
Rhode Island Forest Legacy Assessment of Need

October 2020

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Introduction

The Forest Legacy program was established under the authority of the Cooperative Forestry Assistance Act (CFAA) of 1978, as amended in the 1990 Farm Bill (Food, Agriculture Improvement and Reform Act, to identify and protect environmentally important forest areas that are threatened by conversion to non-forest uses. The FLP is a partnership between the State and the United States Department of Agriculture (USDA) Forest Service to protect important forest land through the acquisition of conservation easements or fee title purchases; the Forest Service provides funding and the state acquires and monitors the property.

To establish eligibility for funding, each state is required to complete a state-wide forest Assessment of Need (AON) that analyzes forest conditions and trends, delineates priority forest legacy areas, and outline the policies and procedures for implementation of the Program. The Rhode Island AON was completed in 1993 and since that time 22 projects, protecting 3583 acres of forest, have been completed.

This document, along with the State Forest Action Plan are intended to meet the planning requirements of the Forest Legacy Program as outlined in the Forest Legacy Program Implementation Guidelines, May 2017. This document updates the original Forest Legacy Needs Assessment prepared in August 1993 and approved by the USDA Secretary of Agriculture on December 30, 1993. This revision serves to document the need and guide the implementation of the program in Rhode Island and was formally approved by the Rhode Island Forest Legacy Committee on October 14, 2020.

Acknowledgements

The principal author of this document was Gregg J. Cassidy, under the direct supervision of Megan Diprete, Chief, Rhode Island DEM Division of Planning and Development with additional guidance and input from the Rhode Island Forest Legacy Committee.

Some of the content in this report was directly excerpted from the original Forest Legacy Assessment of Need, created in 1993.

Maps used in this publication were created by Paul Jordan, Division of Planning and Development using data from the Division of Forest Environment as well as RIGIS.

A special appreciation is extended to Hailey Clark, assisting through the Governor's Internship Program, for providing data analysis and graphics.

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Historical Perspective

Rhode Island was most likely almost entirely forested when a settlement in Providence was established in 1636, but as the population grew most of the forest was cleared to use the land for agriculture. This trend continued until, by the end of the nineteenth century, almost 80 percent of the land had been cleared and forest was limited to untillable land or wetland. Availability of more productive land in the western United States and improved transportation that brought products to eastern markets led to the abandonment of many farms in Rhode Island and idle land quickly reverted to forest. The trend of increasing forest cover continued until after World War II and the land area covered by “second growth” forest peaked in 1963, at 67 %.ⁱ

According to the 2010 census, Rhode Island’s population density is second- highest in the country yet more than 50 percent of the State is forested: The most recent USDA Forest Service Survey (2018) reports there are 366,958 acres of forestland in Rhode Island; almost 56 percent forest.ⁱⁱ This is largely because most of the developed area is concentrated along the coast while the western and southern regions are rural.

Population movement from urban toward rural areas became a dominant land use shift in the latter half of the 20th century and forestland began to be lost to development at a higher rate. RI Department of Administration, Division of Statewide Planning attributes this accelerated loss of forest not only to an increase in population but changing development patterns. Households are smaller and population movement has been to rural areas and single-family houses on larger house lots, consuming more land per house. Employment centers moved from cities as industry relocated from old manufacturing centers to the surrounding countryside. Commercial land use almost doubled, moving into less developed parts of the State concentrated along heavily traveled roadways.

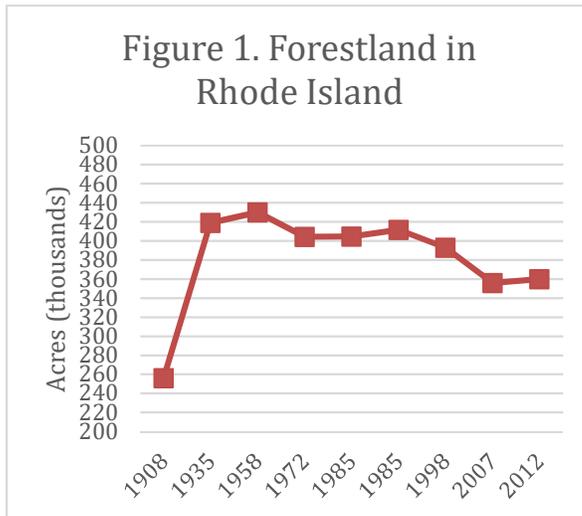
RECENT TRENDS

Land Conversion

The conversion of forest land to developed uses in the late 20th century was higher than historic trends with developed uses increasing by 43 percent from 1970 to 1995ⁱⁱⁱ. “Rhode Island developed more residential, commercial, and industrial land between 1970 and 1995 than in the previous 325 years.”^{iv}

Building permits and aerial photography confirm that development and land use patterns continue to follow sprawl patterns and forest acreage continues to decline as land is developed. The USDA, Forest Service reported a decrease in timberland area of 8.9 percent from 1985 to 1998,^v and a similar decrease between 1998 and 2007,^{vi} Rhode Island had the greatest forest loss of the southern New England States between 1998 and 2007.^{vii}

USDA, Forest Service Data from 2017 indicates RI has 354,000 acres of timberland^{viii}, but forests continue to be under pressure from development. In the past, forest loss has generally occurred near urban areas and roads. This trend is changing as pressure to convert forest to residential use continues and threatens large forest parcels, even those in remote areas.

