



Rhode Island Wildlife Action Plan

Chapter 3

Threats to Rhode Island's SGCN and Key Habitats

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Introduction

5KRGH, VODQG 6* & 1 DQG NH\ habitats face numerous problems or threats that may adversely affect them and compromise their status in the state. Some of these threats are global or national in scale, while others may be regional, statewide, or local. Identifying the threats to Rhode I V O D Q G ¶ V 6 * & 1 D Q G N H \ habitats is an important component in developing effective conservation actions for this SWAP. Once identified, threats can be addressed through actions that RI DEM DFW and its partners have developed throughout this SWAP process, and implemented for long-term conservation of SGCN and key habitats DV UHVRXUFHV DQG RSSRUWXQLWLHV DOORZ 7KH SUHYLRXV WZR F (Element 1) and key habitats (Element 2); this chapter addresses the threats affecting these important conservation targets (Element 3).

6: \$3V DUH UHTXLUHG WR LGHQWLI\ WKH 3SUREOHPV ZKLFK PD\ DGYH DQG WKHLU KDELWDWV 7KHVH 3SUREOHPV LQFOXGH WKUHDWV WH management challenges such as deficiencies in data or resources for particular species or habitats. Human activities and natural processes that affect wildlife species and habitats in negative or detrimental ways are threats, while the effects of these threats on particular wildlife species or habitats are known as stress responses or stressors. Threats may be species-specific, affecting a species by a direct action or through indirect impacts by limitation of a particular habitat condition, or limiting factor. Although terms are often XVHG LQWHUFDQJHDEO\ WKH ZRUG 3WKUHDW LV XVHG LQ WKLV C aspects of the process by which human actions or natural events may jeopardize fish and wildlife species and their habitats. This RI WAP uses the IUCN categories of threats (Salafsky et al. 2008) to describe and present them in a consistent way, as recommended by the Northeast Lexicon and Synthesis (Crisfield and NEFWDC 2013; Terwilliger and NEFWDC 2013).

All species have likely been impacted by human activities. Some have taken advantage of the conditions found in developed areas; alien and invasive species such as European Starling, Rock Pigeon, Tree-of-heaven, and many others have thrived. A few native species have found a surrogate habitat in urban areas as natural habitats have diminished. Some examples of these opportunists in Rhode Island include the Common Nighthawk, Chimney Swift, and Peregrine FDOFRQ 7KH PDMRULW\ RI 5KRGH , VOD populations are vulnerable to multiple threats associated with human activities, and the SGCN list identifies the most vulnerable. Following this chapter (Chapter 4), threats are targeted and addressed by the actions to implement long-term conservation of SGCN and key habitats.

Threats in the Northeast Region

There is no comprehensive assessment of threats across the northeastern region. However, numerous threats to fish, wildlife, and their habitats have been identified by the northeastern states as part of their individual SWAPs. After the completion of the 2005 CWCSs, a survey was conducted to identify common threats listed by states (AFWA 2011) and the predominant threats are listed in Table 3-1 in descending order. The 13 northeastern states and the District of Columbia identified 37 common, recurring threats to SGCN or their habitats (AFWA unpublished and 2011). The most frequently mentioned threats included invasive species (mentioned by 100% of northeastern states) and industrial effluents (pollution); commercial and industrial areas; housing and urban development; and agricultural and forestry effluents (all of which were mentioned by at least 83% of northeastern states). Other important challenges mentioned by 50% or more of the northeastern states included: dams and water

management; habitat shifting and alteration; recreational activities; roads and railroads; storms and flooding; temperature extremes; logging and wood harvesting; problematic native species; harvest or collection of animals; lack of information or data gaps; and droughts. In addition to the specific threats mentioned in the 2005 CWCSs, recent work by the northeastern states has emphasized the importance of additional, emerging threats such as climate change, exurban developments, new invasive species, and disease. The following table fails to convey the fact that climate change can exacerbate other threats, as previously discussed in Chapter 1 within taxonomic group discussions. A few examples of exacerbated effects from climate change: heavier rains are more effective at transporting nutrients and pollutants to water bodies than light rains (negatively impacting water quality), heavy rains cause worse erosion, and invasives thrive in warmer temperatures (M. Staudinger, NECSC pers. comm. 2015).

