

D. Natural Resources and Conservation

1.0 Introduction

The purpose of the Natural Resource and Conservation element is to provide guidance and support for conservation efforts that protect and manage the town's natural resources. Goals, policies, and action plans are included that focus on the protection of the Town's significant resources through conservation. Conservation of natural resources should be evaluated and protected concurrently with open space, historical and cultural significant areas. Therefore this element is closely linked to the Open Space element as well as the Historical and Cultural elements of this Plan. This Plan includes an inventory of existing natural resources, the threats to these resources, and ways to assure the conservation of these Town assets.

When states such as Rhode Island become more urbanized, citizens become increasingly aware of the interrelated nature of our living environment. The breach of a dam might have a significant impact on Narragansett Bay through the release of contaminated sediments trapped behind the dam. Excessive paving may contribute to downstream flooding of residential areas. Closed landfills cast doubts on the long-range viability of aquifers. Increased development and land fragmentation causes loss of habitats for wildlife. It is important for North Smithfield to analyze the nature of existing development practices and the impact to natural resources. Assessing the environmental impacts will aid in making informed decisions about the most suitable sites for development.

Fortunately, there are numerous resources and tools available to help develop ways to conserve our natural resources. The Rhode Island Department of Environmental Resources maintains a wealth of information and provides assistance in protecting the environment and conservation. The North Smithfield Conservation Commission and the Land Trust promote the protection of natural resources and encourage conservation.

Completed Goals

The Town has strived to complete many of the goals of the 2007 Comprehensive Plan. This progress is demonstrated below. North Smithfield

1. Strengthened the existing groundwater overlay protection regulations and revised the overlay district map to include all the protection zones listed including surface water supply basins. (Map G-1)

2. Adopted a zoning ordinance for the protection of fresh water wetlands prohibiting excavation, draining or filling without prior approval from the Rhode Island Department of Environmental Management.
3. Adopted an ordinance for Wetland Setbacks for Onsite Waste Water Treatment Systems (OWTS) and a Buildings and Impervious Surfaces ordinance to protect the health and safety of residents. The ordinance prevents degradation of North Smithfield's surface and ground waters.
4. Adopted an ordinance governing the development and use of lands lying above groundwater aquifers.
5. Adopted an ordinance for the creation of conservation developments to protect natural resources, preserve cultural, historical and archaeological resources, and protect recreation resources.
6. Supplemented the Town's Soil and Earth Removal ordinance by prohibiting earth extraction in all zones.
7. Adopted flexible zoning measures such as conservation development design, which could allow the retention of natural vegetation, buffer areas adjacent to streams, wetlands and provide opportunities to preserve large tracts of open space.
8. Worked cooperatively with the City of Woonsocket as part of a Regional Watershed Protection Committee concerned about Reservoirs # 1 and # 3 and Crookfall Brook. Strengthened regulations and zoning which adversely impact the watershed.
9. Coordinated the Town's open space and conservation planning efforts, with program priority given to increasing land holdings in the Woonsocket Reservoir system watershed in North Smithfield.
10. Maintained strong enforcement of regulations such as zoning, subdivision and land development, erosion and sediment control, soil and earth removal, storm water management, conservation development design and Development Plan Review (site plan review).
11. Required the submission of an "Existing Resources/Site Analysis Map" as part of the Master Plan review stage.
12. Adopted an ordinance that prohibits illicit discharge to wetlands and waterbodies.
13. Amended the Land Development and Subdivision Regulations to include the implementation of pre and post construction erosion, sediment and waste controls in accordance with the Rhode Island Phase II Storm water Regulations.

14. Promoted the current tax provisions of the Farm, Forest, and Open Space Act as a tool to conserve tracts of undeveloped land larger than 10 acres.
15. Adopted and implemented the Phase II Storm water Management Plan in accordance with Rhode Island's Pollution Discharge Elimination System (RIPDES) general permit.

Work in Progress

The Town of North Smithfield is currently working to

1. Amend the Land Development and Subdivision Regulations to strengthen non-point source pollution standards with emphasis on protection of areas over principal groundwater reservoirs or recharge areas or within reservoir drainage areas, in accordance with the Town's Stormwater Management Plan (SWMP).
2. Identify and rank key parcels for acquisition or protection based on criteria such as but not limited to: size, adjacent protected parcels, significant natural resources, rare or endangered species or habitat, significant cultural features, development potential etc. as prioritized in the Woonasquatucket Greenspace Mapping Project (WGMP).
3. Develop a plan to detect illicit discharges.
4. Improve the practice of cleaning and inspecting catch basins and retention based on record performance. Consider provisions that would require landowners to conduct periodic inspection and cleaning of catch basins and other storm water structures installed as part of land development projects outside of the right-of-way.
5. Support the community's agricultural-based businesses by providing technical assistance for available grants and investigate tax incentives for landowners that maintain active agricultural pursuits.

Goals, Policies and Actions

Goal N1: Protect and enhance the Town's natural resources.

Policy N1: Limit development in environmentally sensitive areas.

Action N1: Determine compatible land uses and develop land acquisition and management programs to identify open space and river corridors.

Action N2: Protect existing nature built environments and mitigate the significant negative impacts of proposed development on those environments.

Action N3: Encourage peer review of master plans for large developments.

Policy N2: Protect prime groundwater aquifers and recharge areas from potential environmental damage

Action N4: Investigate alternatives such as packaged wastewater treatment facilities to those developed areas impacting groundwater resources.