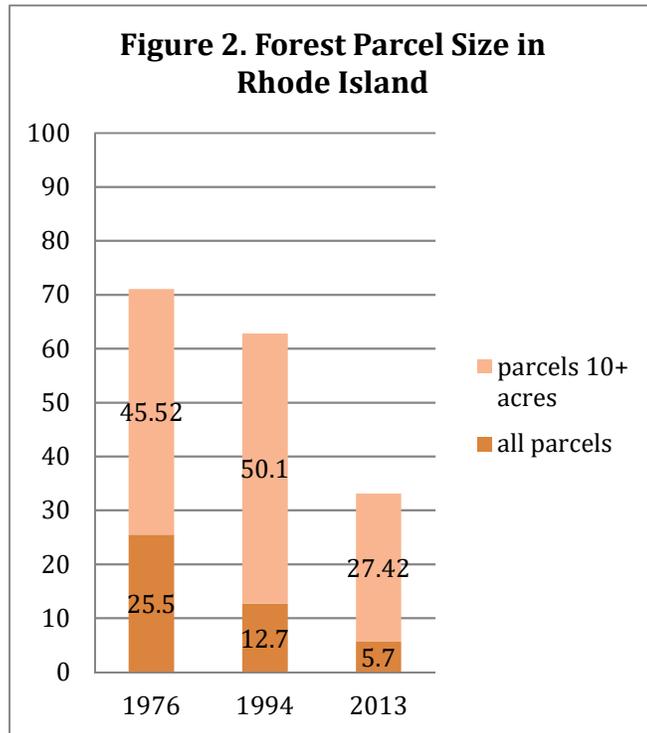


Forest Ownership

A 2017 Forest Service Survey estimates 72% of the forest land in Rhode Island is privately owned. Most of that forest (62%) is owned by families, the remainder by corporations and other private entities.^{ix} The recent trend has been acquisition of large parcels of forest by public agencies with a corresponding decrease in the percentage of forestland in Rhode Island in private ownership. A Forest Service Report from 1957 estimated 94% of Rhode Island’s forestland was privately owned at that time.^x By the late 1980’s forestland in private ownership had decreased to 85%.^{xi} More recent assessments estimate 68% of Rhode Island forestland is privately owned and managed by an 38,000 landowners.

The pattern of land ownership has been one of subdivision of large tracts; average parcel size decreased (from 26 acres in 1973 to 13 acres in 1993).ⁱ Division of forest tracts into smaller parcels has continued and recent reports estimate that the size of the average tract is now only six acresⁱⁱ. This includes all parcels greater than one acre of forest (many may be large house lots). Figure 4 shows the trend in forest ownership size in Rhode Island based on Forest Service Landowner surveys. If only privately-owned parcels greater than 10 acres are evaluated, parcel

size is about 27 acres, about 40% lower than the 1970's. The average land holding in southern New England is 34 acres. ⁱⁱⁱ



Characteristics of Forest Ownership

Analysis of land use performed by RI Statewide Planning found 15 communities with less than 25% developed land area and classified them as rural. A 2005 survey of landowners who owned more than 10 acres was conducted as part of the update of the Forest Resource Plan in 2003, ^{iv} as expected, parcel size was small, with 59% of respondents owning less than 30 acres; 37% less than 20, and 22% owned less than 30 acres.

The survey found most Rhode Island forest owners live on their land, and 90% of respondents gave a place of residence as the most important reason for owning forestland. Investment (42%) and forest products (33%) were the other most important reasons for owning forest. Recreational use (41%) and hunting/fishing (19%) are other common reasons for owning forestland.

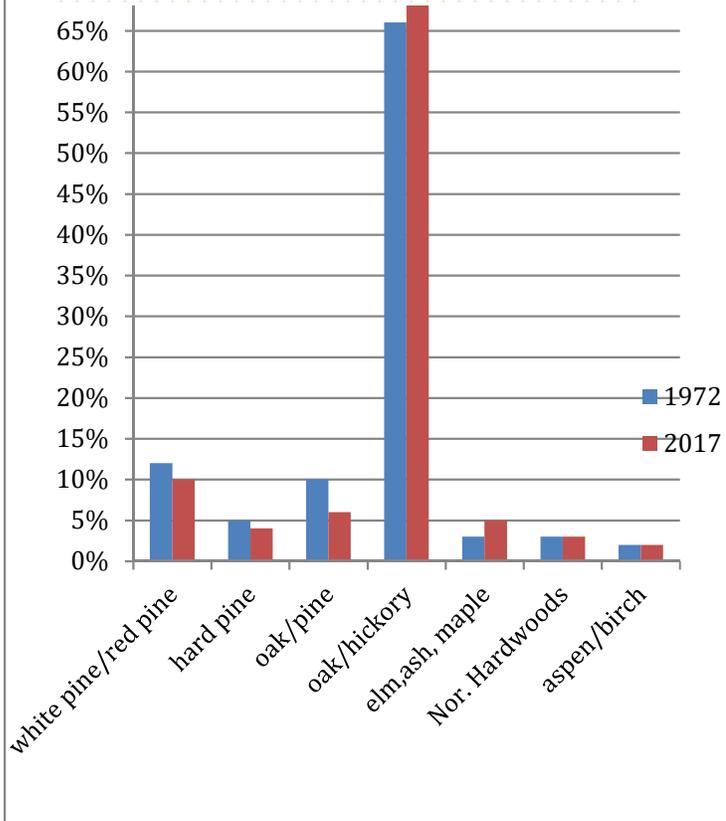
In 2013, the Forest Service surveyed landowners with more than 10 acres of forest. The survey results were similar: most respondents lived on their land (64%) and owned it for the lifestyle it provided (enjoying beauty and scenery). Harvesting wood products was not as important as the other amenities and using it for timber products was even lower (18%). Other top reasons for owning were to protect water (73%), to protect nature and biologic diversity (73%), and to protect wildlife (55%). ^v

Forest Composition

Oak- hickory forest (dominated by red, black, scarlet, and white oak) is the predominant forest type found in Rhode Island, comprising 61% of the forest according to the 2017 Forest Service Inventory. The area of this forest type has decreased since earlier studies (66 % in 1972). Red pine/white pine forests also decreased (from 12 % to 9 %) of the forest in the period from 1972 to 2017. This coincided with increased harvesting activity shown in Harvesting Records filed with DEM as red pine and hemlock were salvaged due to attack by red pine scale or hemlock wooly adelgid. By 2010, the other softwoods category had almost disappeared from harvesting reports.

