Woonasquatucket Greenspace Protection Strategy

December, 2004

Project Team

Project Director and Editor:
Scott Millar, Chief
Sustainable Watersheds Office
Rhode Island Department of
Environmental Management
235 Promenade Street, Suite 330
Providence, RI 02908 (401)222-3434

Outreach and Meeting Facilitation:
Jenny Pereira, Executive Director
Woonasquatucket River Watershed Council
532 Kinsley Avenue
Providence, RI 02909

Consultant Team Leader:
Peter Flinker
Dodson Associates, Ltd.
Landscape Architects & Planners
463 Main Street, Ashfield, MA 01330
www.dodsonassociates.com
(413) 628-4496

GIS Mapping and Analysis:
John Menapace
Dodson Associates, Ltd.

Planning and Public Outreach:
Jane Weidman - Newport, RI
Ginny Leslie - Warwick, RI

Review of Local Plans and Ordinances:
Randall Arendt, Greener Prospects
43 Prospect Avenue
Narragansett Pier, RI 02882
(401) 792-8200

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
235 Promenade Street, Providence, RI 02908-5767 TDD 401-222-4462

Dear Rhode Islander:

The Woonasquatucket River Watershed is a very unique geographic area that originates in the rural lands of Glocester, North Smithfield, and Smithfield and flows into the urbanized communities of Johnston, North Providence and ultimately Providence. The Woonasquatucket River Watershed is blessed with a remarkable diversity of landscapes, from rural farms and orchards to dynamic urban centers. Even in the watershed's most densely developed urban centers significant natural areas remain. Moreover, there are exciting opportunities to restore natural resources as historic neighborhoods and abandoned industrial sites are redeveloped. The River is the common thread uniting six communities into a single region whose future economic growth, environmental health, and quality of life is inextricably linked.

This report and associated 'greenspace maps' illustrate what Woonasquatucket Watershed residents identify as the region's most important natural, cultural and recreational resources and how they think these resources should be protected. It serves as a guide to protect the wonderful natural wealth and cultural heritage that makes this region a truly unique place. And, in doing so, it specifically intends to assist our community partners in their efforts to accommodate new growth and redevelopment without sacrificing the environment or their quality of life.

RIDEM is committed to providing Rhode Island communities the assistance they need to plan for growth while protecting, preserving and restoring the environment. Thanks to the financial support of the USDA Forest Service – Clean Water Action Program, RIDEM in partnership with the Woonasquatucket Watershed Council and the six watershed communities obtained the professional services of nationally recognized planning experts, Dodson Associates and Randall Arendt, to assist the participating communities. The work summarized in the following pages reflects the hard work and dedication of many people especially the tremendous effort by dozens of dedicated watershed residents that volunteered their time. We at RIDEM take great pride in being able to assist residents and their communities in this exciting effort.

Sincerely,

Frederick J. Vincent

Frederick J. Vincent
Acting Director

Acknowledgements

This project could not have succeeded without the dedication and enthusiasm of individuals and organizations from throughout the watershed. The Rhode Island Department of Environmental Management would like to recognize all the people that participated in this important project and extend our most sincere gratitude for their support.

Woonasquatucket River Watershed Council:

Lisa Aurecchia
Jane Sherman

Glocester:

Cheryl and Lou Cadwell
David Calderara
Dave Chace
Mike Dahlquist
Donald Driscoll
Rick Enser
Paul Fogarty
Ray Goff
Michael Gray
Doreen Hamilton
Bob and Lois Hawksley
Molly and Carroll Harrington
Edna Kent
Roy Najecki
Bruce Payton
Charles Poirier
Brooke Priest
Frank Stevenson

Johnston:

Hedy and Al Aurrechia
Albert Coutu
Walter Crocker
Pat Dibiasio
Jeanine M. Laferriere
Dan Lombardi
Helen Lusi
Jean Lynch
William R. Macera
Louis Mcgowan
Steve Merolla
William Riccio, Jr.
Leonard Richard, Jr.
Robert Russo
Kevin Sarli
Jeanne Tracey-McAreavey
Vilma and Ben Zanni

North Providence:

Cheryl Apkarian
Eileen Cook
Rod DaSilva
Peter Glammarco
Louis Khoury
Bob LaFond
Robert Mariani
Paul McElroy
Roland & Mary Mergener
Ralph Mollis
Ron Montecalvo
Leo Perotta
Barry Schiller
Beth Vetter

North Smithfield:

Chris Benetti
Maurice Bourget
Paul Dupuis
John Flaherty
Keith Klockars
Joe Kozlik
Elizabeth Martin
Mary McDonald
Irene Nebiker
Jo-Anne Pacheco
Ruth S. Pacheco
Michael Phillips
Al Schenck
Linda Thibault
Edward F. Yazbak
Paul Zwolenski

Providence:

Sam Abiade
Toby Ayers
Mandy Brown
P. Brown
Beshka Candelaria
Terrance Cannon
David N. Cicilline
Brenda Clement
Gert Connors
Thom Deller
Marybeth Doehr
Stephen Durkee
Andy Galli
Roberta Groch
Andrea Hagy
Nora Harley
Bruce Hooke
Becky Hykes
Steve Kumins
Bonnie Lloyd
John J. Lombardi
Ann McGowan
Christopher McMahan
Patrick McNiff
Michael Merrill
Diaz Negron
Paul Pawlowski
David Riley
Jeanine Scheffert
Amy Stitely
Sally Turner
A. Waters

Smithfield:

Don Brown
Don Burns
Gregg Catlow
Frank Champoux
Karen Esposito
Robert Esposito
Gail Gallagher
Amrita R. Hill
Ann-Marie Ignasher
Albert J. LaGreca, Jr.
Eugenia Marks
Sandra Mayer
Michael Moan
Richard Poirier
Marilyn Stone

Table of Contents

I. Executive Summary 5

1. Overview
2. Project Goals and Objectives
3. Major Findings
4. Key Recommendations
5. Community Implementation

II. Greenspace Planning Process and Methods 10

1. Background
2. The Greenspace Planning Process
3. Public Participation
4. Methods of Mapping and Geographic Analysis
5. Natural Resources
6. Cultural Resources
7. Recreational Resources
8. Individual and Composite Resource Priorities

III. Regional Mapping and Geographic Analysis 18

1. Regional Base Map with Protected Lands 18
2. Inventory of Natural Resources: Biodiversity 20
3. Inventory of Natural Resources: Water Supply..... 22
4. Natural Resource Priorities 24
5. Natural Priorities with Protected Land 26
6. Inventory of Cultural Resources 28
7. Cultural Resource Priorities 30
8. Cultural Resource Focus Areas 32
9. Inventory of Recreational Resources 34
10. Recreational Resource Priorities 36
11. Composite Resource Priorities 38
12. Heritage Landscape Preservation Focus Areas 40

IV. Recommendations for Action.....42

1. Acquisition Strategies
2. Randall Arendt's Community Audit Recommendations
3. Creative Landuse Techniques from the Rural Planning Assistance Project
4. The Rhode Island Rural Design Manual – examples showing coordinated development of multiple parcels, and revitalization of a village center.
5. The Rhode Island Conservation Development Manual – design alternatives for a conservation development project.

V. Action Strategies for Implementation 56

I. Executive Summary

Designated as an American Heritage River, the Woonasquatucket and its tributaries flow through portions of six communities as diverse as the City of Providence and the rural town of Glocester. Planning for open space conservation and recreational development in this varied landscape requires balancing a broad range of priorities held by residents in different areas with a recognition of the regional resources that are important to all. The Woonasquatucket Greenspace Project set out to meet this need and to unite the diverse goals of local, state and federal players into a set of physical plans and action strategies for protecting the landscape and quality of life for residents throughout the region.

Places that are highly valued by residents of the Woonasquatucket Region contain a combination of natural beauty, cultural history, and recreational opportunities: these landscapes were a particular focus of the Greenspace Project.

To complete the project, a broad partnership, funded by the US Forest Service, was formed – including Rhode Island DEM, the Woonasquatucket River Watershed Council, watershed community land trusts and the Audubon Society of Rhode Island – to help planners, town councilors, conservation commissions, historic societies and residents of the six Woonasquatucket Communities create the Greenspace Plan. The project started with a series of meetings in each community where residents helped the consultant team develop detailed resource inventories, and culminated in two regional summits where participants reviewed the results and developed an action strategy for resource conservation and recreational development.

The Woonasquatucket Greenspace Project was designed to bring the process by which open space resources are prioritized into a single system, allowing parties with many different perspectives to work together toward a common goal. To do so, it was consciously designed to avoid the sort of "single-issue" open space planning that can happen when plans are prepared by a town board or state agency concerned with only one type of resource. This can lead, for example, to open space plans that do a good job of protecting wildlife habitat while ignoring historic farms and scenic views. To avoid these problems, the process evaluated three distinct resource types: **natural resources**, such as wetlands, aquifers and wildlife habitat; **cultural resources**, such as historic sites, scenic vistas and rural landscapes; and **recreational resources**, like hiking trails, bike touring routes and water trails. Priorities for each of the three resource themes were mapped first, and then overlaid with each other to identify landscapes that are key to the Woonasquatucket region's visual character and quality of life.

The result of this effort was a set of local and regional maps that identify the most important areas and corridors for each of the three principal themes. Together, these provide the information necessary for state agencies, towns, and non-profit conservation groups to set specific priorities for action and make coordinated decisions about open space protection and management. In some cases, the plan identifies areas that should be protected (e.g. aquifers and riparian corridors) but, it also is meant to clearly show the networks of natural and cultural resources that exist, and to promote a vision of how they could be united into a permanent network of greenways and greenspaces.

Implementing the Woonasquatucket Greenspace Plan will require the coordinated efforts of each city and town, together with regional partners.

Furthermore, protecting the character of this remarkable region will require moving beyond traditional land acquisition techniques to consider creative land use tools such as Conservation Development and other techniques described in the Rural Planning Assistance Project. Thus the plan is designed to be as useful in guiding the location and form of future growth as it is in selecting parcels to be protected outright. It does this by clearly illustrating the interrelated natural and cultural systems whose interaction over centuries produced the rich landscape and vital urban centers enjoyed by today's residents.

Project Goals and Objectives

The Woonasquatucket Greenspace Project had three overall goals:

- First, to provide towns with the information they need to decide which lands to preserve;
- second, to identify areas where conservation development can be used to protect sensitive resources and enhance quality of life through the development process; and
- third, to link city centers and rural neighborhoods into a regional system of recreational greenways and greenspaces.

In support of these goals, the project sought to achieve ten overall objectives that would engage local, state, and federal participants in a comprehensive greenspace planning effort:

1. To assist each community to identify and map their important natural, cultural and recreational resources and develop methods to protect and restore these resources.
2. To identify areas with multiple resource values and promote conservation of landscape character.
3. To demonstrate how local greenspace priorities can be linked throughout each town and the region to form continuous corridors of open space that protect resources that cross town boundaries.

The juxtaposition of human settlements with the natural landscape (typified by mills and mills villages such as Esmond, above) rewards residents of the Woonasquatucket Watershed with a high quality of life. This fragile balance could be lost if current development trends continue.

4. To explain how each town can more effectively employ land use techniques to protect or restore meaningful open space as land is developed.
5. To improve the ability of the state and the watershed communities to protect surface and groundwater quality as well as aquatic habitat while accommodating new growth and maintaining a sense of place.
6. To encourage the use of riparian greenbelts to protect or restore water quality and habitat
7. To demonstrate the multiple values of forestland for recreation, water quality, and habitat.
8. To promote forest stewardship to protect, improve and restore the ecological health of the watershed, including water quality and aquatic habitat.
9. To build partnerships between communities of the Woonasquatucket watershed, the Woonasquatucket River Watershed Council, Rhode Island Department of Environmental Management and other applicable stakeholders.
10. To assist in implementing the State Guide Plan and local plans for greenspace protection.

Major Findings

The *Woonasquatucket Greenspace Project* demonstrated how local, state and federal partners could work together to promote sustainable growth while helping to save the environment

and the quality of life of Rhode Islanders. The project made many important findings and recommendations which are detailed in the report. Some of the major findings include:

1. The region's forested river and stream corridors connect the remaining forests into a network of undeveloped land that is critical to protecting biodiversity and water quality. While some of this network is protected, it is becoming increasingly fragmented by development.
2. Protection of important natural, cultural, and recreational resources cannot be attained through acquisition alone. Creative "conservation development" techniques can allow towns to grow while preserving half the land in each new subdivision. Guided by local Greenspace plans, the open space thus set aside could eventually extend into townwide networks that preserve natural systems and character-defining cultural resources.
3. The watershed's rich cultural history is embodied in historic roads and turnpikes, working landscapes, mill villages and vibrant city centers, many of which are still largely intact. The cultural patterns identified in the study can help cities and towns plan for growth and revitalization efforts that reinforce the region's "quality of place."
4. Abandoned right-of-ways, utility corridors, country roads, and walking trails could be transformed into a recreational network that could ultimately tie each rural village and urban neighborhood into a web of bike trails and pedestrian routes.
5. A number of areas of the region were identified that contain a rich combination of natural and cultural resources. These "heritage landscapes" are representative of the traditional character of the region and help to create its unique "quality of place." Taking advantage of these resources, interpretive nature and historic trails, tourist routes and regional bike paths could link residents and visitors to this remarkable landscape.
6. There is great potential for regional cooperation among the towns of the Woonasquatucket Watershed. Planners, land trusts and individuals from all six communities participated in the project. With continued encouragement and coordination by the WRWC, there is considerable support for continued regional planning.

Key Recommendations

The following recommendations for action summarize ideas developed by the project volunteers working along with the consultants. These actions are intended to help the cities and towns of the Woonasquatucket Watershed promote sustainable development while preserving community character and protecting the environment:

- Update Comprehensive Plans to reflect Greenspace planning data, procedures and results. As the touchstone for decisions by city officials, planning departments and boards, the Comprehensive Plan is the starting point for incorporating the information developed in the Greenspace process into local decision-making. Just as important is adopting into ongoing procedures the balance of natural, cultural and recreational resource planning demonstrated by the Greenspace project.
- Use the Greenspace Plans to separate resource areas which should be preserved outright from those where growth could continue with the use of Conservation Development techniques. While the Greenspace plans do not set specific priorities for conservation in each city and town, they provide a template for each community to look at their existing inventory of conservation and recreation land in light of a potential Greenspace network. The plans also show areas where growth could continue, and indicate the historic densities, street layouts and development patterns that could be used in the design of new neighborhoods.
- Revise zoning in rural and suburban areas to reflect each community's Comprehensive Plan and Greenspace Goals, following Randall Arendt's recommendations. Creative tools such as Conservation Development can guide growth to the most suitable areas while protecting important resources. By giving developers the flexibility to redesign subdivisions around these resources, towns can promote conservation goals without expending public funds.
- Pursue changes to zoning and development review procedures in urban areas that promote economic revitalization while protect-

ing and restoring riparian corridors. Like their rural counterparts, river and stream corridors in urban areas are subject to a complex web of regulation that can stifle redevelopment. The Greenspace approach can help communities institute a more flexible approach to planning and design of sensitive brownfield sites that encourages private redevelopment while achieving public goals for restoring sensitive areas.

- Encourage Land Trusts to work with the Woonasquatucket River Watershed Council, to pursue common goals and joint projects among the six communities. Land Trusts in each of the six communities are starting to think about joint project along their borders. The Greenspace plan identified a number of critical areas that are ideal subjects for such shared efforts.
- Preserve forested riparian corridors, which are the most important links between the region's protected areas, farmland, forests, and key habitats. Forested river and stream corridors are critical, not only as habitat for many species of animals and fish, but for protection of surface water quality and groundwater supplies. Protecting them is the logical first step in maintaining the essential ecological functions of the watershed.
- Pursue continued analysis, public education, and conservation of the historic cultural resources of the region, with a focus on areas that are most affected by changing land uses. As suburban growth pressure increases., cities and towns risk losing the historic village centers, downtowns and rural landscapes that embody the region's heritage. The "quality of place" that these resources represent is a critical economic resource for cities and towns that hope to attract new businesses and residents.
- Focus attention on those areas of the region with a high concentration of natural, cultural, and recreational resources. These "living museums of the Woonasquatucket" embody the historic character and quality of life that draws people to the area. They include some areas of Glocester, North Smithfield and North Providence that lie outside of the Woonasquatucket Watershed:

1. The main stem of the Woonasquatucket from Providence Harbor to Olneyville.
2. The main stem from Olneyville to Esmond
3. The West River Valley, from the Moshassuck River in Providence to the Wenscott Reservoir in North Providence and Lincoln.
4. The north-central area of Smithfield, from Georgiaville to Rocky Hill.
5. The Greater Greenville valley, from Snake Den in Johnston north to the Stillwater Reservoir.
6. The Northern reaches of the Woonasquatucket from Stillwater to Primrose.
7. The Saylesville area of North Smithfield.
8. Slaterville and Branch Village in North Smithfield
9. The Hughesdale – Neutaconkanut Hill area of Johnston and Providence.
10. The Peck Hill – Lawton Hill corridor in Johnston.
11. The Snake Hill Road corridor in Glocester
12. Chepachet and surrounding landscapes

Smithfield's Georgiaville Gorge (left), the Smith-Appleby House (center) and Stillwater Trail (right) represent the three themes of natural, cultural and recreational resources around which the Greenspace project was organized.

These areas are often overlooked by protection efforts that focus on one theme. However, most can be preserved with a combination of acquisition, private management, and careful development that respects the special features of a site and its context.

- Establish an active program to plan, promote and construct a regional recreation network. An interconnected network of pedestrian sidewalks and trails, bike paths, city parks and suburban recreation areas will benefit every resident of the region, and support livable neighborhoods in every community. Potential multiuse trails such as the Woonasquatucket River Greenway and the Northwest Bike Path form the spine of this future network and should be priorities for planning and construction.

Community Implementation

The Woonasquatucket Greenspace Project brought together representatives from the watershed's six diverse cities and towns and laid the groundwork for coordinated action at the local and regional level.

These actions are summarized here:

- Each town received a set of maps illustrating a comprehensive and up-to-date inventory of its natural, cultural and recreational resources. This inventory included a compilation of federal, state, local, and non-governmental data that was previously never assembled in a single set of maps. Digital copies of the maps have been sent to local land trusts and other project partners.

The Greenspace planning process was designed to help urban centers such as Providence (above) find common ground with rural towns in the interior in order to work together on a shared Greenspace Protection Strategy.

- Local resource inventories and priorities were mapped and linked into a regional greenspace plan. Every community received both hard copy maps and the underlying geographic information system (GIS) data in electronic format so that it can be easily maintained.
- An audit and written report were prepared for four communities by Randall Arendt, a national expert, to recommend specific changes to comprehensive plans and zoning and subdivision regulations so towns may preserve meaningful open space and achieve their protection priorities as land is developed. The four communities – Smithfield, North Smithfield, Glocester and Johnston – are currently working with the Rhode Island Department of Environmental Management to select a consultant to work with each town to revise its plans and ordinances to include conservation development techniques.
- A study of trails, sidewalks, and pedestrian systems in North Providence explored options for implementing the recommendations of the Greenspace Project on a more detailed level.
- The project team is working with the Providence planning department to incorporate the Greenspace results into the city's ongoing Neighborhood Investment Project.

II. Greenspace Planning Process and Methods

Background

The Woonasquatucket Region is blessed with a remarkably diverse landscape, a landscape shaped by the forces of nature and human culture over thousands of years. Its basic form is rooted in the geology of the region, shaped by the glaciers of the last ice age, and molded since by the action of wind, water, and communities of plants and animals. From the wooded hills in the northwest, streams drain a series of narrow valleys, and merge to form the main stem of the river. Rich wetland areas formed in valleys where topography slows drainage. Large areas of forest remain, some of it protected in state management areas, but much awaits development.

Overlaid with this natural landscape is a cultural landscape of farms, forests, mill villages and urban centers that evolved in an intimate relationship with the land in three centuries since European settlement and previous millennia of use by Native Americans. Traditional land uses and settlement patterns were based on local resources of farmland, timber, and water power. Town and city centers grew in areas with protected harbors, along turnpikes, and at the center of agricultural or mill districts. The natural systems that underlie these human settlement patterns were not wholly erased, but rather incorporated into a larger composition that is both functionally stable and beautiful to look at. What was passed down to current residents of the region is thus a rich landscape heritage, one that offers a balance of clean water, a healthy environment, scenic resources, and plentiful outdoor recreation -- all of which adds up to a high quality of life.

The Woonasquatucket Watershed is blessed with a remarkably diverse landscapes, from rural farms and orchards (left) to dynamic urban centers (Providence, right). The River is the common thread uniting six communities into a single region whose future economic growth, environmental health, and quality of life is inextricably linked.

Even in Providence and North Providence, the watershed's most densely developed urban centers, significant natural areas remain. As these cities evolve, moreover, there will be opportunities to weave nature back into the fabric of historic neighborhoods and abandoned industrial sites.

While many of the region's natural and cultural resources remain, the accelerating pace of change threatens to replace this diverse landscape with a suburban style of development that sees little difference between rural and urban areas. This new development, no matter where it is located, tends to follow the same monotonous patterns,

reducing everything to a simple formula repeated over and over. Residential development is for the most part restricted to one or two-acre lots spread out along broad cul-de-sacs. Commercial development extends along the state highways outside of older urban centers, driven primarily by the larger national chains stores with their "big-box" buildings and sprawling parking lots. Old commercial strips are abandoned as new strips form farther out. Meanwhile, downtowns struggle to attract residents and businesses, and historic buildings are lost to neglect.

For years, state conservation agencies, town governments, and other public and private groups have been working to preserve natural areas and ensure public access to the region's open space.. Yet the results of these efforts are sometimes diluted because they are not coordinated by an overall protection strategy, and often proceed on an ad hoc basis as opportunities arise. State agencies and non-profit groups commonly pursue relatively narrow aims, usually focused on preservation of sensitive environmental resources. Meanwhile, local efforts, including changes to zoning ordinances that shape growth patterns, are developed largely through plans that end at town borders. The result is a patchwork of different pieces, rather than a unified network of protected open space.

The Greenspace planning process grew out of a realization that surely much more can be accomplished if there is some coordination between agencies, and between what is being done regionally and efforts at the local level. The

The rich variety of the Woonasquatucket's open space resources cannot be experienced within a single community. Only by working together can the cities and towns protect the full spectrum of landscapes and recreational opportunities that creates the sense of place and quality of life that attracts people to this unique region.

difficult part was to develop a planning strategy that would be detailed enough to be meaningful for local planning, but simple enough to generate clear regional priorities upon which a watershed-scale strategy could be based. The answer was a process that began at the local level, using a common methodology to bring each community to the same level of information and understanding. With each city and town on a common footing, communities large and small can confidently evaluate regional priorities and potential action strategies.

A Bottom-Up Planning Process

The greenspace planning process was designed to work from the bottom up. While organized on the regional scale by the Woonasquatucket River, the study included the entire area of each of the six communities that are part of the river's watershed. This allows the results to be easily incorporated into local comprehensive plans. Each community went through an individual process of inventory and analysis, resulting in preliminary maps of Greenspace priorities in each city or town. These local plans were then compiled into a series of regional inventory and priority plans for review at two regional meetings. The results are designed to provide a detailed, yet flexible base of information that can be used by local commissions as well as state agencies to achieve shared goals for landscape protection.