Action N5: Require that the Rhode Island Department of Environmental Management (RIDEM) adopts more stringent regulations for underground storage tank installation, maintenance and testing in critical aquifer and watershed protection areas.

Action N6: Encourage the use of properly designed and maintained OWTS especially in areas with highly permeable soils (generally associated with groundwater reservoirs); encourage DEM to remain vigilant in making sure that necessary OWTS maintenance contracts remain in place.

Action N7: Request quarterly reports from RIDEM regarding the monitoring program and remedial action being taken with respect to the EPA Superfund sites in the vicinity of the Slatersville Aquifer.

Action N8: Develop an ordinance that requires all new lots approved by the Planning Board to have a well water test for volatile organic compounds (VOC's).

Policy N3: Protect the Town's surface water resources with emphasis on the watersheds of the Slatersville and Woonsocket Reservoirs.

Action N9: Maintain strong enforcement of development regulations within reservoir drainage areas under the presumption that the town needs to improve water quality from the current B status.

Action N10: Encourage the Town of Burrillville to consider land use and development impacts relating to downstream areas such as the Slatersville Reservoir.

Policy N4: Adopt and implement programs to protect natural resources and conservation areas through acquisition, conservation easements and other measures.

Action N11: Ensure that the timing of peak flows from new development is designed to minimize downstream flooding especially in flood prone watersheds such as Cherry Brook.

Policy N5: Protect prime farmland and farmlands of statewide importance with emphasis on those areas actively used for farming.

Action N12: Recommend zoning changes to allow more low impact use that will keep farms economically feasible.

Policy N6: Protect and acquire forestland to meet present and future needs.

Action N13: Use a cooperative approach between the Town, State, and private organizations to identify, plan for, and protect valuable and ecologically sensitive forestland from development in critical areas.

Action N14: Conserve and enhance forests to support water quality, forest products, water supply and wildlife habitat.

Policy N7: Use a comprehensive strategy for protecting natural resources.

Action N15: Maintain the Town GIS and utilize it to identify environmentally sensitive areas and potential conservation areas and opportunities.

Natural Resources Inventory

The residents of North Smithfield are the caretakers of 15,600 acres (26.4 miles) rich in natural resources worthy of protection. Whether it is wildlife, vegetation, wetlands, forests or water resources, the natural features of North Smithfield create a sense of place that is valued by the community. Significant natural resources include surface and groundwater resources, minerals and soils, forests and wildlife.

Groundwater Water Resources

Groundwater is an important resource as it supplies drinking water for a large percentage of the town's households. North Smithfield has two class GAA groundwater aquifers, the Slatersville and Lower Branch. Groundwater classified GAA are those groundwater resources that are known or presumed to be suitable for drinking water use without treatment and are located in one of the two areas described below. Groundwater classified GAA underlies approximately 21% of the state and 32% of North Smithfield. Groundwater classified GAA includes the following:

- The state's major stratified drift aquifers that are capable of serving as a significant source for a public water supply ("groundwater reservoirs") and the critical portion of their recharge area as delineated by DEM
- The wellhead protection area for each public water system community water supply well. Community water supply wells are those that serve resident populations and have at least 15 service connections or serve at least 25 individuals, e.g., municipal wells and wells serving nursing homes, condominiums, mobile home parks, etc.

Map D-1 is the Groundwater Aquifer Protection Overlay District from the North Smithfield Zoning Ordinance. This map combined with North Smithfield Zoning Ordinance 6.19 regulates the use and development of land to protect major stratified drift aquifers and their recharge areas (GAA Classification), surface drinking water supplies and their watersheds, community well-head protection areas, and town-owned non-transient, non-community wellhead protection areas (schools).

While much of the town's more intense residential, commercial and industrial development has historically been located over aquifers, ordinances have been put in place specifying permitted uses and non-permitted (possibly contaminating) uses to protect drinking water of North Smithfield's residents.

Surface water resources and watersheds

North Smithfield is located within the drainage system of three major Rhode Island rivers. The northern portions of the Town drain into the Branch River which in turn joins the Blackstone River in the northeastern section of Town. In the southwest corner several streams, including those flowing through Primrose Pond, combine to form the headwaters of the Woonasquatucket River. In the eastern section of the community both the Cherry Brook and Crookfall Brook systems flow to the east and into the Blackstone River in Woonsocket.

State Guide Element 162 classifies the various river segments in North Smithfield as follows:

- The Branch River from its confluence with the Clear and Chepachet Rivers to the Slatersville Reservoir is suitable for swimming or fishing. It has recreational open space value, and mill villages are located along its corridor. (Classified as "Recreational Open Space")
- Slatersville Reservoir (both upper and lower) has recreational value and is designated as swimmable and fishable. It has a state boat ramp and fishing club access. Its current condition with respect to contact recreation is, however, marginal due to coliform and metals levels that exceed state standards. The Land Resource and Recovery landfill Superfund site is located near the Reservoir. (Classified as "Recreational Open Space")¹
- The Branch River, from the Slatersville Reservoir to its confluence with the Blackstone River at the Blackstone Gorge in the Town of North Smithfield, has scenic and open space value with mill villages located along the river corridor. It is suitable for non-contact recreation. (Classified as "Recreational Multiple Use")
- The Blackstone River from the Blackstone Gorge to the Rhode Island state line is suitable for non-contact recreation. White-water rafting is occasionally possible in this segment. (Classified as "Recreational Open Space")
- The Blackstone River from the Rhode Island state line to Thundermist Falls in Woonsocket is suitable for non-contact recreational activities. Mills with historical value are located along the river corridor. (Classified as "Recreational Multiple Use")
- The Woonsocket Reservoirs and Crookfall Brook and its tributaries are components of a public drinking water supply. The main reservoir, identified as Reservoir No. 3, is located in Smithfield and North Smithfield. Crookfall Brook conveys water from Reservoir No. 3 through Reservoir No. 2 to Reservoir No. 1, the terminal reservoir and the water treatment facility. Mill sites, historical resources, and archeological remains can be found along the Crookfall Brook corridor. (Classified as "Water Supply")

