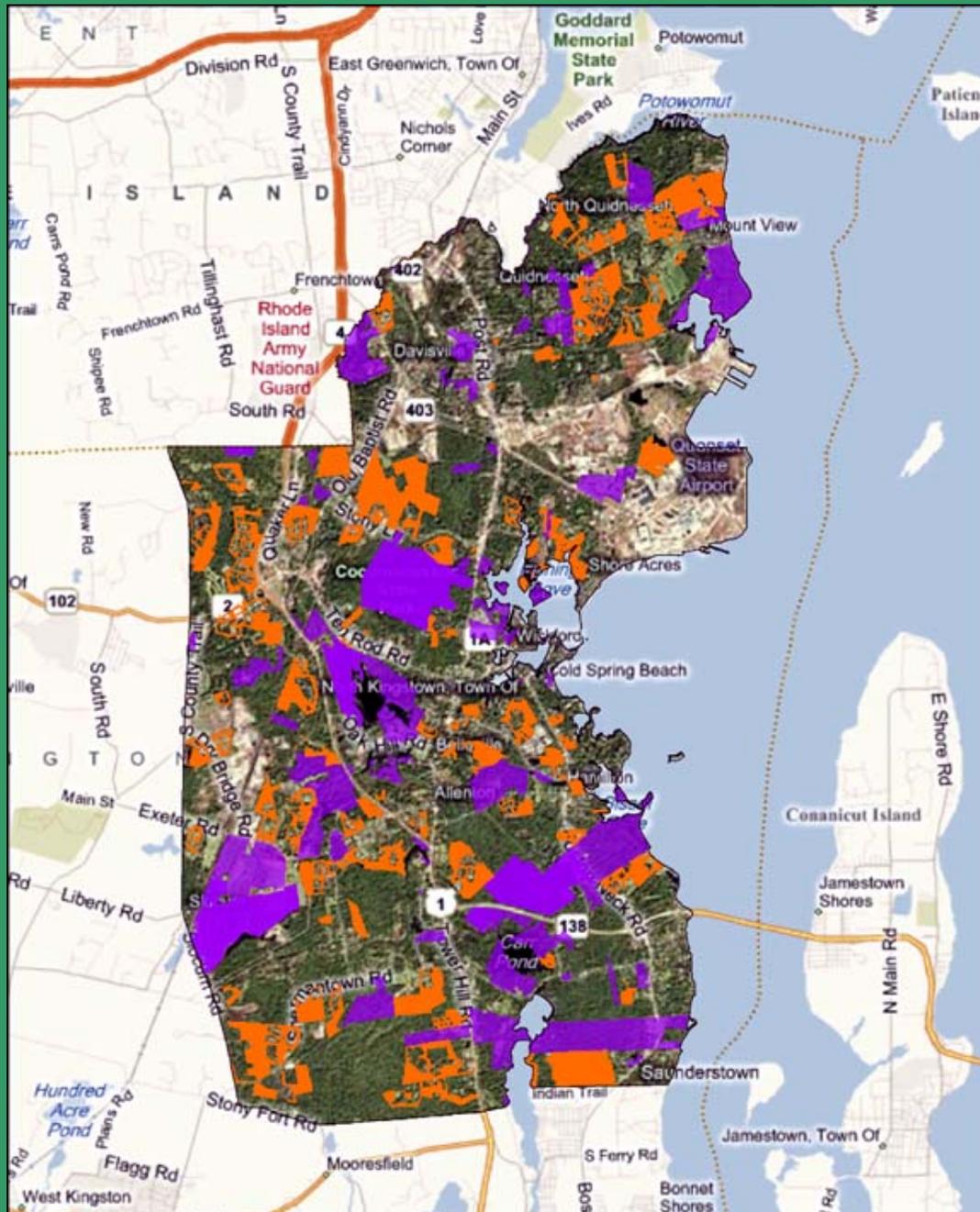


# Habitat Design



# North Kingstown

- 24% town protected
- 40% of total protected by conservation development



70 Acres of Unfragmented Forest

Edges between field and forest provide excellent wildlife habitat.

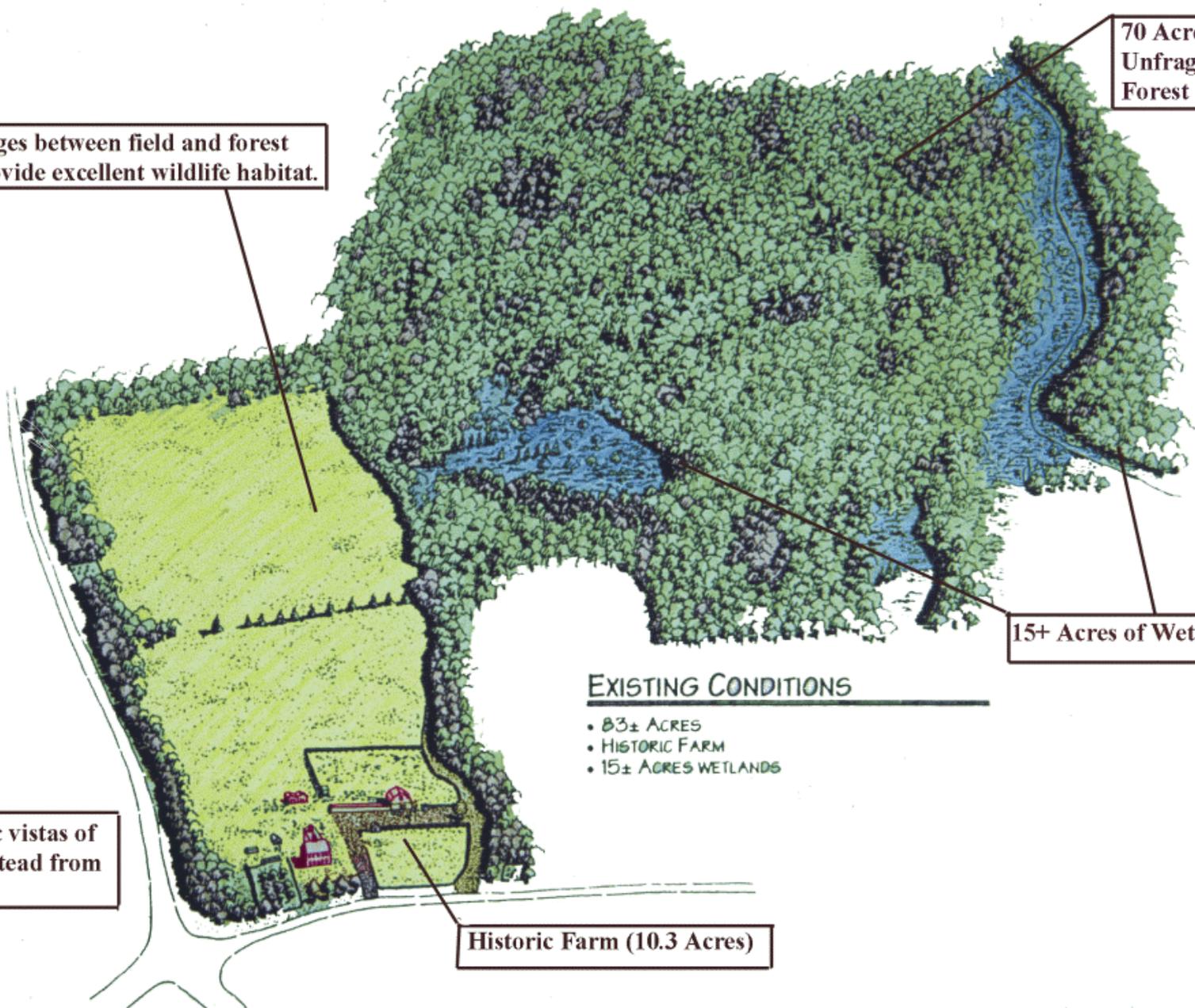
15+ Acres of Wetland

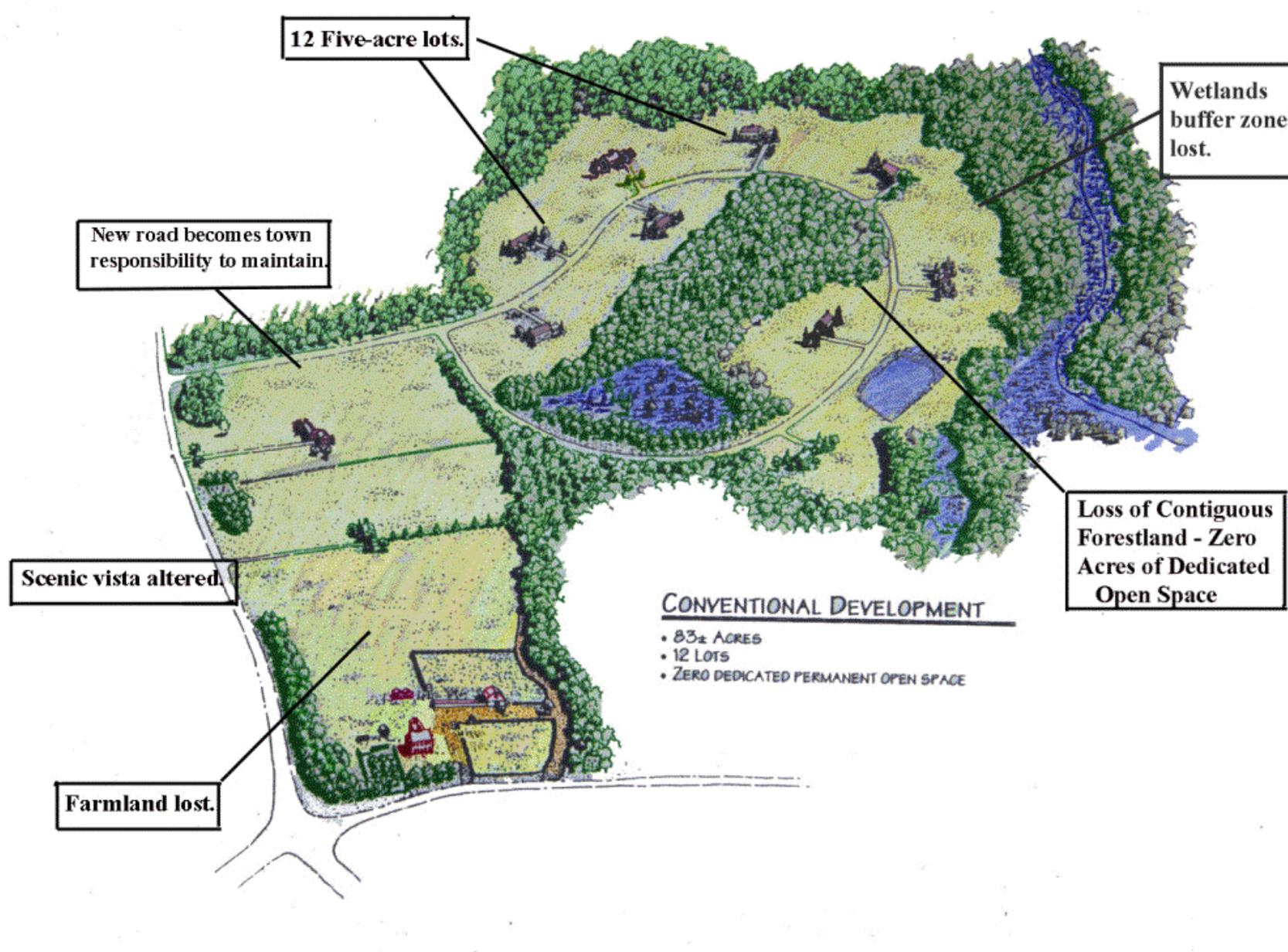
EXISTING CONDITIONS

- 83± ACRES
- HISTORIC FARM
- 15± ACRES WETLANDS

Scenic vistas of farmstead from roads

Historic Farm (10.3 Acres)