The method used for the Greenspace Planning Process followed a traditional landscape planning model. First, data about different types of resources were compiled, starting with the

information that is available on the Rhode Island Geographic Information System, a central depository of maps and data that is maintained at the University of Rhode Island. Supplemented with information provided by volunteers in each community, inventory maps were prepared showing the location and patterns of these resources. Finally, these inventory maps were overlaid with each other to identify those areas and connecting corridors with multiple resource values.

In order to better understand the significance of these resources and why they are found where they are, the Greenspace planning process regroups data into three themes – natural, cultural, and recreational resources. This allows the underlying ecological and social systems to be seen more clearly. As described below, it also allows volunteers with different interests and backgrounds to participate equally in conservation and recreation planning.

Public Participation Process

While the actual process varied somewhat from town to town, public participation revolved around a series of four meetings in each community. **The first meeting** was held as a joint session of the local Planning Board and Town Council. The consultant team introduced the project, presented the critical lands inventory maps, and posted wall-size base maps for review. Attendees were asked to volunteer to serve on a Greenspace Planning Committee, and those that did so were divided into three sub-groups to focus on the three key resource themes. Each

An extensive series of meetings in each community allowed residents to contribute to the process, and brought together diverse local interests in conservation, historic preservation, and recreation.

of these subgroups then met with a member of the consultant team to review the base maps and existing information, to discuss what additional information would be needed to move forward, and to strategize about how to get it and put it on the maps.

Both local volunteers and members of the consultant team came back to the **second meeting** with additional information, sketch plans, and reports providing information about each of the three resource themes. Each group was asked to present the information they collected, and the consultants led discussion about what conclusions could be drawn and what additional information was needed. Throughout the process the emphasis was on understanding the systems that underlie the occurrence of a particular resource. For example, we want to know not only that a rare orchid has been found in a particular place, but also why it is there. What is the ecosystem that supports that species, and how big is the surrounding landscape upon which it depends? Likewise, if certain structures have been identified as historically significant we want to know not only where they are, but also how do they fit into the larger landscape history of the town? What stories do they tell about the history of the community?

The consultant team returned to the **third meeting** with revised maps of natural, cultural and recreational resources for review by the town greenspace committees. Attendees were led in a discussion of important sites and potential linkages for each of the resource themes. Preliminary overlays were presented that began to explore how the three principal resource themes overlap, and various systems for prioritizing open space values were discussed.

At the **fourth meeting**, the consultant team presented a final draft of each town's resource inventory and priority maps for review and discussion. These were compared with maps of lands already protected to examine potential gaps in important resource corridors and opportunities to incorporate larger resource systems into lands already preserved. Finally, a composite map of natural, cultural and recreational priorities was presented that identifies areas that are critical to each community's quality of life. While each city and town will have to sort out its own priorities, the idea is that those areas that include

a balance of natural, cultural, and recreational resources are key to the visual character and quality of life in the region, and represent the common ground where the interests of many diverse groups come together.

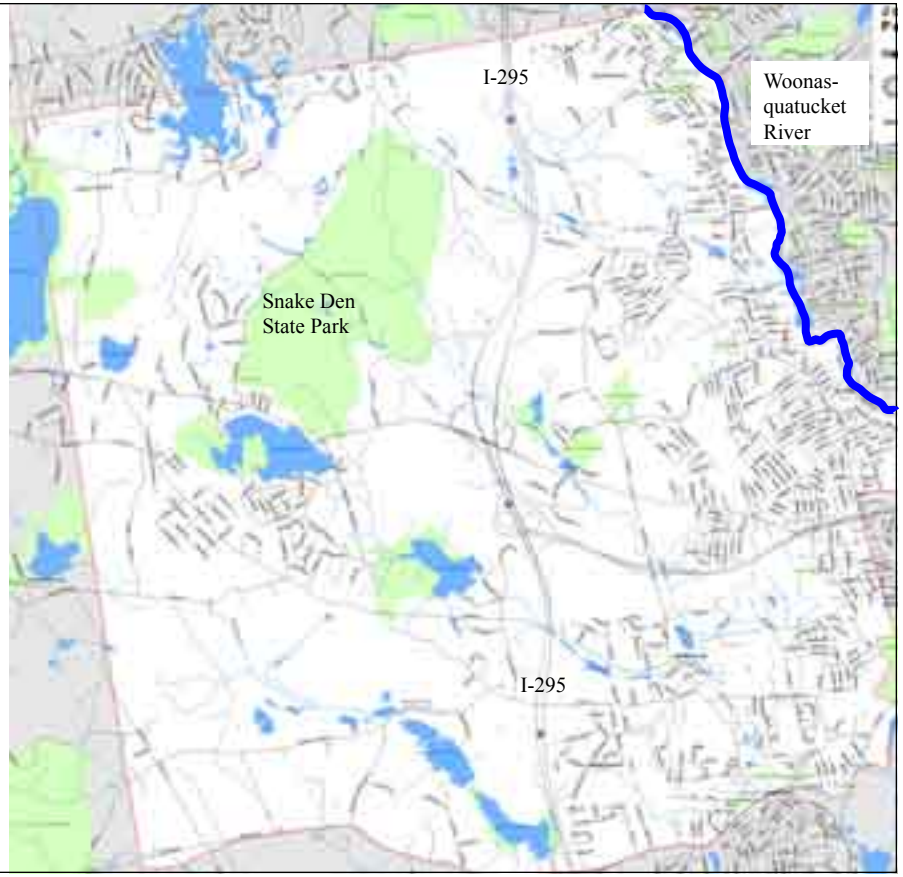
As the local process was concluding, the local greenspace volunteers, together with other town officials and interested citizens, were invited to convene at **two regional meetings**. At the first workshop, maps were presented that compiled all the local data into a single inventory for each resource type. Participants broke into small groups to discuss the map results and approaches to setting regional priorities for greenspace protection. For the second workshop, revised maps were presented for review, along with several alternatives for setting priorities for action. Extensive discussion helped determine the final set of inventory and resource priority maps that are found in this report.

As the regional greenspace process proceeded, attention turned to how towns and regional groups could best **implement the greenspace strategy**. As part of this process, Randall Arendt, a nationally known expert in the use of Conservation Design and other techniques that use the development process to create open space networks, prepared an audit of the Comprehensive Plan, Zoning Ordinance and Development Regulations for four of the Woonasquatucket towns. A detailed report will be presented to each town at a meeting of the Planning Board. Meanwhile, a final set of local maps was presented to planners in each community. As towns reviewed the maps and recommendations for local planning and zoning, the consultants worked with the Watershed Council and the Sustainable Watersheds Office to prepare a series of recommendations that are found in chapter four of this report.

Methods of Mapping and Geographic Analysis

The project followed the typical landscape planning approach where resources are inventoried and analyzed, and then overlaid with each other to determine areas with a concentration of important resources. However, the project differed from the typical approach in the manner in which that overlay process occurred. By explicitly developing separate maps for natural, cultural, and recreational resources, each town had to develop a much more complete understanding of all three areas than is usually attained. At the same time, the limitations on volunteer time and project budget forced the project to make good use of existing data, with carefully targeted development of additional information. The final content of the maps represents the collective review of all the local com-

Base Map of Johnston
The first step in each town was to compile a base map showing existing roads, waterbodies, rivers and streams, and parcels that are permanently protected, shown here in green. The large area of protected land in the left center is Snake Den State Park.



mittees. As described below, the three primary themes represent an objective perspective and a reasonable consensus about which resources are of most concern to towns as they try to protect the environmental health and quality of life of the Woonasquatucket Region.

Natural Resources

Natural resources were mapped primarily using the most current data available from the Rhode Island Geographic Information System. One of the most important natural resources is **water supply**, which was mapped using three types of data: aquifers, aquifer recharge areas, and wellhead protection areas. **Surface waters systems** are critical to the ecology of the area. These included rivers, streams, ponds, and wetlands. A three hundred foot buffer around these surface waters was shown to indicate the area that is most critical to protect both wildlife habitat and water quality. Overlaid with these physical resources were **rare species habitat** areas identified by the Rhode Island Natural Heritage Program. These include documented occurrences of rare species as well as surrounding areas that are critical to their ongoing survival. Finally, in our discussions with scientists at the University of Rhode Island and the Nature Conservancy, it was determined that of all factors in measuring wildlife habitat, the presence of large tracts of undeveloped forest – especially when connected to river and stream corridors – provides the highest value for preservation of all species of wild plants and animals. Lacking an existing data layer for these areas, the consultant team used the 1997 aerial photographs from RIGIS to create a new digital map of **large forest blocks**.

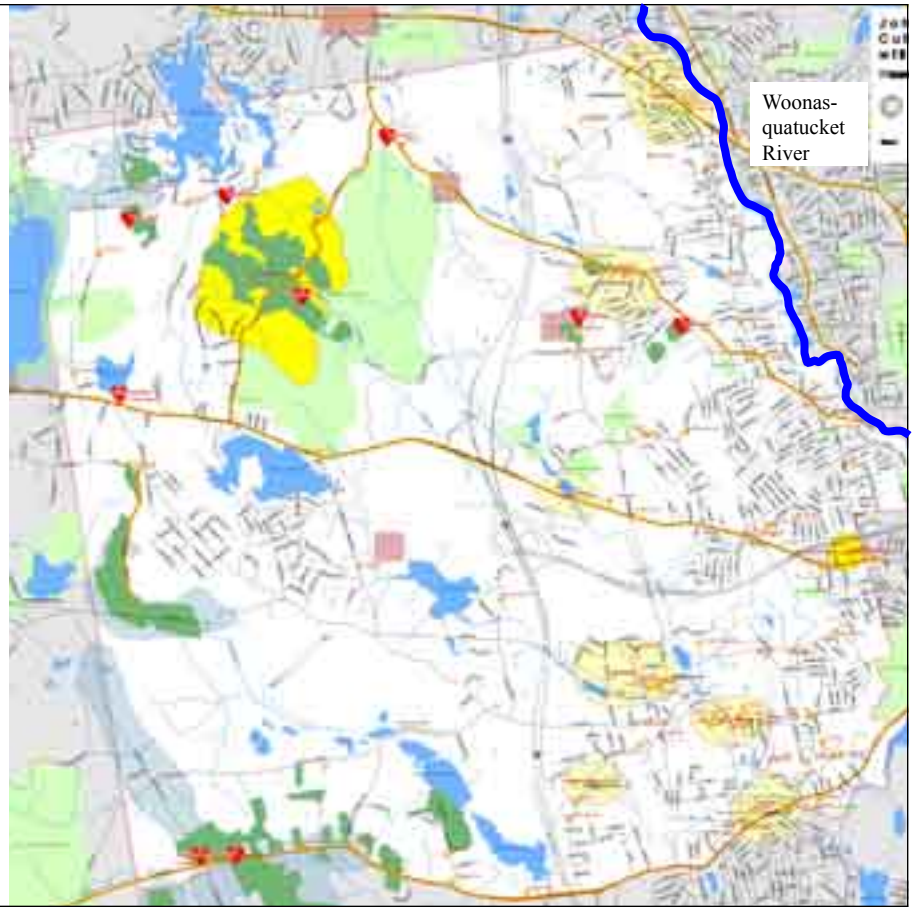
Natural Resource Inventory of Johnston
Natural resources in Johnston include rivers, streams, wetlands and waterbodies (blue), large forest blocks (green) and natural heritage areas (red). Part of the town drains into the Scituate Reservoir (blue cross hatching), while other areas are important protection zones for local wells (circles).

Cultural Resources

While natural resources evolved and continue to grow without human influence, cultural resources generally include anything that people have made, or that people care about. These include historic sites, scenic areas, working agricultural landscapes, mill villages, and historic urban neighborhoods. This includes both the kind of things that can be objectively described, such as an historic farmstead that Washington slept in, as well as places that are important to the history of a particular culture or the ongoing life of a town. Like natural resources, the study of cultural resources can engender a long list of potential factors; in order to fit the analysis into the time that was available we identified three key groups of cultural resources: historic resources, scenic landscapes, and special places.

Cultural Resource Inventory of Johnston

Johnston's inventory of cultural resources includes historic districts (yellow), historic structures (orange houses), heritage landscapes (deep green), scenic areas (blue hatch), and special places. Turnpikes and other historic roads (orange) were, and remain, an important link between historic centers. Note that few of these cultural resources are within existing protected land (light green).



The inventory of historic resources began with **historic and archaeological sites** that have been identified at a statewide level and mapped as part of RIGIS. Because this is limited to those that have been listed, or are candidates to be listed on the National Register of Historic Places, many locally important historic sites were not identified. The best source for additional information is a series of Historic and Architectural reports prepared by the Rhode Island Historical Preservation & Heritage Commission. Each of these reports contains an inventory and evaluation of many local sites, which were digitized as a new geographic data set.

These sources, however, usually focus on a specific structure or group of buildings, without mapping the landscape context. By this we mean that area which was traditionally connected functionally to the structure or site, and which continues to be important to maintaining its visual character. Many old New England homesteads have been protected, for example, while the fields and woodlots that surround them were developed, destroying the historic landscape resource itself, but as importantly diminishing the value of the structure at its center. For our purposes, then, the task was to identify those historic sites and surrounding landscapes that still exist, drawing a boundary on the maps to mark the minimum area that should be protected or managed to protect that cultural landscape. These areas, which include agricultural landscapes, mill sites, and historic village centers, are identified as **heritage landscapes**.

The evaluation of **scenic landscapes** likewise began using a statewide inventory known as the Rhode Island Landscape Inventory, and another statewide survey of scenic roads. Volunteers on some of the local committees enhanced this information using town reports and windshield surveys to identify areas with high scenic quality at the neighborhood scale, with an emphasis on those that are visible from public areas. Specific views or vista points were also identified.

The final category of cultural landscapes that were identified was "**special places**." These include all the places in town that people care about, those "places in the heart" that may not be valuable in and of themselves, but which are nevertheless critical to local character and quality of life. They may be scenic spots or historic sites, just as often they are local hangouts, places where people go to meet each other, or just to get away from it all. In some towns these were compiled from existing surveys or planning studies; in others volunteers posted maps in public places and asked people to mark down their special places.

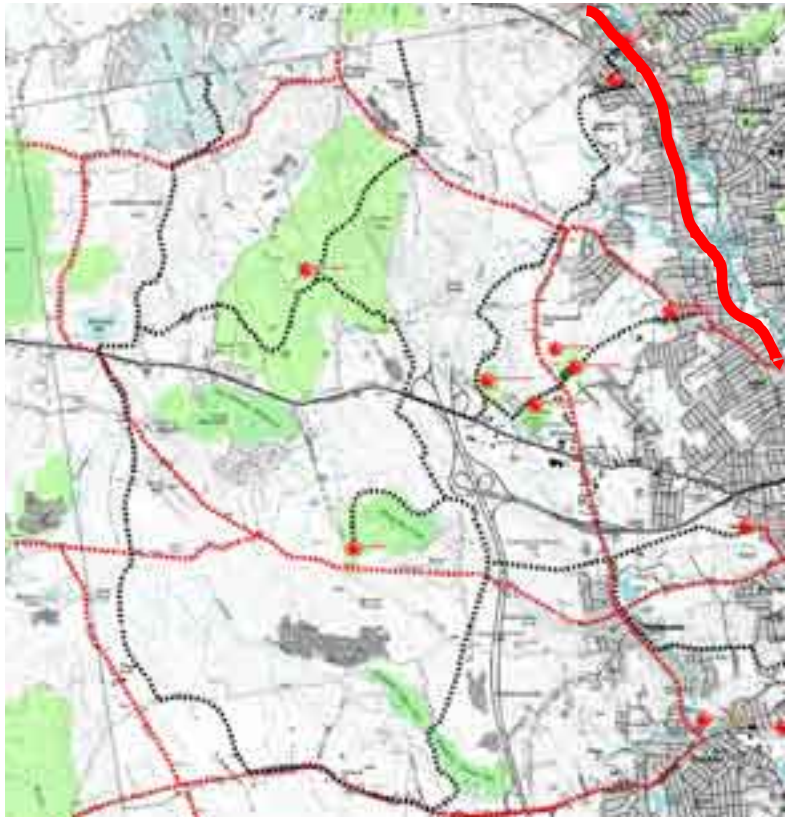
Recreational Resources

The focus of the recreational resource analysis was opportunities for active recreation, especially trails and other recreational routes. Three types of trails were identified in the inventories, which located both existing trails and potential future trails. Existing **hiking trails** were identified by local volunteers on USGS base maps, and compiled from trail maps published in trail guides. Potential future trails were identified based on aerial photographs and USGS maps, with a combination of local knowledge of informal trails and expert opinion about what might be possible using a combination of public roads, utility corridors, overgrown woods roads, etc..

Likewise, **bike trails** and routes were identified with the help of local volunteers, who extended the limited system of rail trails and marked routes with their knowledge of the best bike routes on existing roads. Of all the possible routes, the emphasis was placed on those which offered a combination of natural and cultural landscape experience, scenic value, and logical destination points.

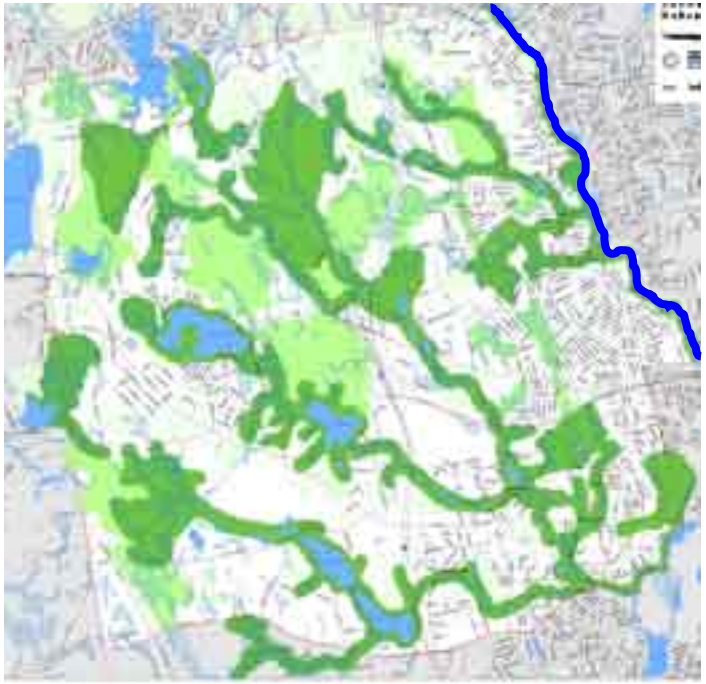
Lastly, **destination points** were identified, both to locate fixed recreation sites like parks, playgrounds and schools, and to evaluate the potential of the various trail systems in developing a network connecting important points around the county. These points were divided into primary destinations, such as village and town centers, and regional transit hubs, and secondary destinations, such as parks, playgrounds, conservation areas, and schools.

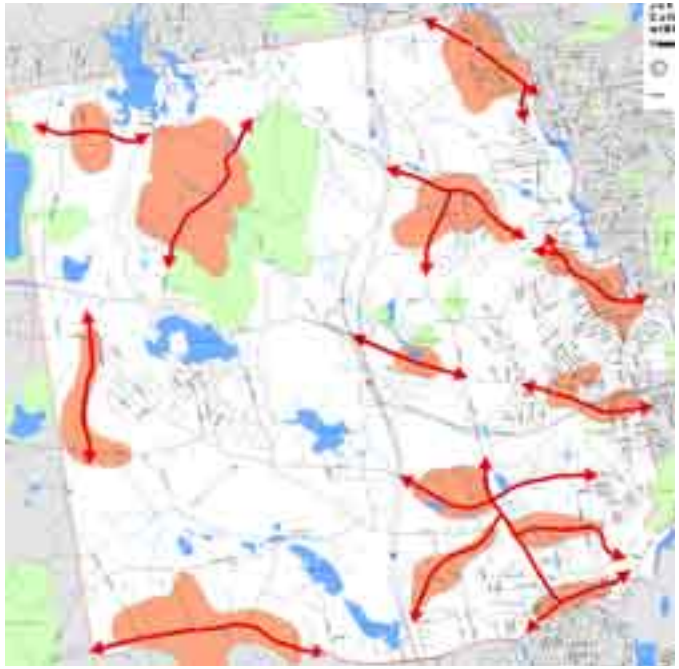
Johnston's Recreational Resources
The Recreational Inventory (near right) identified suitable (blue) and more suitable (orange) bike routes based on a RIDOT study. Potential hiking trails (green) were located from USGS maps and aerial photos. Potential destination points are shown as red stars. The Recreational Priorities Plan (far right) establishes goals for a future network of trails for hiking (black) and biking (red) connecting each of Johnston's neighborhoods and recreational destinations into a cohesive system. The heavy red line represents the possible extension of the Woonasquatucket Greenway along a former rail bed.



Natural Resource Priorities

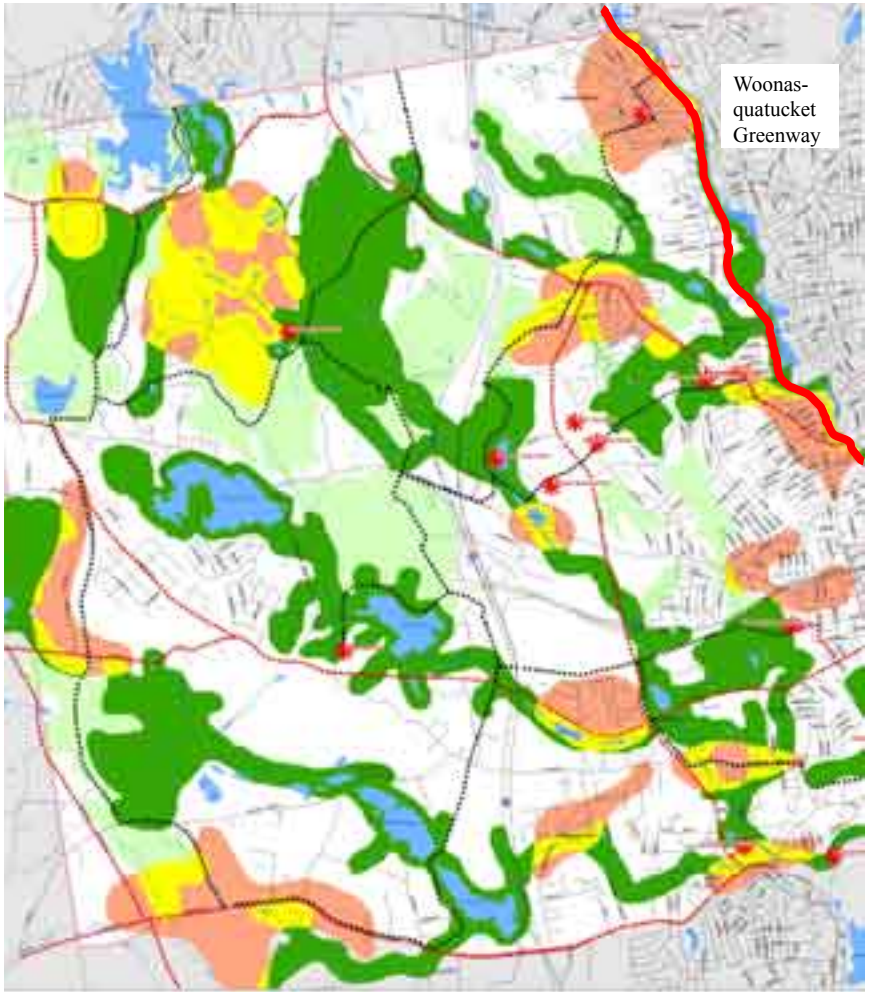
Combining areas with the highest ecological value with other resources highly valued by the town, such as aquifers and farmland, a simplified map of Johnston's natural resource priorities shows the most important areas (dark green) and those of secondary importance (light green). Just as importantly, the map clearly demonstrates the ecological structure that supports wildlife and maintains the quality of the town's water resources.