There are four major dams in North Smithfield. Three, located along the Branch River, were originally developed to provide water power for the mills. The fourth dam Crookfall Brook to create Woonsocket Reservoir #3. The maintenance of existing dams is important for water quality. The dams, particularly those along the Branch River, have served to trap contaminated sediments; a breach could have adverse environmental consequences of statewide significance. RIDEM's Dam Division is concerned with dam safety issues in Rhode Island.

Water Supply Basin

The Blackstone River Watershed drains into two reservoirs located in North Smithfield serving the Woonsocket Water Supply. As shown on Map G-2, major portions of the watersheds serving Reservoir #3 and Reservoir #1 of the Woonsocket water supply system are located in North Smithfield. The watershed is divided into two sections. The westerly portion drains to Reservoir #3 which straddles the North Smithfield/Smithfield Town line. The easterly section drains directly into Crookfall Brook and Reservoir 1; Reservoir #1 is bisected by the North Smithfield/Lincoln Town line. Risk assessments of the watersheds were undertaken in 2004 by the Department of Health and URI Cooperative Extension. Based on an analysis of existing uses and zoning, the Woonsocket water supplies are “moderately susceptible to contamination”.

The City of Woonsocket owns about 30% of Reservoir #3 watershed, primarily around the reservoir's perimeter. The entire Reservoir #3 watershed in North Smithfield is zoned for single family homes; only a small percentage of potential watershed development has taken place to date.

Because of existing and potential development, the Reservoir #1 watershed is the most critical in terms of hydrologic importance. Development activities in the watershed are constrained to the extent that special measures or restrictions may apply to this important watershed. Water quality is constantly monitored and development activities are constrained for protection from contaminants. Rivers and streams running through the watershed carry storm water drainage and drainage from impervious surfaces such as roadways and parking lots. To protect the groundwater reservoirs and streams, the North Smithfield Zoning Ordinance limits the amount of impervious surface in new development.. In Section 17, the section on Site Plan Review, impervious cover is to be minimized in driveways and parking lots. In Section 18 a low impact design Storm water Prevention Plan is recommended to minimize surface runoff.

Flood Hazard Areas

The Special Flood Hazard Area zones in North Smithfield are delineated in Map

D-8 using data from RIGIS and the Statewide Digital Flood Insurance Map (DFIRM) database (2015). The Special Flood Hazard Area (SFHA) is the land in the floodplain within a community subject to a one (1) percent or greater chance of flooding in any given year. SFHAs are determined utilizing the base flood elevations (BFE) provided on the flood profiles in the Flood Insurance Study (FIS) for a community. SFHAs include, but are not necessarily limited to, the land shown as Zones A, A1-30, AE, AO, AH, and the Coastal High Hazard Areas shown as

Zones V, V1-30, and VE on a FIRM. The SFHA is also called the Area of Special Flood Hazard.

The following table illustrates those areas (or portions of areas) in the Special Flood Hazard Area and the flood zone delineation and can be located on map D-8.

Lake or River	Flood Zone *
Slatersville River and Reservoirs	A and AE
Trout Brook Pond	A
Trout Brook	A
Branch River	A and AE
Bel Air Lake	A
Tarkiln Pond/Brook	A
Rankin Brook	A
Primrose Pond	A
Todds Pond	A
Woonasquatucket River	A
Blackstone River	AE
Branch River	A
Cherry Brook	AE
Spring Brook	A
Booth Pond	A

***Zone A** are areas that have a 1% probability of flooding every year (also known as the "100-year floodplain"), and where predicted flood water elevations have *not* been established. Properties in Zone A are considered to be at high risk of flooding under the National Flood Insurance Program (NFIP). Construction in these areas must meet local floodplain zoning ordinance requirements.

Zone AE are areas that have a 1% probability of flooding every year (also known as the "100-year floodplain"), and where predicted flood water elevations above mean sea level have been established. Properties in Zone AE are considered to be at high risk of flooding under the National Flood Insurance Program (NFIP). Construction in these areas must meet local floodplain zoning ordinance requirements, including evidence that principle structures are above the Base Flood Elevation (BFE) as shown on the adopted FIRM maps.

Zone X are areas that are above the 0.2% flood elevation. Properties in unshaded Zone X are considered to be at low risk of flooding under the National Flood Insurance Program. Local floodplain zoning ordinances do *not* apply to Zone X.

In a 50-100 year storm in March of 2010, North Smithfield sustained multiple losses due to flooding in the Cherry Brook watershed. As a possible solution to flooding in this area the Town purchased 69 acres adjacent to the west side of Rte. 146 and north of Rte. 104. This land has a natural bowl of almost 40 acres that could be used to detain water from a 50-100 year storm of the type of March 30-31, 2010. The Town needs to have a Hydrologic Study done to identify

ways to minimize the impacts of Cherry Brook Flooding, possibly utilizing the bowl area. To date, there has been no funding for this study.