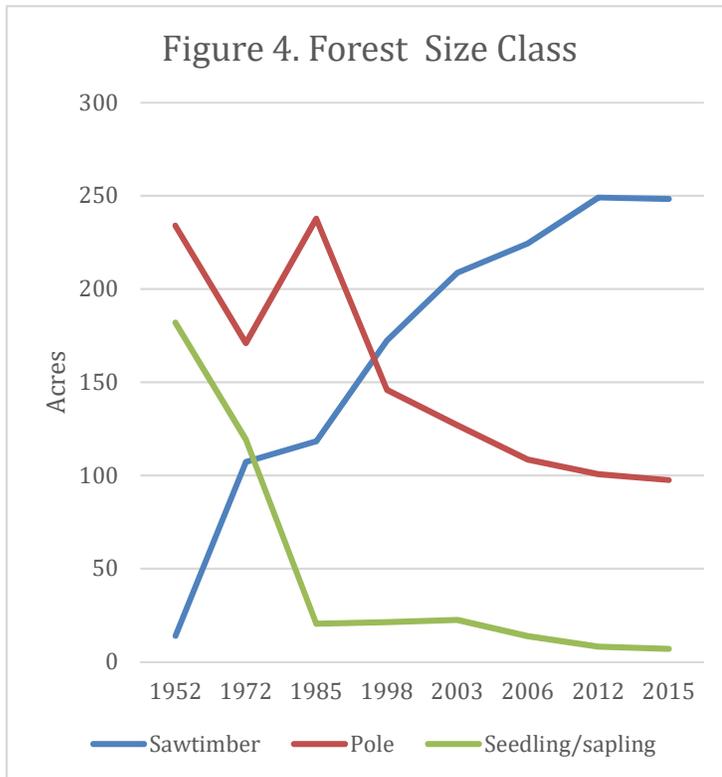
Oak/pine is also a common forest type, making up 5 percent of Rhode Island's forest.^{vi} Other forest types, like pitch pine and Atlantic white cedar, make up a small percentage (less than 3 percent) of Rhode Island's forest but have high importance due to their value as wildlife habitat.

Figure 3. Area of Timberland by Forest Type.



Most of Rhode Island's forest is on land previously used for agriculture and was established only after active farming ceased. There have been few catastrophic weather events or intensive harvests to stimulate regeneration so the forest has matured. Forest Service studies reported only 3% of the forest was composed of trees larger than 10 inches diameter at breast height

(DBH) in 1952, but by 2015 more than 70 % of the forest was this size.



Rhode Island's Forest Resources

Wood Products

Lumber production in Rhode Island peaked at the turn of the century with 33 sawmills operating. ^{vii} According to the Forest Service, in 1988 there were 16 local sawmills producing 6.6 million board feet of lumber. ^{viii} By 2003 this had decreased to six sawmills processing 5.5 million board feet of lumber per year. ^{ix}



Although the number of sawmills operating in Rhode Island has decreased, sawmills in neighboring states and shipment to northern New England and Canada provide additional markets for Rhode Island forest products.

Analysis of harvesting data filed with Department of Environmental Management (DEM) found an average of 3.0 million board feet of sawtimber harvested per year during the period 1997 through 2017. In context, the peak lumber production in Rhode Island was 33.0 million board feet in 1907 but declined after with annual reports of 2.5 million board feet of sawtimber harvested between 1942 and 1952.

Sawtimber is the principal use of trees harvested, primarily for industrial pallets, with the highest quality trees exported for other uses. Softwood logs are processed in state or exported. Firewood is an important market for low quality hardwood trees, with over 3800 cords harvested in Rhode Island forests each year. The sole pulp mill in Rhode Island closed in 1980

and the distance to out of state mills makes harvesting pulpwood now uneconomical. The average commercial harvest in Rhode Island during the last 20 years involved about 56 thousand board feet (MBF) of sawtimber and 71 cords of firewood on 33 acres.



The annual gross output of Rhode Island's forestry and wood products sector totals over \$715 million and employs 4,824 workers. Employment in the forestry and logging sectors of the economy is estimated at 90 jobs with gross annual sales of \$11.6 million.^x

Specialty Products

Suburbanization and the small size of most parcels make management for traditional wood products difficult for the typical Rhode Island forest owner, so it's no surprise that 1 to 5 percent of landowners have commercially harvested an alternative product such as maple syrup, mushrooms, witch hazel, or floral greens.^{xi}

Witch hazel, a shrub with medicinal use, grows in abundance on mesic forest sites throughout Rhode Island. It has astringent properties and is used in the cosmetics industry and the majority of the needs of the industry are met by a facility in nearby Connecticut. The product is cut and chipped in Rhode Island's forest and chips are transported to the American Distilling facility in East Hampton, Connecticut for processing. The shrub regenerates readily and can be sustainably harvested, generating revenue to partially offset property ownership expenses.

Specialty wood products include trees, or parts of trees, that are not usually considered valuable due to the tree species or low volume and are often overlooked in traditional forestry operations. These materials can be turned into valuable products by skilled artisans and a "cottage industry" has developed forest materials. As of August 2019, there are 8 portable

sawmills in Rhode Island and additional sawmills in nearby states servicing a niche market to process trees unmarketable through traditional means into specialty forest products.

Sugar maple, the primary tree species used to produce maple products, is uncommon in Rhode Island and is usually found only along roads and in association with old farmsteads. There were 19 operations that process and sell maple syrup in Rhode Island and markets appear good enough to offset the higher production costs associated with producing maple syrup from maple species found in Rhode Island forests. . Red maple, which is the Rhode Island state tree, can be tapped to produce maple syrup but it has much lower sugar content and requires more processing. Norway maple, native to Europe, has been widely planted in Rhode Island as an ornamental and street tree and is commonly tapped in Rhode Island because it grows to large size and other maples are scarce.



WILDLIFE AND FISH RESOURCES

The state's varied soil and hydrology support a range of plant communities which in turn support a wide range of wildlife. Forests in Rhode Island provide habitat for hundreds of species of wildlife. This includes 86 species of mammals, 394 species of birds, 254 species of fish (freshwater and saltwater), 19 amphibians and 26 species of reptiles^{xii}.

The distribution and abundance of Rhode Island's forest -dwelling wildlife is governed by the changes in the State's forest cover. Some of Rhode Island's forest -dwelling animals are generalists and can be found in a variety of habitats, while others are specialists. Specialists require one or more specific forest conditions to persist and are more susceptible to changes in

forest cover. Two types of forest habitat found in the State (Pine Barrens and Atlantic White cedar swamp) support globally rare species, such as Hessels hairstreak butterfly.

Forest is the most common habitat type in Rhode Island, and most of it is more than 60 years old. While there is little very old forest, forest maturation, fire suppression, and lack of sound management, has led to a condition where there is also little early successional forest. The predominance of a single age class of forest, combined with the ongoing parcelization and fragmentation of forests, impacts the ability of Rhode Island's forest to support the entire suite of plants, wildlife, and other biota they are capable of supporting.