Table 3-1. Key Threats Identified by Northeastern States in Their Wildlife Action Plans

Key Threats Identified by Northeastern States in their Wildlife Action Plans (in descending order of listing recurrences)
Invasive & Other Problematic Species & Genes: Invasive non-native/alien species
Pollution: Household sewage & urban waste water
Pollution: Industrial & military effluents
Pollution: Agricultural & forestry effluents
Residential & Commercial Development: Housing & urban areas
Residential & Commercial Development: Commercial & industrial areas
Human Intrusions & Disturbance: Recreational activities
Natural System Modifications: Dams & water management/use
Climate Change & Severe Weather: Habitat shifting & alteration
Climate Change & Severe Weather: Storms & flooding
Climate Change & Severe Weather: Temperature extremes
Barriers/Needs: Lack of biological information/data gaps
Climate Change & Severe Weather: Droughts
Transportation & Service Corridors: Roads & railroads
Biological Resource Use: Harvesting/collecting terrestrial animals
Biological Resource Use: Logging & wood harvesting
Natural System Modifications: Other ecosystem modifications
Invasive & Other Problematic Species & Genes: Problematic native species
Biological Resource Use: Harvesting aquatic resources
Pollution: Air-borne pollutants
Barriers/Needs: Natural Resource Barriers: Low population levels, insufficient habitat requirements, etc.
Pollution: Garbage & solid waste
Agriculture & Aquaculture: Wood & pulp plantations
Pollution: Excess energy

Key Threats Identified by Northeastern States in their Wildlife Action Plans (in descending order of listing recurrences)
Barriers/Needs: Lack of capacity/funding for conservation actions
Barriers/Needs: Lack of education/outreach with public and other stakeholders
Natural System Modifications: Fire & fire suppression
Agriculture & Aquaculture: Non-timber crops
Residential & Commercial Development: Tourism & recreation areas
Barriers/Needs: Lack of monitoring capacity/infrastructure
Barriers/Needs: Lack of capacity/infrastructure for data management
Barriers/Needs: Administrative/political barriers
Transportation & Service Corridors: Shipping lanes
Biological Resource Use: Gathering terrestrial plants
Energy Production & Mining: Renewable energy
Energy Production & Mining: Mining & quarrying

To provide consistency in identifying threats to SGCN and key habitats, the IUCN standard lexicon of threats (and actions, described in Chapter 4) was adopted for use in SWAPs (Salafsky et al. 2008).

The Northeast Lexicon may cause the destruction, degradation, and/or impairment of SGCN and their habitats. Technical committees applied this lexicon when identifying the specific threats to Rhode Island SGCN and key habitats, the results of which are outlined in Table 3-2 and 3-3.

Identifying Threats to Species of Greatest Conservation Need and Key Habitats in RI

The IUCN threat classification system was also used in RI to report threats at the state level, the taxonomic level, the habitat level and the species level. The Northeast Lexicon was used to assess degree of threat. The RI WAP Technical and Scientific Teams reviewed and reevaluated the threats listed in the 2005 CWCS as well as additional updated threat information according to these standardized protocols. Climate change and emerging diseases are examples of threats where more updated information was incorporated into the threats determination, assessment and ranking process.

Over 100 existing conservation programs and plans were identified through a literature search and were used as a foundation from which to develop the list of threats in this chapter, the WAP, its Profiles and the companion document. Key citations are listed at the end of this chapter on threats to SGCN and their habitats, and additional threats were compiled from current local, state and regional, national and international conservation plans listed in Appendix 1a. Appendix 3 represents threat classification system used by the many partners to identify and rank threats for the RI WAP.

Through a series of workshops, teams of experts, partners and stakeholders identified and ranked the 2005 and additional updated information on threats to SGCN. Teams then grouped and condensed these threats, where similar, for species suites, habitat associations, or broader taxonomic applicability. A similar process was conducted for identifying and updating threats to each key habitat. Habitat threats were also grouped and

condensed to higher tier habitat groupings whenever possible to reduce redundancy and highlight common threats. Table 2-3 presented the best available assessment (by the Technical and Habitat Teams) of degree of threat to each key habitat and its relative condition.