Another flooding problem in North Smithfield is due to the beaver population. There is a broad floodplain area in the valley area of North Smithfield, around Mattity Road. In 2009, beavers built several dams in the area causing flooding of nearby homes and roads. The Town was given an out-of-season beaver trapping permit and a trapper was brought in. The beavers have not returned.

In 2012 summer rain made it an extraordinary year for beaver dam construction, with flooding of areas adjacent to waterways in the Primrose valley. RIDEM does not regulate beaver dams or beaver diversion structures. The Town received from DEM a permit to trap beaver out of season.

There needs to be an awareness of the flooding effect of beaver dams in North Smithfield and procedures to follow to eliminate the problem. The Town researched the installation of beaver diversion systems and the Conservation Commission has installed these successfully in Cedar Swamp in 2015..

Minerals and Soils

North Smithfield's environment is complex and sometimes difficult to manage. Although 37% of the soils have only moderate limitations for development, 47% have severe constraints due to high water tables, steep slopes, and shallow bedrock or wetland conditions. Increasingly, new development is encountering more demanding sites. Over 3,000 acres have agricultural soils rated as prime or of statewide importance, only 500 acres are in use for agriculture.

Farmlands present both constraints and opportunities. The constraints relate to desires to keep productive farmland from being forever lost to urban and suburban uses. The opportunities are there for conserving valuable farmland, maintaining agricultural business and contributing to an open and rural environment.

Map G-3 shows wetlands and hydric soils. Hydric soils have water at or near the surface for significant periods of the year. Development in areas with hydric soils usually is not feasible nor allowed by local, State or Federal wetland regulations without a specific permit granted by RIDEM. Hydric soils cover about 2,250 acres or approximately 14% of North Smithfield. Wetlands are periodically flooded lands occurring between uplands and open water bodies such as lakes, rivers, streams and estuaries. They are important to fish and wildlife habitat, flood protections, erosion control and water quality maintenance. To develop on or near wetlands, permits are required from RIDEM.

In Map D-3 and D-6, a large percentage of land (40%) in North Smithfield is limited for development because of bedrock and slope constraints or hydric soils. Hydric soils are not suitable for development and are not included in calculating buildable land. Bedrock and slope constraints comprising 19.6% of soils in North Smithfield reduce the amount of suitable land for development. Fortunately about one third of the soils in North Smithfield are soils with moderate constraints to development (36.9%).

Map D-5 shows soils classified as prime farmland and those of statewide importance. Generally, farmlands of statewide importance include those lands that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to modern farming methods.

The primary minerals resource extracted from the natural geology of North Smithfield are the sand and gravels found in ice age fluvial-glacial deposits through the Town (Map D-4). Holliston Sand Company, one of the largest purveyors of natural sand and stone in New England, has been excavating sand and gravel in North Smithfield since 1988. More than 50 acres of land are being used to create specialized products used on airport runways, green roofs and endless sand filters.

Forest and Trees

Woodlands serve major ecological, hydrological, climatological and aesthetic functions in North Smithfield. Ecologically, North Smithfield's undeveloped areas are made up of small woodlands, wooded swamps, streams which serves as habitat for a fairly diverse group of plant and animal species (see Map D-7). Hydrologically and climatologically, trees clean the air and water, reduce storm water runoff, aid in climate mitigation and sequester carbon from the atmosphere providing us with oxygen. Forests are positive sinks for carbon from the carbon dioxide in the air and are providing positive benefits in the greenhouse gas problem. And finally aesthetically, trees and green space have a positive impact on people's well-being and possibly lower stress levels.

Calculations from the RIGIS land use data indicate that 42% of the land area in North Smithfield is wooded, 36% deciduous and 8% softwood. With one acre and larger housing sites being used for new development in large portions of the community, a considerable amount of woodland is now located on individual house lots. As can be seen on Map D-7, most of the forested area in North Smithfield is in the southern portion and is deciduous forest.

Forest fragmentation due to residential and urban development is of major concern in the state as well as in North Smithfield. Fragmentation occurs when contiguous forest land is divided into smaller patches. The division has the potential to change the local water cycles, reduce critical wildlife habitat and foster the invasion of exotic plant species.

Wildlife

The Town's rolling and forested terrain, interspersed with streams, ponds and wetlands, creates habitats for a variety of plant and animal species, both common and rare. These same features help to break up the development pattern and provide varied living environments for residents as well. Small ponds and a variety of deciduous and coniferous trees provide for a diverse habitat of wildlife. But this break in the development pattern also causes fragmentation of habitat. According to the Rhode Island Wildlife Action Plan of 2015 (RI WAP), the primary threat to wildlife habitats is the conversion of land for housing, urban growth, transportation, commercial, industrial, and recreational uses. Over the years there has been a shift from the population living in cities to people moving out to more rural and suburban areas. This shift causes breaks in

contiguous land for habitats as well as loss of habitat. This fragmentation has a profound effect on wildlife and on species diversity.

Many species of wildlife depend on the forested habitats for their survival. The maturing/aging of the forests and the lack of young forests are changing the wildlife species in Rhode Island. Maturing/aging forests are a benefit to the wildlife because of the abundance of nuts and fruits but this varies year to year. Aging forests also contain dead and fallen trees providing habit for cavity-nesting animals and those that need dead wood to survive. But the lack of young trees and plants and the inhibition of understory growth affect the nesting and feeding habits of other wildlife.