Cultural Resource Priorities

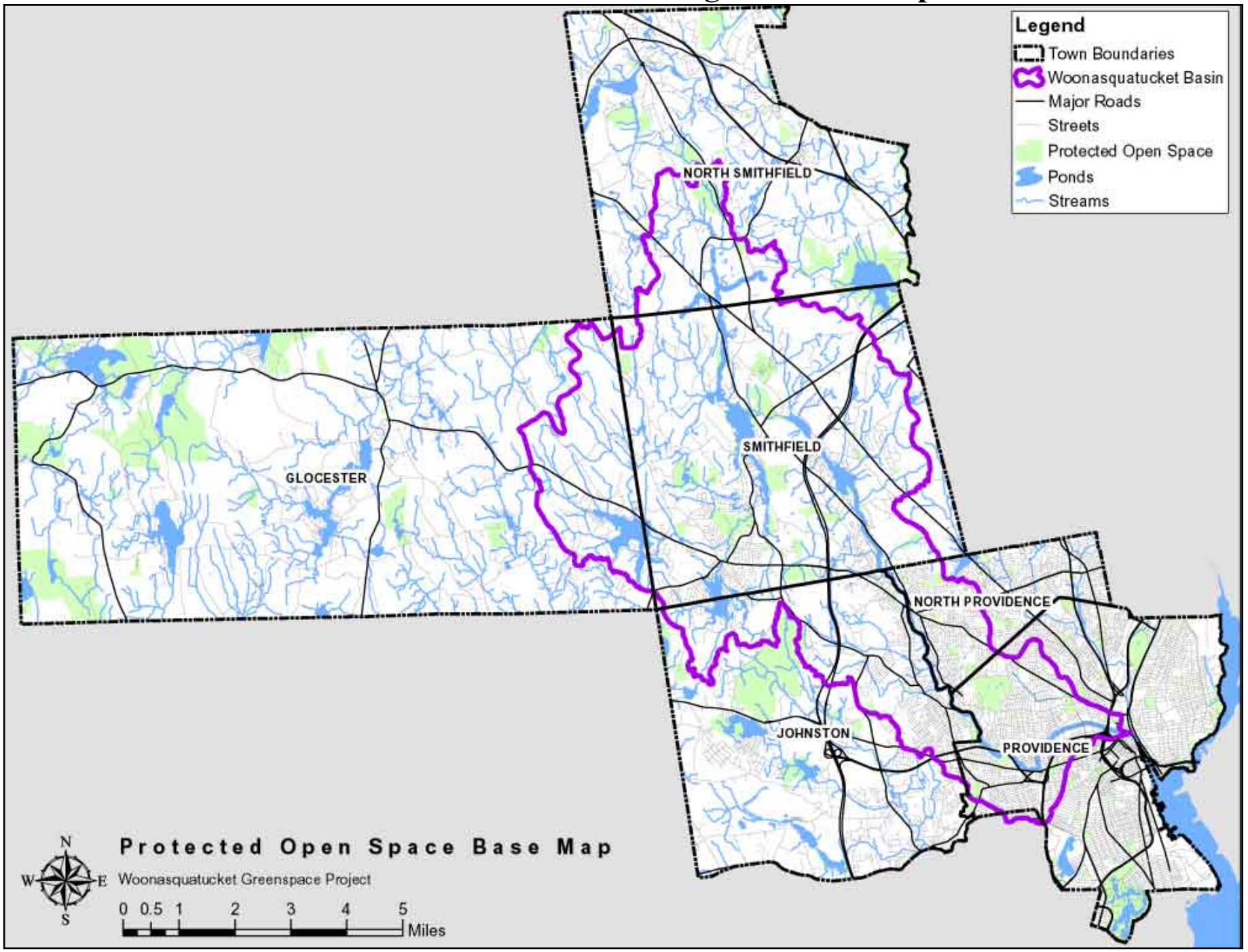
Just like the map of natural priorities, this map of cultural resource priorities is designed to show the overall pattern of historic sites and other cultural features. The orange areas represent zones with an unusual combination of historic sites and surrounding heritage landscapes, scenic roads and vistas, as well as the special places valued by local citizens. The red arrows identify cultural corridors, such as the historic turnpikes that connected Johnston with Providence and Hartford.



Combined Priorities

The final step in the Greenspace mapping process is to overlay the separate resource maps to identify areas where natural and cultural priorities overlap (yellow). These are often the most important to protecting the unique character of the community. By adding Johnston's recreational priorities, planners can identify opportunities to preserve multiple resources while providing sites for public recreational access, historic interpretation, nature trails, and so on.

Regional Base Map with Protected Lands



III. Regional Mapping and Geographic Analysis

The process of inventory and analysis for the six individual cities and towns produced a set of maps for each community, as described in the previous section. These were compiled into a package of regional inventory maps, organized along the same lines into the three resource themes. With review by participants in the regional workshops, regional priority maps were prepared to show the key resource areas and corridors for each of the resource types. Finally, a regional composite map was prepared, to identify those areas with a unique combination of resources. Based on this composite, "heritage landscape" focus areas were identified that embody the character and quality of life that draws people to the region.

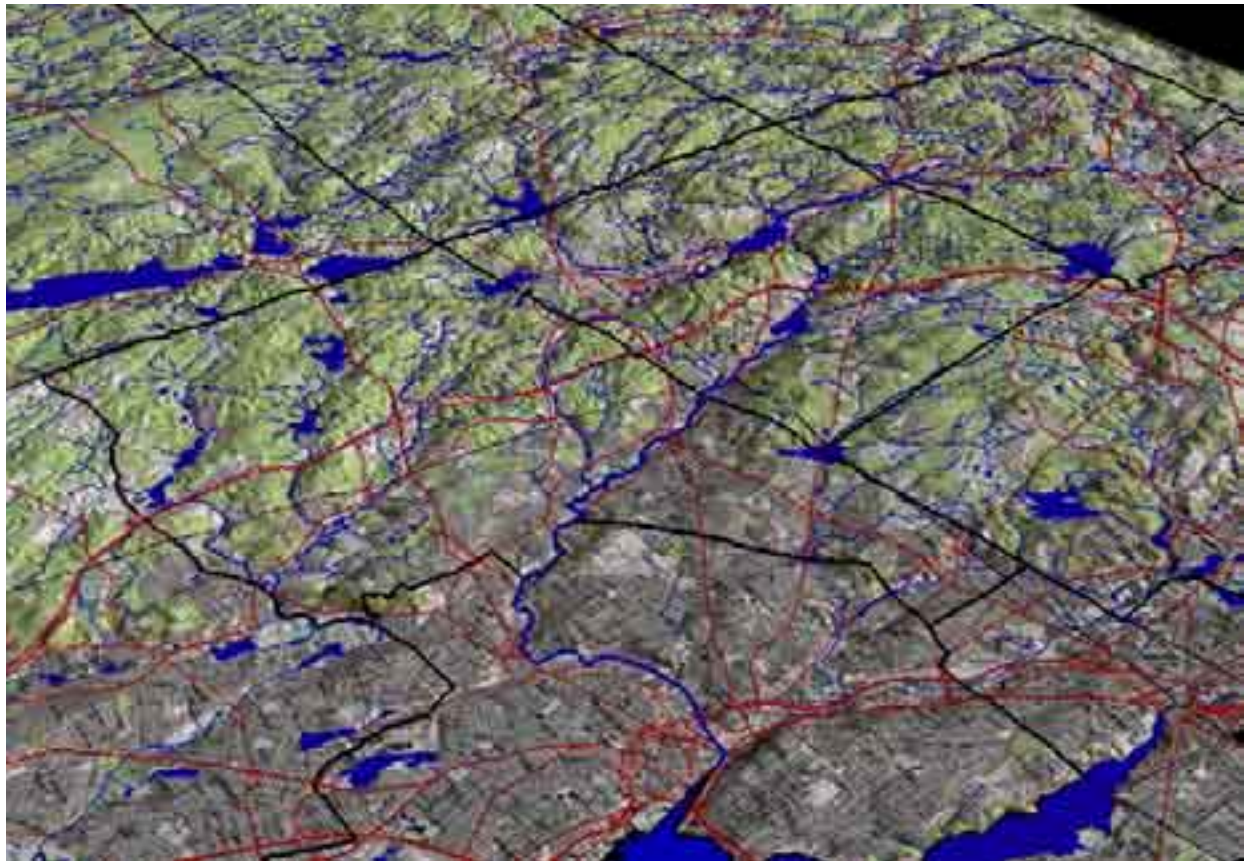
The following regional maps are described in this section:

1. Base map with Protected Lands
2. Inventory of Natural Resources: Biodiversity
3. Inventory of Natural Resources: Water Supply
4. Natural Resource Priority Areas
5. Natural Resource Priorities With Protected Lands
6. Inventory of Cultural Resources
7. Cultural Resource Priorities
8. Cultural Resource Focus Areas
9. Recreational Resource Inventory
10. Recreational Resource Priorities
11. Composite Resource Priorities
12. Heritage Landscape Preservation Focus Areas

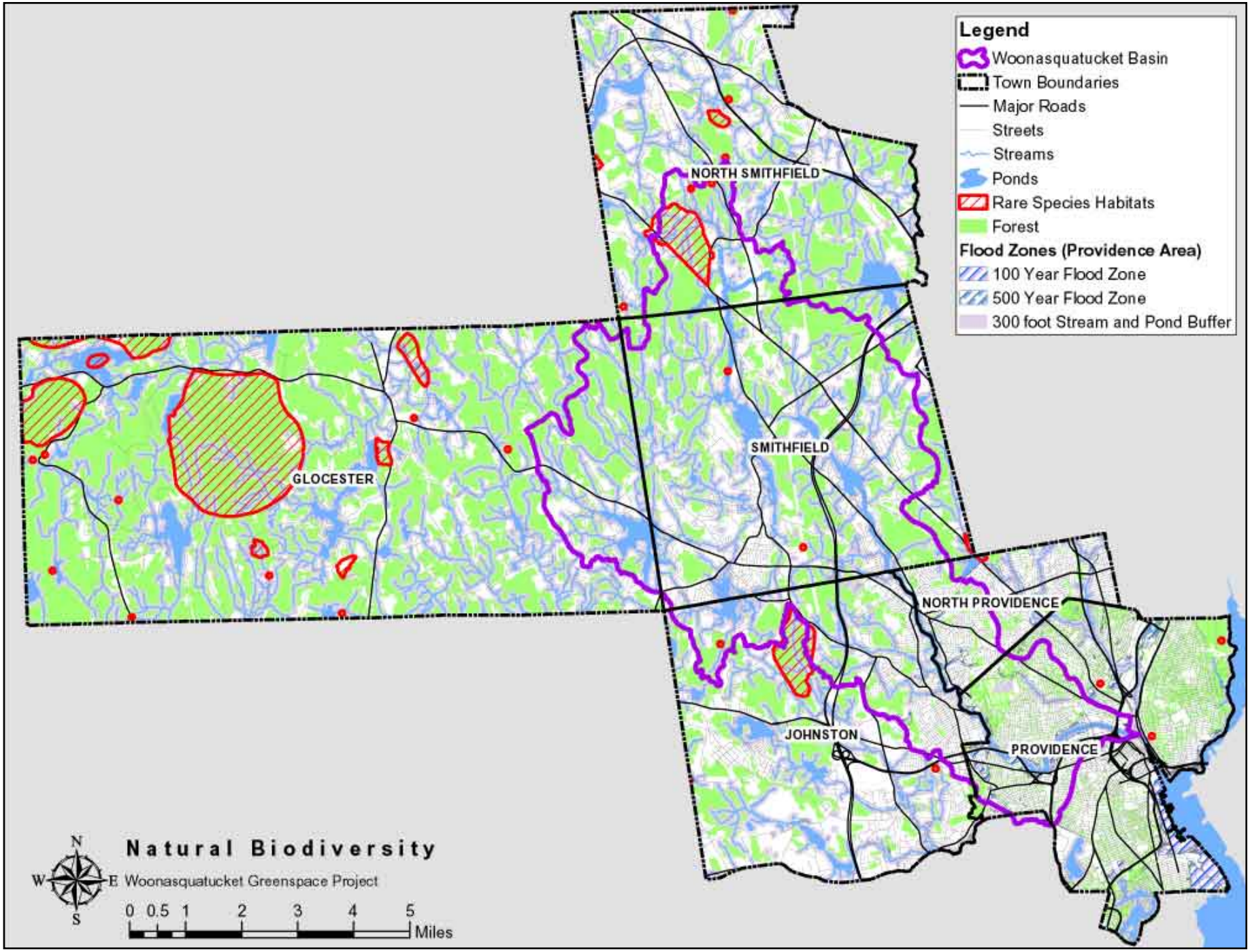
Regional Base Map with Protected Lands

The base map (opposite, left) was compiled from Rhode Island GIS data layers for roads, rivers, water bodies, and town boundaries. The Woonasquatucket Watershed boundary is shown in purple. Note that, other than Smithfield, a large portion of the six town study area is outside of the watershed.

Permanently protected open space is shown in green, and includes various state forest and wildlife management areas, municipal conservation lands, water department/reservoir lands, and local park and recreation properties. These lands were identified based on RIGIS data, and supplemented with updates from each of the local committees and planning departments.



Along with the standard two-dimensional GIS maps, three-dimensional images were created to help participants understand regional features of landform and drainage.


Legend
Woonasquatucket Basin
Town Boundaries
Major Roads
Streets
Streams
Ponds
Rare Species Habitats
Forest
Flood Zones (Providence Area)
100 Year Flood Zone
500 Year Flood Zone
300 foot Stream and Pond Buffer
NORTH SMITHFIELD
SMITHFIELD
GLOCESTER
NORTH PROVIDENCE
JOHNSTON
PROVIDENCE
N
W
E
S
Natural Biodiversity
Woonasquatucket Greenspace Project
0 0.5 1 2 3 4 5
Miles

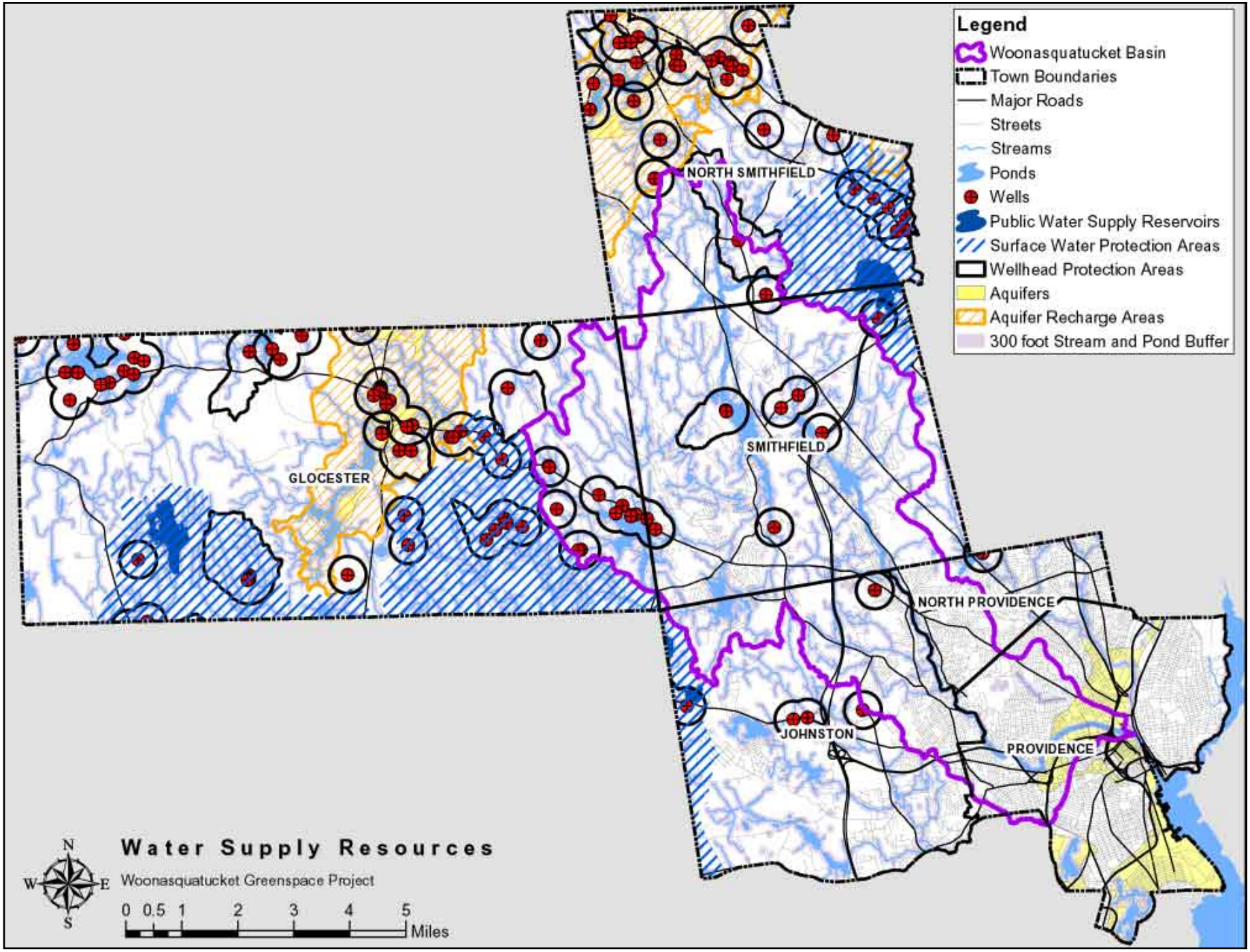
Inventory of Natural Resources

Natural resources of the greatest interest were identified initially using the data available on RI Geographic Information System (RIGIS). The relative value of these resources to local residents was assessed by participants in each of the local committees. Throughout the watershed, several categories of natural resources emerged as having critical value. The first revolved around the region's ecological systems and the plants and animals they support, known as biodiversity. The second category centers on water supply resources, which are perhaps most important to continued human use of this landscape. In some of the communities, the density of these resources required the team to create separate maps of biodiversity patterns and water supply resources in order to better clarify patterns and relationships. These were combined in the final local and regional maps.

Even in some of the most developed areas of the corridor such as this stretch near the Allendale Mill, the Woonasquatucket River supports a rich community of plants and animals.

Biodiversity

Biodiversity refers to naturally-occuring, interdependent communities of plants and animals and the landscape that supports them. In mapping biodiversity, each town sought to identify both the areas containing important species and the network of forest, wetlands, waterbodies and streams that provides them food and shelter -- in short, the ecosystems which must be preserved if these natural communities are to survive. In consultation with local ecologists, The Nature Conservancy, and state biologists, it was determined that critical biodiversity resources could be identified by mapping lakes and ponds, rivers and streams and associated riparian corridors, large forest blocks, wetlands, and documented rare species habitats. A 300 foot buffer of waterbodies (violet) was highlighted to show the riparian corridors, this setback represents an average distance within which disturbance tends to have an impact on the ecology of a river or stream. Large forest blocks (green) were digitized from the RIGIS 1997 orthophoto set, based on areas of continuous canopy generally larger than five acres. Wetlands (green dot screen) and rare species habitat (red dot screen) are as mapped by RIGIS. For the cities of Providence and North Providence, where many of the historic wetlands have long since been filled in, floodplains were used to identify areas with potential value for reclamation of wetlands and wildlife habitat.


Legend
Woonasquatucket Basin
Town Boundaries
Major Roads
Streets
Streams
Ponds
Wells
Public Water Supply Reservoirs
Surface Water Protection Areas
Wellhead Protection Areas
Aquifers
Aquifer Recharge Areas
300 foot Stream and Pond Buffer
NORTH SMITHFIELD
SMITHFIELD
GLOCESTER
NORTH PROVIDENCE
JOHNSTON
PROVIDENCE
N
W
E
S
Water Supply Resources
Woonasquatucket Greenspace Project
0 0.5 1 2 3 4 5
Miles

Water Supply Resources

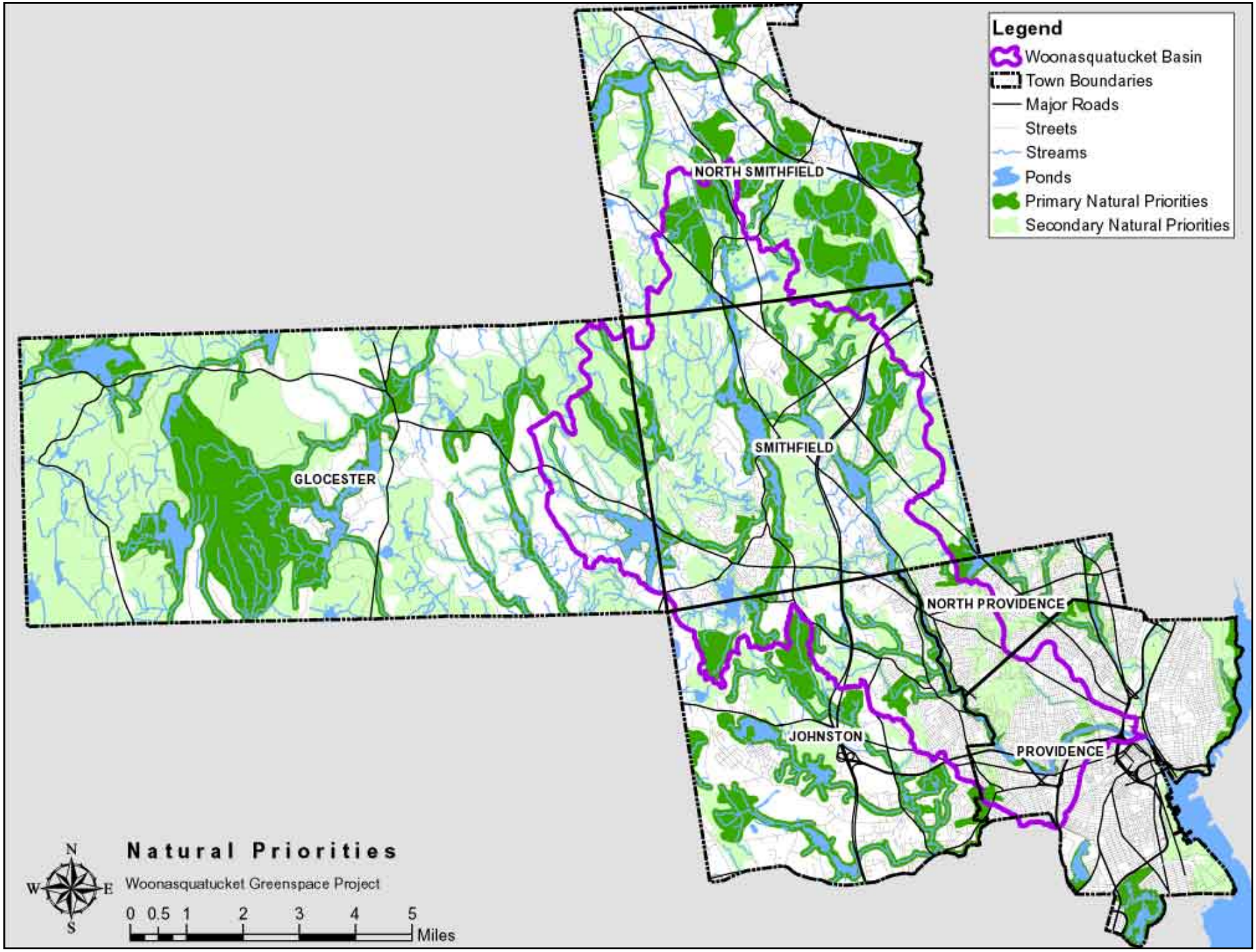
Water supply includes both surface and subsurface resources. Surface water supplies have been mapped by the state, and include public water supply reservoirs (dark blue) and the surface water protection areas that drain into them (blue cross-hatching). These include a large area of Glocester that drains south into the Scituate Reservoir, along with a narrow corridor along the western boundary of Johnston. Woonsocket Reservoir #3, on the border of Smithfield and North Smithfield, is surrounded by a Surface Water Protection Area that includes, much of the southeastern part of North Smithfield. Note that there are no surface water supplies within the Woonasquatucket River Watershed itself.