To highlight the link from threats and actions, priority actions presented in this document are linked to the threat addressed. Threats are coupled with actions and are listed for each hierarchical level (from general statewide to specific species) in Chapter 4, and are listed in Appendix 4 and the species and habitat profiles. Appendix 3 outlines threats at the statewide, taxa, and habitat levels.

The following tables and figures depict the key threats identified to Rhode Island fish and wildlife. Figure 3-1 depicts the ranked threats to the SGCN. The ranking for this table was produced using a rank coefficient for each threat and the number of times that the threat is given for each of these. Should a threat be listed first (revealing a rank of 1), the Rank Coefficient is 10; should a threat be listed second (revealing a rank of 2), the Rank Coefficient is 3.1623, should a threat be listed third (revealing a rank of 3) the Rank Coefficient is 1.7783, and so on with an exponential decrease (decrease by square root) in Rank Coefficient, with a place of seventh the Rank Coefficient is only 1.0366. The purpose of this simple method is to give greater weight to initial levels, focusing on making the primary level the priority. Table 3-2 depicts the threats to SGCN taxa and Table 3-3 depicts the threats to 5 K R G H , Key Data V

It is clear that residential and commercial development pose the greatest threat overall to SGCN. Natural systems modifications, pollution, biological resource use, and invasive species are other top threats to species. In comparison, invasiv H V SHFLHV DUH OLVWHG DV D WRS WKUHDW WR 5 K by pollution and development.