Conservation and Protection

Although North Smithfield's scenic resources do not run to the unusual and dramatic, there are many man-made and natural landscapes which add to the attractiveness of the community. Many of the natural resources such as Todd's Pond or the Blackstone River Gorge are obscured from public view due to private ownership or limited access. Others are not; the view of the farms and barns on Woonsocket Hill Road as one travels north on Route 146 is both dramatic and memorable. Cedar Swamp, 69.5 acres of freshwater wetlands off of Rte 146 and Greenville Rd., is accessible and is home to wildlife including rabbits, raccoons, foxes, fishers, deer, turkey, hawks and waterfowl as well as amphibians, reptiles and insects. Walks through the Audubon Property off the Providence Pike take one into a seemingly virgin area of streams, ponds, fields and woods that could pass for an isolated section of northern New England. These are but a few of North Smithfield's "highly scenic" resources. Fortunately, as is being pointed out through the efforts of the Blackstone River Valley National Heritage Corridor Commission and Scenic Rhode Island, Rhode Islanders are learning that there are untapped scenic resources readily at hand to be enjoyed.

Aquifer Protection

The following approaches are suggested for the protection of the Slatersville and Branch River Aquifers and other lesser groundwater reservoirs and recharge areas which have potentials for public water supply.

- Groundwater Overlay Zoning

The Town responded to the 1992 Comprehensive Plan requirement for groundwater protection by adopting Section 6-19 of the Zoning Ordinance titled "Regulation of Groundwater Aquifer Zones, Groundwater Recharge Areas, Wellhead Protection Areas and Water Supply Basin". As recommended by the Comprehensive Plan, the regulations dictating uses over these particular resources are more stringent than in the underlying districts. The current Overlay language ought to be reviewed for possible expansion of the list of prohibited uses and the Overlay map should be revised to clearly show all protection zones including surface water supply basins. More specifically, it ought to prohibit excessive water drawdown for non-municipal uses. More resources ought to be spent on enforcement of the Ordinance and property owner education. The bedrock aquifers and especially those areas

sensitive to brittle fracture zones ought to be mapped and baseline data collected for the purpose of monitoring ground water quality.

- **Soil Erosion and Sediment Control Ordinance**

North Smithfield's Erosion and Sediment Control Ordinance requiring proper provisions for water disposal and the protection of soil surfaces during and after construction is in conformance with State law. However, the Ordinance needs some adjustment in light of the recently adopted Stormwater Management Plan. A major objective is the prevention of water pollution. Enforcement remains a challenge due to competing and limited resources.

- **Subdivision and Land Development Regulations**

The present Subdivision and Land Development Regulations do require consideration of drainage and the suitability of lots for the individual sewage disposal systems. However, as written, the Regulations appear to favor the piping of stormwater rather than the use of natural drainage courses. The Regulations should be reexamined to consider best management practices (BMP) such as natural drainage, retention and detention basins and related measures being advanced by the Land Management Project and generally included in contemporary subdivision regulations. Requirements that drainage flow from the site shall not exceed that experienced prior to development already exist in some communities, as do stormwater standards for Land Development projects and definitions and standards dictating minimum contiguous buildable lot sizes. The Town should also consider adopting regulations more rigorous than DEM's current regulations pertaining to the buffering of wetlands and waterbodies.

- **Soil and Earth Removal Ordinance**

As previously noted, the Soil and Earth Removal Ordinance does not apply to several sand and gravel operation which were in operation prior to the enactment of the Ordinance. One, for example, is located between the Slatersville Reservoir and the Slatersville groundwater reservoir. Since critical resources of the Town and State may be at risk, the Town should reexamine present regulations with particular regard to the underlying water resources and adjacent wetland and surface waters and the restoration of the land in a manner which will provide long-term protection. The Soil Erosion and Sediment Control Ordinance will be amended in accordance with Phase II Stormwater regulations and will include pre and post construction provisions.

- **Underground Storage Tanks**

State regulations on the installation, management and testing of underground storage tanks are administered by RIDEM. Failed tanks can impact individual wells, large aquifers, streams and waterbodies. The Town should insist on strong enforcement of these regulations in critical water resource areas.

- **Hazardous and Emergency Spill Response**

Through its Emergency Management Agency, the Town continues to participate with nine other Northern Rhode Island communities in a regional compact covering hazardous and emergency spill responses. As a result of the effort associated with the production of the October 2004 *Multi-Hazard Mitigation Strategy*, there is now better coordination amongst

the various public safety organizations in and around North Smithfield and a comprehensive inventory of the equipment that may be used to deal with hazards and emergency spills. Additionally, the March 2004 *Stormwater Management Program Plan*, in response to RIPDES Stormwater Phase II Regulations illustrates all outfalls such that, in an emergency, the Town's rivers and streams can be better protected by the targeting of critical outfall locations.

- **Individual Sewage Disposal Systems**

A critical area generally associated with groundwater reservoirs is the highly permeable soils which transmit wastewater too quickly, allowing little time for waste constituents to be attenuated. This condition may apply over the Slatersville Aquifer. While the Town does have slightly more stringent regulations than the RIDEM (in terms of ISDS setbacks to waterbodies), more must be done to protect aquifers and groundwater recharge areas.

Watershed Protection

Two watersheds are of prime importance. They include those relating to the Slatersville Reservoirs and Woonsocket Water Supply Reservoirs #1 and #3. The Town should use the resources of the EPA and RIDEM as well as the Northern Rhode Island Conservation District to help protect these areas. Other key organizations are the Watershed Councils. The Woonasquatucket and Blackstone River Watershed Associations are non-profit organizations, empowered by the Rhode Island Rivers Council, to restore and improve the communities within their respective watersheds. North Smithfield has worked extensively with the Woonasquatucket Council in 2004 on its mapping project; however, both Councils should be recognized as important partners that could assist with future land acquisition activities, river and resource area cleanups, and water quality monitoring.