Subsurface water supplies have also been identified by the state, and include aquifers (yellow) and aquifer recharge areas (orange cross-hatching with orange boundary line) from RIGIS. While they are not used as a public water supply, note that Providence contains significant aquifers.

Wells (red) and wellhead protection areas (black) were also taken from RIGIS. The state categorizes these as "public community wells," which serve at least 25 residents or 15 service connections year-round, and "public non-community wells," which serve at east 25 persons for a minimum of 60 days of the year. In both cases, the well head protection area represents that area around a public well considered critical for the protection of the source water supply.

The complexity of the biodiversity and water supply maps demonstrates the richness of natural resources in the region, as well as the difficulty of making decisions based on this information at the regional scale. The following maps demonstrate an approach to simplifying this information to better understand the pattern of natural resources across the watershed.

Protection of the water quality of all surface water bodies -- whether or not they are actively used for water supply -- is important to preserving these resources against potential future need. In the meantime, clean water supports healthy fisheries, and a range of recreational opportunities. Photo: Waterman Lake, Glocester.


Legend
Woonasquatucket Basin
Town Boundaries
Major Roads
Streets
Streams
Ponds
Primary Natural Priorities
Secondary Natural Priorities
NORTH SMITHFIELD
SMITHFIELD
GLOCESTER
NORTH PROVIDENCE
JOHNSTON
PROVIDENCE
N
W
E
S
Natural Priorities
Woonasquatucket Greenspace Project
0 0.5 1 2 3 4 5
Miles

Natural Resource Priorities

While virtually any location in the Woonasquatucket Region has some existing or potential natural resource value, in order to make decisions for conservation and management it is necessary to group these resources according to their relative value. While each town, state agency, and private conservation group has its own standards for setting priorities, this map shows one approach to defining relative values based on features shown on the previous map. It assumes that protection of both biodiversity and water supply is a shared goal of most residents of the region. It therefore places a higher value on areas with many different kinds of natural resources than on those that contain fewer important features.

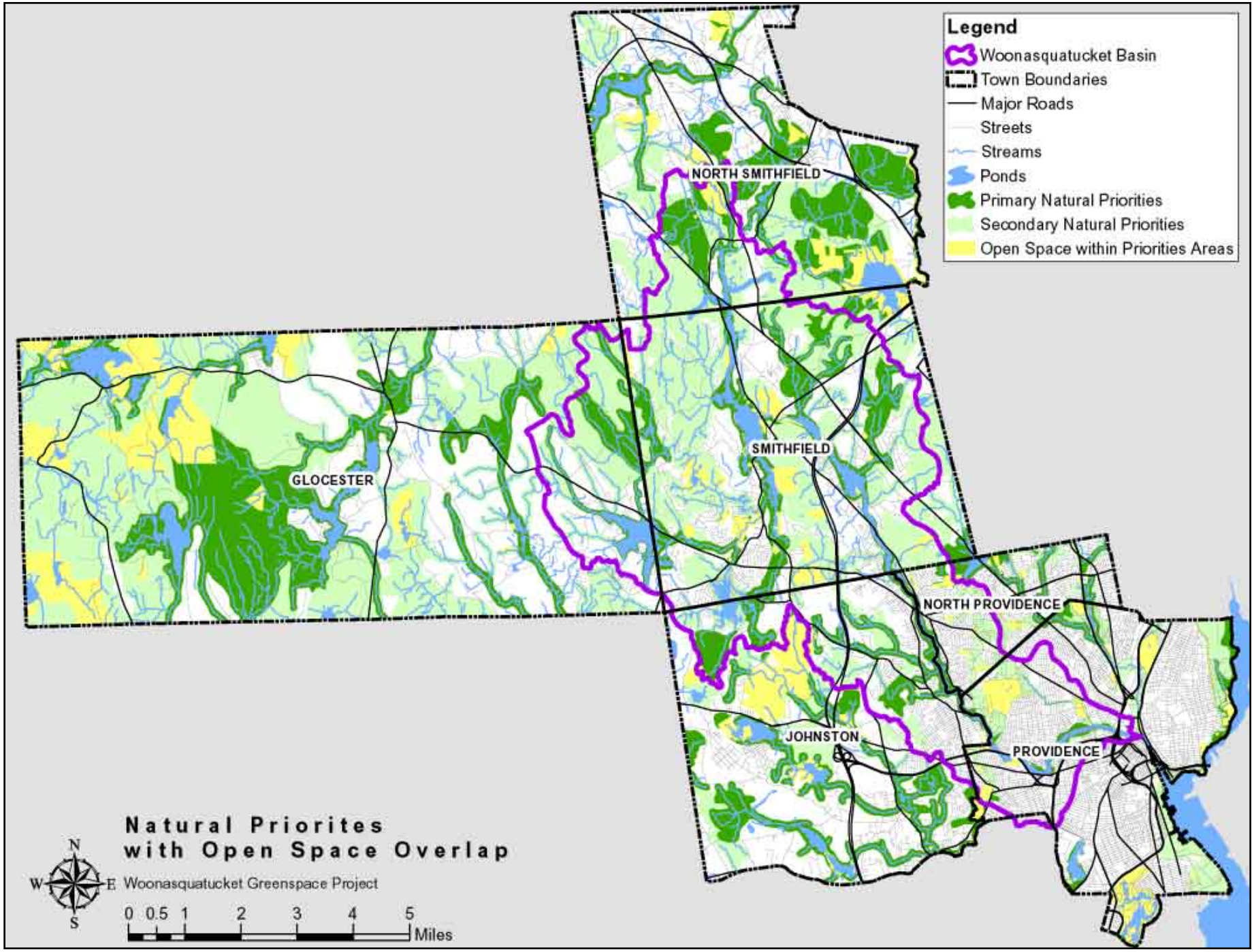
Thus, the dark green areas on the map identify primary natural resource zones. For the most part, these are relatively narrow corridors that follow the river and stream systems, and link up large areas of forested wetlands and unfragmented upland. These forested riparian corridors and adjacent areas are critical, not only as habitat for many species of animals, but also for protection of water supply. They filter and absorb storm-water runoff, preventing flooding and recharging groundwater aquifers. During dry periods, groundwater flows back into the rivers and streams, maintaining a steady flow of water.

The forested riparian corridors along the Woonasquatucket River and its tributary streams act as the connective tissue for the region's ecosystems.

When riparian corridors are cleared of native vegetation they lose many of their functions, even though they are still green and "undeveloped." Parking lots and roads increase the quantity and speed of runoff, and contribute many contaminants.

Disturbance of the primary natural resource zones is of particular concern because these areas represent the connective tissue of the region's ecosystem. If a parcel of land within these areas is lost to development, filled for a parking lot or clear cut, it affects not only that parcel, but to some extent everything up and down stream. If plants and animals can no longer travel across the site, or if they lose an area they need for feeding or nesting, the entire corridor may lose an important species.

Areas with a lower concentration of natural resources have been placed in the category of secondary natural priorities. These areas generally fall outside of the principal riparian corridors, but include some minor streams and wetlands. They may be forested, but typically have been somewhat fragmented by development of roads and house lots, logging, or other active uses. Typically, further loss of these areas to development would have a gradual cumulative effect on the health of the regional ecosystem, but would not immediately sever an important connection. Likewise, disturbance of the secondary natural resource zones will have a gradual impact on the quantity and quality of the region's water supplies, but will not have an immediate effect.


Legend
Woonasquatucket Basin
Town Boundaries
Major Roads
Streets
Streams
Ponds
Primary Natural Priorities
Secondary Natural Priorities
Open Space within Priorities Areas
NORTH SMITHFIELD
SMITHFIELD
GLOCESTER
NORTH PROVIDENCE
JOHNSTON
PROVIDENCE
Natural Priorites
with Open Space Overlap
Woonasquatucket Greenspace Project
N
W
E
S
0 0.5 1 2 3 4 5
Miles

Natural Resource Priorities with Protected Lands

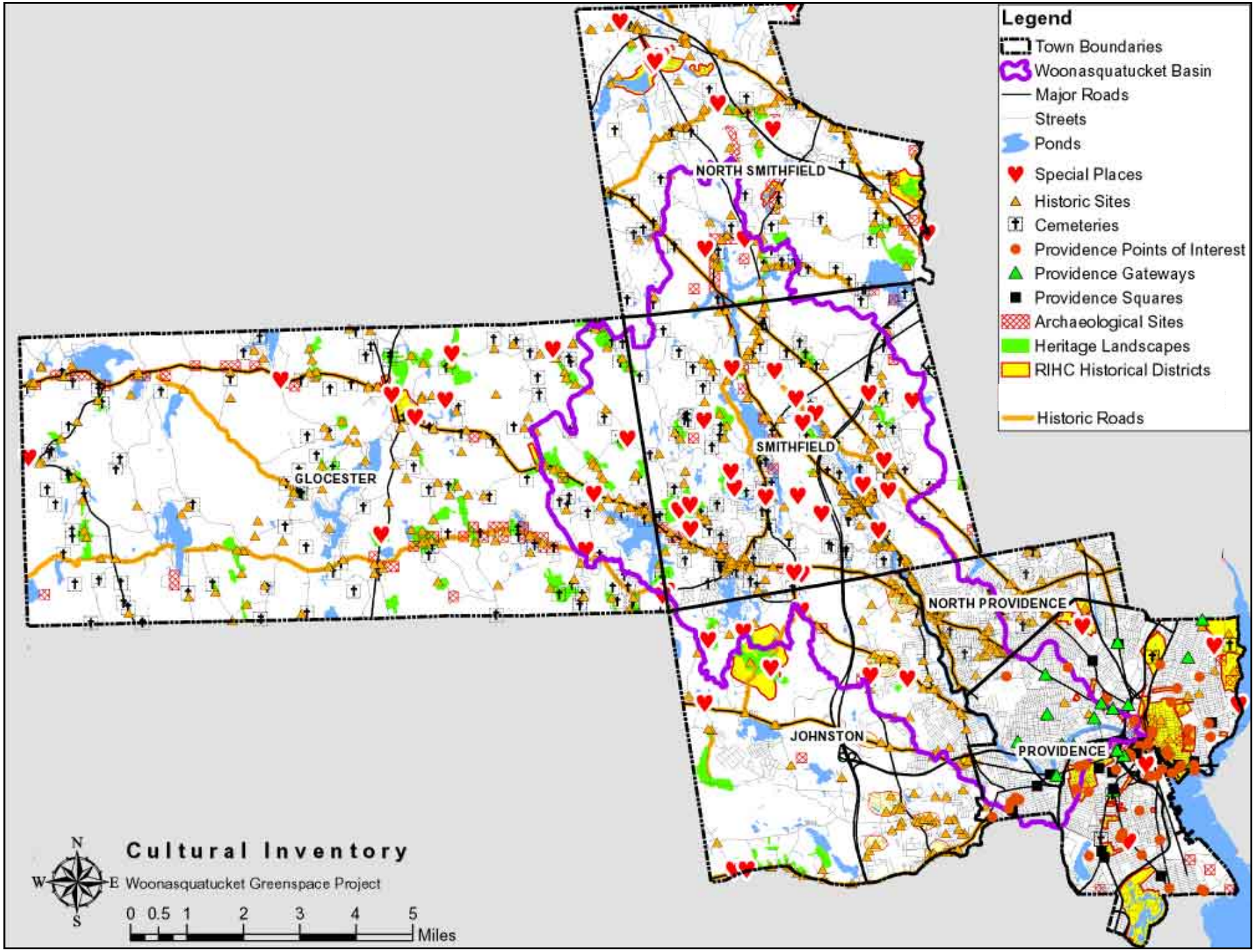
While the previous map shows the areas with the greatest value for natural resources, how should the cities and towns use this information? One way to set priorities for action is to look at which lands have already been permanently protected, and focus action on filling in the gaps in the key resource networks. Overlaying the primary (dark green) and secondary (light green) natural resource priorities with areas that have already been preserved (bright green) reveals gaps in the "connective tissue" of a potential future network of protected natural resource areas. This demonstrates the pattern of previous conservation efforts, which have been most effective in preserving large tracts of forest in the Western part of the region, with many smaller preserved parcels in the Eastern cities and towns. Each of the Woonasquatucket Communities has some significant park, forest, or watershed land that has been preserved, but in most cases these areas are surrounded by unprotected land.

In rural Glocester, there is a large area south of Durfee Hill with many significant natural resources. Here, future protection might focus as much on expanding the extent of existing protected areas as on preserving particular corridors. One area of interest is the Chepachet River corridor, which makes a natural link from the wild areas on the west side of the town right through the village of Chepachet.

Johnston Memorial Park (left) and Johnston Town Forest (right) are both permanently protected as open space, but have divergent natural resource values. An area in active use, improved for recreation with mowed lawns and paved trails, is less important to the ecosystem than an undisturbed water body surrounded by thick vegetation.

In the central towns of Johnston, Smithfield, and North Smithfield, this map highlights what could be called a "biodiversity corridor" running from Neutaconkanut Hill in Providence and Johnston north along the Pocasset River to Snake Den State Park. From there this corridor continues north through Greenville, along the Stillwater River and through the Stillwater Reservoir, and up the Woonasquatucket all the way into North Smithfield. Some areas within this biodiversity corridor, such as Snake Den State Park, have already been protected. Working together, the three towns could connect these protected areas into a permanent open space corridor.

Even in the urban neighborhoods of Providence, North Providence and Johnston, there are tremendous possibilities for linking up existing protected areas with conservation corridors. The main stem of the Woonasquatucket is already recognized as a critical connection between existing parks. Less well known is the Moshassuck/West River system, which connects all the way from downtown Providence through North Providence to the Wenscott Reservoir.


Legend
Town Boundaries
Woonasquatucket Basin
Major Roads
Streets
Ponds
Special Places
Historic Sites
Cemeteries
Providence Points of Interest
Providence Gateways
Providence Squares
Archaeological Sites
Heritage Landscapes
RIHC Historical Districts
Historic Roads
NORTH SMITHFIELD
SMITHFIELD
GLOCESTER
NORTH PROVIDENCE
JOHNSTON
PROVIDENCE
N
W
E
S
Cultural Inventory
Woonasquatucket Greenspace Project
0 0.5 1 2 3 4 5
Miles

Inventory of Cultural Resources

Three types of cultural resources were inventoried and assessed in each community. Each of these shares the common element of being important to the history, present lifestyle, or future livability of the region. While the natural resource maps identify features that were created for the most part without human influence, cultural resources include everything that people have made through history, as well as the places that people care about most.

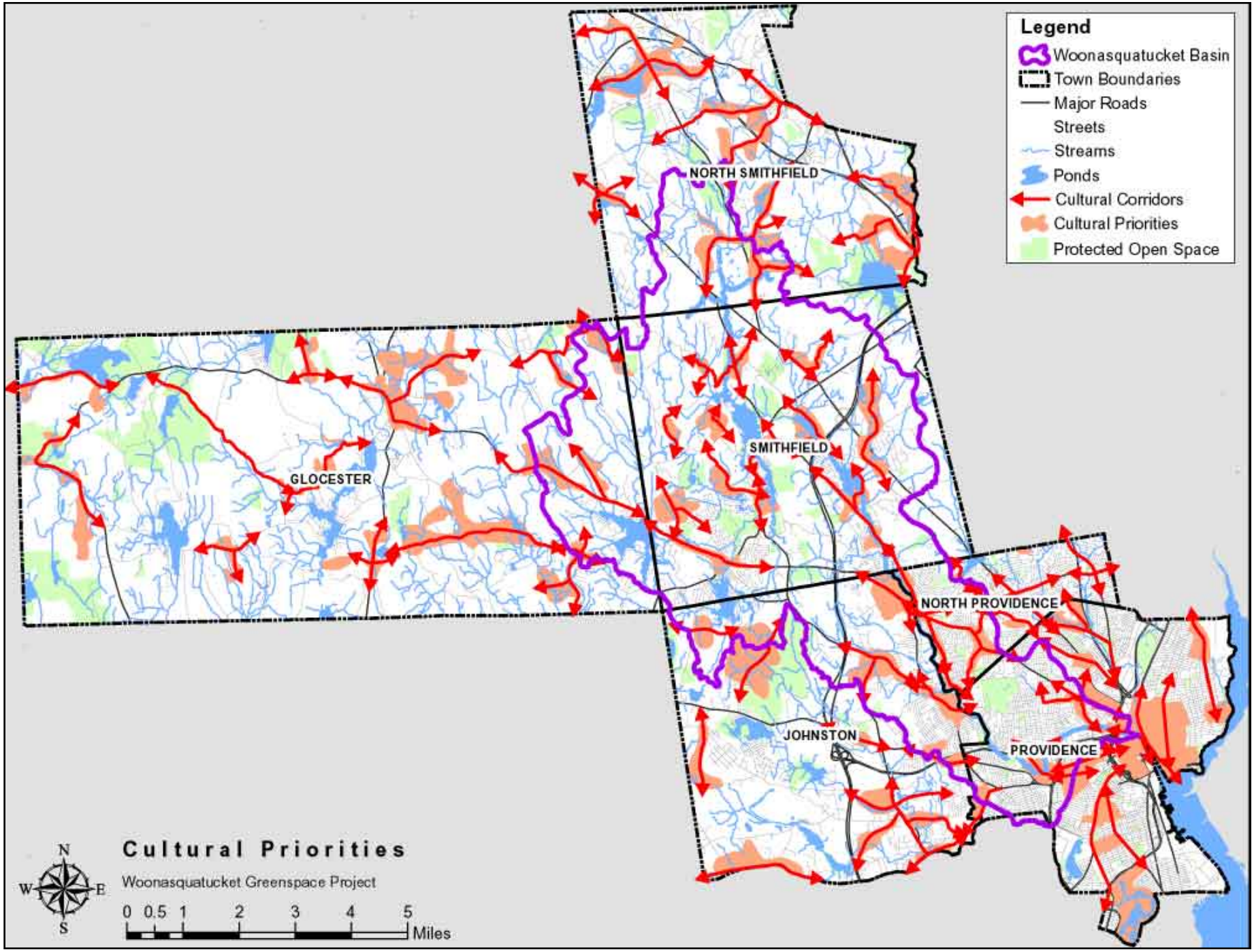
The first category of cultural resources includes historic sites. While RIGIS data includes registered historic sites and districts, many of the locally-important historic features have never been mapped digitally. Excellent local inventories of historic and architectural resources were prepared by the Rhode Island Historic Preservation Commission in the 1970's and 80's, but only small paper maps were available. Participants in each community reviewed these paper inventories and helped the consultants digitally map over 750 specific sites across the six communities. Another type of historic element mapped for the first time were heritage landscapes, which are defined as traditional agricultural or mill landscapes that embody the historic way of life that built the region. These were identified through field surveys and digitized using aerial photography.

Not shown on this map is a second type of cultural resource -- scenic resources -- which were compiled from the Rhode Island Landscape Inventory (RIDEM, 1990); from the state Inventory of Scenic Roadways (Rhode Island Scenic Roadways Board, 1996); and from locally identified scenic roads and scenic areas. Scenic resources are important in their own right as a shared resource; they also include many of the specific roadside views and vista points that allow the public to enjoy features that are important for other reasons. Without this visual access, towns can lose the shared sense of identity that is so important in building a sense of community among residents.

The third type of cultural resources were "special places." These include specific sites and areas in each town that are important to the daily life or character of the community. These were identified by the local volunteer committees, and represented by the red hearts on the maps, since they are "places in the heart." In a few communities, local volunteers developed inventories of cultural resources of particular importance. In Providence these included points of interest, gateways and squares, each of which is important to defining the character of the city's diverse neighborhoods.

Across the region, few of these cultural resource areas have been preserved. Other than a small number of parks and historic sites, most of the features that define the character of the Woonasquatucket communities could be lost to neglect or inappropriate development.

Cultural resources include recognized historic buildings (left, below) and larger compositions made up of buildings and surrounding landscape (Slatersville, above). They also include "special places" (right, below), whose importance may emanate primarily from their value in the hearts of local residents.