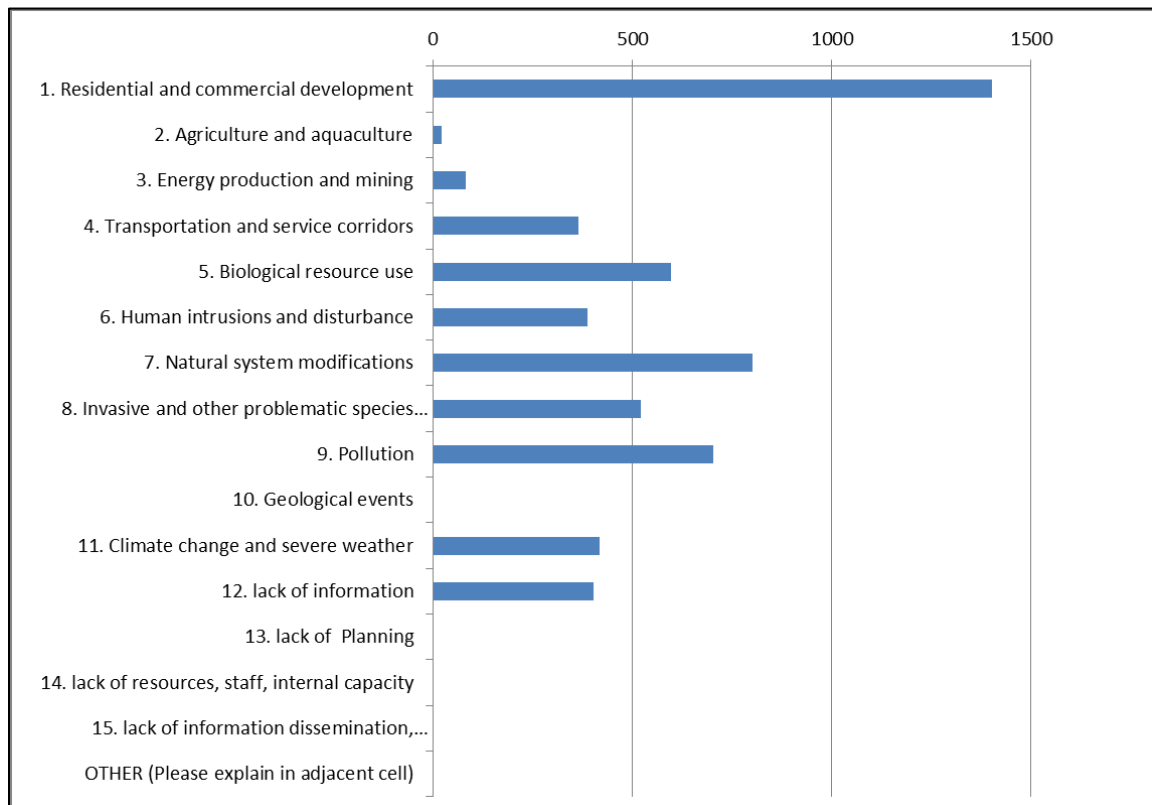


Figure 3-1 General Species Threats and Total Ranked Score

Table 3-2. General Threats and Percent of SGCN Affected

IUCN Threat Code	BIRD	MAM	FISH	HERP	INV	ALL^{reg}	ALL^{norm}
1. Residential and commercial development	50%	52%	18%	70%	59%	53%	50%
2. Agriculture and aquaculture	2%	19%	0%	4%	0%	2%	5%
3. Energy production and mining	14%	14%	0%	0%	0%	4%	6%
4. Transportation and service corridors	2%	24%	2%	78%	11%	12%	24%
5. Biological resource use	15%	48%	53%	48%	22%	26%	37%
6. Human intrusions and disturbance	46%	43%	0%	39%	14%	24%	28%
7. Natural system modifications	49%	14%	20%	61%	20%	30%	33%
8. Invasive and other problematic species and genes	37%	33%	24%	78%	19%	28%	38%
9. Pollution	31%	38%	53%	48%	51%	45%	44%
10. Geological events	0%	0%	0%	0%	0%	0%	0%
11. Climate change and severe weather	41%	5%	29%	70%	27%	32%	34%
12. Lack of information	20%	19%	9%	22%	8%	12%	15%

Table 3-3. Key Threats to Rhode Island Key Habitats

Threat	Primary	Secondary	Tertiary	Overall
Invasive and Other Problematic Species	16%	50%	31%	97%
Residential and Commercial Development	47%	2%	3%	52%
Climate Change and Severe Weather	14%	22%	5%	41%
Natural System Modifications	9%	21%	3%	33%
Transportation and Service Corridors	--	16%	16%	31%
Pollution	3%	10%	16%	29%
Human Intrusion and Disturbance	16%	3%	3%	22%
Biological Resource Use	--	--	2%	2%
Energy Production and Mining	--	2%	--	2%

Residential and Commercial Development

development for housing, urban areas, commercial, industrial, and recreational uses. Since its colonization 400 years ago, southern New England continues to be one of the most densely populated regions in the country. Rhode Island is the second most densely populated state, with 1,052,567 residents (US Census 2010) occupying roughly 1,045 square miles. This figure is only about 0.4% higher than the population reported in the 2000 Census, and is the lowest rate of population growth of the New England states, which averaged 3.8% for the region (US Census 2010).

population declines in cities and towns within the urbanized corridor, and population increases in rural communities (Table 3-4). For example, the town of West Greenwich, one of the more rural communities in the western part of the state, experienced the highest growth rate at 20.6%, an increase of approximately 1,050 new residents. The town of South Kingstown added more than 2,700 new residents for a growth rate of 9.7% (US Census 2010). Increases in rural populations tend to be accompanied by a rise in new homes. For example, in West Greenwich during the seven year period of 2006-2012 there was a 23% increase in the number of housing units.