52+ Acres of Dedicated Open Space  
with Minimal Loss of Forestland

4 Five-Acre Lots for Homes

Wildlife Habitat  
Protected

Private  
Road

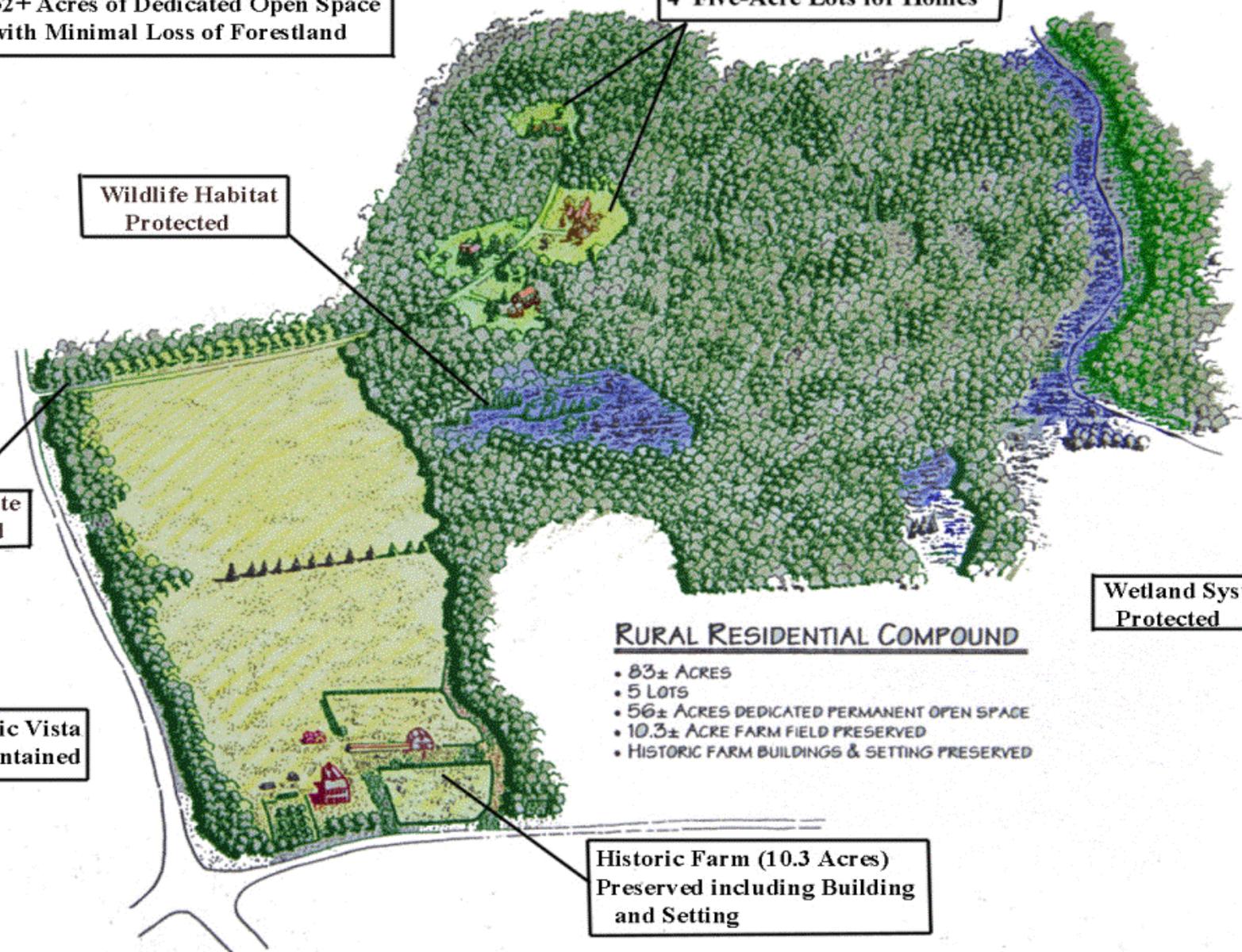
Scenic Vista  
Maintained

Wetland System  
Protected

RURAL RESIDENTIAL COMPOUND

- 83± ACRES
- 5 LOTS
- 56± ACRES DEDICATED PERMANENT OPEN SPACE
- 10.3± ACRE FARM FIELD PRESERVED
- HISTORIC FARM BUILDINGS & SETTING PRESERVED

Historic Farm (10.3 Acres)  
Preserved including Building  
and Setting





# The Rhode Island Conservation Development Manual

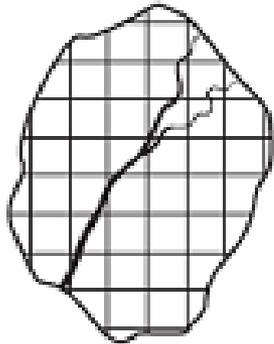


A Ten-Step Process for Planning and Design of Creative Development Projects

# Village Development



## Scenario A

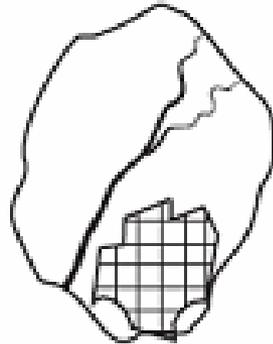


1 unit per acre

**Site: 20%  
impervious cover**

**Watershed: 20%  
impervious cover**

## Scenario B

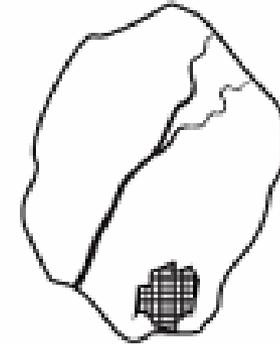


4 units per acre

**Site: 38%  
impervious cover**

**Watershed: 9.5%  
impervious cover**

## Scenario C



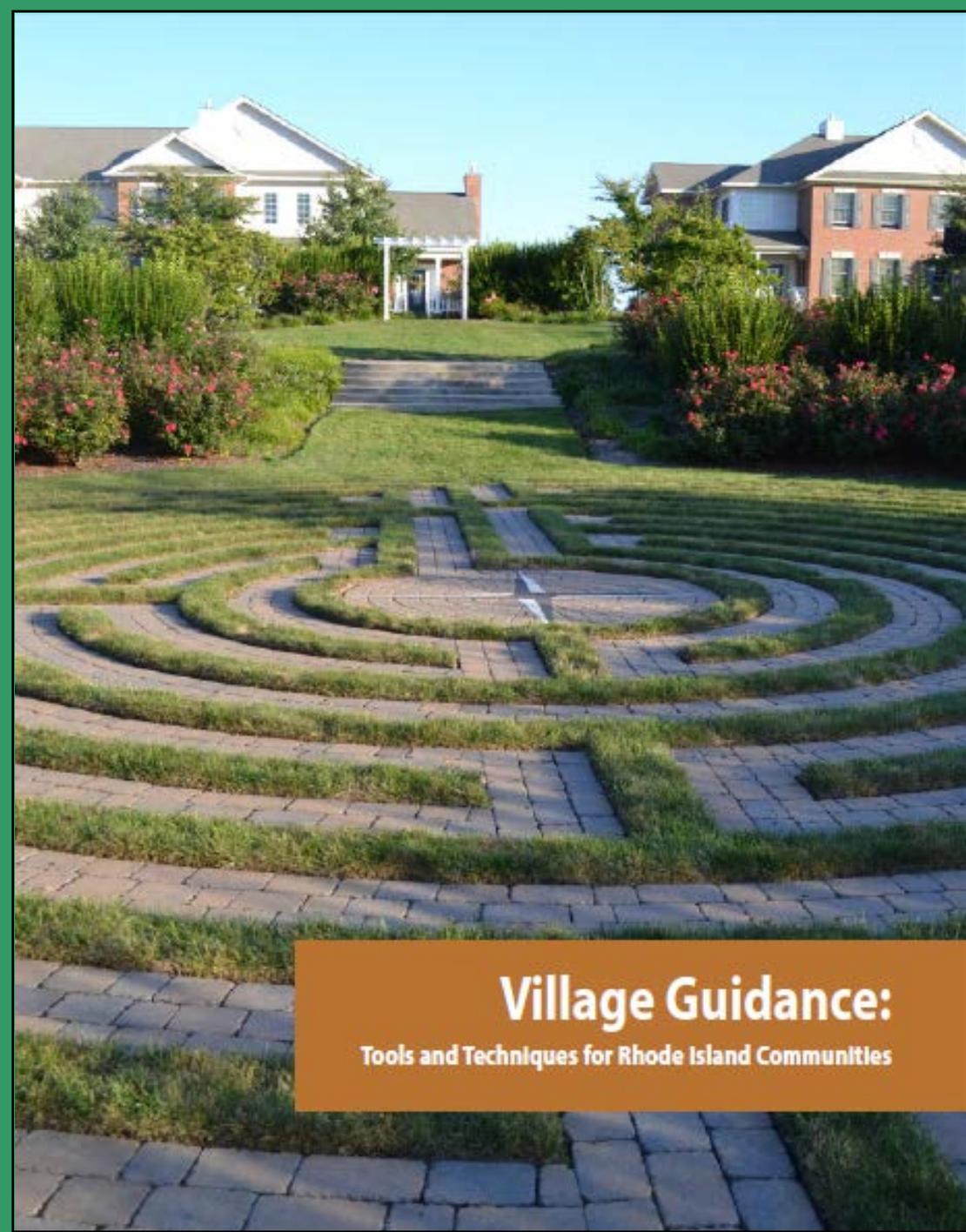
8 units per acre

**Site: 65%  
impervious cover**

**Watershed: 8.1%  
impervious cover**







## Village Guidance:

Tools and Techniques for Rhode Island Communities

- Planning
- Consensus building
- Design guidelines
- Market analysis
- Fiscal impacts
- Case Studies
- Ordinance models

# Transfer of Developments Rights

Development rights sold in exchange for permanent conservation easement.

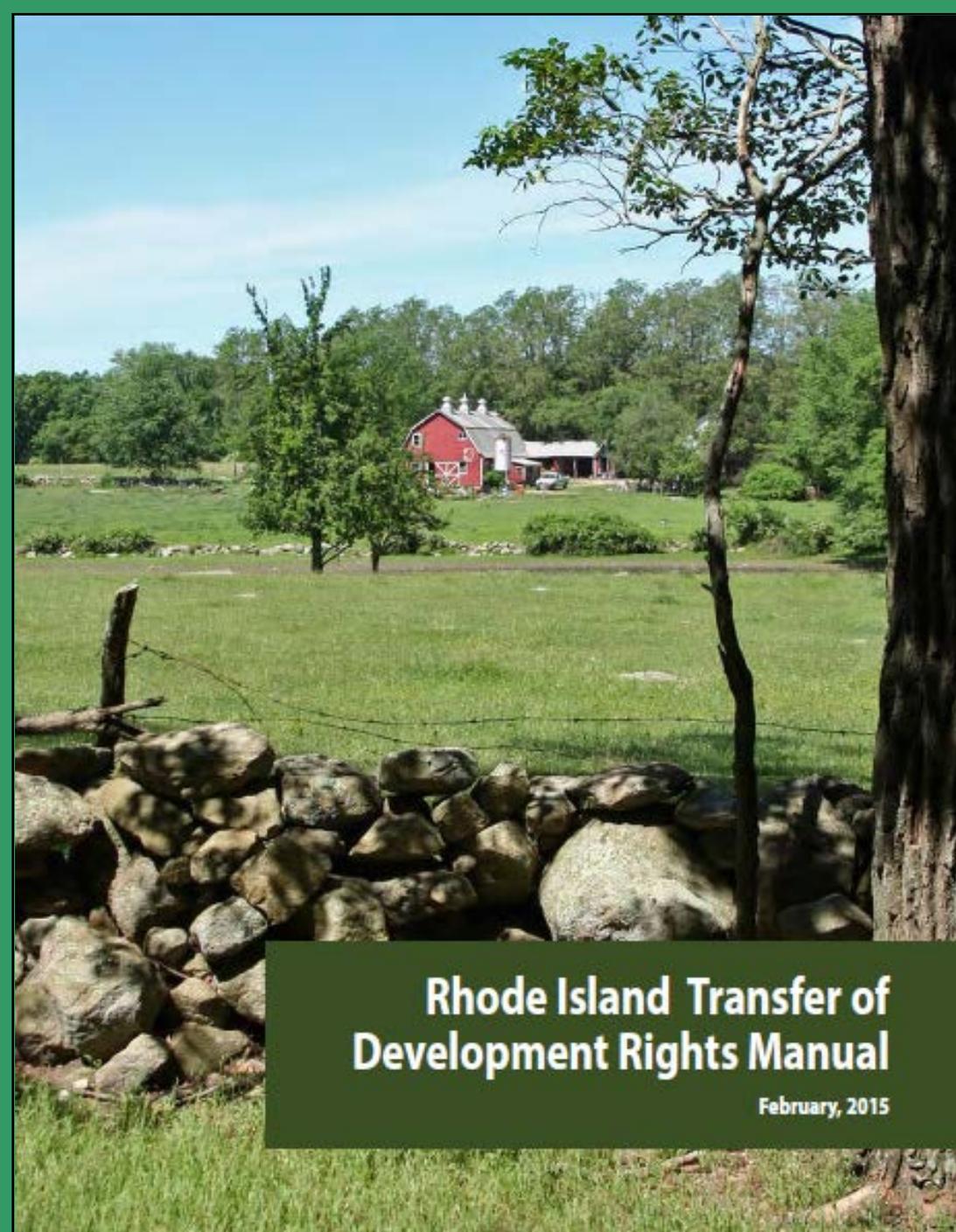
preservation area



growth area



Development rights transferred to build at densities higher than allowed under base zoning.