- **Reservoir Protection**

Various development regulations should be strongly enforced where there is the potential to degrade the Slatersville and Woonsocket Reservoirs. In some cases, such as the Town's water supply well near the Slatersville Reservoirs, the aquifer is being recharged, in part, by surface water from the Reservoir. The Town should work cooperatively with the City of Woonsocket as part of a regional protection strategy. Where possible, North Smithfield's program for conservation area protection, as presented in the Open Space and Recreation Plan Element, should be coordinated with the land holdings, both existing and proposed, of the City of Woonsocket. North Smithfield should also encourage strong upstream protection of both surface and groundwater resources by the Town of Burrillville.

- **Development Regulations**

North Smithfield should consider adopting flexible residential development regulations allowing the clustering of housing through "Conservation Development" and the protection of open space and fragile resources. This approach could open up opportunities for natural buffers and a reduction of impervious surfaces. Clustering, or its modern successor: Conservation Design or Development, can be a major tool for protecting interconnected networks of open space and implementing key goals of this Comprehensive Plan. The

adoption of best management practices, as previously discussed, will also bring significant surface water benefits.

- Stormwater Management

The March 2004 *Five-Year Municipal Stormwater Management Program Plan* prepared with the assistance of Vanasse Hangen Brustlin, Inc. is also an important tool to help protect watersheds. The actions identified in that document should be implemented as prescribed.

Protect Farms, Forests and Open Space

In North Smithfield the number one protection of farms, forest and open spaces is Rhode Island Law (44-27) the Farm, Forest, Open Space Act (FFOS). This law allows landowners of farm, forest or open space, to conserve their property for themselves and their future generations. Properties qualified for the FFOS program are assessed according to their current use instead of the value of the land if redeveloped. To qualify as a farm, the land must have more than 5 acres of agricultural land, woodlands and wetlands. Farmers who depend on their farms for sustenance and have very limited income also qualify for this tax benefit. North Smithfield's areas of prime farmland and farmland of statewide importance are significantly in excess of the lands used for agricultural purposes.

To qualify for the Forest designation in the FFOS, there must be at least 10 acres bearing a dense growth of trees, including young regenerating forest. The forest must be actively managed in accordance with the provisions of the written forest stewardship plan for the purpose of enhancing forest resources. The plan must be prepared by a qualified forester and reviewed and approved by RIDEM.

Open space qualification is ten acres or more of undeveloped land (excluding the house site). Open space is where undeveloped land serves to enhance agricultural values, or land in its natural state that conserves forests, enhances wildlife habitat, or protects ecosystem health. This includes: 1) tracts of any size that are designated as open space land on the comprehensive community plan and 2) tracts of any size that have conservation restrictions or easements in full force.

Farms

Proposals for the conservation of significant natural areas are contained in the Open Space and Recreation Element. The array of regulatory controls discussed in this Natural Resource Element should be applied with equal vigor to the protection of significant natural resources. Of special importance is the inclusion in Town regulations of provisions for the review of development applications by all concerned Town boards. The regulations should be amended, as necessary, to protect special areas (e.g. Rhode Island Natural Heritage Program sites).

- North Smithfield's areas of prime farmland and farmland of statewide importance are significantly in excess of the lands used for agricultural purposes. Unfortunately, not enough of these lands are used for farming.

- Protection of remaining farmland can be accomplished by: Encouraging applications for reduced property assessments under the Farm, Forest and Open Space Act.
- Consider adopting Conservation Development regulations to set aside farmland in perpetuity. Additional State acquisition of development rights. Considering farm preservation as part of open space and conservation planning.
- Forest Resource Protection-Conservation Development options and strict enforcement of Town and State wood cutting regulations will, in part, ensure a continuation of the woodlands in the Town. Many of the areas proposed for conservation in the Open Space and Recreation Element represent relatively large tracts of forested land.

Wildlife Protection

While some alien and invasive species have thrived in developed areas, most wildlife, birds and plant populations are vulnerable to multiple threats associated with human activity. Some threats include:

- Residential and commercial development
- Natural systems modification
- Invasive species
- Pollution
- Climate change and severe weather
- Human intrusion and disturbance

A primary threat to Rhode Island's fish, wildlife, and their habitats is conversion of land by human development for housing, urban areas, commercial, industrial, and recreational uses. Results of the Geospatial Condition Analyses (Anderson et al. 2013) indicated high density development of natural resources can change local hydrology, increase recreation pressure, introduce invasive species and bring significant disturbance to the area. Forest plants and animals are disrupted by development and roads. Securement of land and water remains the most effective, long-lasting, and essential tool for conserving habitats.

Map D-10 contains information pertinent to wildlife protection. Non-state conservation lands are real property permanently protected from future development by recognized land protection organization other than the State of Rhode Island. Natural Heritage areas are areas of estimated habit and ranges of rare species and noteworthy natural communities. The forest habitat layer on the map is derived from land-use and land-cover data enhanced by existing forest datasets, shrubland data and data classified manually.

North Smithfield Land Development and Subdivision Regulations (LDSR)

Conservation Development is a land use technique that allows a community to guide growth to the most appropriate areas within a parcel of land, in order to minimize negative impacts to the environment and preserve community character. In the LDSR under Article IV Special Requirements, Article 4.1 Conservation Developments was created for those reasons.