Legend
Woonasquatucket Basin
Town Boundaries
Major Roads
Streets
Streams
Ponds
Cultural Corridors
Cultural Priorities
Protected Open Space
NORTH SMITHFIELD
GLOCESTER
SMITHFIELD
NORTH PROVIDENCE
JOHNSTON
PROVIDENCE
N
W
E
S
Cultural Priorities
Woonasquatucket Greenspace Project
0 0.5 1 2 3 4 5
Miles

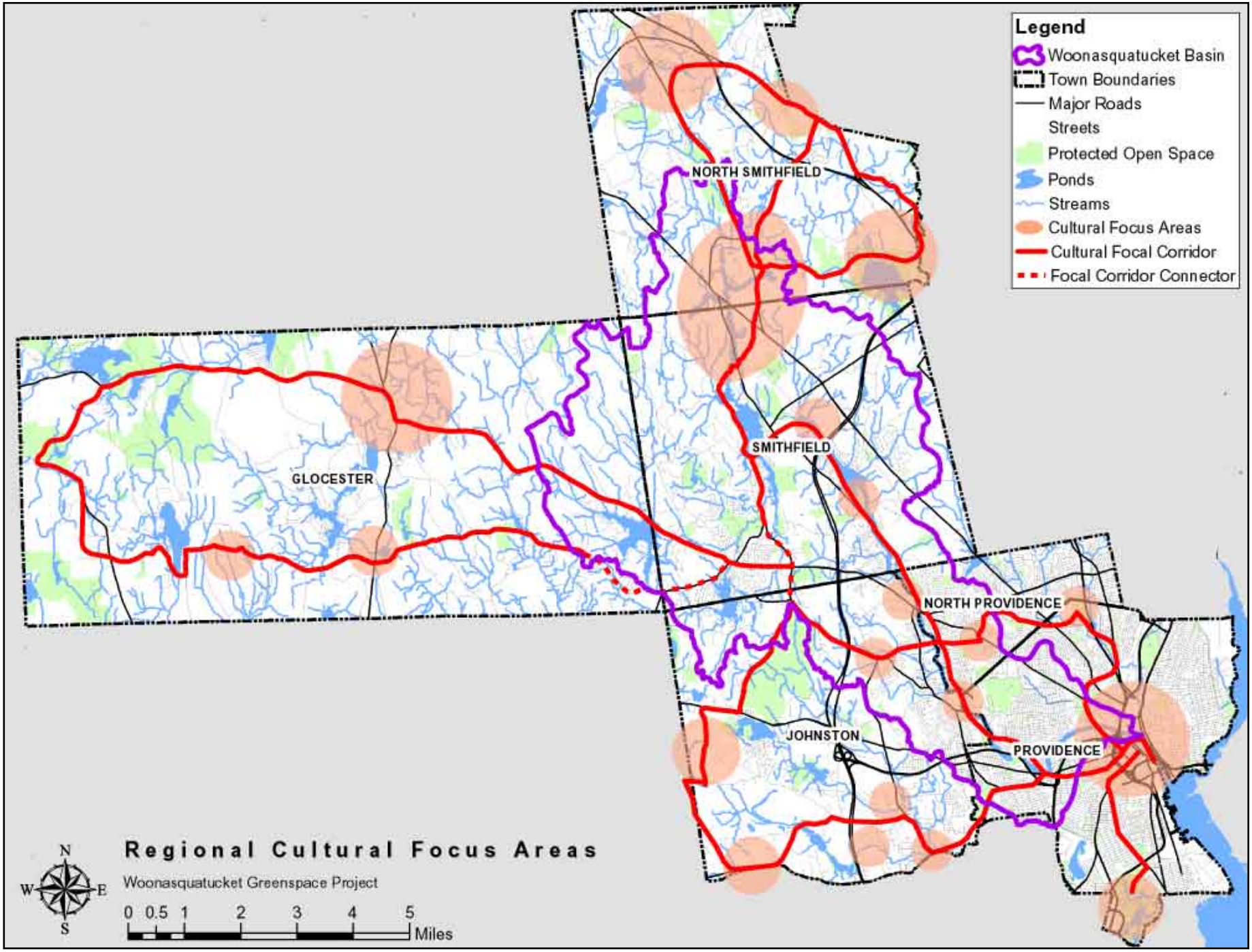
Cultural Resource Priorities

Based on the initial inventory of cultural resources, areas with a high concentration of valuable elements were grouped into "heritage areas." Each of these areas represents a special combination of cultural resources: traditional agricultural landscapes and scenic corridors through rural areas; historic agricultural hamlets and mill villages; and historic urban centers. Each of them is more than the sum of its parts -- they typically include a number of recognized historic structures, along with that part of the surrounding landscape which is important to understanding the story of that place. It is not enough to save a historic homestead, for example, if the farmland and woodlots that originally supported the family are developed. Likewise, if one or two buildings along a historic city street are preserved and the rest are torn down for parking lots, their value is diminished considerably.

As shown on this map of Cultural Resource Priorities, these resources tend to follow other landscape elements, which might be natural features such as the Woonasquatucket River or cultural features like historic turnpikes or rail corridors. These corridors are indicated with red arrows. The pattern that results illustrates the historic transportation network that linked the region together: turnpikes radiating out from Providence form the principal east-wet connections. Local roads, and later the state highways, follow ridges and valleys north-south. Where the two systems met there often arose a crossroads hamlet or village, the largest of which grew up where there was access to water power for mill development. Looking at cultural resources this way is based on the idea of a cultural system, analogous to a natural ecosystem, which must be preserved as an intact whole if each part is also to survive.

In both rural districts and urban neighborhood, features with recognized historic value developed within a rich context. Thus if we preserve a farmstead (above) or city armory (right) but allow the surrounding area to be developed for houselots or torn down for parking, the larger story of those structures is lost forever.

What this map suggests is that the most important cultural resources, while distributed throughout the region, take up only a small percentage of the total land area. By protecting a relatively limited number of key areas and historic corridors, we can preserve the cultural landscapes that give the region its unique visual character and quality of life. With a focus on protecting the context of these sites as well as individual structures, we can also preserve the essential story of this landscape and its residents for future generations.


Legend
Woonasquatucket Basin
Town Boundaries
Major Roads
Streets
Protected Open Space
Ponds
Streams
Cultural Focus Areas
Cultural Focal Corridor
Focal Corridor Connector
NORTH SMITHFIELD
SMITHFIELD
GLOCESTER
NORTH PROVIDENCE
JOHNSTON
PROVIDENCE
N
W
E
S
Regional Cultural Focus Areas
Woonasquatucket Greenspace Project
0 0.5 1 2 3 4 5
Miles

Cultural Resource Focus Areas

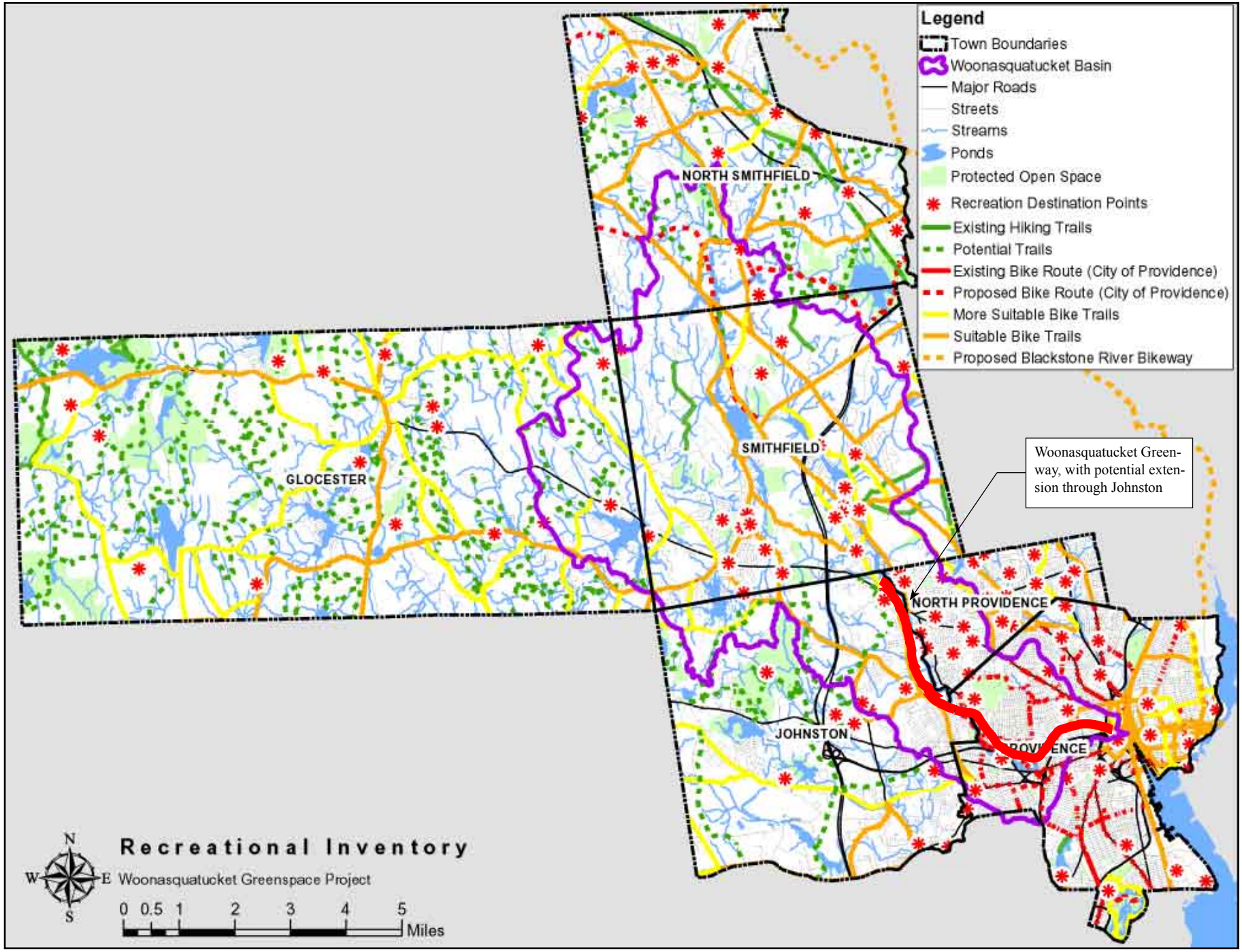
Participants in the regional meetings evaluated the cultural resource priorities identified by the separate cities and towns. They refined the list to focus on a core system of cultural areas and connecting corridors that embody the history of the region. Ultimately, this network could evolve into a cultural tour route that would celebrate the cultural heritage of the Woonasquatucket and help focus preservation efforts. The cultural focus areas include the center of Providence and Roger Williams Park, the mill villages of Johnston, and historic neighborhoods in North Providence. A simple loop of historic roads, turnpikes, and city streets connects each of these areas into a single tour route, which could extend up the Woonasquatucket River Valley through Smithfield and on to Glocester and North Smithfield. Along the way, focus areas include the villages of Georgiaville and Stillwater in Smithfield, and key destinations of Chepachet, in the West, and to the north, Slatersville.

Historic farm landscapes, as well as the farm structures, need to be preserved if the story of these places is to remain as a tangible resource for future generations.

Whether it's central Providence (above) or the village of Chepachet (right), the cultural focus areas share a unique concentration of historic resources. Just as importantly, they present an opportunity to celebrate the story of each community as an important part of the heritage of the entire region.

A series of outlying areas could also be made part of a potential tour loop, and help to tell the story of the rural landscape. These include historic hamlets and rural landscapes in the Peck Hill neighborhood of Johnston, along Snake Hill Road in Glocester, and along the common border of Smithfield and North Smithfield, extending to Primrose and Sayle's Hill.

This map demonstrates the principle that it is impossible to fully comprehend the cultural heritage of the region from any single vantage point. Only by preserving and interpreting villages and urban centers, rural farms and mill sites as a system of cultural resources can the story of the region be truly understood. As explained in later chapters of this report, this does not imply or require a no-growth policy -- rather, as the region continues to grow the remaining resources will become increasingly important in maintaining the character and quality of life of each community. By building with this character rather than erasing it, the best of the old can be preserved as the inspiration for the new.


Legend
Town Boundaries
Woonasquatucket Basin
Major Roads
Streets
Streams
Ponds
Protected Open Space
Recreation Destination Points
Existing Hiking Trails
Potential Trails
Existing Bike Route (City of Providence)
Proposed Bike Route (City of Providence)
More Suitable Bike Trails
Suitable Bike Trails
Proposed Blackstone River Bikeway
NORTH SMITHFIELD
SMITHFIELD
GLOCESTER
JOHNSTON
NORTH PROVIDENCE
Woonasquatucket Greenway, with potential extension through Johnston
N
W
E
S
Recreational Inventory
Woonasquatucket Greenspace Project
0 0.5 1 2 3 4 5
Miles

Inventory of Recreational Resources

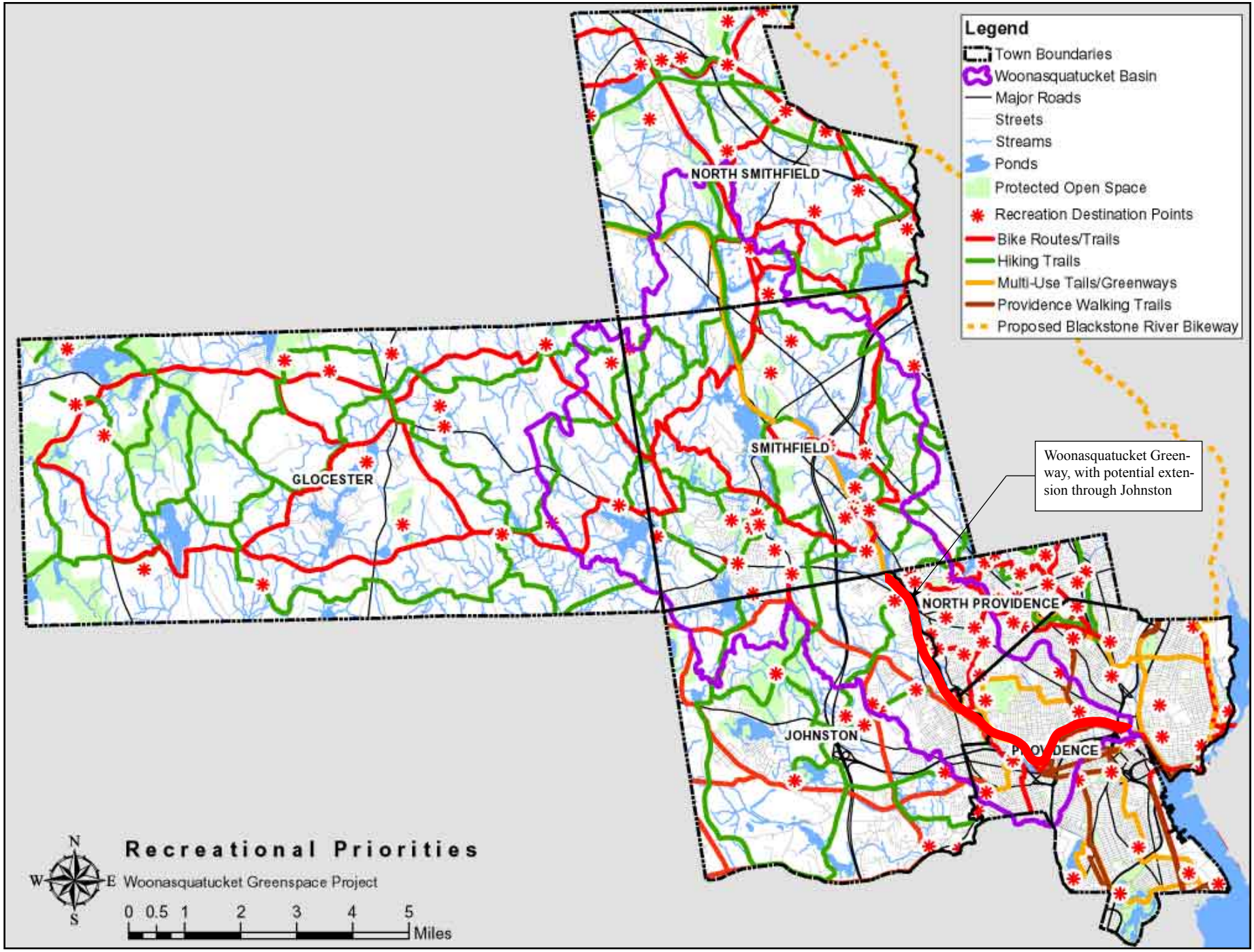
The recreational resources information was compiled by volunteers from each town, along with data from RIGIS for boat launches and other activity areas. What is shown here is a simple composite of all the local maps. For the purpose of this study, the inventory focussed on trail corridors, and grouped these linear connections into two main groups: hiking trails and bike routes. Existing trails or marked routes are shown with a solid line, while proposed connections are dashed.

Existing hiking trails are shown with a solid green line. These include trails within some of the state parks and municipal lands, as well as some trails on private lands that are commonly used by the public. Potential hiking trails, shown with a dashed green line, were identified by volunteers in the different communities and also located using aerial photographs. These include old roads and logging trails, utility corridors and other right-of-ways, on the theory that it is easier to establish public access on an existing trail than it is to blaze a completely new path through undeveloped land. **Note: existing and potential trails are shown on this map for planning purposes only. It should be assumed that these trails are not open to the public.**

Bike paths and on-road routes were identified with the help of a RI Dept. of Transportation study of bike routes, supplemented by the knowledge of volunteers. The RIDOT study divided these routes into Suitable (orange line) and More Suitable Bike Routes (yellow line). Existing bike routes identified by the City of Providence in a separate study are shown with a solid red line. Potential bike routes are shown with a dashed red line. This includes the route of the Woonasquatucket Greenway bike path and its potential extension through Smithfield as the Northwest Bikeway.

This map makes it clear that a regional recreational network is a very real possibility. In planning for such a system, it is important to know not only where the trails are but where people would likely want to go using those trails. Thus the recreational inventory identified the most important potential destination points in each community. These include parks and conservation areas, schools, ballfields, village centers, and urban neighborhoods. As trails and bike routes are planned to bring people out to enjoy the natural and cultural resources identified in the study, it will be important to also identify locations for parking, restrooms and refreshments.

The recreational inventory included existing trails, such as the Stillwater Trail in Smithfield (left), and destination points like Johnston's Memorial Park (above).


Legend
Town Boundaries
Woonasquatucket Basin
Major Roads
Streets
Streams
Ponds
Protected Open Space
Recreation Destination Points
Bike Routes/Trails
Hiking Trails
Multi-Use Tails/Greenways
Providence Walking Trails
Proposed Blackstone River Bikeway
NORTH SMITHFIELD
SMITHFIELD
GLOCESTER
NORTH PROVIDENCE
JOHNSTON
Woonasquatucket Greenway, with potential extension through Johnston
N
W
E
S
Recreational Priorities
Woonasquatucket Greenspace Project
0 0.5 1 2 3 4 5
Miles

Recreational Resource Priorities

Regional trail priorities were selected in consultation with attendees at the regional workshops. From the compilation of all possibilities shown on the previous page, regional routes were selected that connect and extend existing trail systems, and provide the best access to natural and cultural resource areas and key destination points.

Hiking trails, shown in a solid green line, were selected to link every village and neighborhood to a regional network. They include some important pedestrian routes through Providence and North Providence. While these would for the most part follow sidewalks, they would be an important part of a potential pedestrian system that could, for example, connect Roger Williams Park to Lincoln Woods State Park, and follow the Woonasquatucket to connect to the other towns of the watershed.

Another important trail opportunity is to connect a north-south route from Slatersville, down the Woonasquatucket Valley to Greenville, continuing through Snake Den State Park and down the Pocasset River to Neutaconkanut Hill. This "Woonasquatucket Headwaters Trail would link up an extraordinary variety of landscapes in North Smithfield, Smithfield, and Johnston. More importantly, it would bring a conceptual focus to bear on hidden landscapes in each of these towns, and give local residents a reason to support conservation efforts in what is an important biodiversity corridor (see page 27).

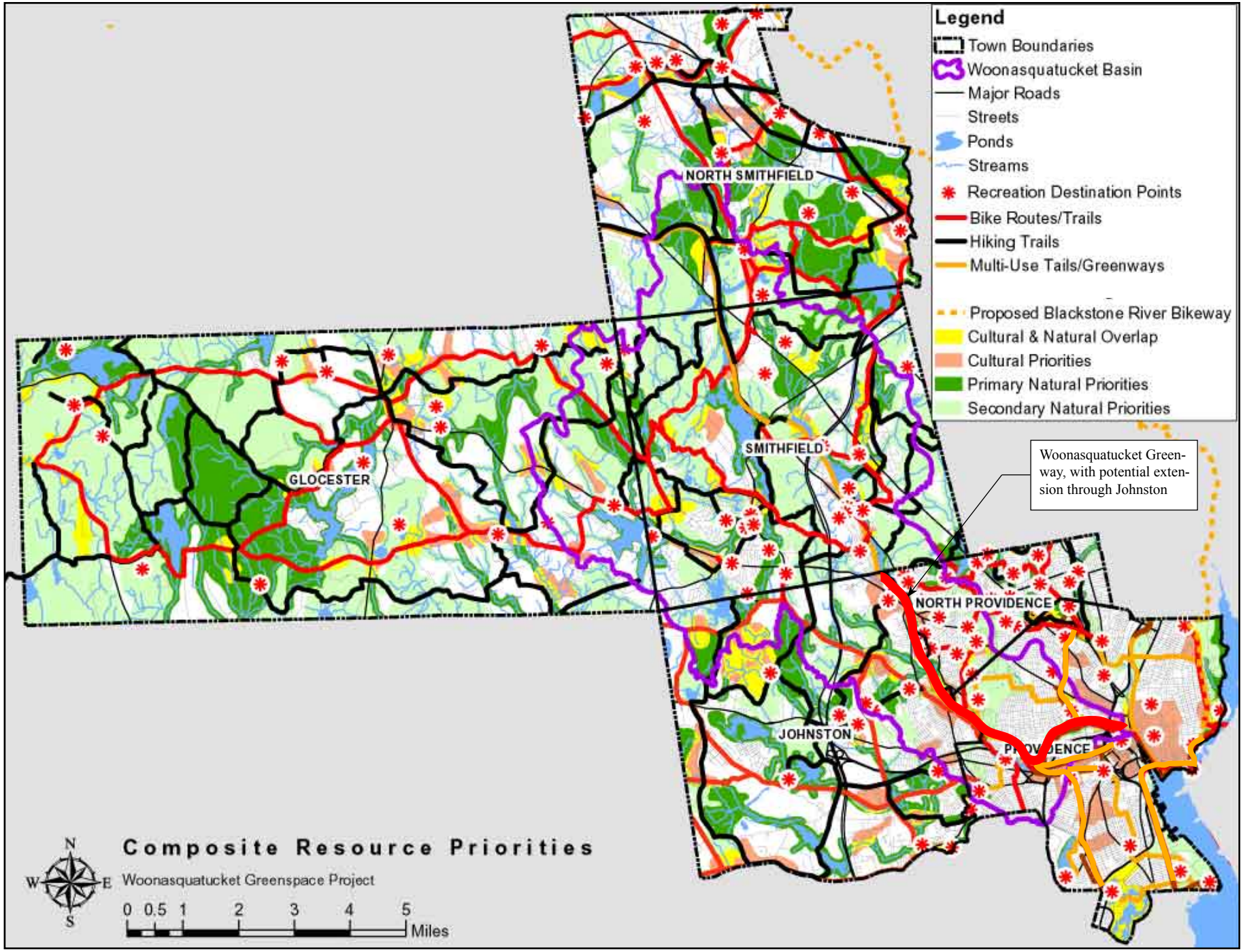
While a continuous water trail along the Woonasquatucket is only a dream at this point, participants supported the idea of developing a series of access points, to encourage use, while thinking long-term about linking them up into a longer water trail.

In the western part of the study area, hiking trails could connect across the northern and southern tiers of Glocester, and eventually connect the Woonasquatucket Headwaters Trail with the Existing North-South Trail which goes from Burrillville to Charlestown.

While most of the existing trails are on public parks or conservation land, filling the gaps in the proposed network would require additional easements across private lands, acquisition of important parcels, and coordination of access and parking lot development. Many of the destination points identified on the map can serve as parking and jumping off points for the trail system. There are additional opportunities to combine planning for these facilities with the wider network of public transportation, so that trail users could leave their cars at home and take the bus to a hiking trail. In addition, some elements of the trail system could be developed in conjunction with preservation efforts for natural or cultural resources.

Bike routes, shown in red, connect historic village centers and city neighborhoods with a network of scenic roads and recreational routes. Following or paralleling the historic turnpikes that radiate from Providence, these routes connect the region's center to outlying villages and rural districts. They would intersect with several key north-south routes, perhaps the most important of which is the potential Northwest Bikeway, which as an extension of the Woonasquatucket Greenway could eventually function as an dedicated bikeway from the center of Providence through Burrillville. Another exciting connection is with the growing Blackstone Bikeway, which has been completed for some distance through Lincoln, and will soon extend south to Pawtucket and north through North Smithfield. In the meantime, existing on-road routes serve much the same purpose, at least functionally, as these major regional bike paths.