## **Rhode Island Transfer of Development Rights Manual**

February, 2015

- Success factors
- RI options
- Case Studies
- Ordinance models

# Land Owner Incentives to Preserve Habitat



# Approach

- Identify Business Uses
- Performance Standards
- Regulatory Guidance





# Community Guidance to Maintain Working Farms and Forests

Rhode Island Department of Environmental Management

# Techniques to Avoid and Reduce Impacts

# Development Review Fee

# Buffer Standards



# Urban Buffers



# Urban Buffers



# Buffer Benefits

- Decreases watershed impervious cover
- Flood control
- Provides habitat
- Reduces stream warming
- Greenway corridors
- Increases property values
- Protects water quality

# Site Clearing Standards



<http://croptechnology.unl.edu/>



Limited Disturbance Zone

Owner Discretion Zone

Construction staging area

Driveway Disturbance Zone







# RHODE ISLAND COMMUNITY LID SITE PLANNING AND DESIGN GUIDANCE



Rhode Island Department of Environmental Management



Coastal Resources Management Council

"THIS IS A CLUSTER DEVELOPMENT SUBJECT TO THE BYLAWS, RULES AND REGULATIONS OF THE HOMEOWNERS' ASSOCIATION."



Questions?

# Wildlife Habitat Protection Checklist

## Community Habitat Maps

1. Have you viewed the Conservation Opportunity Areas (COAs)\* developed for your community? If no COAs have been identified, locate the largest undeveloped areas that remain in your community as well as vegetated areas along waterways.
2. Has your community included the habitat areas listed above into open space priorities to be permanently preserved by land acquisition?

## Community Comprehensive Plan

3. Does your community comprehensive plan contain a map of the habitats identified in question 1?
4. Does your community comprehensive plan include habitat as a priority for land acquisition?
5. Has your community established clear goals, objectives and policies to preserve habitat and avoid and reduce the impacts to habitat from new development?
6. Has your community identified areas where increased density is appropriate and encouraged to take the development pressure off of natural areas?
7. Has your town recognized the need to give large land owners the flexibility needed to establish appropriate businesses to help keep these parcels from being developed?
8. Do you have a clear policy that allows land owners to participate in the Rhode Island Farm Forest and Open Space Act?

## Land Use Techniques to Preserve Open Space and Habitat

9. Has a transfer of development rights ordinance been adopted to provide an incentive for land owners to preserve natural areas and to use development to pay for the preservation of open space? (Refer to the *Rhode Island Transfer of Development Rights Manual* DEM 2015 for more information)
10. Has a conservation development ordinance been adopted to guide growth away from important habitat and establish corridors to connect habitat by preserving a minimum of 50% of a parcel as permanently protected open space? (Refer to the *Rhode Island Conservation Development Guidance Manual* DEM 2003 for more information)
11. Has a Rural Residential Compound ordinance been adopted that encourages land owners to build fewer houses as a tradeoff for smaller lots, private road, and the preservation of 50% of the parcel?
12. Has a village ordinance been established to concentrate growth in the most appropriate areas to reduce development pressure on natural areas? (Refer to *Village Guidance: Tools and Techniques for Rhode Island Communities* DEM 2015 for more information)

\*Conservation Opportunity Areas, a tool developed as part of the 2015 RI Wildlife Action Plan, include undeveloped forest lands greater than 250 acres, corridors that connect these areas, and other important habitat (natural heritage areas, ecological land units, etc.) You may access the maps here: <http://ridemgis.maps.arcgis.com/apps/webappviewer/index.html?id=63f3ef956b3e4711ab3f8dd8349f346e>

13. Did your town adopt the recommendations from *Community Guidance to Maintain Working Farms and Forests* (DEM 2012) to give owners of farm and forest land the option of creating appropriate small businesses as an incentive for preserving their land?

#### **Land Use Regulations to Avoid and Reduce Impacts to Habitat**

14. Are limits of disturbance required to be marked on all construction plans to minimize the loss of natural areas?
15. Do regulations require or encourage new lots to exclude wetland jurisdictional areas to the extent practicable?
16. Has a community buffer program been created to establish or restore a naturally vegetated buffer system along all surface waters and wetlands?
17. Are zoning setback distances flexible to avoid requiring new lot locations to be unnecessarily close to surface waters, wetlands and riparian corridors?
18. Has your community adopted an erosion and sedimentation control ordinance?
19. Have you amended regulations to require all development projects comply with Low Impact Development (LID) pursuant to the Rhode Island Stormwater Design and Installation Standards Manual?
20. Has your community adopted a forest cover, tree protection or tree canopy ordinance?
21. Has your town adopted a review and inspection fee provision in your subdivision regulations to hire the expertise needed, including wildlife biologists, to carefully evaluate development proposals and offer recommendations to avoid and reduce impacts to habitat as well as community character?



# Rhode Island Wildlife Action Plan Executive Summary



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# RHODE ISLAND WILDLIFE ACTION PLAN EXECUTIVE SUMMARY

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## Introduction

This document is the 10-year revision of Rhode Island’s Wildlife Action Plan (WAP), an effective strategy for wildlife conservation enabled through the State Wildlife Grants (SWG) program administered by the U.S. Fish and Wildlife Service (USFWS). The goal of this document is to provide direction of wildlife conservation efforts for the next decade. It represents a vision and a strategy that the Rhode Island Department of Environmental Management’s Division of Fisheries and Wildlife (RI DEM DFW) shares with its partners for conservation of wildlife in the state.

This WAP document is presented in three complementary formats: first, this comprehensive strategic plan; second, the accompanying species and habitat profile fact sheets; and third, a Community Companion Guide to the RI WAP. These were assembled in partnership with RI DEM, The Nature Conservancy (TNC), the University of Rhode Island (URI), and the RI Natural History Survey (RINHS). Together these documents present the most current information available on Rhode Island’s wildlife and on the habitats and natural systems that support it. It also includes detailed information on the various threats to wildlife and to individual species in the state and outlines strategies for addressing those threats.

In part, the 2015 Rhode Island WAP is a barometer of the State’s ecological health. It offers a composite picture, based on up-to-date science and using the most advanced analytical tools available. This WAP cannot guarantee the future of wildlife in Rhode Island—which is, in many ways and from many directions, under threat. But it *can* help Rhode Islanders take important, necessary steps toward that end.

Wildlife thrives in wild places. And one goal of this effort to develop the 2015 WAP is to see that, wherever possible, Rhode Island’s remaining wild lands are preserved. Another equally important goal is to create a solid and practical framework for wildlife management, for government and individual decision-making, and for protecting species that have been identified through a rigorous process as species of greatest conservation need.

## Background

Even though it is the smallest and the second-most densely populated state in the U.S., Rhode Island’s wildlife is remarkably diverse. It includes thousands of resident and migratory species of mammals, birds, fish, reptiles and amphibians, beetles, butterflies and moths, and other insects, freshwater mollusks, annelids, crustaceans, and other marine invertebrates.

From the western highlands to the coastlines and the adjoining ocean waters, the state supports a broad spectrum of biodiversity, ranging from the rarest and most endangered species to the most common and abundant.

The focus of this WAP is on Rhode Island, but it must also be seen within a regional and even a global context. The ecological health of species and natural systems in Rhode Island are affected, not just by what happens in adjoining states, but also by events occurring hundreds, even thousands of miles away.

## RHODE ISLAND WILDLIFE ACTION PLAN EXECUTIVE SUMMARY

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Rhode Island's forests replenish oxygen and cleanse the air; wetlands clear toxic elements from the water and absorb runoff. Birds and other wildlife species help control pests, disperse seed, recycle nutrients, pollinate plants, and maintain a resilient but still delicate balance; a web-of-life that also is in need of conservation and long-term stewardship. The contributions that wildlife and wild places make to the quality of life in the Rhode Island cannot be fully measured or quantified.

**Chapter 1** presents an overview of Rhode Island's wildlife, within a regional context that encompasses thirteen states from Maine to Virginia and D.C. Among the 874 vertebrate species documented in Rhode Island, birds—with more than 430 species—are the dominant taxonomic group. Fish are the second-largest category, with 306 species, followed by mammals (92), reptiles (26), and amphibians (19). Within this chapter, each of the main vertebrate groups is discussed separately. Information on the more than 3,500 invertebrate species is also included.

The intent of the WAP is to compile, evaluate, and present summary status information for species of greatest conservation need (SGCN), along with the best sources for this information. The 2015 list of SGCN for Rhode Island includes 463 species, which is 91 more species than appeared on the SGCN list in 2005. This figure results from the addition of 182 species and the removal of 91 others. In addition, more detailed profiles of each species or group of species have been developed for the first time in Rhode Island. These profiles address the status and distribution, threats and actions for each of these species/groups.

Several national and regional frameworks have been developed to address the conservation needs of birds, especially those in the SGCN category. In Rhode Island, as throughout the Northeast, bird habitats have been heavily altered by four centuries of human activity since the arrival of the European colonists. The accumulated impact of human population growth and associated changes in land use has been profound. Separate sections are devoted here to pelagic, inshore, coastline, marine island, beach, intertidal/mudflat, wetland, salt-marsh, freshwater marsh, pond, early successional habitat, grassland, shrub/scrub, and forest birds, as well as other birds that do not fit naturally within these categories, such as the barn owl and kestrel which use man-made structures for nesting.

Regionally, reptile and amphibian species face multiple threats, from habitat loss and fragmentation, pollution, and illegal harvest; and the same is true of the 23 species native to Rhode Island. It is worth noting that approximately half of these 23 species are listed as SGCN.

Likewise, human activity continues to have an impact on aquatic systems across the Northeast. Pollution, over-harvesting, the introduction of non-native species into the ecosystem, alteration of natural habitat (e.g., the introduction of dams, etc.), and global climate change and associated alterations in weather patterns are among these threats.

The majority of Rhode Island's fish diversity consists of saltwater species; and this diversity attracts both commercial and recreational fishermen. Harvests are declining. The volume of landings for all species of finfish and shellfish in 2000 was 36% higher than it was in 2010, while

## RHODE ISLAND WILDLIFE ACTION PLAN EXECUTIVE SUMMARY

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the *unadjusted* value of these species in 2000 was 25% higher than it was in 2010. When adjusted for inflation, the 2000 value of this combined harvest in 2010 dollars was \$101,474,041; which is 60% greater than the value in 2010.