The extent of early successional habitat in Rhode Island is ephemeral and depends on anthropogenic events; reversion of abandoned farmland to forest in the late 1800's and early 1900's led to an abundance of brush land and young forest. Since that time, there has been a steady decline as old fields succeed to forest and farms are converted to developed uses. Currently less than 4% of the State's forest is early successional habitat and natural disturbances, like severe storms, do not create enough early successional habitat on a regular basis in Rhode Island to support wildlife species of the greatest conservation need (SGCN), like ruffed grouse, blue winged warbler, or eastern woodcock that require it.

In Rhode Island, forest blocks are becoming smaller and more isolated due to fragmentation caused by roads and developed land uses. More than 1,100 acres of forest in large unfragmented blocks identified as important habitat in the RI Wildlife Action Plan were converted to non-forest land use between 2011 and 2018 ^{xiii}. Fragmentation divides large contiguous areas of natural land into smaller patches, resulting in each patch having more edge habitat, degrading its ecological quality and integrity and changing the wildlife species that use it as habitat. Conversion of forestland to other land uses and fragmentation into smaller parcels has a negative impact on some species, such as Wood Thrush, Scarlet Tanager, and Cerulean Warbler, which are dependent on large tracts of unbroken forest for their life cycle.

Core habitat includes large blocks of forest (more than 250 acres) unfragmented by other land uses. Few areas now contain core habitats large enough to support the full complement of expected species and natural ecosystem processes. Key characteristics that determine a forest's value for bird breeding habitat, for example, are its size and shape, proximity to other forest tracts, and surrounding land uses. The increasing number of landowners and small parcel sizes makes management for species that require large tracts of land as habitat more difficult. To address this concern RI DEM has pursued the acquisition of large tracts of forest land as well as parcels adjacent to already protected land to be incorporated into Conservation Areas.



Active management by landowners can be beneficial to wildlife by creating a range of forest types and age classes distributed across the landscape. A partnership of organizations including Natural Resources Conservation Service (NRCS), DEM, Rhode Island Forest Conservators Organization (RIFCO) and the RI Tree Farm Committee provide financial and technical assistance to create habitat which supports priority upland wildlife habitats that are of conservation concern.

This includes early successional forest, shrub-scrub dominated habitats, old fields and grass-herbaceous dominated areas.

Soils and Soil Productivity

Geologically, Rhode Island can be divided into two regions; highlands in the northwestern interior of the state and coastal plain that extends along Narragansett Bay. The western upland area, along the Connecticut border is the state's most rural region with forest, some rural industry, and limited agriculture. The largest water body there is the Scituate Reservoir, an impoundment of the North Branch of the Pawtuxet River created to provide municipal drinking water to the metropolitan Providence area.

The south coast of Rhode Island borders the Atlantic Ocean and the area between the mainland and the sea consists of barrier beaches and coastal ponds. Farther inland, a broad outwash plain of the South County region contains the State's most productive agricultural soil.

North of this plain is the Charlestown Moraine, a long ridge formed by soil and rock left by glaciers. The moraine region is drained by the Wood-Pawcatuck River, a river ecosystem that supports the highest biodiversity of any river in New England and is also a focal point for outdoor recreation.



According to *Soils of Rhode Island Landscapes* Approximately 64 % of the soil in the state have developed from glacial till and 21 % from glacial outwash deposits.^{xiv} This report groups the 41-soil series found in the State into 13 mapping units based on their properties: this includes glacial till, outwash plains, and areas of Inland depressions or low-lying areas where water collects.

Glacial till occurs upland till plains and Narragansett till plains (*immediately* around Narragansett Bay). The RI Soil Survey,^{xv} reports potential productivity of glacial till varies with site index (height in feet of dominant trees at 50 years) ranging from 49 -70 feet for red oak and 58-80 feet for white pine.

Although characteristics vary and soil in *Narragansett till plains* is generally compacted with few bedrock outcrops and has been smoothed by glacial action. A large portion of this soil type is cleared and used for agriculture and/or has been developed for low density housing while most of the Upland till Plains is forest.

Outwash consists of particles of gravel, sand, silt, and clay deposited by glacial meltwater. Areas of outwash are located throughout the State with significant deposits along the Wood and Pawcatuck Rivers in West Greenwich as well as deposits in North Kingstown and North Smithfield. Most areas of this soil type have been cleared for crops or pasture with some areas used for low density housing or unmanaged woodland.

Areas of inland depressions and low lying areas dominated by organic soils make up about four % of the state. The water table is at or near the surface most of the year and flooding and instability affects the use of these areas. Most of this soil is unmanaged woodland with low

potential productivity for growing trees due to poor drainage (site index of 46- 51 feet for red maple).

MINERAL RESOURCES

Rhode Island lies at the foothills of the Appalachian mountain range and the geology of Rhode Island is heavily influenced by events that included formation of the Appalachian Mountains. The landform and mineral resources of the State are a result of glaciation 10,000 to 20,000 years ago that shaped the terrain creating narrow valleys. The melting of the ice left sorted surficial deposits, including two distinct terminal moraines, glacial boulders, and glacial outwash plains.

Limestone is scarce in Rhode Island, and most of the deposits are within the Blackstone Bedrock series in north- eastern Rhode Island. This mineral is still extracted (primarily by one company) on a small scale for lining athletic fields and lawn and garden use.

Westerly Granite is exposed chiefly in south -western Rhode Island is recognized in the stone industry due to its fine grain and uniform composition. It was once used extensively for statuary and monuments. Quarries were common at one time but have declined as the resource has been nearly exhausted. There is one small company in Westerly that uses the granite from their quarry for monuments.

At one time soapstone, coal, and bog iron were also mined in Rhode Island but these industries have ceased operation since it is no longer economical to extract the resource. Currently, Rhode Island's primary mineral production is for construction, sand and gravel, and crushed stone. Some industrial sand is mined and used for beach replacement and other uses. Crushed stone is also used as riprap and jetty stone.

Although it is uncommon in Rhode Island, interests in mineral resources are sometimes owned by someone other than the landowner. A *mineral rights determination*, done during the due diligence phase of a project, is part of the acquisition process for Forest Legacy Tracts.