This is the strategy taken by a Rhode Island-based group called the East Coast Greenway, which is coordinating plans for a bike route from Florida to Maine. (www.greenway.org) By combining finished bike paths with on-road routes they will quickly establish what will gradually develop into a nearly continuous off-road bike path. In the meantime, signage, user guides and management of on-road routes will allow the trail to be used and to develop a constituency.


Legend
Town Boundaries
Woonasquatucket Basin
Major Roads
Streets
Ponds
Streams
Recreation Destination Points
Bike Routes/Trails
Hiking Trails
Multi-Use Tails/Greenways
Proposed Blackstone River Bikeway
Cultural & Natural Overlap
Cultural Priorities
Primary Natural Priorities
Secondary Natural Priorities
NORTH SMITHFIELD
SMITHFIELD
GLOCESTER
NORTH PROVIDENCE
JOHNSTON
Woonasquatucket Greenway, with potential extension through Johnston
Composite Resource Priorities
Woonasquatucket Greenspace Project
0 0.5 1 2 3 4 5
Miles

Composite Resource Priorities

While many groups will continue to base their priorities on a particular mission focus or funding source, one of the goals of this project is to look for areas where Natural, Cultural, and Recreational resources converge. The map at right shows these concentrations of multiple resource types. In dark green are the Primary Natural Priorities, with Secondary Priorities in light green. Cultural Priorities are shown in orange. For clarity, the red cultural corridors are not shown. Areas where natural and cultural resources overlap are shown in yellow. Finally, recreational hiking and biking routes and destination points are depicted in red and black, with multi-use trails in orange.

This map highlights areas and corridors with an unusual concentration of different open space resources: because of the value of these areas to the visual character and quality of life in the region, they should be studied closely as part of what might be called a "heritage landscape preservation plan." Some of these areas, such as Dame Farm and Snake Den State Park, have already been recognized and preserved. Many others have not.

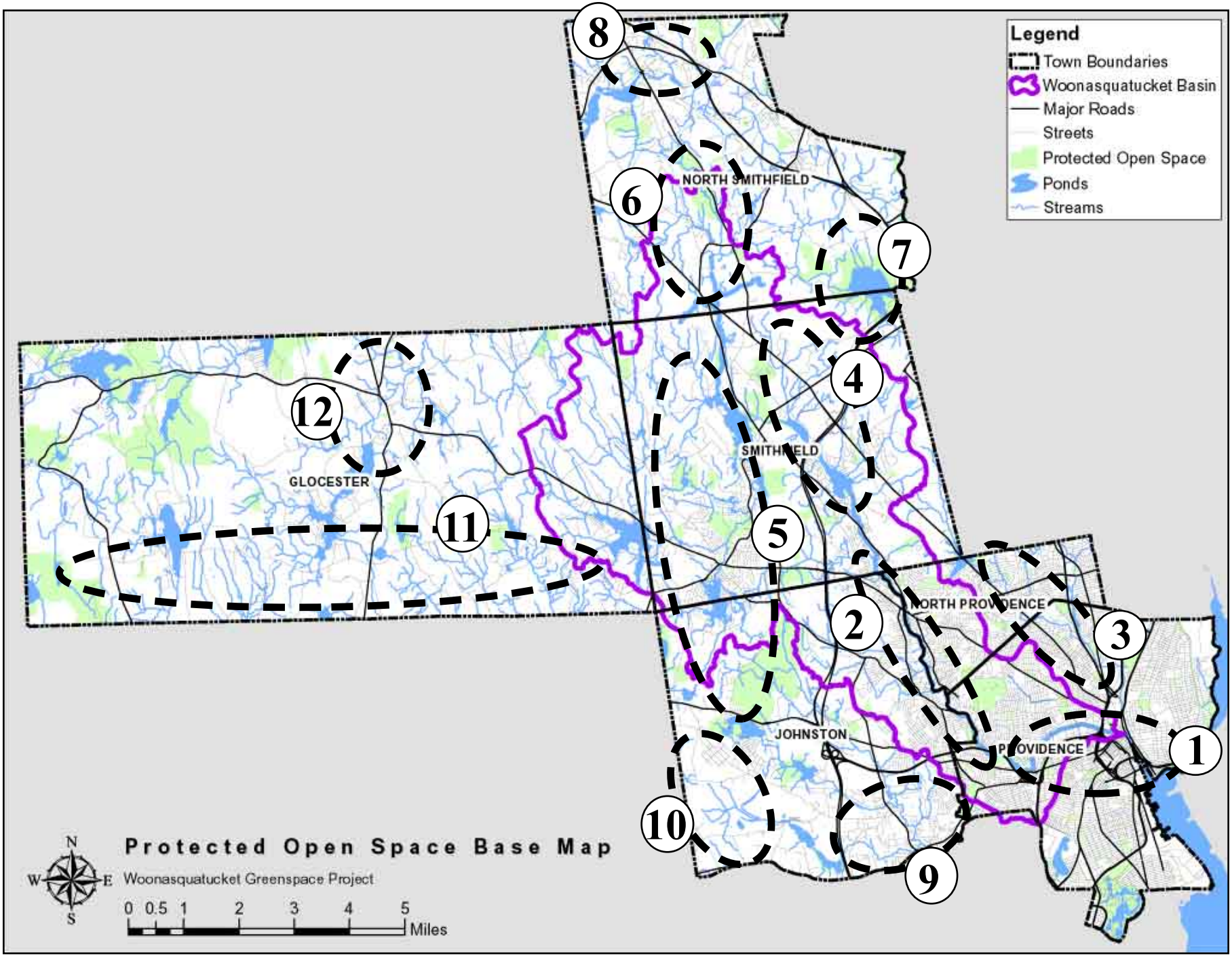
To some extent this is understandable. Traditional conservation efforts tend to focus on large tracts of undeveloped land, and are commonly funded by state agencies that are most interested in natural resources. These heritage landscapes, however, are by definition complex combinations of natural and cultural features:

An old bridge in Slatersville illustrates that the most beautiful landscapes are rarely entirely natural or man-made, but rather a combination of the two that has evolved over time, capturing the story of a particular place.

in fact it is the braiding together of the two that often makes them such interesting and beautiful places to visit.

This includes many areas that may have been overlooked in previous conservation efforts: the villages of Hughesdale, Thornton and Simmonsville, and the Peck's Hill neighborhood of Johnston; the Snake Hill Road and Sheldon Road corridors of Glocester; several areas north and east of Stillwater and Georgiaville in Smithfield; and the landscape surrounding Primrose in North Smithfield. These "hidden gems" include urban landscapes as well, including historic mill villages along the Woonasquatucket such as Olneyville, Manton, Centerdale, and Greystone; and upland neighborhoods such as Fruit Hill in North Providence. In each of these places, there may not be any one feature that has truly regional importance -- instead it is the combination of resources, together with recreational opportunities, that provides the value that makes these special places worth preserving.

As shown on the following page, using this analysis, the areas with the highest value for multiple resources and recreational opportunities can be readily identified. Some may be so special or sensitive to development that they need to be protected outright. Most however, can be largely preserved with a combination of acquisition, private management, and careful development that respects the existing character of each site and its context. As described in the next section, there are many tools that towns can use to implement this approach. The process of Greenspace mapping and analysis shown here, however, is a critical step in identifying which tools are most appropriate to any given area or parcel of land.


Legend
Town Boundaries
Woonasquatucket Basin
Major Roads
Streets
Protected Open Space
Ponds
Streams
8
6
7
4
12
11
5
2
3
1
10
9
NORTH SMITHFIELD
SMITHFIELD
GLOCESTER
NORTH PROVIDENCE
JOHNSTON
PROVIDENCE
Protected Open Space Base Map
Woonasquatucket Greenspace Project
N
W
E
S
0 0.5 1 2 3 4 5
Miles

Heritage Landscape Preservation Focus Areas

This map shows a simplified view of the areas with a high concentration of natural, cultural and recreational resources. These places, which could be considered "living museums of the Woonasquatucket" embody the historic character and quality of life that draws people to the area. They include some areas of Glocester and North Smithfield that lie outside of the Woonasquatucket Watershed:

1. Lower Woonasquatucket Main Stem. The main stem of the Woonasquatucket from Providence Harbor to Olneyville.

2. Middle Main Stem. The main stem from Olneyville to Esmond

3. The West River Valley, from the Moshassuck River in Providence to the Wenscott Reservoir in North Providence and Lincoln.

4. North-Central Smithfield, from Georgiaville to Rocky Hill.

5. The Greater Greenville Valley, from Snake Den in Johnstone north to the Stillwater Reservoir.

6. The Northern Reaches of the Woonasquatucket, from Stillwater to Primrose.

7. The Saylesville Neighborhood of North Smithfield.

8. Slatersville and Branch Village in North Smithfield

9. Hughesdale – Neutaconkanut Hill area of Johnston and Providence.

10. The Peck Hill – Lawton Hill Corridor in Johnston.

11. The Snake Hill Road Corridor in Glocester

12. Chepachet and surrounding landscapes

Further study of these focus areas will reveal many opportunities to combine conservation of sensitive natural resources with protection of historic sites and landscapes. Rich opportunities for recreational development also exist, especially through the creation of recreational trails that also provide access to special natural and cultural sites. This combination of recreation and historical interpretation can be a valuable economic development tool for communities whose major asset is their visual character and quality of life.

At the same time, growth can continue, even within the focus areas -- but that growth should be directed at rebuilding and revitalizing village centers and urban neighborhoods. It can also include carefully-planned development in the surrounding countryside. The value of the Greenspace planning approach is that it helps to identify the essential character-defining elements of each community before development occurs, allowing towns to preserve those that are most sensitive while taking advantage of the rest to enhance the character of each new project. Techniques for implementing these ideas are described in the next chapter.

Reuse of old mills for offices and apartments has become more and more common -- particularly where these historic structures are surrounded by intact neighborhoods, natural areas, and recreational amenities.

IV. Recommendations for Action

This chapter begins with an overview of well-established acquisition strategies for land protection and continues with specific recommendations to communities based on Randall Arendt's analysis of their local comprehensive land use plans. It concludes with a presentation of techniques outlined in the *Rhode Island Rural Design Manual* as well as a second publication, *The Rhode Island Conservation Development Manual.* It is followed by a final chapter which details specific action strategies developed during the regional workshops that towns and regional agencies can use to implement the Woonasquatucket Greenspace Plan.

Before the recommendations are presented it is important to note here that the implementation of this regional greenspace protection strategy occurs under the rubric of state law dealing with greenway protection (The 'Rhode Island Greenways Act of 1995' (R.I.G.L. 42-125)) and local comprehensive land use planning (R.I.G.L. 45-22.2 *et seq.*). Moreover, implementation of this regional strategy represents the realization of statewide greenspace and greenway protection objectives. For instance, the recommendations that follow discuss how land protection efforts should focus on protection targets such as riparian corridors and other linkages between important resources to create a network of greenspace, joined by greenways, serving multiple purposes.

In addition, this section explains how greenspace conservation can take advantage of the

The complex landscapes of the Woonasquatucket Region cannot be understood from a single perspective: successful conservation and urban redevelopment will likewise require coordinated efforts in planning, acquisition, and creative growth management.

through the land development process. These strategies are paramount to the realization of the Rhode Island State Guide Plan Element #155: *A Greener Path…Greenspace and Greenways for Rhode Island's Future* – the State's principal guidance for greenspace and greenway protection. Furthermore, the Greenspace Planning Program has made considerable progress in coordinating state agency greenway efforts, assisting local governments and private groups in greenway creation, and providing information to the public on the availability and usage of greenways in Rhode Island – the very goals of the Rhode Island Greenways Council. Therefore, it makes sense that this section on implementing the Woonasquatucket Greenspace Protection Strategy begins with land protection strategies derived from state guidance.

Acquisition Strategies

The recommendations described below for protecting land are not new. These acquisition techniques are adapted from the Rhode Island State Guide Plan Element #155: *A Greener Path…Greenspace and Greenways for Rhode Island's Future*. This "*Land Protection Toolbox* – A *Compendium of Acquisition and Regulatory Strategies useful in Preserving Greenspace and Assembling Greenways"* (*See* Table I below) lists and describes techniques for greenspace protection that apply to most municipalities, agencies and organizations involved in land protection. It is included here as a reference. For more information on funding sources please refer to the grant guide provided in Appendix II.

Using Greenspace Planning and Creative Development to Preserve Land

Town governments play key roles, especially planning boards and planners, as the entities that can shape growth through management of the development process through local plans and regulations. The common thread that unites the following recommendations for local

Table I - Adapted from "THE LAND PROTECTION TOOLBOX - A Compendium of Acquisition and Regulatory Strategies Useful in Preserving Greenspace and Assembling Greenways"[1]

1.Adapted from *Tools and Strategies: Preserving open Space: A Guide for New England*. Taubman Center, Kennedy School of Government, Harvard University and National Park Service. 1992.

Acquisition Strategies

Technique	Description
Fee Simple Purchase & Variations	Acquisition of full title to land and all rights associates with land.
Fair Market Purchase its use.	Open market or negotiated purchase of full title to land and all rights associated with
Donation/Bargain Sale	Outright gift of full or partial interest in property, or sale of property at less than market cost.
Purchase With Sale or Leaseback Provision	Purchase of full title followed by sale of non-sensitive portion, or leaseback to original owner with restrictive provisions to control future use/ development.
Installment Sale	Allows buyer to pay for property over time
Land Exchange	Swapping of developable parcel for property with conservation value.
Option/Right of First Refusal	Owner agrees to offer designated entity first chance to purchase land before placing on market.
Public Condemnation/Eminent Domain	Taking of private land by governmental entity for legitimate public purpose upon payment of just compensation
Purchase of Development Rights	Right to development purchased while the landowner reserves the rights to exclusive occupancy and limited usage.
Conservation Easements	Partial interest in property purchased or donated to protect its natural or historic features.
Public Access Easement	Provides right for public to access parcel for specific uses.
Joint Use Easement	Combines multiple uses in one easement instrument (e.g., public access with utility corridor easement).
Permits & Licenses	For fee agreements that specify usage conditions for fixed period.
Lease	Legal arrangement for short or long term rental of property.
	Agreement between landowner and agency for specific purpose.

communities is the idea of using the Greenspace Planning Process not to stop development, but rather to guide growth to create vibrant centers while preserving the character-defining features of a community. Land development by private interests is the primary agent of change that most towns face. Since many more areas have value as open space than can possibly be protected through outright purchase, a comprehensive network of open space – either locally or across the region – will only be realized through a collaboration of towns and developers. Changes to local zoning ordinances, such as Conservation Development, will make this possible, but by themselves will not create better projects. Likewise, local comprehensive planning often lacks the detail and clarity of direction that helps individual landowners and site planners make good decisions when planning for development. The detailed inventory and resource priority maps created during the Greenspace Project are designed to fill this gap with specific, detailed information that allows Planning Boards, land owners, and developers to see ahead of time where the most important open space resources are in a town. As each property is considered for development, as most inevitably are, the Greenspace Plans provide a starting place for discussions about where development should be placed on a property in order to protect the resources enjoyed by all town residents.

Randall Arendt's Recommendations

As part of the Greenspace Project, **Randall Arendt** prepared an audit of the comprehensive plan, zoning ordinance and development regulations for Glocester, Johnston, Smithfield and North Smithfield. The audits examined the comprehensive plan's stated goals, and discussed techniques of preserving the visual qualities of the Town's important natural features and scenic roadways, of protecting vegetated buffers between land uses, roads, streams, wetlands, etc., and of providing flexibility to encourage alternative land-use developments.

These audits are designed to highlight the areas of local plans and regulations that can make it difficult to protect open space effectively both within individual sites, and as a community-wide network of open space. He prepared two memoranda for each community and made a presentation to the Planning Board in each town. The first document offers broader recommendations, while the second provides more "town-specific" recommendations for each community. The ***key recommendations*** shared by multiple towns

include:

- Adopt greenspace maps and other applicable recommendations into comprehensive land use plans.
- Develop a town-wide map of Potential Conservation Lands, comparing various levels of protection to degrees of resource value identified through the Greenspace Analysis.
- Update Comprehensive Plan with descriptions of necessary changes to zoning ordinances and subdivision regulations necessary to implement the Conservation Plan.
- Update the Subdivision Ordinance to include a "sketch plan," Conceptual Master Plan, mandatory site visit, and required site analysis elements, as well as to describe a design process.
- Amend the Zoning Ordinance to incorporate "Growing Greener" mechanisms.
- If it exists in local ordinances, replace "cluster development," with Conservation Development approach, so that new development will contribute substantially to the community's overall conservation objectives, adding specific design standards for the quantity, quality, and configuration of subdivision open space that must be delineated, conserved, and related to the community-wide open space network.
- Provide incentives for projects that help accomplish town-wide open space goals.
- Encourage landowner stewardship. Nongovernmental groups, such as land trusts and watershed associations, best carry out such an effort.

Creative Land Use Techniques: Recommendations of the South County Watersheds Technical Planning Assistance Project

In 2001, Dodson Associates completed a project for RIDEM's Sustainable Watersheds Office that was designed to assemble tools and techniques for more sustainable planning, design and regulation in rural Rhode Island. Developed by a team of designers, planners, water resource specialists, and legal experts, the project produced a series of reports and manuals that were distributed to each of the towns, and which are available from DEM, and can be viewed at: www.state.ri.us/dem/programs/bpoladm/suswshed/sctpap.htm.

The project was designed to gather the best possible solutions from around the country and show how they could be applied locally. With the participation of an advisory committee of more than sixty town planners, elected officials, and citizens, the consultants prepared a suite of "Smart Growth" tools, including a set of Model Zoning Ordinances, Strategies to promote Farming and Forestry, a study of Transfer of Development Rights, and a Development Site Assessment Guide.

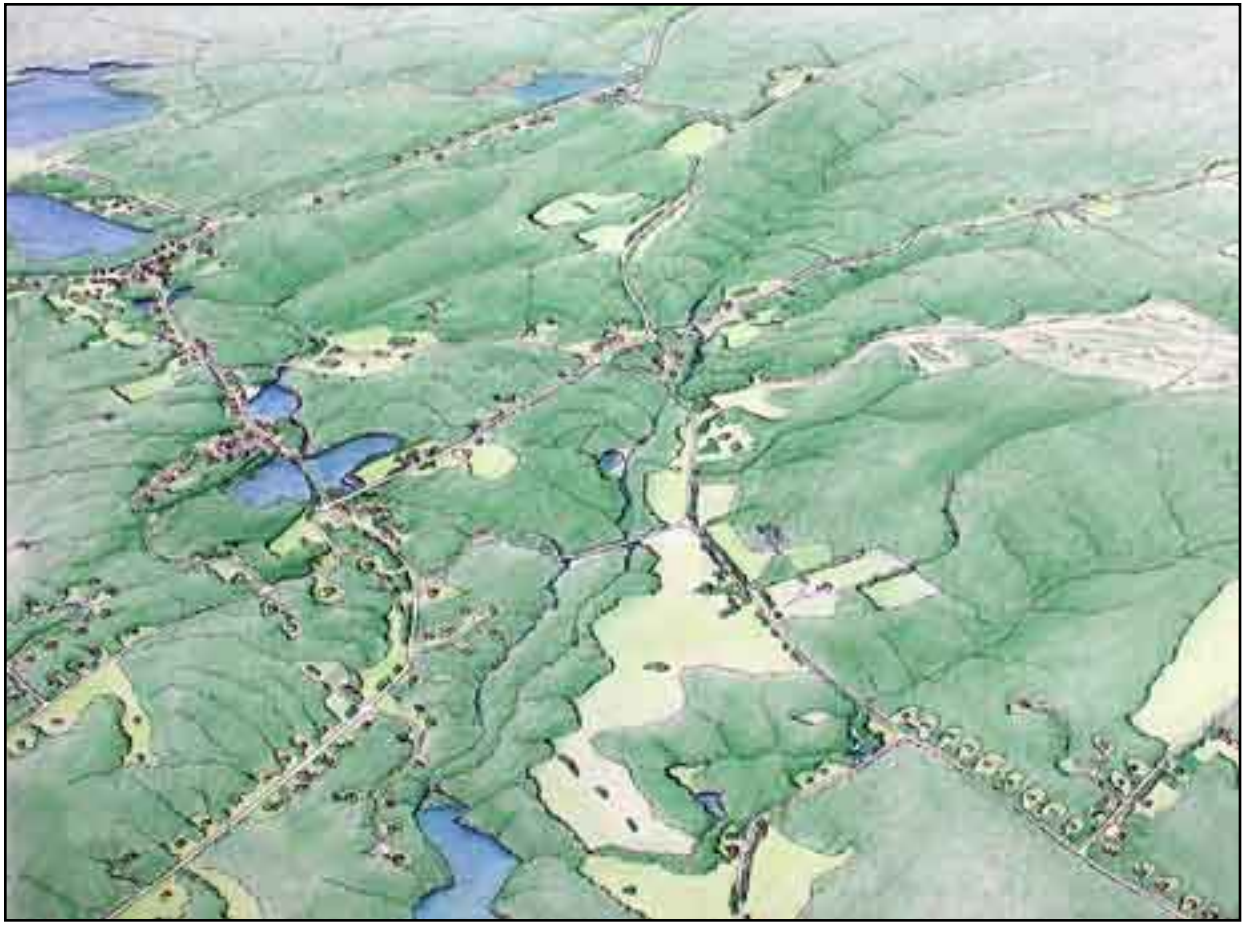
The centerpiece of the effort has recently been republished as the *Rhode Island Rural Design Manual*. The design manual demonstrates creative approaches to development and/or revitalization for eight real sites in rural Rhode Island Towns. As shown in the following images from the Manual, the development scenarios for each site were illustrated with aerial perspective drawings and photographs, designed to show how planning and design can work together to build more sustainable communities. In the first example, a typical ***rural neighborhood*** is shown before and after conventional development. The creative development scenario illustrates how the local greenspace maps could be used to help plan development of individual parcels. With coordinated planning for each property, the development process itself can help preserve permanent town-wide open space networks.

Similarly, significant cultural resources like ***historic village centers*** can be protected through the development process when towns adopt historic district overlay zones that combine flexible controls on use and density to promote revitalization, with standards for design that protect historic architecture and landscape character. *The Rhode Island Rural Design Manual* outlines such planning and design techniques for a 'Historic Town Center' with supporting model language for a new zoning to protect village centers - 'Planned Development District – Village and Neighborhood Sites' – found in the ***Technical Planning Assistance Project Model Land Use Ordinances*** (page 101).

The Rhode Island Rural Design Manual was built around eight different sites (top right) chosen to represent a wide range of landscape types and typical planning situations encountered by rural and suburban towns. Each of these hypothetical case studies takes an actual site and shows how it would most likely be developed in today's market, following current zoning and other regulations. A more creative development alternative for each site was drawn up to demonstrate how the same or an even greater amount of development could be accommodated while preserving important resources.

The results graphically illustrate that growth doesn't have to be detrimental to the character and livability of small towns. Indeed, with careful planning and creative regulation, investment in new development can be harnessed to rebuild downtowns, retrofit declining commercial strips, and create wonderful new neighborhoods surrounded by protected open space.

Many areas of rural Rhode Island identified by local Greenspace plans as important open space resources are also the easiest to develop for large-scale commercial uses. The Design Manual demonstrates how to develop a portion of such areas while allowing traditional open space uses to continue on most of the land.