Among invertebrates, tiger beetles; butterflies, moths, and skippers; freshwater mussels; and marine invertebrates such as quahogs, oysters, and horseshoe crabs are notably at risk.

Although plants are not included in SWAPs, they comprise a significant portion of Rhode Island's (and the region's) biodiversity, creating in many cases the habitats in which animal species thrive or decline. It is worth noting here that a recently updated (2014) publication *Rare Plants of Rhode Island* includes 20 new additions since the list was last updated in 2007; and that 320 plant species—roughly 25% of Rhode Island's native flora—are now classified as “rare.”

This chapter also takes note of the monetary value of wildlife and wildlife-related activities in Rhode Island. For example, in 2011, a total of 503,000 residents and non-residents participated in wildlife-associated recreation in the state, spending \$348 million on fishing, hunting, and the observation of wildlife.

The statistics are striking. USFWS estimates that more than 200,000 people annually enjoy bird watching in Rhode Island. RI DEM maintains 30 parks and management areas that draw six million visitors to the state each year, generating \$1.7 billion in annual revenue.

At the same time 20,000 hunters (residents and non-residents) spent approximately \$18 million on hunting-related activities in Rhode Island in 2011 alone. In the same year, an estimated 175,000 anglers spent more than \$130 million in the state. Wildlife is part of the culture and the conservation ethic in which Rhode Islanders take pride.

Rhode Island's forests replenish oxygen and cleanse the air; wetlands clear toxic elements from the water and absorb runoff. Birds and other wildlife species help control pests, disperse seed, recycle nutrients, pollinate plants, and maintain a resilient but still delicate balance; a web-of-life that also is in need of conservation and long-term stewardship.

**Chapter 2** examines Rhode Island's habitats in relation to the state's wildlife, especially its SGCN. Without suitable habitat, wildlife cannot exist. Likewise, wildlife diversity depends on a diversity of habitat, which Rhode Island offers in abundance. The state's varied geology, soil types, topography, and hydrology support a range of plant communities that in turn provide the basis for a complex ecological framework.

Here, the regional context is especially important. The Northeast is still 60% forested, but the average forest age is young at approximately 60 years. The region contains more than 200,000 miles of rivers and streams; 34,000 bodies of water; and more than 6 million acres of wetlands. It also contains 732,000 miles of roads and has the highest density of dams and other obstacles to fish passage in the country. One third of the forest land and one quarter of the wetlands that existed when the first European settlers arrived have been permanently altered for human use.

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Region-wide, 16% of the region is secured against development. State governments together own the largest share of conserved land (12 million acres). The U.S. government holds 6 million acres. Private lands held in easements account for 3 million acres; and land owned by private non-profit land trusts totals another 1.4 million acres. At the same time, the current rate of land conversion outweighs land acquisition by a factor of 2:1. Rhode Island is the second-most densely populated state in the country, and development pressures on land throughout the state are increasing.

Rhode Island's climate is hospitable and governed largely by its proximity to the Atlantic Ocean. Climate change is given special consideration in this WAP because its scope reaches beyond the state's borders and because it exacerbates many other threats to wildlife and affects each species differently. Sea levels are rising while changes in other indicators such as length of growing season have been observed in many areas.

This chapter also explores the concept of Ecological Regions in relation to Rhode Island's landscape. The state lies within the Lower New England Section of the Eastern Broadleaf Forest Province, in which disturbance by human settlement has resulted in an ecological shift to a system that lacks large predators and therefore suffers from an imbalance between plant resources and herbivores.

Chapter 2 also provides an analysis of the various ecological systems that characterize the state, including: forests, non-forested uplands, early successional habitats (many created when former farmland is abandoned), agricultural lands, fresh water wetlands, estuarine wetlands (among the most important wildlife habitats in North America—and the most threatened), salt-marshes, lakes and ponds, and marine habitats.

A table at the end of the chapter rates the various ecological systems in terms of their importance to biodiversity, current condition, degree of threat, and vulnerability to climate change. The Key Habitat Profiles include descriptions, their location and relative condition for each key habitat.

**Chapter 3** analyzes the threats to SGCN and their habitats in Rhode Island. Some of these threats are global or national, while others are regional, statewide, or local. They include threats or “problems” that stress wildlife (species and/or habitat) as well as management challenges caused by inadequate data, insufficient resources, or other limitations.

The primary threat to Rhode Island's fish, wildlife, and their habitats is conversion of land for housing, urban growth, and commercial, industrial, transportation, or recreational uses. Although Rhode Island's population has not grown appreciably in the past ten years, there has been a shift in population from cities and towns in the state's urbanized corridor to formerly rural areas. Increases in residential and commercial development in rural areas account for much of the reported losses in wildlife habitat and related natural resources. This development has also resulted in a significant loss of prime farmland.

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The need for a growing transportation infrastructure compounds the effects of these shifts in population. Fragmentation subdivides large contiguous areas of natural land into smaller and smaller patches, creating more edge habitat and less interior habitat. This trend toward greater fragmentation of the landscape has had a profound impact on both individual species and the diversity and balance of the system as a whole.

Conservation initiatives have been established, in particular the RI DEM Land Conservation Program, in an effort to protect important natural areas and to ensure proper management of land that has a high intrinsic resource value. Emphasis is placed on several critical elements, including protection of working farms and prime farmland, forests, drinking water sources, lands used for recreation, and areas that are rich in natural heritage and/or biodiversity. The State Land Conservation Program, the Local Open Space Grant Program, and the Agricultural Land Preservation Program are discussed here in detail.

The introduction of invasive or exotic (non-native) species is another very significant threat to Rhode Island's wildlife. Today, nearly all (97%) of the key habitats in Rhode Island are threatened by invasive plant species, the most common being *Phragmites australis*. Several aquatic invasive animal species also pose threats to the ecological balance, especially in river and lake habitats, in particular the Asian and the Zebra Clams, the Asian shore and the Japanese mitten crabs, and several species of Carp.

The changing climate is also now widely recognized as a potential major threat to fish and wildlife habitats, populations, and communities. Species and populations likely to have greater sensitivities to climate change include those with highly specialized habitat requirements, species already near their temperature limits or having other narrow environmental tolerances, rare or declining populations with poor dispersal or migratory capacity, and groups that are especially sensitive to pathogens.

Climate modeling analyses for the northeastern region of the U.S. predict major changes occurring over the rest of this century. These include: higher air and water temperatures; reduced extent and duration of snow cover; more frequent and severe summer droughts; earlier and more prolonged low-flow periods in rivers and streams; winter and spring floods of shorter duration but higher intensity; delayed ice formation and earlier spring melt.

Rising sea levels are also predicted—and in fact, already occurring. Major impacts on coastline habitats are likely, and while the exact nature of these impacts is difficult to predict, it is clear that estuarine wetlands and other coastal habitats are the most vulnerable.

Critical habitats—areas in which targeted species can persist and/or relocate over time—may provide a refuge from climate change impacts and become high-priority candidates for protection and conservation efforts. Among the various habitat types, brackish marshes and tidal flats may be the most vulnerable, while pitch pine woodlands/barrens, oak-pine forests, and warm water rivers and ponds may be the most resilient.

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As the composition of ecological communities change over the next century, this presents an added challenge for conservationists. The identification and protection of ecological land units (ELUs) may help the conservation community to address this challenge. ELUs are areas on the landscape with unique physical properties based on soil characteristics and topography. Areas with many different ELUs often support diverse plant and animal communities and show high levels of biodiversity.

The relationship between physical diversity and ecological diversity is important because, as the climate changes, lands that are highly variable with respect to their physical properties are likely to support more diverse communities of plants and animals. Such lands are therefore prime candidates for protection and conservation.

Pollution remains a major threat. The Northeast is not only the most populated area of the country, but its buildings and infrastructure are generally older and septic and wastewater systems are often out-of-date. Storm water runoff further degrades water quality through erosion. Increases in the amount impervious surface in high-drainage areas pose another major threat.

The loss of wetlands, urban and agricultural runoff, sedimentation, pollution, and other factors will continue to affect the health of aquatic ecosystems. One mitigating factor in Rhode Island is the increasing number of organic farms, which do not rely on pesticides, artificial fertilizers, or other chemical “enhancements.”

Overharvesting of resources; human intrusion and disturbance, especially along beaches; and wildlife diseases such as White Nose Syndrome are also important threats to Rhode Island’s wildlife. Stresses placed on plants and vegetated areas that support wildlife; energy extraction and production; and—ironically—new, alternative energy developments such as wind turbines and biomass fuels pose additional challenges to the conservation of wildlife in the state.

**Chapter 4** recommends a broad range of action steps. Other conservation and management plans have identified a range of goals, objectives and strategies for addressing threats to wildlife at the local, state, regional, and national scales. A careful survey of these existing plans was undertaken as part of the process for developing the recommendations presented here.

This WAP recognizes that threats to wildlife occur at multiple levels, from global trends to the most localized impacts. Thus, the actions recommended in Chapter 4 are presented in a multi-tiered format, from overarching, statewide conservation needs to those focused on a particular species or type of habitat. On the broader scale, actions are recommended to address the threats posed by lack of resources and advocacy for comprehensive wildlife conservation; habitat loss due to fragmentation; insufficient information; lack of research and landscape-level monitoring; and degradation from pollution and disease.

Specific action steps are also recommended to protect mammals, birds, reptiles and amphibians, freshwater fish, marine/estuarine fish, marine invertebrates, beetles, butterflies and moths, dragonflies, and mussels. The same is true for a broad range of habitats from upland, evergreen,

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and deciduous forests to agricultural habitats, grass and shrub-lands, wetlands, marshes, rivers and streams, estuaries and coastal waters, and even urban habitats where species like the peregrine falcon have developed important ecological niches within the built environment.

In total, Chapter 4 presents hundreds of individual inventory/research/monitoring needs and conservation actions. Together they provide a detailed blueprint and a clear, comprehensive strategy for addressing Rhode Island's wildlife conservation needs.

**Chapter 5** discusses the need for effective monitoring and adaptive management. Monitoring is needed to assess trends affecting wildlife and to track the success of conservation actions. Adaptive management allows agency personnel and others to respond effectively as conditions—land use patterns, climate, human population, and available data and other information—change. Rhode Island already has a number of effective monitoring programs in place. The Rhode Island Environmental Monitoring Collaborative, for example, is a partnership of agencies, organizations, and individuals involved in monitoring the state's aquatic environments.

Coordination of monitoring efforts and the effective sharing of information are of key importance to the implementation of Rhode Island's WAP. Although the tools available for monitoring progress have become more sophisticated and more widely used since 2005, the need to develop new tools that are better suited to a non-traditional systems approach remains. This work is inherently complex; and the status of diverse natural biological communities is inherently more difficult to quantify and measure than that of a single species.

An extensive list of the existing monitoring programs and actions is included in this chapter, along with information on the gaps in data being gathered through these existing programs. Rhode Island's biodiversity monitoring strategy includes regular evaluation of conservation actions to measure their success and effectiveness in achieving the goals outlined in this WAP.

The priority Inventory, Research, and Monitoring sections in the previous Chapter (4) recommend the appropriate level of monitoring for each species and habitat. Short-term, interim, and long-term monitoring objectives are discussed here, along with the various tools and mechanisms used to achieve these objectives. Criteria in the form of Annual Accomplishment Measures for evaluating success in planning, research, conservation design, information management, funding, and professional and public outreach are also included.

**Chapter 6** describes the process and the timeframe by which Rhode Island's WAP will be reviewed and updated. Full revision will be completed in ten years (2025). Interim sections will be reviewed and revised throughout the ten-year period. The goal is to keep the document as up-to-date as possible. As gaps in the data that exists in 2015 are filled, new ones will be identified. Knowledge of the status of Rhode Island's wildlife and the conditions that affect wildlife management are constantly changing. Thus, the current WAP is seen as a dynamic document.