WATER QUALITY AND QUANTITY

Surface reservoirs and groundwater are relied on for Rhode Island's potable water supplies, and nearby land uses influence water quality for both sources. Forests serve as natural filters and are the most effective land cover for maintenance of water quality and quantity. Forests therefore provide an economic benefit since they filter sediments and other pollutants from the water in the soil before it reaches a water source, reducing treatment costs. Maintaining forest cover and practicing forest stewardship help ensure cleaner water is available from water supply sources.

Most public water supply systems in Rhode Island originated in the urban areas which needed a source of water because of development and increasing population density. Historically, Rhode Island has some of the first public water systems and they were expanded in size and scope of operations as the populations in the area they served grew. This is no longer feasible.

Although, never intended to be the single source supply for the State, the Scituate Reservoir of the Providence Water Supply Board (PWSB) water system now provides water to the metropolitan areas of the State and about 600,000 persons, about 60% of State's residents. Other large public water suppliers now rely on the Providence Water Supply Board (PWSB) as a



supply due to contamination from intensive land use activities.

The drainage area for the Scituate Reservoir watershed is about 60,000 acres. Of that, 28% of the watershed (including 12,000 acres of managed forestland) is controlled by the PWSB, and the rest is privately owned. The watershed is subject to development pressure due to its proximity to Providence. The PWSB works to acquire critical parcels of land within the watershed to ensure

important watershed resources are protected. A 2001 USGS study indicated that the quality of water resources in the watershed may be slowly degrading as a result of urban development. Less than a third of the land in the watershed is publicly owned and protected from development, stewardship of the remaining land by private landowners is critical.

The Scituate Reservoir was never designed to be the primary source of drinking water for Rhode Island but the State has no backup supplies. This was one of the factors in the State's purchase of the Big River Management Area in the south-central portion of the Rhode Island as an alternative water supply. Purchase of land for the reservoir began in the late 1960's but the EPA later determined that construction of a reservoir at Big River would cause serious environmental damage so development of the area for water supply was halted. The Big River Reservoir land (about 8,000 acres) was designated as open space by the Rhode Island

Legislature. It is protected: the land cannot be sold or developed except for the development of wells and well sites for the distribution of drinking water.

Most of the State's groundwater is considered suitable for drinking water use, and four groundwater aquifer systems of the State have been classified as "Sole Source Aquifers" by the



United States Environmental Protection Agency (EPA) since they serve as the principal source of drinking water for an area and no other water supplies are available. About 26 % of the state's population depend on these sole source aquifers for their water supply; there are a total of 490 public water supply systems ranging in size from small rural restaurants to 28 major suppliers.

AESTHETIC/SCENIC RESOURCES

The value of scenic resources in the Rhode Island landscape is important in measurable ways, such as tourism, recreation, as well as intangible assets that give distinct areas their "sense of place".

The State wide Comprehensive Outdoor Recreation Plan (SCORP) recommends a policy that recognizes the State's scenic rural landscapes, roads, and vistas are important historic and cultural resources that maintain the quality of life. The Rhode Island Landscape Inventory (DEM 1990) provides a comprehensive evaluation and inventory of the State's significant scenic resources. This report resulted from legislation that directed DEM to establish and maintain a list of scenic areas in the state. The study evaluated the scenic characteristics of the landscape and identified hundreds of scenic sites throughout Rhode Island. These sites were mapped on United States Geological Survey (USGS) topographic quadrants as well as a comprehensive map of the state. A Geographic Information System (GIS) map layer of the data has subsequently been created.

The Wood/ Pawcatuck River Watershed in south-western Rhode Island provides tremendous scenic, cultural, recreational, and wildlife resources. Although the rivers here provided power for many mills in the 1800's, this area is now largely undeveloped and expanses of forest and unique wetlands interwoven with villages showing the great cultural and historical value these rivers and forest systems provide. There are seven rivers that make up the Wood Pawcatuck River system. In March 219 the Wood-Pawcatuck Watershed Wild and Scenic River Act was passed by Congress protecting the outstanding scenic, cultural, and recreational assets



of this river system for the benefit of present and future generations.

CULTURAL RESOURCES

The context for Rhode Island's cultural resources spans thousands of years from the precolonial period to modern times. Five indigenous tribes inhabited the area and were hunting, fishing, and farming the land. The largest of these tribes, the Narragansett's, are still active in Rhode Island today. It was Narragansett Sachems who, in 1636, granted Roger Williams land use rights to establish a settlement in what is now the City of Providence

Over 2,500 significant archaeological sites have been identified throughout Rhode Island (including historic shipwrecks beneath the state's waters) and more sites are expected to be present in the areas that have not yet been investigated. ^{xvi} Historic Resource Surveys have been completed for each town and are available at preservation.ri.gov.

Changing needs and lifestyles over Rhode Island's settlement history have created distinctive places throughout the state. The west side of Narragansett Bay was developed as a series of port villages bounded by agricultural settlements. The western uplands, from the port settlements to the Connecticut border included agricultural use with some rural industry along rivers. The landscape has been shaped by both natural and cultural forces and arguably nowhere else can such a diverse and rich cultural history be found in such a small area. The combination of diverse natural, cultural, and recreational resources gives areas unique "sense of place" characteristics that enhance livability.



The Rhode Island Historical Preservation & Heritage Commission surveyed the cultural heritage in each Rhode Island community to identify land and land-use patterns that characterize each region of the State^{xvii}. The publication documents significant historic resources throughout Rhode Island, including historic landscapes,

many of which are located with the Forest Legacy area. The Commission has also produced survey publications for each of the state's 39 municipalities highlighting historic, architectural, and archeological resources in each. The survey and report are part of the on-going program set forth in Rhode Island's "Historic Preservation Plan," first edition, issued in 1970.

In recent years, attention and effort has focused on planning at a regional level to protect community character as well as natural resources. One example is the 2003 *South County Greenspace Protection Strategy* that grouped areas with high concentrations of natural and cultural elements into Landscape Preservation Heritage Areas that are priority for conservation.