Table 3-4. Population Growth Rates in Rhode Island Municipalities 2000 – 2010

Urban Communities*		Suburban Communities		Rural Communities	
City/Town	GR	City/Town	GR	City/Town	GR
Providence	+2.5	Cumberland	+5.2	W. Greenwich	+20.6
Central Falls	+2.4	Smithfield	+4.0	N. Smithfield	+12.7
Cranston	+1.4	Bristol	+2.2	S. Kingstown	+9.7
N. Providence	- 1.0	Johnston	+2.0	Foster	+7.8
W. Warwick	- 1.3	E. Greenwich	+1.5	Richmond	+6.7
Pawtucket	- 2.5	Portsmouth	+1.4	Exeter	+6.3
E. Providence	- 3.4	Lincoln	+1.0	Hopkinton	+4.5
Warwick	- 3.7	N. Kingstown	+0.6	Block Island	+4.1
Woonsocket	- 4.7	Westerly	- 0.8	Coventry	+4.0
Newport	- 6.8	Barrington	- 3.0	Tiverton	+3.4
		Narragansett	- 3.0	Burrillville	+1.0
		Jamestown	- 3.9	Scituate	0
		Warren	- 6.6	Charlestown	- 0.4
		Middletown	- 6.8	Glocester	- 2.0
				Lit. Compton	- 2.8
Overall GR	- 0.8	Overall GR	+0.3	Overall GR	+5.2

Source: US Census, GR=Growth Rate

* Communities assigned to Urban, Suburban, and Rural categories based on designations provided by GrowSmart RI (2000).

Commercial and industrial development inevitably accompanies housing, and recent trends in commercial distribution facilities that consume large acreages of habitat.

Increases in residential and commercial development in rural areas accounts for much of the reported losses in wildlife habitat and other natural resources. The 2008 forest survey of Rhode Island conducted

by the USFS reported a total of 348,400 acres of forest in the state which is a reduction of more than 11% from the 393,000 acres reported in 1998 (RI DEM DFE 2014, Butler 2014). Figure 3-2 provides one example of forest habitat consumed more than 175 acres of deciduous forest habitat.

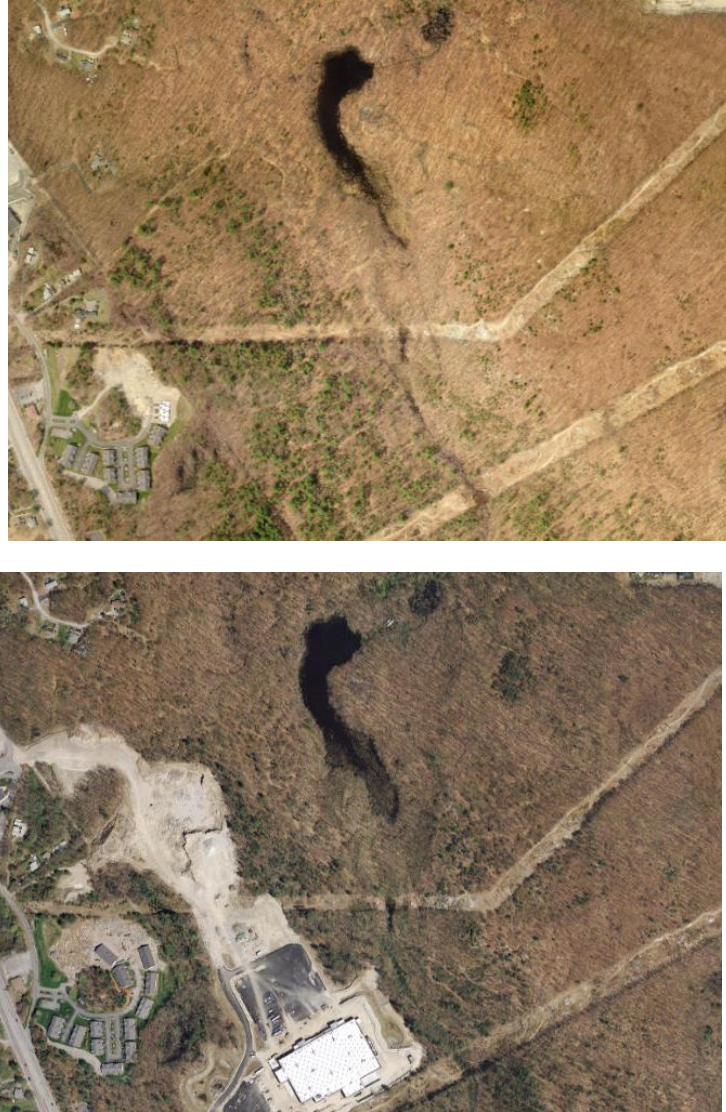


Figure 3-2. Aerial Photographs from 2008 and 2011 Showing the Development of a “Big Box” Complex (Dowling Village) in the Town of North Smithfield, RI

According to the NRCS, widespread development has resulted in a significant loss of prime farmland in Rhode Island with approximately 50,000 acres (25%) converted to non-farmland uses during the 23-year period from 1981-2004 (NRCS 2014) (Figure 3-3).