This chapter also describes the review process and presents a schedule for the review of other Conservation and Management plans and identifies the agencies responsible. Information from

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the review of these plans will inform the ongoing review of the Rhode Island WAP. Evaluation of the conservation actions recommended in this document will be continuous as new information becomes available. Annual measures for reporting accomplishments are conducted through TRACS through Federal Aid project reporting.

**Chapter 7** describes coordination with various partners in the development of the 2015 WAP and how this coordination and collaboration will continue through the next ten-year cycle. Opportunities to use existing partnerships and create new ones to help implement the WAP are also described in this chapter. Members of the Planning, Technical, Scientific Review, and Habitat Mapping/GIS teams are identified, and the process of coordination with federal, state, local, and tribal partners is outlined in detail.

State partners include the Rhode Island Geographic Information System (RIGIS) consortium; the Statewide Planning Program of the Department of Administration (DA), including the Growth Planning Council, the Greenways Council and the Rivers Council; the Coastal Resources Management Council (CRMC); and the Department of Transportation (DOT).

The Comprehensive Community Plans that each municipality is required to develop and maintain guide local land use planning in Rhode Island and provide important channels for implementation of the WAP at the local level. Members of the Rhode Island Conservation Partnership are also key participants in the implementation process. The RI WAP Community Liaison will be providing outreach and technical assistance to these many local partners including municipalities, Conservation Commissions, and Land Trusts.

Federal partners include USFWS; the U.S. Geological Survey (USGS); the U.S. Dept. of Agriculture (Natural Resources Conservation Service, USDA-NRCS); the U.S. Forest Service (USFS); the Environmental Protection Agency (EPA); the National Oceanic and Atmospheric Administration (NOAA); the New England Fishery Management Council (NEFMC); the Atlantic States Marine Fisheries Commission (ASFMC); the Department of Defense (DOD); the U.S. Army Corps of Engineers (ACOE); and the National Park Service (NPS).

The Narragansett Tribe was consulted in the WAP development process and input has been requested throughout each stage of development of the 2015 WAP.

Faculty and study centers at the URI, Brown University, and Roger Williams University have contributed in significant ways to the development of the current WAP. All of these contributors are listed in Chapter 7 and web contact information is provided. Non-governmental organization (NGO) partners include The Nature Conservancy; the Audubon Society of Rhode Island; the Rhode Island Natural History Survey; the National Wildlife Federation (NWF), The Wildlife Society; the American Fisheries Society; various individual land trusts; and the Rhode Island Land Trust Council.

This chapter also describes the process of public and stakeholder participation that is a key component in the development and implementation of the Rhode Island WAP. Every effort has

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been made to communicate with stakeholders and with the public at large throughout the three-year period in which the 2015 Plan was under development, and to solicit their input. Similar efforts will be made throughout the implementation period, including regularly scheduled public events and meetings.

Work leading up to publication of the current document has proceeded under the framework of a stakeholder and public input review plan that included partner and stakeholder meetings as well as correspondence and communication with the public through websites, published articles, newsletters, and a series of public presentations.

Partners and stakeholders will be closely involved in the 10-year implementation of this WAP; and many will continue to play a major role in identifying SGCN and key habitats, as well as in updating and identifying new threats and actions over the next decade. Other stakeholders including members of the general public will be kept informed of any updates; and open, participatory events will be used to solicit additional information and input from the public at large.

**Appendices** present more detailed supporting material for each of the chapters.

**RI WAP SGCN and Key Habitat Profiles** are fact sheets that summarize key information about each species or habitat in RI. They include photos and maps wherever possible and list the key threats and actions for them to be conserved in RI.

**The RI WAP Community Companion Guide** is a short guide intended as a customized, condensed document to guide easy implementation at the local level. It provides information and tools for community implementation of the RI WAP.

### **Conclusion**

In conclusion, there are many challenges facing Rhode Island's wildlife species and the habitats and ecosystems that support them. The intent of the Wildlife Action Plan is to identify those challenges and to recommend important steps that can be taken to conserve wildlife in the state. The tools exist, the networks and partnerships are in place, and the conservation measures needed to protect Rhode Island's wildlife have been identified and are within reach.

This Wildlife Action Plan is a public document designed for public use. The information it contains will be widely disseminated, and it can provide a strong foundation as well as inspiration for the work ahead.

By itself, this Plan cannot guarantee the future of wildlife in Rhode Island—which is, in many ways and from many directions, under threat. But it *can* help Rhode Islanders—legislators, local government officials, park and refuge managers, conservationists, business leaders, educators, and concerned individuals—take important, necessary steps toward that end.

## Fifteen Small Things that Make a Big Difference for Wildlife

Choose them all, or start with one. Every little bit helps.

1. **Teach the children (and willing adults) in your life to love and respect wild animals and special places.** You needn't be an expert; just share whatever is dear to you with those around you. We only make an effort to protect what we appreciate and understand. Too many people feel removed from nature, seemingly unaware of their dependence upon it.
2. **Manage your property as habitat.** Leave part of your property wild and natural. If it's already all lawn, consider replacing any portions that go unused with native plants. Natives can be beautiful, and they have co-evolved with the local wildlife to support a healthy natural community. Look for the Rhody Native™ tag to identify plants that are a step beyond native species; they're genetically local and genetically diverse (evolved right here in Rhode Island), and you'll be helping the local economy to boot! Consider providing water (make sure to keep it clean) and cover (brush piles, etc.). If at all possible, wait until fall to trim trees and shrubs or mow fields. You can avoid a lot of damage to nests and dispersing young by doing so. Show the improvements made to your neighbors and encourage them to follow your example. The arrival of new and beautiful birds and butterflies may even do the convincing for you!
3. **Minimize your own use of pesticides and fertilizers** and look for products grown according to these same standards. Targeting a single "pest" species often has unintended and undesirable consequences. For example, pesticides reduce food availability for birds by reducing insect diversity. Many of these chemicals harm wildlife, especially bees, butterflies, and other beneficial insects, and they often find their way into our local waters, causing algal blooms and other problems. Integrated Pest Management (IPM) is one alternative that relies on the science of pests, their life cycles, and their broader relationship to the environment to derive environmentally sensitive management approaches that minimize pesticide use. Organic methods like composting and leaf mulching can give you great results without posing any risk (or costing any money) at all!
4. **Encourage good stewardship throughout your community.** Advocate for the use of wildlife-friendly practices in public spaces. Support wildlife habitat-friendly legislation and sound, science-based wildlife management. Support your local businesses if they are practicing good stewardship, and gently nudge them if they are not. Consumers are very powerful, so vote with your dollars!
5. **Educate yourself and be an ingredient reader.** Remember that *everything* we use, indoors and out ends up in our environment. From where we wash our cars, to the food we eat, to the laundry detergent we choose, we make choices every day that affect local (and sometimes not-so-local) water quality and the humans and wildlife that rely on those waters. Research natural ways of achieving your goals – there is a wealth of information at your fingertips.
6. **Keep dogs away from wildlife.** Respect signage that restricts or disallows pets. It may seem disappointing to not be able to take your dog exploring, but they can cause a lot of problems for wildlife (stress, disease predation). Whether posted or not, dogs should be leashed or otherwise under control when walking through forests and other wildlife areas so as to keep them away from wildlife and their homes and nests, especially during the breeding and nesting seasons.
7. **Keep cats indoors** and have your pets spayed or neutered. According to the [American Bird Conservancy](#) (ABC), domestic and feral cats kill an estimated half to one billion birds a year in the United States. Putting a bell on a cat may seem like a reasonable solution, but cats can learn to walk silently while wearing a bell, and birds do not actually register a ringing bell as a warning sound. Outdoor cats also kill snakes, amphibians, and small mammals.
8. **Be informed and support local conservation.** Conservation includes protecting natural areas in perpetuity, but it also means making sure that development that does occur is well planned, makes sense on the landscape, and is as people and wildlife-friendly as possible. As undeveloped land becomes rarer, protecting habitat is increasingly vital to fulfilling our responsibility to conserve wildlife and the places they live for future generations. Luckily, many of the same measures that help our local wildlife also help keep our air and water clean and preserve community character.
9. **Don't release pets into the wild.** Many people think it is harmless to drop aquarium fish, frogs or turtles into local ponds; however, animals from the pet trade don't appreciate the gesture (and in many cases, it's illegal). They often suffer and die when released into the wild, while those that are successful can disrupt the existing ecosystem and may prove invasive. They also may introduce diseases that are new to an area and that native species aren't equipped to fend off.

10. **Be a waste watcher.** Of course you shouldn't litter and you should try to recycle as much as possible, but it's also important to reduce your waste in the first place by avoiding single use products and packaging as much as possible. Most of what goes into our recycling bins is not infinitely recyclable and eventually becomes trash. According to the EPA, plastics and other marine debris not only cause direct harm to marine species (ingestion, laceration, entanglement, suffocation), but also degrade habitat, harm tourism and fishing (reduced stock, damage to gear), and present a safety hazard that can damage boats and even injure humans.
11. **Minimize light pollution and save on your energy bill while helping birds, bats, and other wildlife.** Turn off outdoor lights and draw the curtains/blinds at night, especially during peak migration seasons (spring and fall). Since migrating and nocturnal birds rely on the moon, stars, and setting sun for navigation, artificial lighting can attract these birds and cause them to collide with buildings and other tall structures. The American Bird Conservancy (ABC) has stated that hundreds of millions of birds die each year from strikes with manmade structures. Birds can also become confused by reflections on windows during the day. ABC's website has a lot of good information on how to avoid bird strikes around the home, including treating windows so they don't fly into the glass. While birds are perhaps the most studied example of the impacts that artificial lighting can have on behavior, this type of pollution disrupts the natural rhythms of many species of plants and animals. An obvious example is all the harmless insects that are drawn to outdoor lights (and Bug Zappers!) and die. The loss of these animals means less butterflies and moths and less food for birds and bats.

You could also advocate for a "Lights Out" ordinance in your community or start a voluntary Lights Out pledge campaign. Both Block Island and Charlestown already have outdoor lighting ordinances that might serve as models. Additionally, the International Dark-Sky Association is an excellent reference on the effects of artificial lighting and how to minimize them.

12. **Don't feed wild animals.** If done responsibly, feeding backyard birds is not harmful. However, feeding waterfowl and other wildlife or leaving pet food out and accessible to wild animals can cause numerous problems. It encourages dependence on humans and the loss of their natural fear of us. Both of these situations create increased conflicts between humans and animals, which can be dangerous for both. Animals that are fed, such as ducks, geese, and deer, tend to congregate much more tightly than they otherwise would. Combined with the fact that much of their nutrient dense natural diet is replaced with empty calories from human food, these cramped conditions lead to increased diseases, some of which can be spread to humans. Accordingly, with a few exceptions that include backyard birds, *feeding wild animals is illegal in Rhode Island*.
13. **Drive slowly and alertly** on rural roads and especially within state wildlife management areas. Vehicle strikes are a major threat to a large number of Rhode Island's wildlife species
14. **Be respectful and keep your distance.** Make every effort to enjoy our local plants and animals in a manner that leaves both of you safe from harm. Most of the time people try to assist injured, sick or orphaned animals; they end up doing more harm than good. People often misunderstand the behaviors and cues of wild animals and end up causing stress or injury to animals that were not really in need of help. Even simple things like trying to get a great nature photograph can be hazardous to an animal that is stressed (examples are birds looking for food before a long flight and wintering bats, both of which may not survive if forced to expend energy avoiding a perceived threat).
15. **Don't pass on your prejudice.** So you simply can't get over your fear of spiders, or snakes, or bats even though you know deep down that your fear is not grounded in fact? Try not to pass this fear on to your child, niece, or nephew. Instead of using words like "creepy" and "gross", encourage children's innate curiosity and love of the natural world. You can still teach them to keep a respectful distance. This way, you can feel good about doing your part to protect important critters even if you can't quite get past your own trepidation!