Within Article V Design Standards in the LDSR, Article 5.1 Land Unsuitable for Development land deemed unhealthy for residential purposes, according to the Planning Board and

consultation with the DEM's ISDS Section will not be approved for subdivision. The LDSR section is governed by the provisions of Section 5.5.3 of the North Smithfield Zoning Ordinance.

Stormwater Management

The Stormwater Design and Installation Standards Manual, written by the RIDEM and the Rhode Island Coastal Resources Council, was created to assist property owners, engineers, developers, municipal staff and others involved in the planning, designing and implementing of best management practices for development and redevelopment of properties.

The Rhode Island Pollutant Discharge Elimination System (RIPDES) Program issues Permits for Stormwater Discharge from Small Municipal Separate Storm Sewer Systems (MS4s) and from Industrial Activity at Eligible Facilities Operated by Regulated Small MS4s. Under the General Permit MS4s are required to submit an Annual Report documenting progress made towards achieving the requirements of the program, as well as reporting on ongoing maintenance of their stormwater system.

Conservation Commission

The North Smithfield Conservation Commission was created for the purpose of promoting and developing the natural resources, for protecting the watershed resources and for preserving the natural esthetic areas of the town. The commission currently oversees several properties including the Cedar Swamp Conservation Area and Monica's Garden. The commission recommends programs for better municipal promotion, development, utilization or preservation of open areas, streams, shores, wooded areas, roadsides, swamps, marshlands and natural esthetic areas. The Commission was instrumental in obtaining gifts of land, most notably 69.5 acres abutting Route 146 near the Greenville Road exit (Cedar Swamp Conservation Area).

North Smithfield Land Trust

North Smithfield Land Trust is a private, non-profit corporation whose function is to preserve and protect natural resources in North Smithfield. The Trust encourages cooperation in the protection of the beauty of the land and natural resources. Four properties owned by the trust are available for passive recreation, birding and hiking (see table below)

Property	Location	Size	Use
Booth Pond Property	East of Dowling Village	40 acres mixed wetlands, woodlands and Booth Pond	Walking, birding, hiking
Rocky Hill Property	South of Rocky Hill Rd #431, borders Woonsocket Reservoir #3	22 acres mixed wetlands and woodlands	Birding, walking, hiking
Mattity Rd Property	West of Mattity Rd and Black Plain Rd intersection	17 acres wetlands and woodlands	Birding, hiking
Village Way Property	Past The Meadows subdivision at 2 Village Way.	42 acres fields, woodlands, bogs and rocky outcroppings	Passive recreation

The picture below shows the 17 acre parcel on Mattity Road at the headwater region of the Woonasquatucket River. Protecting the headwaters ensures the water stays pristine further downstream. Together with Woonsocket’s contiguous conservation lands, we share more than 90 acres of forest in an urbanized area.



Source: North Smithfield Land Trust Website

Conservation Easements

Conservation easements have been used throughout Rhode Island to protect the value and special character of the land in perpetuity. Through the use of the conservation easement, special plant and animal populations as well as water resources, are protected and development is prevented that would conflict with the maintenance of the current, natural, scenic and open condition of the property. They are an effective way to promote growth while minimizing impacts to the environment and community character.

Transfer of Development Rights (TDR)

Transfer of Development Rights is a powerful tool that can enable North Smithfield to grow while preserving open space and protecting natural resources. Large lot sizes cause fragmentation and loss of critical habitat areas. TDR encourages the use of smaller lot sizes and village settings where services are close to where residents live. In a 2007 white paper written from research done by GrowSmart RI, “Transfer of Development Rights: A Study of Its Use in Other States and the Potential for Use in Rhode Island” (Sheehan, 2007), TDR is defined as follows: “TDR is a voluntary and market-based land use tool used by communities to direct development away from rural, open space, and farm lands and towards areas most appropriate for growth. The goal of the program is to help to implement community land-use goals by having an exchange take place: the permanent preservation of lands that a community wants to save is exchanged for extra development in areas a community has designated for growth.”

Rhode Island Wildlife Action Plan (RI WAP)

The RI WAP is a comprehensive plan developed by a collaboration of the Nature Conservancy, The University of Rhode Island and the RI DEM to conserve and protect wildlife. The document presents a framework for wildlife management, for decision-making and for protecting species that have been identified as in the greatest need of conservation. This is an exhaustive document that should be used by the town to identify wildlife being threatened with endangerment.

Threats to the Natural Resources of North Smithfield

Unfortunately there are sites throughout Rhode Island that have been contaminated in the past because of refuse from landfill and disposal from mills. The contaminated sites have been identified but not before damage to the environment. Wells were contaminated and the town was forced to provide public water sources. Soils were polluted causing habitat disruption for both wildlife and the tree/plant population. The map below shows the location of the Superfund sites in North Smithfield, environmentally sensitive areas and locations where remediation is taking place. The Superfund sites are

- **Stamina Mills**

Stamina Mills was a textile mill operating on 5 acres in North Smithfield in the 1900s. Closed during the Depression the mill reopened in 1969 when a solvent scouring system that used trichloroethylene (TCE) to remove oil and dirt from newly woven fabric was installed. An unknown amount of TCE was spilled on the property. The mill closed and later was destroyed by fire. In 1981, contaminants were discovered in private wells and public water lines had to be installed to residents in the area. Following construction of the site’s long-term remedy, soil and groundwater treatment are ongoing.