RECREATION & TOURISM

Rhode Island's forests provide numerous recreational opportunities such as hiking, hunting, fishing, camping, bird watching, picnicking and more. A Study of the economic impact of Rhode Island State Parks found that Rhode Island Parks and Management Areas are host to 6 million visitors each year^{xviii}. The study also found that this generates \$2.3 billion dollars for the state from both tourism and recreation, making tourism the second- largest and

fastest- growing industry in RI. The Outdoor Industry Association estimates that this sector directly supports an estimated 24,000 Rhode Island jobs, which provide \$737 million in wages and salaries each year. ^{xix}



The Wood/Pawcatuck Wild & Scenic Rivers Study showed that the rivers in south- western Rhode Island are the most heavily used for water-based recreation in the state. The forests in the area provide natural backdrops for other recreation. Cold-water fisheries that support recreational fishing are uncommon in Rhode Island and are predominantly in the south- western part of the State. Brook Trout in Rhode Island remain a threatened species, an indicator of the impact of development.



History of Conservation

Rhode Island established the Rhode Island Forest Commission in 1906. The first State Forester under this program was Jesse B. Mowry. He believed that the forest sustainability field was not in the hearts of the citizens and that it would have to be the government that led the effort in improving our forests. In 1930, The George Washington Memorial Forest in Glocester became the first state forest. In 1933, The Civilian Conservation Corps was established. Under this Act crews engaged in reforestation, forest management, disease control, etc. throughout the country. The reforestation effort peaked in the 1950's in Rhode Island, when the state was 64% forested. Since that time, the amount of forest land in Rhode Island has declined because of threats from development and fragmentation. However, efforts to maintain the Rhode Island's forest acres have continued. In 1964, the Green Acres Act was established aimed at protecting conservation and recreation land by providing funding for acquisition.

The state sets goals and policies for conservation of open space through a State Guide Plan and indirectly through oversight of local Community Comprehensive Plans for each of its 39 cities and towns. A separate Forest Resources Management plan is an element of the State Guide Plan that provides guidance to enhance the effectiveness of public and private stewardship of the state's tree and forest resources.

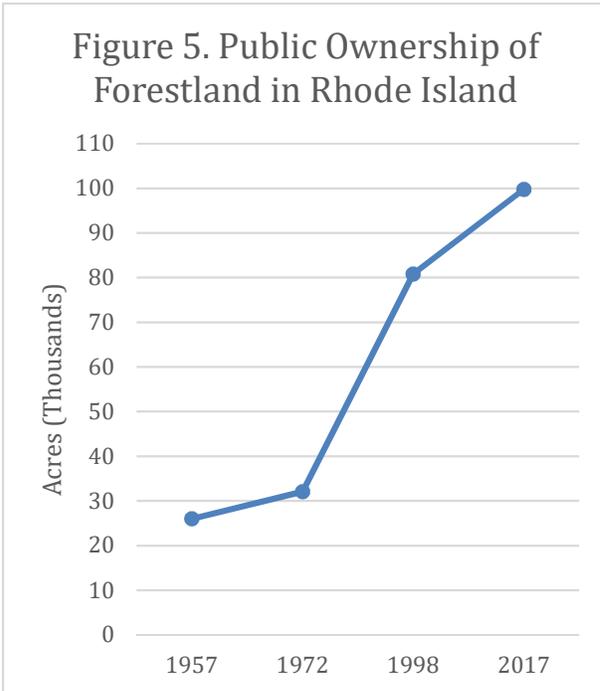


CURRENT MEASURES TO PROTECT RHODE ISLAND'S FOREST RESOURCES

Although there has been a decrease in privately owned forest in recent years, there has been an increase in conservation efforts by public agencies during the same time period. DEM owns 47,384 acres, has conservation easements on 22,958 acres, and deed to development rights on 2,705 acres, most of it farmland (Paul Jordan, March 28, 2019). This includes 22 parcels encompassing 3,583 acres protected through conservation easement or fee purchase by the Forest Legacy Program. Figure 5 shows

trends in land acquisition by DEM from the late 1950's through 2018. Funding for many of these purchases was provided by bond issues approved by voters demonstrating public awareness of the threat of fragmentation and a willingness to protect land by funding acquisition of open space.

Figure 5. Public Ownership of Forestland in Rhode Island

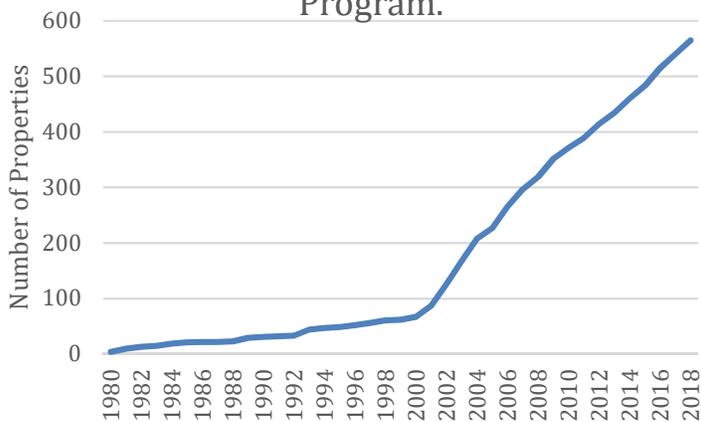


Since 2001, There has been a dramatic increase in enrollment in Rhode Island's Farm, Forest, and Open Space (FFOS) Program, a program which offers lower tax assessment (based on the land's use as forest) in return for a conservation restriction that insures the property cannot be developed for 15 years without paying a penalty. Interest in this Program has increased as higher tax assessments have made the cost of maintaining forestland more challenging. Figure 6 shows the number of forest properties enrolled in this Program since 1985. A survey of forest landowners in 2005 found 51 percent of eligible landowners in 13 rural communities

participated in the Program at that time. Of properties enrolled in the Program at that time, 58 % were enrolled under the open space classification, 29% as forest, and 12% in the farm

classification. This Program has been an effective in slowing the change of forestland in both rural and suburban communities to other uses. The Rhode Island State Conservation Committee reports 3,600 properties enrolled in the Program statewide (28,614 acres in farmland and 29,345 acres as forest classification).

Figure 6. Properties Enrolled in the Farm, Forest, and Open Space Program.