Additional Sources and Links:

<http://ocean.nationalgeographic.com/ocean/take-action/10-things-you-can-do-to-save-the-ocean/>

[http://water.epa.gov/type/oceb/marinedebris/md\\_impacts.cfm](http://water.epa.gov/type/oceb/marinedebris/md_impacts.cfm)

<http://www.abcbirds.org/conservationissues/threats/index.html>

[http://www.lbp.org.uk/downloads/Publications/Management/lighting\\_and\\_bats.pdf](http://www.lbp.org.uk/downloads/Publications/Management/lighting_and_bats.pdf)

<https://www.cityofboston.gov/environmentalandenergy/conservation/lightsoutboston.asp>

<http://www.flap.org/index.php>

[www.nwf.org/Get-Outside/Outdoor-Activities/Garden-for-Wildlife.aspx](http://www.nwf.org/Get-Outside/Outdoor-Activities/Garden-for-Wildlife.aspx)

You can also contact the RI Wildlife Action Plan Community Liaison at [dem.rwap@dem.ri.gov](mailto:dem.rwap@dem.ri.gov)

# Test Your Knowledge of Rhode Island's Wildlife

1. Since many bats use sophisticated echolocation (high frequency sounds) to navigate, communicate, and detect prey, most species of bats are actually blind [True/False].
2. This RI snake is nicknamed the “puff adder” because it will puff up, flatten its head (like a cobra), hiss, and pretend to strike when threatened. Despite its intimidating display, this snake isn't venomous, poses no threat to humans, and is perhaps the most docile of RI's local snakes. In fact, if this first display does not ward off the threat, this snake will often resort to rolling onto its back, opening its mouth, and “playing dead”! What is the name of this snake?
  - a) Northern Water Snake (*Nerodia sipedon sipedon*)
  - b) Northern Brown Snake (*Storeria dekayi dekayi*)
  - c) Eastern Hognose Snake (*Heterodon platirhinos*)
  - d) Black Rat Snake (*Elaphe obsoleta obsoleta*)

*Bonus: How many of the 7 remaining native RI snakes not listed above can you name?*

3. Bug zappers are a great way to reduce the number of biting insects in your yard. [True/False]
4. The Rhode Island endangered species regulations have specific provisions to protect habitat within the state, so amphibians that rely on vernal pools and their surrounding uplands are protected. [True/False]
5. This RI critter is one of the world's oldest living mammals. Nicknamed the living fossil, it has existed for about 70 million years and dates back to the days of the dinosaur. Can you name it?
6. Feeding wildlife can increase the incidence of nuisance complaints as well as injuries to both humans and animals, and it is even illegal in some cases. [True/False]
7. RI has a native fish species that is catadromous (lives most of its life in fresh or brackish water, but reproduces in the sea), can survive out of water for *several hours*, and can navigate over exposed rocks, dams, and even some waterfalls. [True/False]
8. In a given year, the RI Department of Health may test between 100 and 200 bats for rabies. Over a ten year period, the average infection rate of tested bats in a given year was determined to be:
  - a) Less than 1%
  - b) About 4%
  - c) About 30%
  - d) Over 50%
9. Hibernation is a survival strategy used by many mammal species to cope with adverse environmental conditions such as cold temperatures or lack of available food resources. Which of these RI species is a true hibernator?
  - a) Black bear
  - b) Raccoon
  - c) Woodchuck
  - d) Skunk
10. If you find a turtle crossing the road, you should bring it to the best habitat in your neighborhood to keep it safe [True/False].

## Wildlife Quiz Answer Sheet

1. **False. All bats can see, and most bats have excellent eye sight.**
2. **c) Eastern Hognose Snake**  
Bonus: (5) Eastern Milk Snake, (6) Northern Ringneck Snake, (7) Eastern Smooth Green Snake, (8) Eastern Ribbon Snake, (9) Eastern Garter Snake, (10) Eastern Worm Snake, and (11) Northern Black Racer
3. **False.** Mosquitoes, blackflies and other blood-seeking pests are attracted to heat and carbon dioxide rather than to light, so a traditional bug zapper will do nothing to keep you and your family from getting bitten. Some bug zappers now also release carbon dioxide or other “baits,” but they still kill a lot of harmless and beneficial insects and shrink the food supply for birds, bats, and fish by doing so. Bats are primary predators of night-flying insects and are important in controlling many insect pests, so encouraging them to stick around is a good idea for you and them.
4. **False. There are no provisions to protect habitat in the RI endangered species regulations (RIGL Title 20; Ch. 37).** RI DEM has jurisdiction over freshwater wetlands, but their powers aren’t sufficient to safeguard vernal pool species. They can restrict disturbance within 50’ of certain wetlands. Only bogs have this “perimeter wetland” regardless of size, whereas ponds must be at least ¼ acre, marshes at least 1 acre, and swamps at least 3 acres. Freshwater wetlands not meeting these size requirements are still regulated, but they have no protections beyond their immediate boundaries. Even where these 50’ perimeter wetlands are established, they are insufficient to protect vernal pool species. Spotted salamanders, for example, have been found up to ¼ mile from their breeding pools.
5. **The opossum (*Didelphis virginiana*)**
6. **True.** Feeding wildlife causes a number of problems. Animals that are fed can become accustomed to taking handouts, which **can lead to aggressive or unwanted behavior in public spaces and around homes.** Examples include turkeys and geese chasing people and pets, defecating on homes, cars or lawns, and becoming a general neighborhood nuisance. **Feeding animals can also make them sick.** Foods outside their natural diet can wreak havoc on their digestive systems and often lack the nutrients they need to be healthy. For example, the natural winter diet of deer includes acorns and woody browse rather than corn or hay, and the natural diet of waterfowl includes grasses, insects, and other aquatic life rather than processed grains like bread and crackers. Further, **feeding can concentrate animals tightly and promote the spread of disease.** Waterfowl that are fed produce a lot of waste that can raise bacteria levels in our waters, and feeding them is illegal in Rhode Island. Chronic Wasting Disease (CWD) is a fatal and contagious brain disease in deer. To prevent the spread of CWD and other harms, feeding wild deer is also illegal in RI.
7. **True. The American eel (*Anguilla rostrata*),** also known as the common eel, freshwater eel, or Atlantic eel, can absorb oxygen through its skin to breathe. This allows it to climb out of the water for short periods. Some barriers to stream passage are too great even for this superstar navigator, however, so RI DEM incorporates eel passage into all its fish ladder installations.
8. **b) About 4% of tested bats** were found to have rabies, but the actual incidence in RI is likely far less. Sick bats are more likely to be caught and turned in than healthy bats, and **scientific surveys of wild bats usually report a rate of <0.5% for most North American bats species.** It’s still important not to handle bats and risk exposure.
9. **c) The woodchuck.** This one was tricky! Black bears, raccoons, and skunks all may den up during winter months. Black bears don’t eat, drink, or defecate in their winter den, and their heart beat, body temperature, and breathing decrease substantially, but not quite as much as hibernator bodies do. This very deep sleep is referred to as *torpor*. It is displayed to varying degrees among mammals and is far more common than true hibernation. Bats, jumping mice, and ground squirrels are “true hibernators.”
10. **False.** Many turtles have a very specific home range they occupy their entire lives. Unfortunately, bringing a turtle to a spot that seems perfect to you may actually put them in more danger than their original circumstances. The turtle may not find suitable food and habitat in its new surroundings and is likely to try to return to where it was going. Along the way, it will likely have to cross more roads and may be exposed to additional perils such as exhaustion. If you find a turtle in the road, the best thing to do is to take note of which direction it is headed and help it cross to that side of the street. *Of course you should always be sure conditions are safe for you before you attempt to rescue wildlife.*

# Breeding Bird Responses to Land Preservation within Southern New England Cluster Subdivisions

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## Introduction

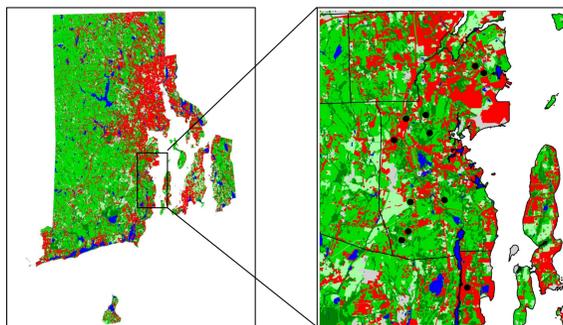
Much of the rapid and ongoing loss of natural and agricultural habitats in the United States is due to the proliferation and sprawl of residential developments that protect little, if any, natural habitats as open space. This eventually led to the concept of cluster subdivisions, which are specifically designed to allow a similar number of housing units as conventional developments, but protect a portion of the original buildable parcel as open space. It is presumed that protecting open space within cluster subdivisions will benefit native wildlife species and communities, but this has not been extensively evaluated.

The goal of this study was to examine how the amount of land protected within existing cluster subdivisions in Rhode Island affects breeding bird populations and communities. More specifically, this study: 1) examined breeding bird population and community metrics along a gradient based on the amount of land that is conserved within cluster subdivisions; 2) used nonparametric multivariate analyses to compare bird communities among three groups of sites based on the amount of land that is conserved within each site, and 3) examined relationships between development-sensitive species and habitats at a smaller, within-site, scale.



## Study Area – North Kingstown, RI

This study was conducted in suburbanized North Kingstown, RI (maps below; red indicates developed lands, green indicates natural lands). The study sites (indicated by black dots) included 9 cluster subdivisions, 1 conventional development, and 1 conservation area.



The maps below represent two examples of cluster subdivision study sites. The site on the left protects very little open space (dark green; 40% of the parcel), most of which is a narrow band around the development. The site on the right protects 84% of the parcel in a large contiguous block.



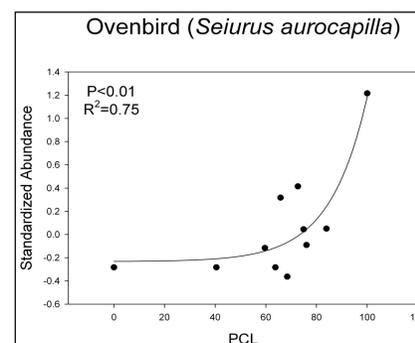
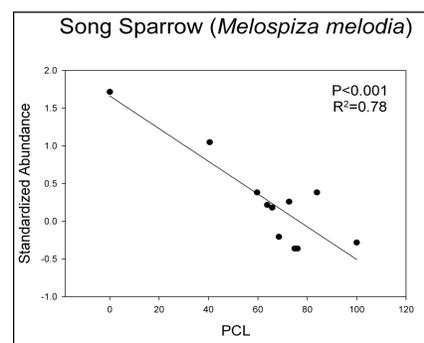
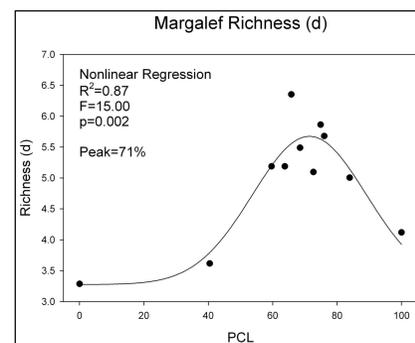
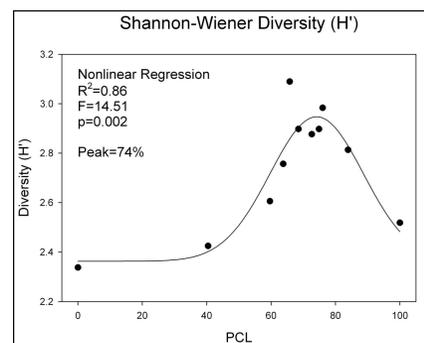
## Field and Analytical Methods

Birds were surveyed at each site in the spring of 2009 between 0600 and 0900. Standard circular point count surveys were used and all birds seen or heard within a 100-m radius around each point were recorded within a 10-minute period. Linear and nonlinear regression analyses were used to examine population and community metrics along a gradient based on the proportion of conserved land (PCL) within each cluster. Next, the sites were grouped into three treatments based on PCL, and bird community structure was compared among the treatments using PRIMER. The treatments included developed sites (<50% PCL), moderate sites (50-70% PCL) and natural sites (>70% PCL). In PRIMER, ANOSIM was used to compare bird communities among these three groups, and if a significant difference was found, SIMPER was used to identify the species most responsible for the significant differences. Lastly, basic statistics were used to describe habitat-use by species that were identified by the prior analyses to be most sensitive to human development in clusters subdivisions.