- **Landfill & Resource Recovery (L&RR) Site**

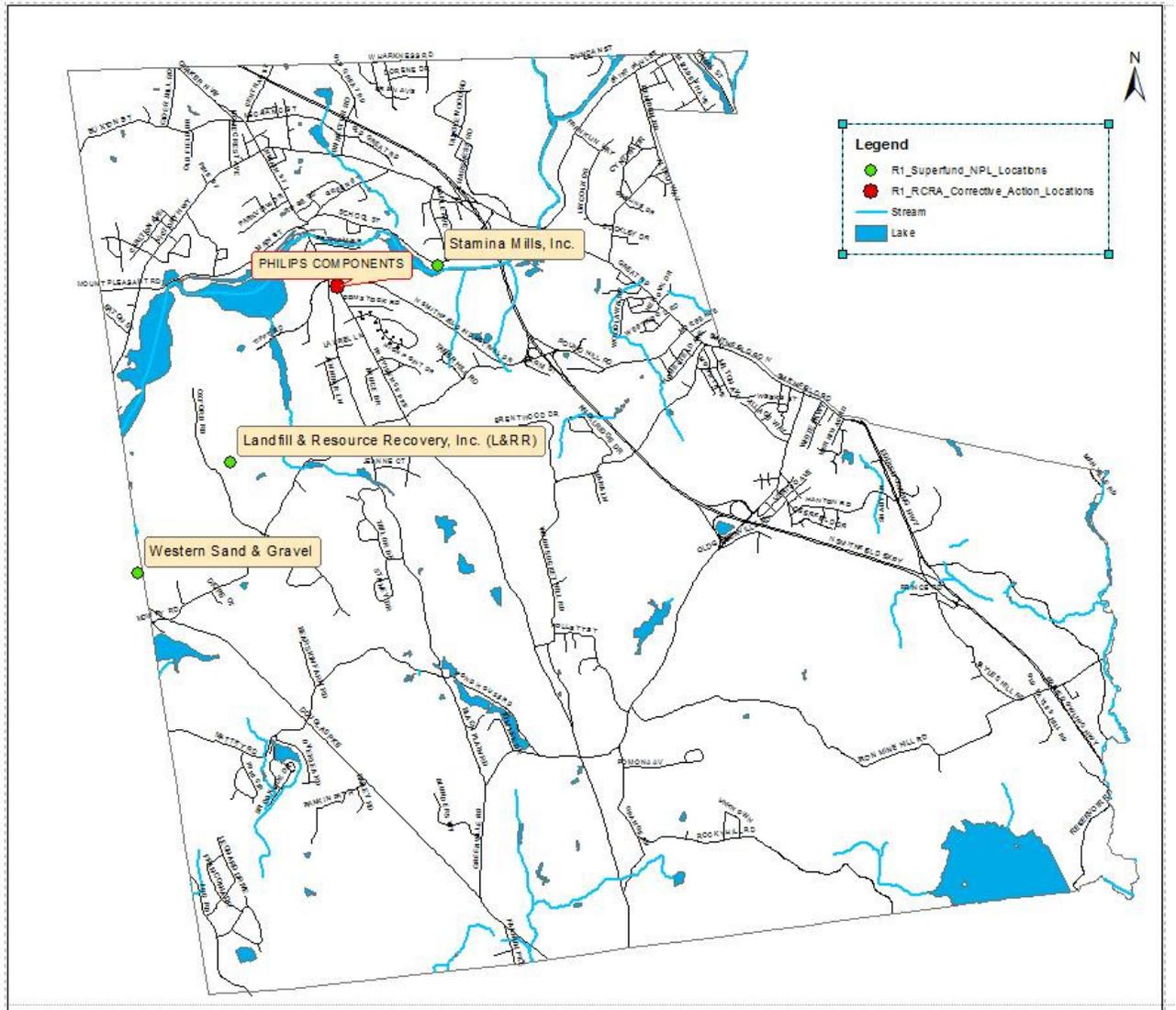
The Landfill and Resource Recovery, Inc. (L&RR) site is a 28-acre landfill on a 36-acre parcel of land. The area, originally a sand and gravel pit, has been used for refuse disposal since 1927. In 1969, the site began accepting solid waste for disposal. This small-scale operation was sold in 1974 to L&RR, which developed it into a large-scale facility accepting commercial, domestic, and industrial wastes. Between 1978 and 1979, from 0.5 million to

2.0 million gallons of hazardous waste were accepted at the site. The L&RR Site is located in a recharge area of an aquifer with the potential to be developed for municipal drinking water. Ground water and the Slatersville Reservoir (both down-gradient) are being used for drinking water. On-site and off-site monitoring wells show low levels of organic and metal contamination. Status (July 1983): EPA recently completed a Remedial Action Master Plan outlining the investigations needed to determine the full extent of cleanup required at the site.

- **Western Sand and Gravel**

The Western Sand & Gravel site consists of about 25 acres of land, and is located in a rural area on the boundary of Burrillville and North Smithfield. The site was a sand and gravel quarry operation from 1953 until 1975. From 1975 to 1979, approximately 12 acres of the 20-acre site were used for the disposal of liquid wastes, including chemicals and septic waste. Over time, the wastes penetrated into the permeable soil and contaminated the groundwater. The State closed the disposal operation because nearby residents complained of odors. Approximately 600 people within a 1-mile radius of the site depended on groundwater and eight homes were historically found to have contaminated wells. All of these residences are now connected to a permanent water supply.

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Contaminated sites in North Smithfield