ISSUES IMPACTING RHODE ISLAND'S FOREST

The Initial Forest Legacy Needs Assessment 1993 identified forest fragmentation and conversion as a vital issue facing Rhode Island. A survey of forest landowners done as part of the development of the *State Forest Resource Plan* in 2005 identified development as the most critical issue affecting forests^{xx} Recent studies found forest fragmentation, or the breaking of contiguous forested areas into smaller ones, and conversion to other land uses continues to be the greatest threat to forests in Rhode Island.^{xxi}

There is a high degree of public awareness about this issue and Rhode Island voters have authorized millions of dollars to protect open space from development through statewide and local referenda. Forest landowners were surveyed about the allocation of funding during the development of the Forest Resource Plan and forest conservation was by far their highest priority for funding. The Forest Legacy Program has been accepted as a tool to conserve Rhode Island's forest resources and has protected over 3000 acres of important forest from conversion to other uses.

Public comment during the development of the Initial Needs Assessment pointed out that although Forest Legacy is a valuable program there is not enough funding to protect all the important land. More recent analysis recognized that funding for conservation continues to be a critical issue and reliable sources of financial support are needed.^{xxii}

IMPLEMENTING THE FOREST LEGACY PROGRAM

Forest Legacy Area

The Forest Legacy Area in Rhode Island has not changed from that initially established in 1993.

A. Methodology

During the development of the states' first Forest Legacy Assessment of Need (1993) maps of Rhode Island's significant forest tracts, watersheds of public drinking water supplies, public open-space tracts and recreational areas, location of rare, threatened and endangered species and/or their habitats, and significant mineral resources were analyzed (ref. maps Appendix A). Then, utilizing population growth statistics, communities experiencing significant population increases were identified and compared with the forest resource data. Once this information was assimilated, the Forest Legacy Subcommittee developed proposed Forest Legacy Area boundaries, keeping in mind the Forest Legacy Program's intent, the need for public involvement, the participation of willing landowners, and utilizing the Committee's expertise and personal knowledge of the state's significant resources. Appendix B. contains a summary of the important resources to be protected, public benefits to be derived, and entities that may be given monitoring responsibility for an individual parcel.

B. Description of proposed Forest Legacy Areas

The proposed Rhode Island Forest Legacy Areas (FLA) includes two separate pieces and will be referred to in this document as the "Mainland" and "East Bay" areas. Each of these will be discussed separately. See the attached USGS metric topographic maps (1:100,000) which have the proposed Forest Legacy Areas delineated. For a reference map and detailed boundary descriptions of each of the proposed Legacy Areas refer to Appendix C.

1. Mainland

The northern and western boundaries of the Mainland Legacy Area are delineated by the state boundaries between Rhode Island and the State of Connecticut and the Commonwealth of Massachusetts. This geopolitical boundary was not selected because it was merely a convenient line. Most of Rhode Island's remaining forested tracts are located abutting this boundary, as is a significant amount of public open space. The two adjacent States have forested tracts and open space abutting Rhode Island's border as well. Therefore, using these lines as a boundary is consistent with the intent of the Legacy Program to wherever possible recombine significant forest tracts artificially separated by political boundaries.

The southwestern portion of the Mainland Legacy Area includes the watershed of the Wood-Pawcatuck Rivers system, an important public drinking water supply aquifer and recreational and wildlife species resource.

The southern boundary nearly coincides with a drinking water aquifer and includes forested lands located in an area that has seen higher development pressure than any other lands mentioned.

At the south-eastern region of the proposed Mainland Legacy Area lie the towns of South Kingstown and Narragansett. These towns are characterized by clusters of development, particularly near the shoreline and the major roadways, which extend inland towards the University of Rhode Island. The FLA boundary in this area skirts the major developments around the urban centers, but is intended to include significant forested tracts which may add to the character of historic villages such as Peacedale and West Kingston. The boundary line actually extends to the forested shoreline of Narragansett Bay and includes the Pettaquamscutt River watershed wherever possible. This area has extremely high wildlife and other forest values and faces a severe threat from development pressure. The U.S. Fish and Wildlife Service maintains a 563 acre wildlife refuge along and including a portion of the river. Also included within this general area are several historic farms.

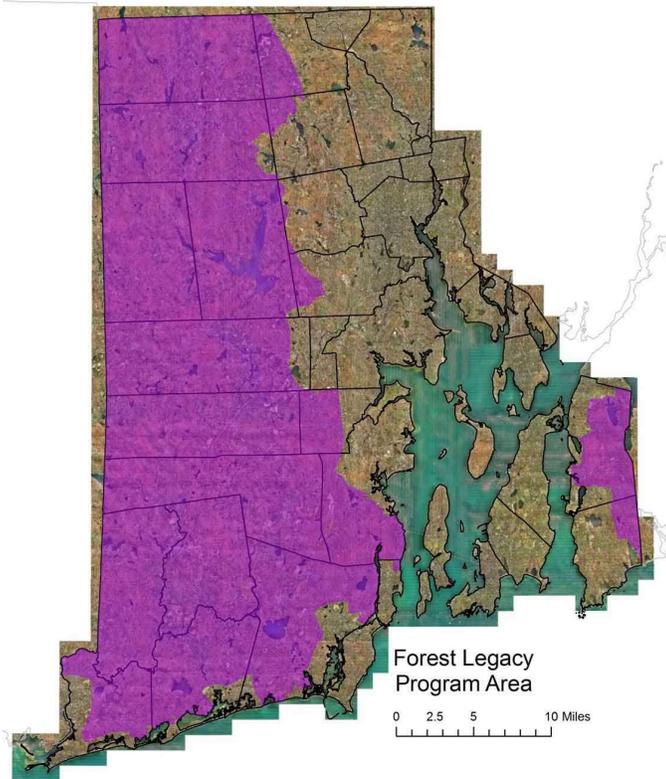
Moving north, FLA boundary turns inland, skirting major development, and meets and follows the eastern boundary of the Scituate Reservoir Watershed, the State's single most important public water supply watershed. The FLA boundary line continues running in a northerly direction, intersects the watershed boundary of the Slatersville Reservoir watershed and follows this line northerly to the intersection of State Routes 7 and 104. Following Route 104 north to Route 5 north to the beginning, completes the circuit. The above mentioned roadways are nearly identical to the watershed boundary of the Slatersville Reservoir.