The Rural Neighborhood site is made up of a mix of open meadows and large forested parcels (at right side of the drawing at left) together with a series of historic mill villages that line an old state highway (left side of the picture). Like many rural areas, there is no single dominant element that generates its rural character; rather, it results from a great variety of natural and historic cultural landscapes within a relatively small area. In this scenario, natural resources include streams, ponds and wetlands, and several large tracts of undeveloped woodland. Cultural resources include village centers, agricultural landscapes and historic mill sites.

These resources are linked together by several types of corridors: streams connect wetlands and waterbodies into an ecological system supporting diverse communities of plants and animals; rural roads link farmsteads and meadows into a continuous agricultural corridor; and old farm and logging roads make an informal network of recreational trails that link existing protected lands with village centers.

Current zoning for the area requires a two-acre minimum lot size, as seen in the recent frontage lots at the lower right and left. Historic lot sizes are either much larger, as seen in the farmstead at the lower left side of the page, or much smaller than two acres, as shown by the aerial view of one of the mill villages, where lot sizes are as small as 5,000 s.f.

Like many rural areas, the diversity of uses and development densities has created a rich visual environment. Much of the land has remained open and in active management for timber harvesting or agriculture, and there is room for both wildlife and people.

Under current zoning, in the **conventional scenario** most of this rural neighborhood would be developed at a density of two acres per unit. Areas with poor soils, steep slopes and difficult access have not been shown as developed: even so, this uncoordinated large-lot development pattern pollutes water bodies, fragments wildlife habitat, and destroys scenic vistas. Any hope of maintaining existing visual character or quality of life would be lost.

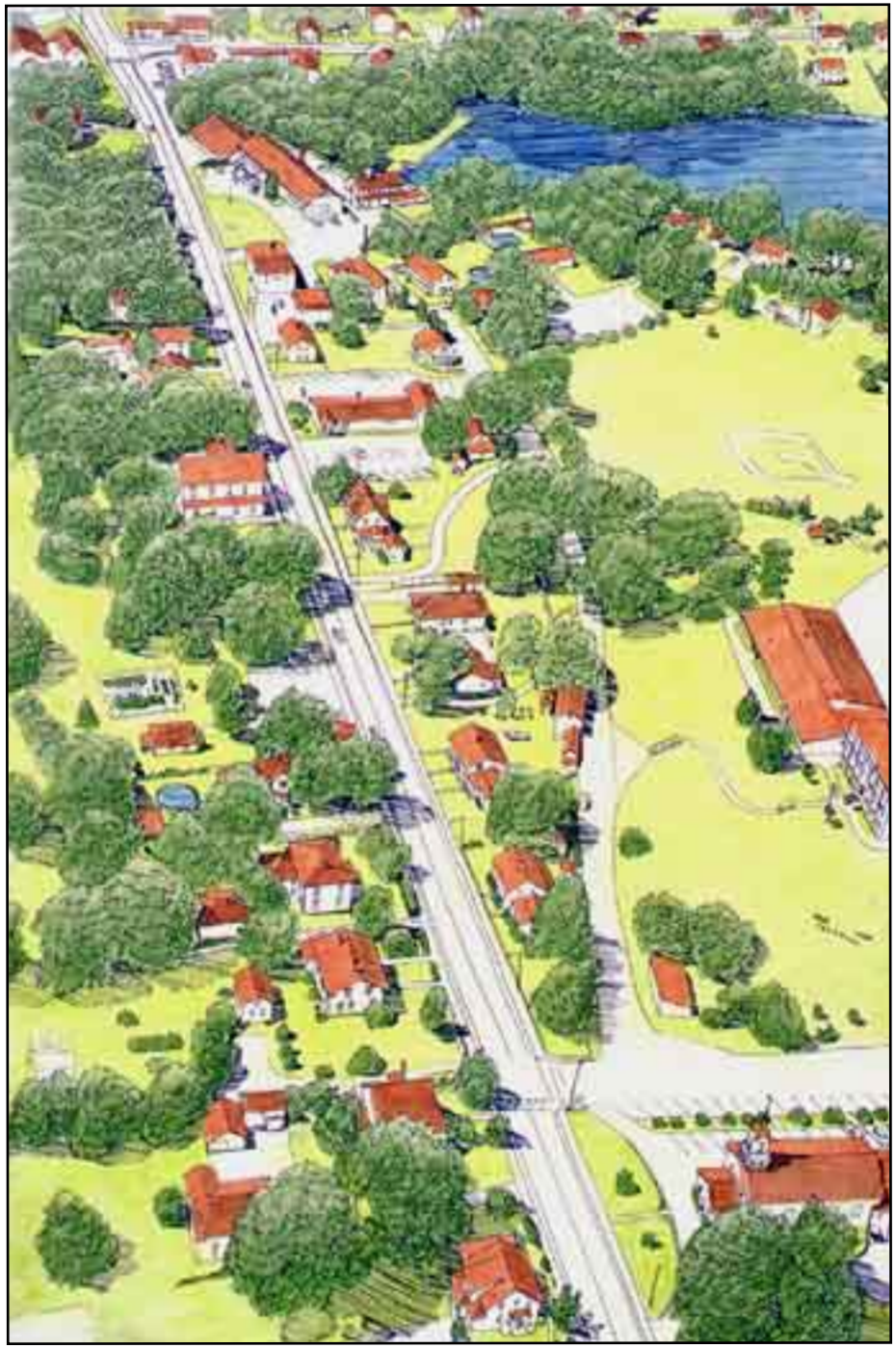
The rigid standards of conventional zoning make little sense in such a varied landscape, where suitability for construction varies widely from parcel to parcel. Relatively few large lots are available close to village centers, which ironically have the best infrastructure, road access, and services. It ends up being easier to subdivide the large farms in the countryside, in part because these have the room and free-draining soils necessary for individual septic systems. In order to make money at these densities, developers tend to favor construction of large single-family houses on cul-de-sacs (bottom right and left), which are more likely to produce a profit to offset high per-unit construction costs.

The result of this process is a virtual monoculture of suburban house lots, which fit in neither with the rural landscape in the countryside nor the traditional streetscape of the villages. This ends up destroying the character and sense of place of both environments. Just as problematic, this narrow range of products no longer meets the needs of many existing residents, and caters to an increasingly small segment of the larger marketplace, especially as the regional population continue to age and households shrink.

The **creative development scenario** uses the idea of "conservation development" to accommodate the number of units allowed by current zoning while preserving 50-75% of the land available for development on each parcel. What makes this possible are flexible zoning rules that keep the overall 2 acres/unit density while allowing smaller or narrower building lots. What makes it work is a design process that goes beyond the usual engineering to address the visual character of the proposed development and how it fits into its context. Most important, this design process starts with a detailed analysis of natural and cultural resources, and designs the development around the open space, rather than the opposite.

If each subdivision project follows this "conservation design" approach, then the development process itself gradually creates a permanent town-wide open space network. In addition, many towns and counties are beginning to provide guidance for these efforts with plans that identify key open space resources and suggest town-wide open space corridors. By following these plans, developer can avoid sensitive resources, contribute to town goals for open space, and enhance the value of building lots. Thus, while individual house lots may be smaller than two acres, each homeowner shares in the views, character, and recreational potential of the protected open space that surrounds his or her property.

Within each project, the design process takes advantage of the character of the site and its surroundings to create a more attractive and livable neighborhood, which may take the form of a rural hamlet, a shady road through the woods, or a quiet lane on the edge of an existing village -- in each case building *with* the character of the site rather than paving *over* it.



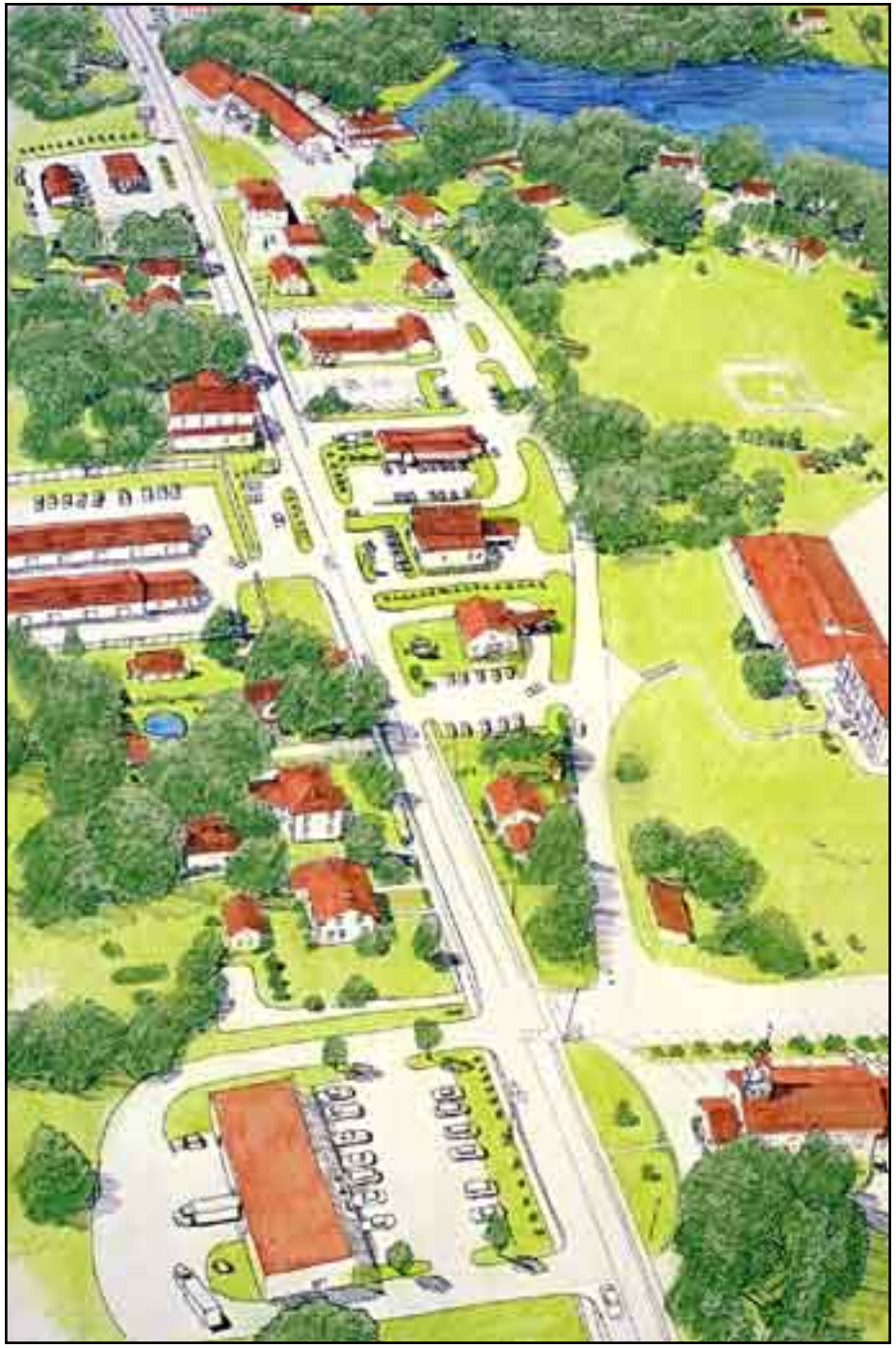
Settled in a dense band of structures lining Main Street, this **historic village** contains a remarkable collection of historic homes, commercial buildings, brick mills, and churches. Visually, this has created a delightful variety in size, shape and architectural styles, held together by the unifying theme of Main Street. Functionally, it is still a 19th century village, with home, school, church, commercial and government uses in close proximity. This creates an eminently walkable community, with a high degree of livability and a strong sense of place. Shops and businesses tend to be small and locally-owned, relying on personal service rather than cheap prices to attract customers. The scale of these businesses is ideal for the Main Street location, where they have the flexibility to fit into existing storefronts (left), or reuse historic structures (below). Despite the attractions of village centers like this one, growth can be stifled by small lots, lack of parking, and aging infrastructure. What growth there is tends to occur around the edges of the village, where large lots are easier to develop. Open space surrounding the village is lost, together with the traditional character of a community surrounded by open space.

As a result, Main Streets in small towns can remain in suspended animation for years as the fields and forest that surround them are divided up for house lots. Meanwhile, commercial investment is siphoned off to other areas of the town, often on the highway strip outside of the village, or in new industrial parks near the interstate.

Many factors conspire to produce the **conventional scenario** illustrated at right. Zoning requirements for minimum lot size, frontage and setbacks make it hard to expand on existing lots. Requirements for off-street parking and limits on building coverage can make it even harder to build anything without tearing down existing structures and consolidating lots. Lacking a municipal wastewater system, any change of use can require expensive upgrades to individual systems. Some uses, like restaurants, may be driven out of the village if the lot is too small to install a suitable system.

While this has slowed development to some extent, it is only a matter of time before the rewards to developers outweigh the costs of wholesale replacement of existing buildings. It also means that new development is likely to be driven, not by local residents, but by corporations looking to expand franchise gas stations, mini-malls and fast food outlets. The result will be development that does not relate to the existing village in either scale or appearance, which tends to favor automobile access over pedestrians, and which virtually ensures the loss of much of the fine architecture that remains in the village.

These pressures also encourage businesses such as self storage units (below) that certainly contribute economically to the town, but offer little to the character and livablity of Main Street. With low overhead and minimal needs for wastewater treatment, this can seem like a perfect choice for the small local business owner who can't get approval for a more traditional Main Street use.



In the **Creative Development Scenario**, the village is revitalized with new homes and businesses carefully designed to fit in with the historic character and pedestrian scale of the village. Rather than tearing down existing buildings, additions are placed to the rear in compatible architectural styles. Larger uses are accommodated by connecting existing buildings together. Meanwhile, careful planning provides the convenient vehicular access and ample parking demanded by growing businesses. At the same time, open space surrounding the village is protected through a combination of acquisition and carefully-planned development. Parks, playgrounds and overlooks are set aside to make the village more livable, and the town's Greenspace plans help to locate potential trail connections.

Shared curb-cuts between parcels reduce conflicts between cars and pedestrians and improve the appearance of the streetscape. Driveway connections cross lot lines, minimizing curb cuts and allowing customers to drive to adjacent businesses without pulling back onto Main Street. Placing drive-through windows at the rear of the buildings allows a function necessary for the success of many modern businesses, while keeping the streetside pedestrian-friendly.

Parking is distributed throughout the village in small lots at the side and rear of structures. This is convenient for customers, and helps to reduce the apparent amount of asphalt. Cooperative agreements between landowners provide for connections across lot lines. The alleys allow customers and service vehicles to travel between businesses without pulling back onto Main Street. Sharing of parking lots is also encouraged, with residents using lots at night that during the day serve neighboring businesses.

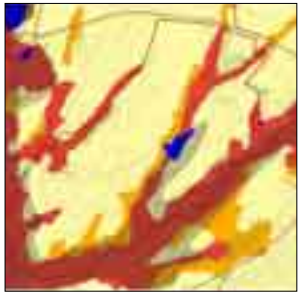
This comprehensive approach to providing for parking and vehicular access results in a much more efficient use of space, allowing Main Street to be renovated for the comfort of pedestrians. A "streetscape masterplan" provides for improvements to sidewalks, addition of benches and trash receptacles, and pedestrian-scale street lights that encourage people to walk between uses. Overhead wires are buried, and a comprehensive landscape maintenance plan provides for the care and replacement of street trees. This public investment inspires private investment in storefronts, sidewalk cafes and events that take advantage of a revitalized Main Street environment.

Conservation Development is a creative land use technique that allows a community to guide growth to the most appropriate areas within a parcel of land to avoid impacts to the environment and to protect the character-defining features of the property. The goal is to accommodate growth while preserving at least 50% of the parcel as meaningful open space in perpetuity.

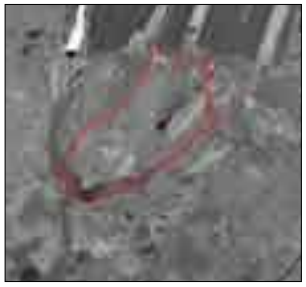
The Rhode Island Conservation Development Manual describes a detailed ten-step process for designing projects that protect important resources while allowing the same number of new homes to be built as would be possible under a conventional plan. As illustrated by the drawings on the following pages, this process helps to identify not only where to place roads and structures on a site, but how to design a new neighborhood so that it respects the character of the existing landscape.

The process is based on a detailed analysis of the site and its context, followed by a delineation of the land which has the highest resource value. Thus, towns that have completed Greenspace plans can use them to help landowners and developers design new projects that preserve the features of a site that have the most value to the community. Guided by such a townwide plan, multiple projects can collectively build continuous open space networks -- all without any expenditure of public funds.

Step 1: Analyze the Site



Step 2: Evaluate Site Context



Step 3: Designate Potential Conservation Areas

Step 4: Determine the Maximum Number of Units

Step 5: Locate Development Areas, Explore Alternatives

Step 6: Locate House Sites

Step 7: Lay Out Streets, Trails and Infrastructure

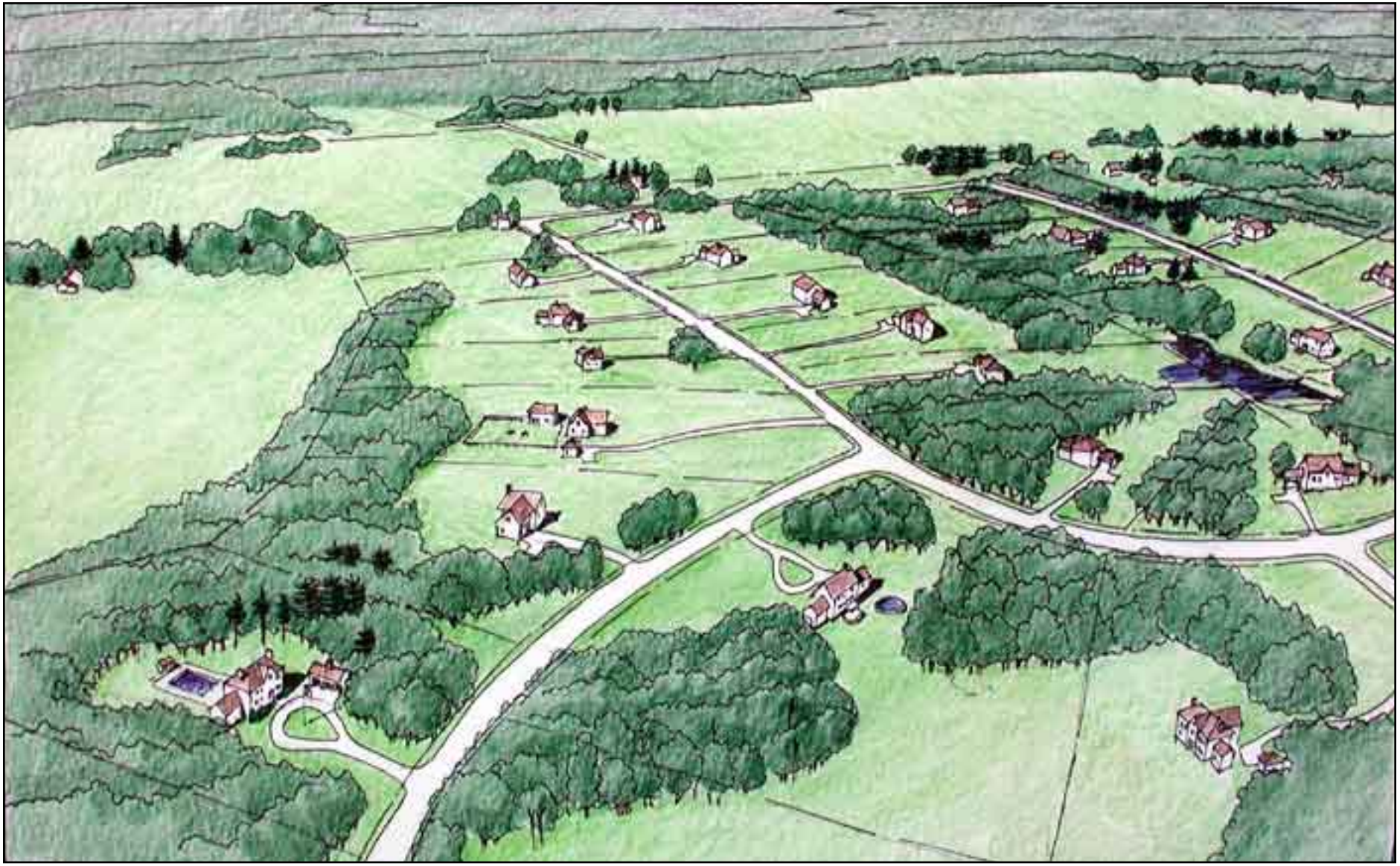
Step 8: Design and Program Open Space

Step 9: Draw in the Lot Lines

Step 10: Establish Ownership and Maintenance of Open Space

Existing Conditions

The site is made up of a varied landscape of farmland, forest, and wetlands, totaling about 175 acres. Each of these landscape types is connected to similar lands on neighboring parcels. Ecologically, the site is imbedded in a rich matrix of meadows, riparian forest, and upland forest. Economically, the active dairy farm on the site is central to one of the last remaining agricultural areas in Rhode Island -- a land use that gets harder to maintain as farms are isolated from each other by development. The visual character of the site reflects this remarkable variety of land uses: it includes historic farmsteads along the state highway, long views across cultivated land, and a series of small meadows and woodlots. Adding further variety to the mix are isolated large trees and hedgerows dividing the fields, as well as steams, ponds, and wetland corridors.



Conventional Development Scenario

Applying the 200,000 s.f. minimum lot size allowed in this district produces a subdivision of 34 lots (some out of sight below the frame of this illustration). Development of these lots and new roads to access them destroys the agricultural use of the land -- though homeowners would have enough room on individual lots to keep a few horses. The open character of the landscape, particularly on the more visible northern end (top of illustration), would make it difficult to hide the houses. At best, what results is a more spread out version of a typical suburban subdivision, with lots too large to be easily maintained, but too small for continued agricultural use.

Conservation Development Scenario

The Conservation Development approach allows the farmer, the residents, and the public all to benefit. Most of the areas in active cultivation remain so, and are leased or resold to the same family now operating the farm. A new road follows the treeline along the edge of the fields to provide access to a new neighborhood tucked into the woods and meadows on the southern half of the site (bottom of illustration). The same 34 units allowed under current zoning for the site are constructed on lots averaging half an acre. The remaining open space is set aside for conservation of stream corridors and wetlands, while a network of pedestrian trails allows residents to enjoy this common land. Homes in the new neighborhood would each face out onto a small park, as well as having views and physical access to common open space in the rear of each property. The quality of life this affords keeps lot values high, even though the lots themselves are smaller.

V. Action Strategies for Implementation

Introduction

The regional maps described in Chapter Three illustrate the physical goals of the Greenspace project. In Chapter Four, recommendations for action were described, including acquisition strategies, creative landuse techniques, and conservation development. In practice, implementing the Greenspace Plan will involve the efforts of many different private and public groups, acting at both the local and regional level. To guide these initiatives, participants in the regional workshops were asked to review the regional maps and develop a list of the most important strategies and potential actions to be pursued. As described below, these include efforts that each town can undertake individually, as well as shared regional projects. With such a diverse range of resource types and recreational opportunities, participants soon realized that implementing the plan means going beyond the traditional conservation tools of purchasing land or easements. While these will continue to be important, equally valuable will be efforts at education and outreach, updates to local zoning and development regulations, and shared efforts to plan and build recreational networks.