## Regression Analyses

Breeding bird community metrics and abundances of some individual species were significantly related to PCL using linear and nonlinear regression analyses. Species diversity and richness peaked when 74% and 71% of the original parcel of land was protected as open space, respectively (top left and right below). Species that are relatively acclimated to human development showed a negative relationship to PCL (e.g., American Robin, Common Grackle, and Song Sparrow, bottom left), while forest interior species that are sensitive to development were positively related to PCL (e.g., Ovenbird, bottom right).



## PRIMER and Habitat Analyses

Based on ANOSIM, there was a statistically significant difference in breeding bird communities between developed and natural sites ( $p=0.048$ ), but not between developed and moderate sites ( $p=0.067$ ), nor between moderate and natural sites ( $p=0.167$ ). Based on SIMPER, 10 species each contributed at least 3% to the total community dissimilarity between developed and natural sites (Table 1). Of the seven bird species that typified natural sites, the Ovenbird, Pine Warbler, and Veery were the most sensitive to human development metrics (Table 2)

Table 1. SIMPER results; species in green were more abundant in natural sites (>70 PCL), while those in red were more abundant in developed sites (<50 PCL). % contribution is the relative amount each species contributed to overall dissimilarity between the two bird communities.

| <50 vs. >70 PCE    |                    |                    |                |
|--------------------|--------------------|--------------------|----------------|
| Common Name        | <50 Mean Abundance | >70 Mean Abundance | % Contribution |
| Common Grackle     | 4.75               | 1.51               | 7.47           |
| Tufted Titmouse    | 0.48               | 3.52               | 6.96           |
| Song Sparrow       | 2.86               | 0.74               | 4.84           |
| Ovenbird           | 0.00               | 1.99               | 4.63           |
| House Wren         | 2.49               | 0.71               | 4.10           |
| Veery              | 0.00               | 1.74               | 3.99           |
| American Goldfinch | 0.00               | 1.76               | 3.98           |
| Pine Warbler       | 0.00               | 1.36               | 3.17           |
| Red-eyed Vireo     | 0.00               | 1.39               | 3.15           |
| Eastern Towhee     | 0.67               | 1.94               | 2.99           |

Table 2. Relationships between habitat metrics and bird species that typify natural sites. Metrics included 1) mean abundance in conserved land within the subdivisions, 2) mean distance from the nearest development edge, and 3) the percent contribution of forest and developed habitats where each species was found.

| Sensitivity to Development |                    | Mean in CL | Mean edge | % Forest; Developed |
|----------------------------|--------------------|------------|-----------|---------------------|
|                            | American Goldfinch | 41%        | 41 m      | 57%; 37%            |
| Eastern Towhee             | 74%                | 122 m      | 73%; 24%  |                     |
| Red-eyed Vireo             |                    |            |           |                     |
| Tufted Titmouse            |                    |            |           |                     |
| Ovenbird                   | 92%                | 217 m      | 80%; 15%  |                     |
| Pine Warbler               |                    |            |           |                     |
| Veery                      |                    |            |           |                     |

## Conclusions and Links with CTP

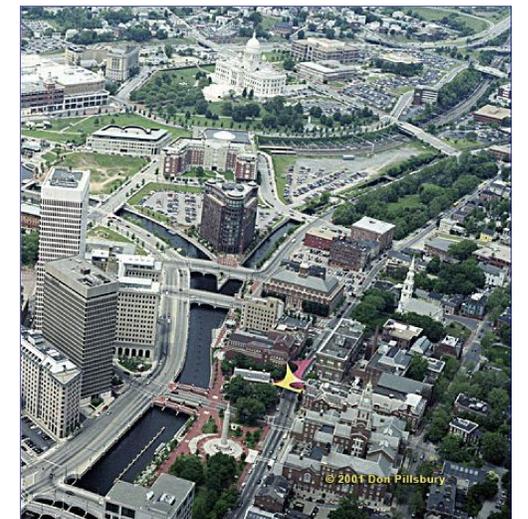
In summary, this study clearly demonstrates that protected open space within cluster subdivisions does provide valuable habitat for wildlife – in this case, breeding birds. However, this study also shows that approximately 70-75% of the original undeveloped parcel of land should be set aside as open space to maximize the benefits for birds. If less than 70% is protected, the benefits for breeding bird communities are not significantly different from conventional developments. This has important ramifications for local municipalities and the NERR CTP program that provides trainings for them. For example, the State of Rhode Island currently recommends the use of Conservation Development, which requires the protection of  $\geq 50\%$  of the land that could otherwise be developed. The NBNERR CTP will include data from this study to show town planners and developers that protecting at least 70% of the land would be significantly more beneficial for breeding birds. This also shows that you should vote for this poster in the non-student category. Thank you.

### Acknowledgements

We would like to thank: 1) Scott Millar from the Rhode Island Division of Planning and Development for providing ideas and insight that help us to define the goals of this project; 2) Jon Reiner, principal planner for the Town of North Kingstown RI, and his staff for meeting with us and providing essential information for all of the Town's cluster subdivisions, and; 3) all of the residents and homeowner's associations for allowing us early morning access to the neighborhoods and open space within each subdivision.