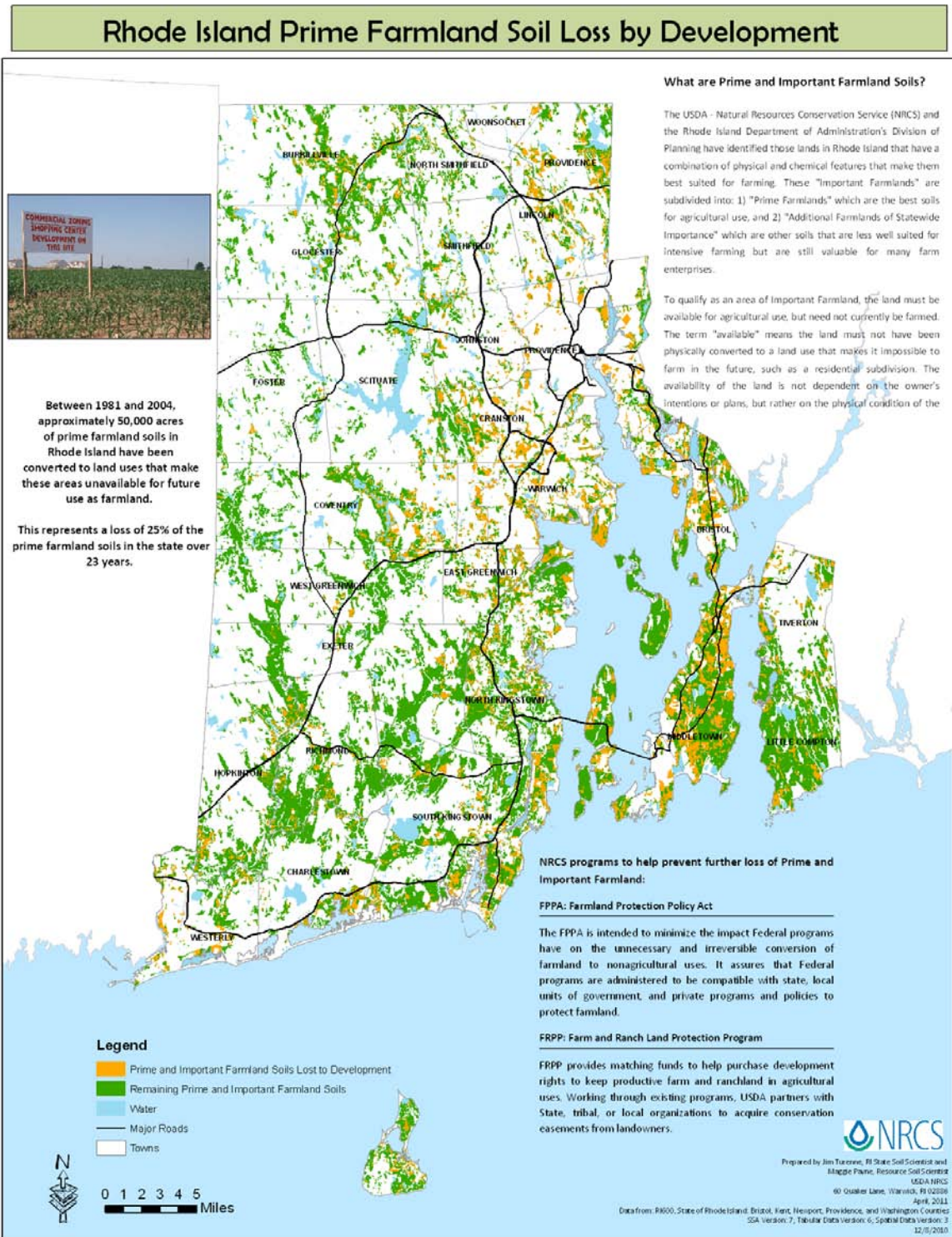


Figure 3-3. Rhode Island Prime Farmland Soil Loss by Development. Source: NRCS 2014

Transportation infrastructure that accompanies development compounds impacts by further fragmenting habitats and interrupting wildlife travel corridors to breeding, spawning, and wintering habitats. Table 3-5 provides an indication of the increase in miles of public roads in Rhode Island.