These strategies are designed to serve as a guide to action by town boards and commissions, state agencies, non-profit conservation groups, and the Woonasquatucket River Watershed Council. They are not listed in order of importance, but following the structure of the Greenspace process have been organized according to the three resource themes, with a section of general strategies and actions for all Greenspace resources. For each section, the overall strategy and potential actions are shown in bold type, with an accompanying explanation where appropriate.

General Strategies and Actions

A. Use the Greenspace Plans to separate resource areas which should be preserved outright from those which could be partially developed.

A1. Consider permanent protection of areas with the highest resource value for a single resource theme. The most sensitive natural resources, the most historic places, the last working farms, and key recreation sites all may be impossible to preserve without being purchased by a town, land trust or non-profit entity. This tends to be particularly true for sensitive habitat areas where even modest levels of development may have a negative effect.

A2. Consider permanent protection of areas where two or three resource categories combine to create opportunities to achieve multiple conservation or recreational goals. In each of the six communities, there are areas where resources and recreational opportunities converge to promise a potential benefit from conservation that is more than the sum of its parts. While the Greenspace plans indicate where these areas are, individual sites need to be evaluated on a case by case basis to determine the potential benefits of permanent protection.

A3. Develop more detailed plans for conservation and development in areas that include all three resource categories. Many of the areas shown as containing multiple resource priorities in the Greenspace Plans can absorb additional development without harming those resources. In fact, by reinforcing historic development patterns, cleaning up abandoned properties, and improving the condition of infrastructure, new development can revitalize older neighborhoods and improve quality of life for existing residents. The complexity of these areas, however, combined with multiple ownership, can make it difficult for any single landowner or developer to know how best to build on a site. Preparation of a neighborhood masterplan can bring the concepts identified in the town Greenspace Plan down to the level of individual streets and parcels, and provide guidance for individuals as decisions are made about each property. Having such a plan in place makes it much easier to pursue creative techniques such as Conservation Development.

A4. Consider immediate action for regional Greenspace corridors that coincide with important local landscapes. It makes sense to join with neighboring communities to develop regional Greenspace corridors as

illustrated in this plan. The best place to start is with those areas where the highest values for local residents coincide with potential for regional connections.

A5. Consider local open space bond funding for land acquisitions that include cultural resources. Because most existing open space grant sources emphasize protection of natural areas, state and non-profit conservation funding may not be available to help preserve the most important cultural and historic sites, or areas with multiple resource values.

B. Update Comprehensive Plans to reflect Greenspace planning data, procedures and results.

B1. Develop a detailed local greenspace strategy. It is possible to incorporate the Greenspace Maps "as is" into the local Comprehensive Plan. Just as important, perhaps, is to adopt the Greenspace planning *process*, with its focus on the full range of natural, cultural and recreational resources. Planners and board members should discuss which elements of this process are most important to the community, and work to develop detailed strategies for those areas. For example, some towns are most concerned about water supply, while others need more parkland and recreational opportunities. Some feel they have more than enough conservation land and others not enough. While a balanced strategy is desirable in all communities, each will naturally want to emphasize certain elements according to local needs.

B2. Adopt a town-wide map of potential conservation lands. While the Greenspace plans provide a systematic conceptual framework for local decision making about conservation and development, it does not reflect those decisions on a parcel level. As described more fully in chapter five, this process must go beyond mapping of resource priorities to look at the practical threats and opportunities that any town or land trust considers when planning for conservation. Where are the parcels that are already protected, and where are the key gaps between them? Which land is already fully developed under current zoning? Which lands are protected by wetland regulations? Which lands are unlikely to be developed due to steep slopes or access problems? As described by Randall Arendt in his audits for Smithfield, North Smithfield, Glocester and Johnston, the map of potential conservation lands summarizes these questions and highlights those resource areas that are most likely to be developed. This provides a valuable reference when parcels become available for purchase, or during pre-application review of development proposals.

B3. Pursue corridor and neighborhood plans to inventory resources and establish design guidelines for future development. While both the Greenspace plans and a more detailed map of potential conservation lands provide guidance for the location of new development, neither is very useful in describing the *form* that development should take. Especially along the historic road corridors and village centers identified as cultural priorities in the Greenspace plans, it is desirable to prepare more detailed masterplans that establish guidelines for the design of the streetscape, location of buildings, driveways and parking lots, and promote shared services, parks and amenities. These guidelines are often incorporated into the zoning ordinance, and can help ensure that development fits in with the historic character of the community.

C. Incorporate Greenspace goals and data into ongoing functions of town boards, staff and officials

C1. Pursue outreach and education of staff and board members. The Greenspace maps contain a wealth of information for guiding many different kinds of decisions by various town boards and commissions. Review of new subdivisions, proposed roadway improvements, recreation planning, and neighborhood revitalization all can be enhanced with a better understanding of a site's natural and cultural history and context. However, this will only be accomplished if officials, staff and board members know enough to ask the right questions. Some of the necessary education can happen as the Comprehensive Plan is updated. As new board members and staff come on board, yearly training sessions can help bring participants up to speed.

C2. Develop posters and educational materials for all participants. Each town planner has received a digital copy of the town's maps on CD, and additional copies can easily be made. Paper copies of the maps can be incorporated into the Comprehensive Plan and included as appendixes to the zoning ordinance and subdivision regulations. To keep the town-wide goals for greenspace in the forefront, it is useful to have the summary of overlapping resources hanging on the wall; for a few thousand dollars, a poster including the map and explanatory text could be developed and distributed to various town offices.

C3. Identify town staff who will take responsibility for desired actions. Use of the Greenspace maps and implementation of plan objectives need not require a large additional investment, but responsibility needs to be made clear. As projects come forward, the town can require developers to assess potential impacts to Greenspace resources and adjust their plans – the town can even hire experts to help with the design process, with the developer paying for it. The key is for appropriate town staff to know where the Greenspace resources are, and for the town to give them the political support they need to move the developers in the right direction.

D. Revise zoning to reflect Comprehensive Plan and Greenspace goals.

D1. Adopt Randall Arendt's recommendations to implement Conservation Development. These techniques, described more fully in chapter five, can help towns ensure that new development avoids impacts to the environment, respects sensitive landscapes and fits into historic development patterns. The necessary changes to local zoning ordinances must be coordinated to updates to subdivision regulations and the Comprehensive Plan. Once in place, these allow towns to work with developers to take the number of buildings allowed on a parcel by current zoning and rearrange them to avoid sensitive areas and build more livable communities.

D2. Use Conservation Development to preserve/restore riparian buffers for river and stream corridors. Probably the single most important element in each town's natural resource system is the network of rivers and streams. Protecting riparian buffers in perpetuity enhances wildlife habitat, protects water supplies, reduces nutrient pollution and sedimentation, and controls flooding. Moreover, protecting riparian corridors can connect greenspace throughout each community and the watershed. While state wetlands laws provide a basic level of protection, towns should consider additional setbacks that reflect a more detailed understanding of soil conditions, vegetation, and functions and values of riparian corridors.

D3. Consider incentives for projects that support town goals for greenspace protection or restoration . While Conservation Subdivisions by definition preserve at least half of a site as permanent open space, towns sometimes place additional incentives in the zoning ordinance to reward developers who go beyond the minimal requirements. Typically taking the form of a small increase in the allowed number of units, these could be awarded for a project that preserves or restores permanent riparian buffers, creates scenic easements, corridors for trails or bike paths, or which creates public parks or ballfields. Incentives could be applied to any project that helps accomplish the town's goals for the preservation/restoration of natural, cultural and recreational resources.

E. Develop regional program of education and outreach to citizens, town officials, planners, and finance managers.

E1. Translate growth impacts and conservation opportunities into financial language. Local decision makers need to see the fiscal benefits of Greenspace protection and enhancement, both in reducing the impact of development on town finances and protecting natural systems that provide valuable services to the town. Grow Smart Rhode Island, the Southern New England Forest Consortium and others have documented the costs of sprawl generally, and the specific impact of each new home on local services. For further information on the financial costs of sprawl visit the Grow Smart Rhode Island website

at www.growsmartri.com. More recently, the value of undeveloped lands in protecting drinking water supplies, filtering pollutants from the air and water, and enhancing quality of life for residents has been quantified. Translated into financial language, these factors make an impressive argument for spending time and money now to prevent overdevelopment and loss of open space that will have a major financial impact in the future.

E2. Involve schools in further resource mapping and planning activities. The rich natural and cultural history identified in the Greenspace plans is a great resource for local schools. This can open up possibilities for the Woonasquatucket River Watershed Council to sponsor school curriculum development on the subject of local history and nature study. Schools are a great place to continue discussions about regional trails and bikeways.

E3. Pursue an identity program to name places, water bodies, and tributaries of the Woonasquatucket, with signage and other elements. Identification of important natural and cultural features in the watershed, both on maps and in the field, is critical to creating a shared awareness of the area's rich history. The Woonasquatucket River Watershed Council should continue to work with volunteers to rediscover the names of these places and consider a signage program to increase public awareness.

F. Pursue scenic byways, scenic roads program designation and management.

F1. Pursue research into current local scenic road designations and potential opportunities and benefits of state designation. Rhode Island's Scenic Roadways program, established in 1985, provides for stewardship, oversight and technical assistance for scenic roads. Seven such roads have been designated so far, including the Great Road in Lincoln. Benefits include help protecting roadside resources and planning for appropriate transportation improvements. Communities could adopt a similar program for local roads.

F2. Pursue outreach to towns on shared resources and opportunities for joint projects. The Woonasquatucket River Watershed Council should coordinate discussions between towns and the state Dept. of Transportation and Scenic Roadways Board on planning for scenic roads.

G. Promote Cooperation Between Local Land Trusts

G1. Identify convening body and organize initial meetings. The regional Greenspace meetings convened by the WRWC were well attended by local land trusts, and sparked interest in continued discussion. The Watershed Council or Rhode Island Audubon are logical conveners for future meetings.

G2. Solicit volunteers from each community land trust to serve as liaisons with land trusts in neighboring towns.

G3. Pursue common goals and joint projects. While local land trusts are by definition most concerned with sites within their own town, many opportunities for cross-border collaboration were identified by the regional Greenspace plans.

Natural Resource Strategies and Actions

H. Plan on the basis of watershed and sub-watersheds in order to protect functioning ecosystems and water supplies.

H1. Protect key "hidden resources" in each community. The Greenspace plans located a number of areas that are little known among local residents. Often difficult to see except from the air, these areas represent important opportunities for protecting water supplies and wildlife habitat. One reason they are hidden is that they often straddle the borders of adjoining towns. Some important examples were identified by participants in the regional meetings. These include:

- Cedar Swamp in Smithfield/Johnston,

especially borderlands of towns where combined parcels make significant shared areas.

- Wenscott Reservoir/Twin Rivers: an important ecological connection to Lincoln Woods and the neighboring Blackstone Watershed.
- Moshassuck River/ West River system in Providence; an industrial area that can be reclaimed.
- Connections between Durfee Hill and other natural resource areas in the west end of Glocester.
- The Neutaconkanut Hill area of Johnston and Providence.

H2. Protect headwater streams that are important to supporting wildlife, preventing flooding and degradation of down-stream water quality. While there is little detailed information available about the water quality and fisheries value of the Woonasquatucket's headwater streams, impacts on these areas can have devastating effects downstream. Towns should consider more detailed study of these areas, and explore methods for guiding future development as far away from surface waters as possible using conservation development or acquisition.

H3. Develop regional GIS database for natural resources. While the Greenspace plans collected available data on natural resources and supplemented it with local knowledge, there is a need for continued updates and more detailed investigation of important areas within each town. Coordinated by WRWC, additional GIS development could be implemented by local colleges and universities with oversight by RIDEM. The Nature Conservancy's Rhode Island Land Trust Council's technical support program is another possible source of help.

H4. Work with DEM, local conservation commissions, schools and universities to document biodiversity and ecosystem functioning and educate the public. Many different entities are interested in biodiversity and are collecting data about local sites – but little of this information is accessible to the public. The WRWC web site already has some data about biodiversity which could be the foundation of a more comprehensive source of ecological information.

H5. Work with landowners, developers and local officials to incorporate environmental best management practices into redevelopment projects. Well-planned development and mill revitalization projects can enhance riparian buffers and deal with potential pollution problems. These techniques are described and illustrated in detail in the Urban Environmental Design Manual, a publication that will soon be available from the Rhode Island Dept. of Environmental Management's Sustainable Watersheds Office.

I. Prioritize conservation action on the basis of making connections within and between towns.

I1. Place priority on preserving corridors and key gap parcels that extend and link existing protected areas. The "gap analysis" approach to conservation planning helps to prioritize investments by focusing attention on the critical unprotected parcels in the Greenspace system. Loss of these gap areas to development can often disturb the ecological functions of adjacent protected land, so it makes sense to look at where these are most threatened.

I2. Identify privately-owned areas that could be conserved with easements. Public ownership and control of lands is often unnecessary to protect their Greenspace value. Purchase or donation of easements can prevent development while keeping lands on local tax roles and in private stewardship to maintain working landscapes.

I3. Work with towns to publicize the Woonasquatucket Watershed Council's ongoing riparian buffer restoration project and extend to additional tributary streams.

I4. Pursue protection of farm and forest lands through acquisition, easements, and viability programs. Working farms and forests represent a tremendous community asset, both as natural resources and in support of visual character and quality of life.

The Rhode Island DEM's Sustainable Watersheds office has published a Farming and Forestry Strategies report which is available at: www.state.ri.us/dem/programs/bpoladm/suswshed/pdfs/farmstrt.pdf.

J. Promote joint conservation planning and action between towns.

J1. Foster better communication between bordering town's conservation efforts. For natural resources in particular, many of the important areas within the Woonasquatucket watershed straddle the back lands at the borders of the towns. Raising the visibility of these "hidden resources" through the use of GIS maps, aerial photography and site visits can help local commissions work together to extend Greenspace corridors across borders.

J2. Communities should combine applications for grant money to take advantage of points for joint effort.

J3. Help each town pursue locally-supported land acquisition and conservation of open space. Largely driven by volunteers, local land trusts and open space committees go through cycles of activity. RIDEM and WRWC should focus on providing planning and logistical support to build the base of volunteers and even out the gaps in funding. The Nature Conservancy also provides support to local land trusts through the Rhode Island Land Trust Council.

Cultural Resource Strategies and Actions

K. Pursue more detailed inventory and analysis of cultural resources and incorporate the results into local Comprehensive Plans and land use decisions.

K1. Involve local historic commissions in developing town databases and management plans. Local historic commissions and societies participated in the Greenspace planning process, which mapped many cultural resources digitally for the first time. These local experts should be involved in any Comprehensive Plan updates.

K2. Involve statewide experts in developing plans and reviewing development proposals. The Rhode Island Historical Preservation and Heritage Commission has been at the forefront of efforts to inventory cultural resources across the state. Their town surveys from the 70's and 80's remain the best inventories of local historic resources. Their 2002 Historic Landscapes of Rhode Island report identified many of the important cultural areas in the Woonasquatucket Watershed. These state-level experts, along with historians at local colleges and universities, are an underutilized resource in helping towns manage cultural resources.

K3. Develop regional management plan for archaeological resources. Local boards are largely unaware of state programs to identify and conserve archaeological resources. With rural development and redevelopment of historic urban sites accelerating, this kind of guidance will be increasingly important.

L. Pursue conservation of cultural resources that are most threatened by development or inappropriate management.

L1. Consider ordinances to protect roadside resources. Protection of old stone walls, roadside trees, and other cultural features can be effected through zoning ordinances. On a practical level, such protection should begin with outreach to local public safety personnel, highway departments, and school bus companies to identify conflicts – real or perceived – between protection of historic streetscapes and traffic safety improvements.

L2. Evaluate agricultural lands and pursue efforts to support active agriculture. The best way to preserve the historic agricultural lands identified in the Greenspace plans is to support the economic viability of agricultural operations. The Rhode Island DEM Division of Agriculture provides assistance for farm viability projects and promotion of farm products. More information is available at: www.state.ri.us/dem/programs/bnatres/agricult/index.htm.

L3. Develop management plans for dams. Most dams on the Woonasquatucket and its tributaries remain in private ownership. While issues of liability and maintenance may make public ownership undesirable, dams will play a critical role in the future of the river. Towns should consider developing management plans for dams as part of Comprehensive Plan updates.

M. Promote public education and outreach in support of cultural resources and their conservation.

M1. Develop brochures or interpretive guides describing historic resources. While the WRWC published a map of cultural resources in the watershed as part of the American Heritage Rivers designation, the Greenspace plans identified tremendous opportunities for developing information describing the rich history of the area. These could be organized by town, or be developed according to regional themes such as the history of the old turnpikes, development of industry along the rivers, or changes in the rural landscape.

M2. Create historic trails and guided biking/driving tours. Several towns and historic commissions have published historical walking tour guides, illustrating the potential for a regional series of historic trails and guided tours connecting sites in the region. The advantage of these is to link sites together in such a way as to allow users to better understand changes in land use and society over time.

M3. Pursue research into colonial and older Indian names for historic features. The origin of many old place names – as well as some of the names themselves – has been forgotten. Exploring the story of these names can create a living link between residents of the watershed and those that came before.

M4. Consider an "Exploration Day" to highlight lesser-known cultural resources. An annual day with coordinated tours of cultural sites is a great way to publicize the watershed's resources.

M5. Capitalize on the 225th anniversary celebrations of Rochambeau's march to Yorktown. In 1781, a French Army under General Rochambeau left Newport and marched through Providence and down what is now Route 14, eventually joining Washington to conduct the final campaign of the Revolutionary War. Reenactments planned in 2006, state designation of Rt. 14 as an historic highway, and plans for a national historic trail all provide opportunities for further study and protection of Greenspace resources in the area. While Rt. 14 only crosses a small corner of the Woonasquatucket watershed, the event represents a significant link between the region and a pivotal time in American history.

Recreational Resource Strategies and Actions

N. Create an integrated network of bike paths and on-road bike routes.

N1. Complete the Northwest bike trail and Woonasquatucket River Greenway (WRG).. Develop linkage to East Coast Greenway by connecting the Washington Secondary to the WRG in Olneyville. Develop alternative linkages to the Blackstone and East Bay bike paths. While it will be feasible for bikers to find their way on local streets to the beginning of Woonasquatucket Greenway, this is such an important potential link between two regional bikepaths that it deserves careful study.

N2. Connect the future Northwest Bike Path to the Blackstone Bikeway. Several possible routes were identified to connect these two regional bike trails through North Smithfield, with interesting possibilities for interpretation of historic villages such as Slatersville.

N3. Establish on-road route linking key recreation sites and cultural features. Perhaps the easiest immediate possibility is completion of an on-road bike route connecting cultural features – this could help demonstrate the potential of off-road routes to spur heritage tourism throughout the region.

O. Pursue planning for the Northwest Bikeway

O1. Continue planning and public outreach. As with many bike path projects, the concerns of communities and abutters regarding property values, security, maintenance and other issues need to be addressed in a long-term process of outreach and education. Meanwhile, potential routes, funding mechanisms and planning can continue, with the aim of establishing an objective base of information and alternatives to support community consensus on the future of the Bikeway.

O2. Continue work to deal with real (or perceived) roadblocks. Secure Right-of-way for future development and develop alternatives for difficult sections. Find alternate route around the wastewater treatment plant in Esmond. Find acceptable route through other problem areas in Johnston and Georgiaville. In Johnston, identify town-owned land and clear encroachments on public right-of-way.

O3. Organize public support for the Bikeway as a shared benefit for all the Woonasquatucket cities and towns. Use the WRWC website as a clearinghouse of objective information about the bikeway, and to coordinate outreach to sympathetic groups. Consider an annual tour of the route to popularize the idea. Work with local schools on planning, clean-up projects, and publicity.

P. Develop regional water trail.

P1. Develop a Woonasquatucket Water Trail Masterplan. Identify existing and potential access points, parking areas, and portages along the passable length of the Woonasquatucket.

P2. Pursue achievable goals for implementation. Starting with publicly-owned areas, build small links first. Build public use and involvement, using the Blackstone Boating Club as a model.

P3. Secure and improve public access to lakes and ponds throughout the watershed. Identify existing and potential access points and work with towns to plan for appropriate public access. Coordinate with fishing programs of RIDEM Division of Fish & Wildlife.

P4. Extend Blackstone access plan to Providence and link with Woonasquatucket. Work with East Coast Greenway staff to extend planning for public access through Providence.

Q. Develop regional hiking trail network with local links to village centers and recreation sites.

Q1. Develop a Woonasquatucket Headwaters trail. Pursue planning and development of a regional trail linking cultural and natural areas in the "outback" of North Smithfield, Smithfield, and Johnston, from Neutaconkanut Hill to the Blackstone Gorge.

Q2. Establish East-West Links. While the major trails logically follow the north-south river corridors, there is an opportunity to connect each of the adjoining neighborhoods and town centers with trails linking the Woonasquatucket Headwaters trail to the Blackstone by way of Providence, North Providence and North Smithfield.

Q3. Connect to the North-South Trail. Links through the Northern and Southern tiers of Glocester, as well as the potential extension of the Northwest Bikeway through Burrillville, could connect the rural west side of the state to the Woonasquatucket Corridor.

Q4. Make city streets and sidewalks part of the regional network. The value and livability of urban neighborhoods will be enhanced by thinking of local streets and sidewalks as part of a continuous pedestrian system connecting urban destinations and cultural features.

R. Establish an active program to plan, promote and construct a regional recreation network.

R1. Organize local citizens around efforts to plan, build and maintain trails. While regional concepts can be an exciting

way to build support for trail planning, practical implementation needs to build from the neighborhood level. By identifying trails in common use and encouraging local stewardship, regional trail systems can be built one link at a time. Large landowners such as corporations, colleges and universities are potential partners in establishing trails through campus open space.

R2. Start with a strong concept, and let the trail evolve over time. The experience of the North-South trail demonstrates a flexible approach to linking trails on public land with temporary roadside connections: a model of far-sighted planning combined with practical development.

R3. Investigate state and federal trail development grants. Transportation enhancement funding can provide money for trail development, especially as part of a regional strategy to reduce dependence on automobiles.

R4. Work with local utilities. Utility corridors are used informally for recreation in each of the Woonasquatucket cities and towns. Contact utility companies to explore possibilities for long-term access to right-of-ways for trails.

R5. Incorporate trail priorities in local planning. Contact local recreation commissions and directors to review regional trail priorities and build local support. Work with town planners to incorporate trail planning into Comprehensive Plans. Work with local schools to link trails to natural and cultural resource interpretation.

R6. Plan for regional bridle trails. Work with local horseback riding clubs and equestrian businesses to identify opportunities for local and regional riding trails.

R7. Plan for All-Terrain Vehicles. Pursue regional management plan for ATVs that identifies threats to sensitive areas and opportunities for appropriate use.

S. Provide better publicity for existing trails

S1. Publish maps and brochures for trails. Many existing trails are unknown and underutilized because people don't know about them. To publicize local walking opportunities, the Smithfield Conservation Commission has developed a series of maps in a common format for town conservation areas. These offer a great example for a regional series of simple trail maps.

S2. Put trail maps on WRWC web site. Having trail maps, water access points, and parking areas in one location on the web site would provide a reliable source for information about trails throughout the region.