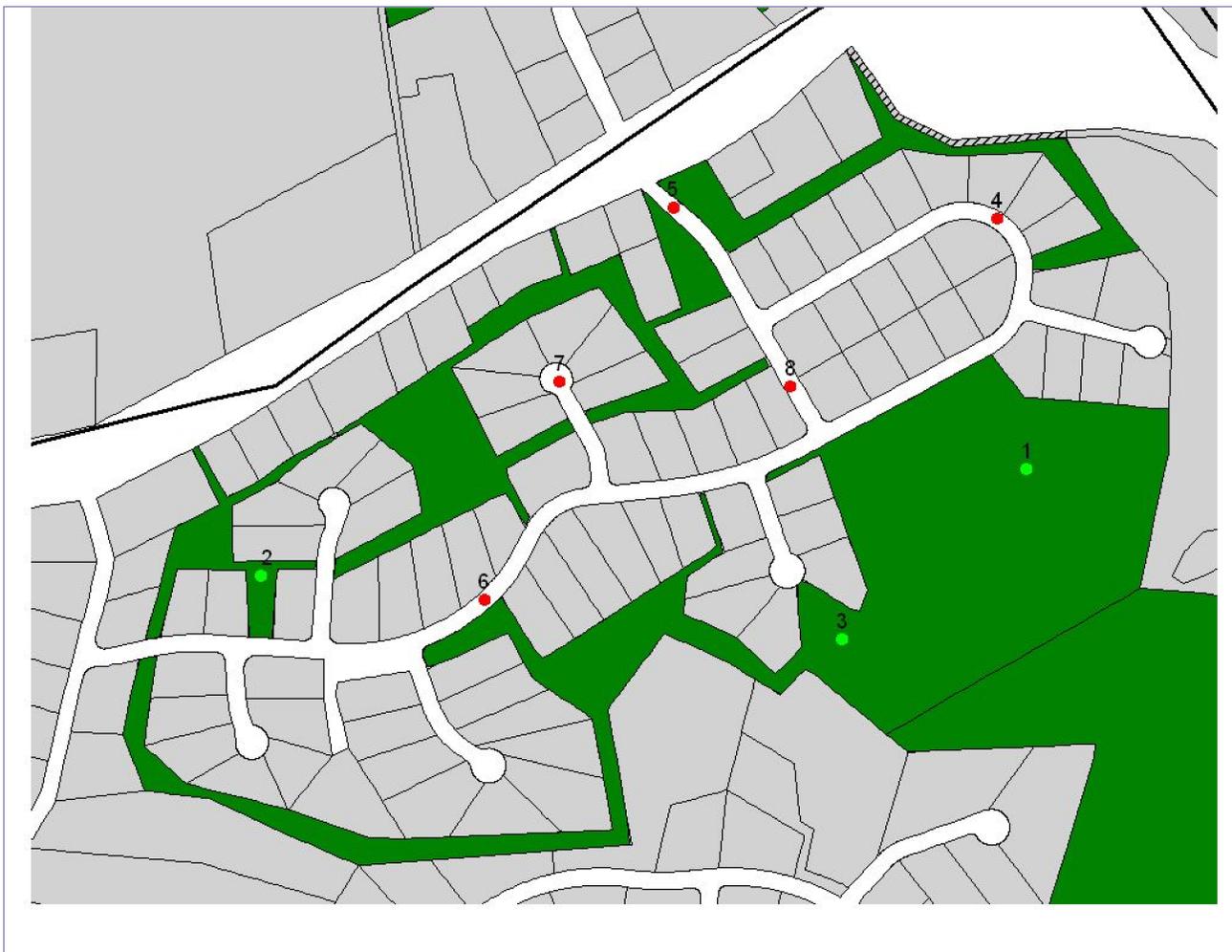
# Link to Wildlife

## “Breeding Bird Responses to Land Preservation within Southern New England Cluster Developments” study

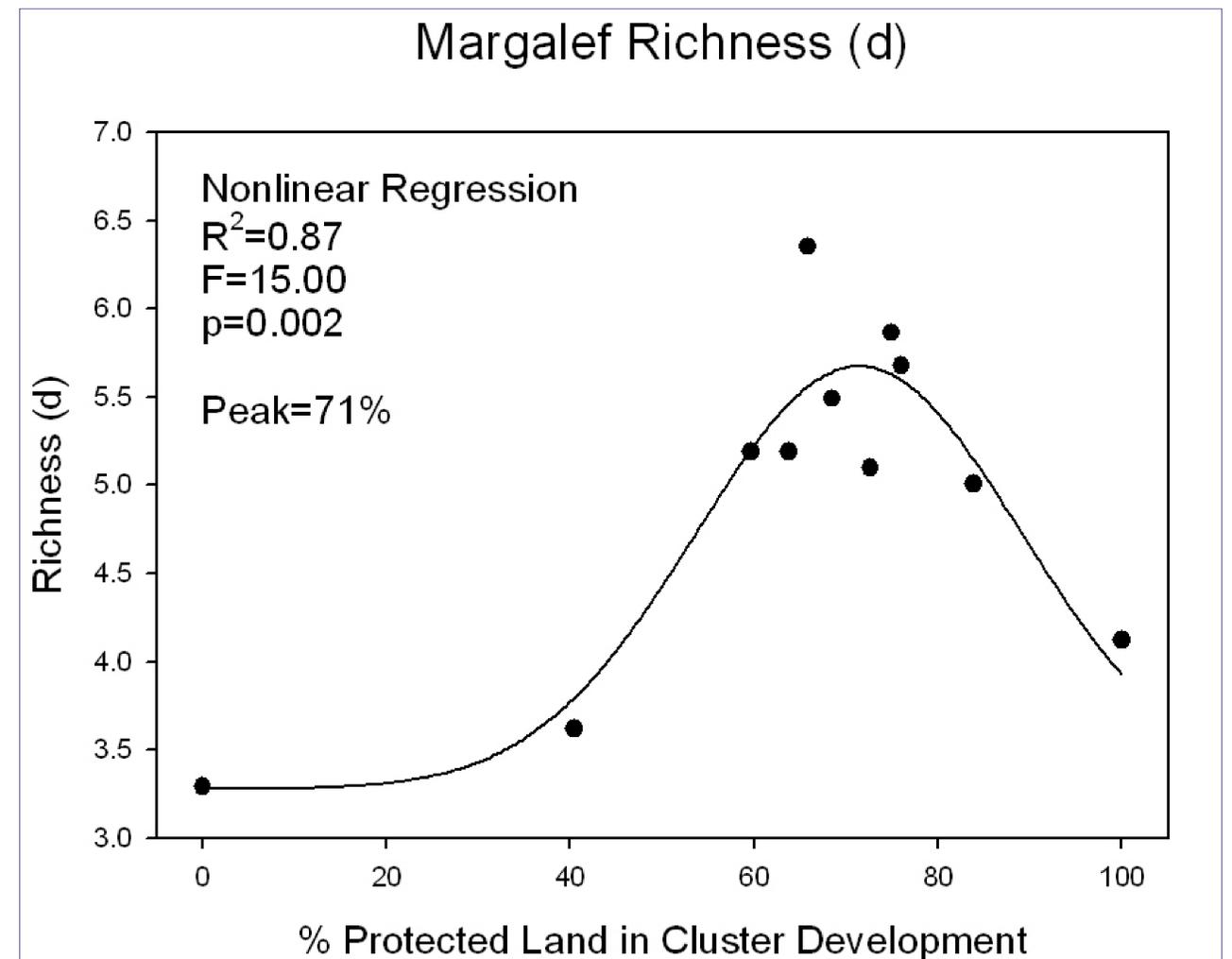
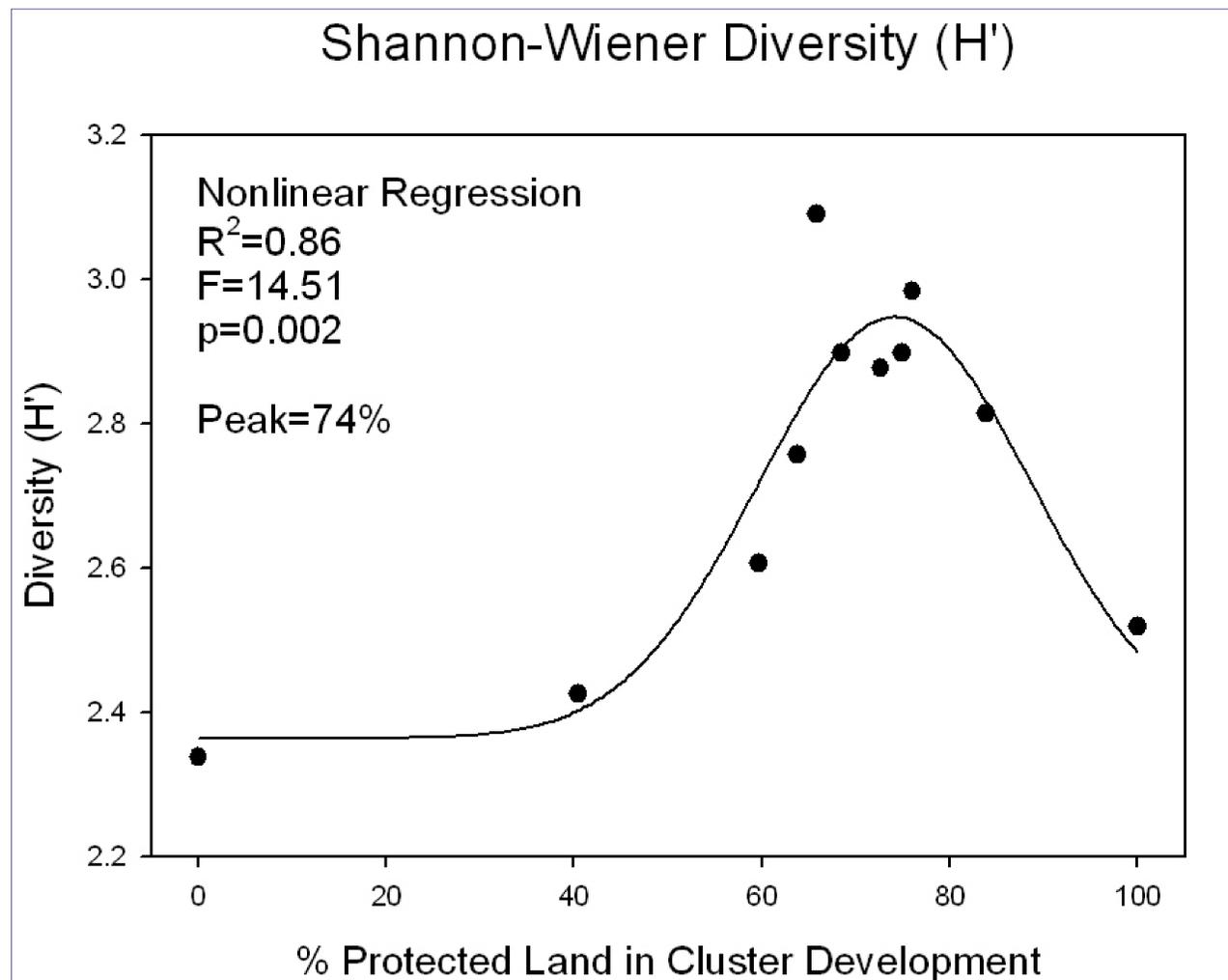


# Study Sites

- **10 cluster development, 1 conventional development, one state forest;**  
**8 stations per site**
- **Cluster developments range from 9 to 31 years old and from 57 to 106 ha in size;**
- **Protected land within cluster developments ranges from 40%-84%.**

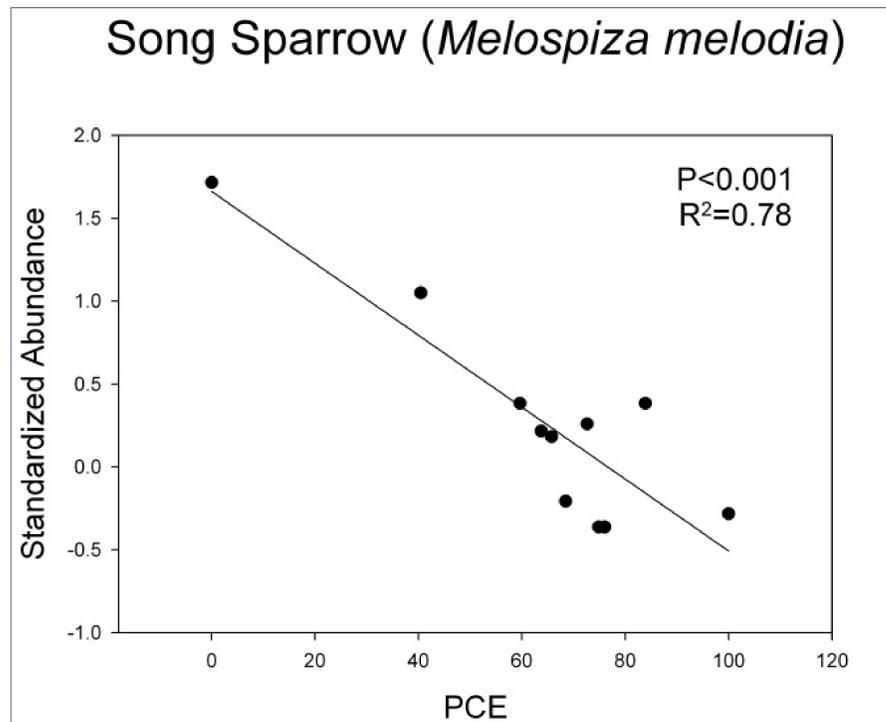


# Results – Community Responses



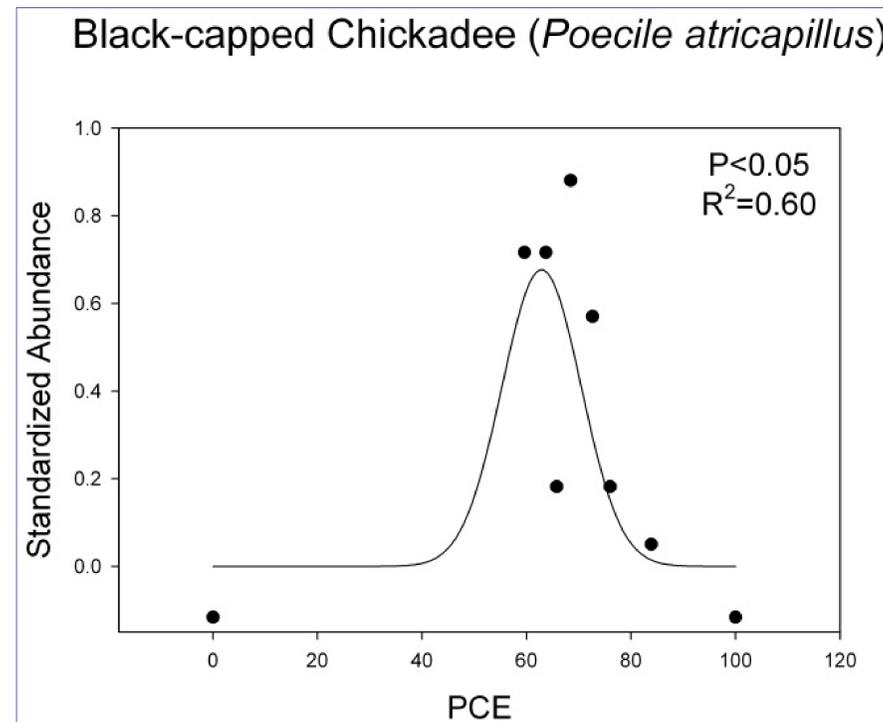
# Results – Species Responses

## Linear Decrease



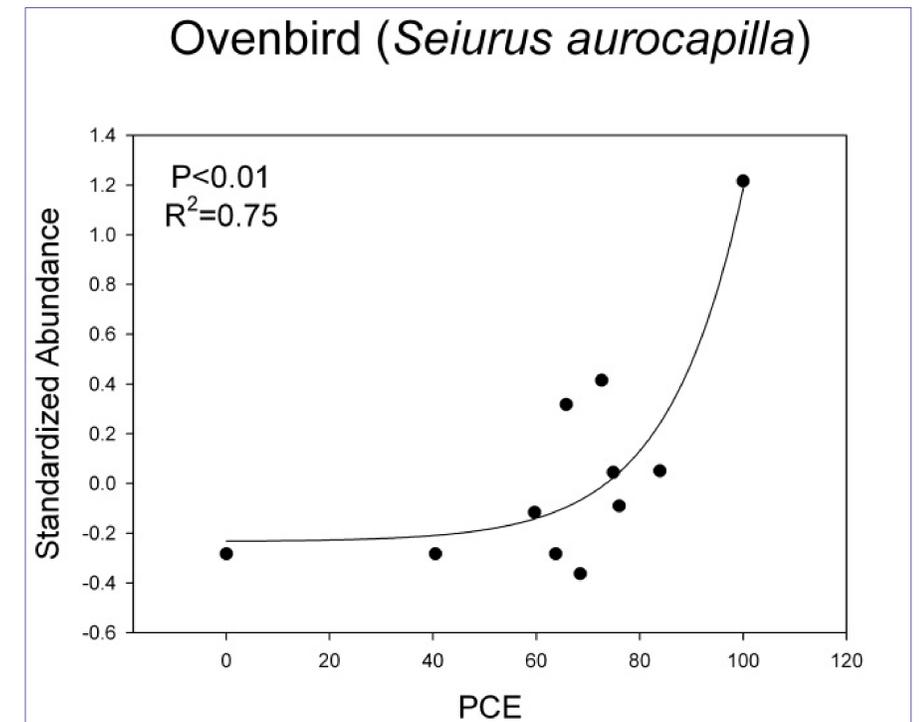
**American Robin**  
**Common Grackle**  
**House Wren**  
**Mourning Dove**  
**Song Sparrow**  
**Total abundance**

## Peak



**American Goldfinch**  
**Black-capped Chickadee**

## Exponential Increase



**Ovenbird**

# Summary

- **Not all cluster developments equal for songbirds**
- **More land protected better for songbird communities**
  - **Richness and diversity highest when 70-75% protected**
- **7 species representative of clusters with protected land**
  - **Ovenbird, Pine Warbler, Veery most sensitive**
- **Future alternative developments should protect  $\geq 70\%$  of parcel**
  - **e.g., Conservation developments in Rhode Island**