Results of the Geospatial Condition Analyses (Anderson et al. 2013) shed additional light on the extent of these threats in the Northeast. In general, high density development of natural habitats can change local hydrology, increase recreation pressure, introduce invasive species either by design or by accident with the introduction of vehicles, and bring significant disturbance to the area. Urbanization and forest fragmentation are inextricably linked to the effects of climate change, because the dispersal and migration of forest plants and animals are disrupted by development and roads.

Fragmentation subdivides large contiguous areas of natural land into smaller patches, resulting in each patch having more edge habitat and less interior. Because edge habitat contrasts strongly with interior the surrounding edge habitat tends to isolate the interior region and contribute to its degradation. Thus fragmentation can lead to an overall deterioration of ecological quality and integrity, and a shift in associated species from interior specialists to edge generalists.

Table 3-5. Total Miles of Public Roads in Rhode Island. Source: US DOT 2013

Road Type	1995	2000	2012
Urban	4572	4720	5256
Rural	1321	1333	1224*
Total	5893	6053	6480

* ILJXUH IRU UXUDO URDGV UHIOHFWV D UHFODVVLILFDWLRQ RI aSUHYLRXVO \ C decline in the number of rural road miles.

In Figure 3-4, Westerly Airport is at the top, the Atlantic Ocean on the bottom. The 1988 photo clearly shows the complex of vernal ponds in this area, with housing development beginning to encroach from the west.



Figure 3-4. Aerial Photograph from 1988 of a Portion of the Westerly Moraine

The 2008 photo (Figure 3-5) shows the amount of development that occurred in 20 years and how the ponds have been isolated and amphibian movement corridors compromised.



Figure 3-5. Aerial Photograph from 2008 of a Portion of the Westerly Moraine

HYHORSPHWSDWWHUQLKRGH,VODQKDYHEHHQHVFULEHGLWKHVLQHZUGVSUDZ*URZPDUW

Rhode Island (2000) described sprawl as, land development trends and patterns that are more wasteful, impact larger amounts of natural resources, require redundant capital investments (public facilities and infrastructures), and impact considerable human resources requiring longer commute distances. In recognition of this development pattern, the Rhode Island Division of Planning has published *Land Use 2025 State Land Use Policies and Plan* as the major State Guide Plan for conservation and development in the 21st Century. This plan envisions Rhode Island as a constellation of community centers connected by infrastructure corridors and framed by greenspace (see Figure 3-6).

Coordination with ongoing planning efforts will be important. This includes RhodeMap RI, a coordinated effort by the state intended to make Rhode Island a better place to live and work by mobilizing state and community assets in a new way. RhodeMap RI, offers a possibility to strengthen the economy, meet current and future housing needs, and plan for future growth through the development of an integrated plan that will also include strategies for transportation, land use, and environmental protection. RhodeMap RI is funded with a Sustainable Communities Initiative Grant, one of several offered through the Federal Partnership for Sustainable Communities, a collaboration of the U.S. Department of Housing and Urban Development, EPA, and the U.S. Department of Transportation (US DOT). The Sustainable Communities Regional Planning Grant Program supports metropolitan and multi-jurisdictional planning efforts that integrate housing, land use, economic and workforce development, transportation, and infrastructure investments in a manner that empowers jurisdictions to consider the interdependent challenges of: (1) economic competitiveness and revitalization; (2) social equity, inclusion, and access to opportunity; (3) energy use and climate change; and, (4) public health and environmental impact. For more information about RhodeMap RI, see: <http://rhodemapri.org/>.