2. East Bay

The East Bay Legacy Area is located largely within the Town of Tiverton, and to a lesser extent the Town of Little Compton, and includes the last remaining significant forest tracts in this area. This area contains many of the same resources and is experiencing the same types of development pressures as the Mainland area.

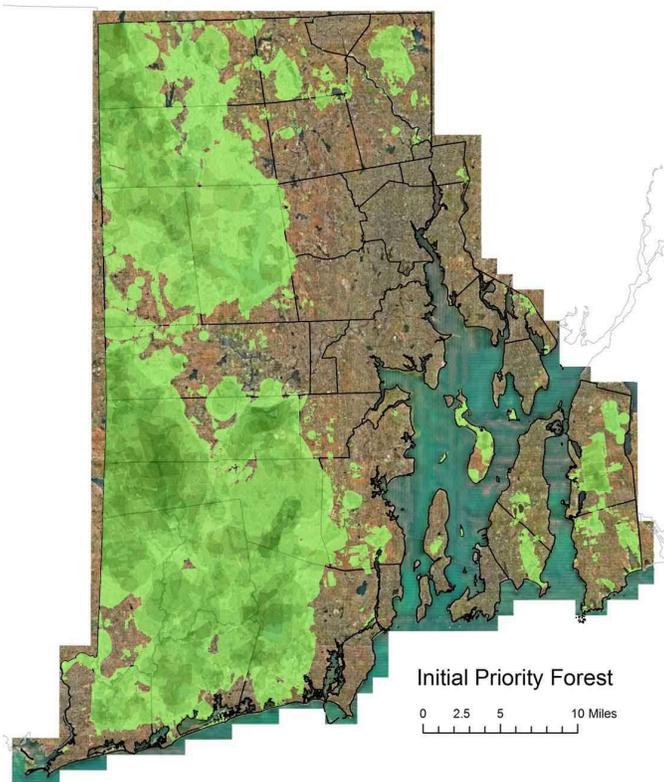
The eastern boundary of this tract corresponds with the state line between Rhode Island and southeastern Massachusetts. Once reaching the shoreline, the boundary continues along the north shore of Quicksand Pond to Mullen Hill Road, and continues westward to the intersection of Long Highway where it turns north. The line continues north onto Lake Road and turns westerly onto State Route 179, then continues westerly onto Neck Road and encompasses

the Sapowet Management Area. Travelling north from Sapowet Avenue to state Route 77, the FLA boundary turns easterly onto State Route 177, then northerly again on Fish Road to Eagleville Road. Then from Eagleville Road to Stafford Avenue and northerly to the state line and thence to the point of origin. Enclosed within this area are several key open space areas, a state management area, and several rare, threatened and endangered species habitats.



The initial Forest Legacy Area was refined, but not substantially changed, using GIS technology that wasn't available when the first mapped. This included spatial data for:

- Conservation Lands.
- Core Habitat Water protection area, aquifer or aquifer recharge area
- Pitch pine habitat
- Areas able to produce clean water as identified by the USFS
- Blocks of contiguous forest
- Concentrations of state listed Natural Heritage species
- State Conservation Priority Areas
- State Forest Legacy Areas



Criteria for Selection as a Forest Legacy Tract

The goal of the Rhode Island Forest Legacy Program is to protect important forest land from fragmentation and/or conversion to non- forest uses. The Forest Legacy Program in Rhode Island is implemented through a State Grant Option, where RI DEM holds title to conservation easements or deeds for tracts of forestland that focus on the sustainable use of forest resources.

Acquisition of conservation easements is preferred to fee simple purchase although the Forest Stewardship Committee will consider recommending full-fee acquisition if it is in the best interest of the resource. Conservation easements (CE) that limits the rights to subdivide the property or convert the forest to other uses and requires it be managed in accordance with a multi resource management plan that has been reviewed and approved by the State Forester. DEM monitors the tracts and enforce the CE if necessary. Following are the criteria for enrollment:

- Property must be more than 25 acres
- Must be in a Forest Legacy Area
- Property must be 75% forested
- Public access is desirable but not required.

The Parcel Acquisition Process

At the state level, the acquisition process begins with an application from a willing landowner. The Application and Project Evaluation Sheet are available for download from the DEM/Division of Forest Environment webpage (www.dem.ri.gov/programs/forestry/forestlegacy).

A staff member from DEM may conduct a site visit to evaluate the parcel and ensure it meets minimum criteria for project eligibility. The staff member may be accompanied by one or more representatives from the Forest Legacy Committee who may have insight into specific resources associated with the parcel.

The review includes both a subjective and objective process to insure the tracts to be included in a project grant proposal fulfill the purpose of the Forest Legacy Program and address the concerns outlined in the Assessment of Need (AON). The Project Evaluation sheet is based on the criteria adopted by the Massachusetts Forest Legacy Committee and modified by incorporating RI DEM Open Space Criteria to evaluate natural resource value and conservation opportunity. In addition, a ranking spreadsheet is used that incorporates the USDA, Forest Service ranking guidance (from the call for projects) to ascertain how the project will be evaluated on National level.

The Rhode Island Forest Legacy Committee endorses parcels for inclusion in a project grant request submitted to the Forest Service for funding based on:

- importance of natural resources on the property
- strategic value (on a landscape scale) conservation of the land would provide
- imminent threat that the parcel will be converted to other uses



If Federal Forest Legacy Project Grant Funding is approved, the application and evaluation will be forwarded to DEM's Land Acquisition Committee (LAC) to confirm state interest in the parcel, authorize appraisals, and determine potential sources of state cost-share funding. The LAC's findings will be reported to the State Forest Legacy Committee.

DEM, cooperatively with the USDA Forest Service, then begins due diligence for the acquisitions which includes:

- Conservation easement and deed drafting
- Title Search and Title Insurance
- Legal Description/ Survey
- Minerals Determination

After due diligence is complete, appraisals are initiated in accordance with federal appraisal standards.

The appraisal must be reviewed and approved by the Forest Service before DEM can proceed to negotiations with the landowner. The LAC then approves negotiations with the landowner to secure a Purchase and Sale Agreement.

Prior to closing DEM and /or Partners must complete the following tasks.

Environmental Assessment including a preliminary scoping of property conditions and, if warranted, a Phase 1 Environmental Assessment.

Baseline Documentation Report that details the relevant conditions of the property at the time the conservation easement is granted.

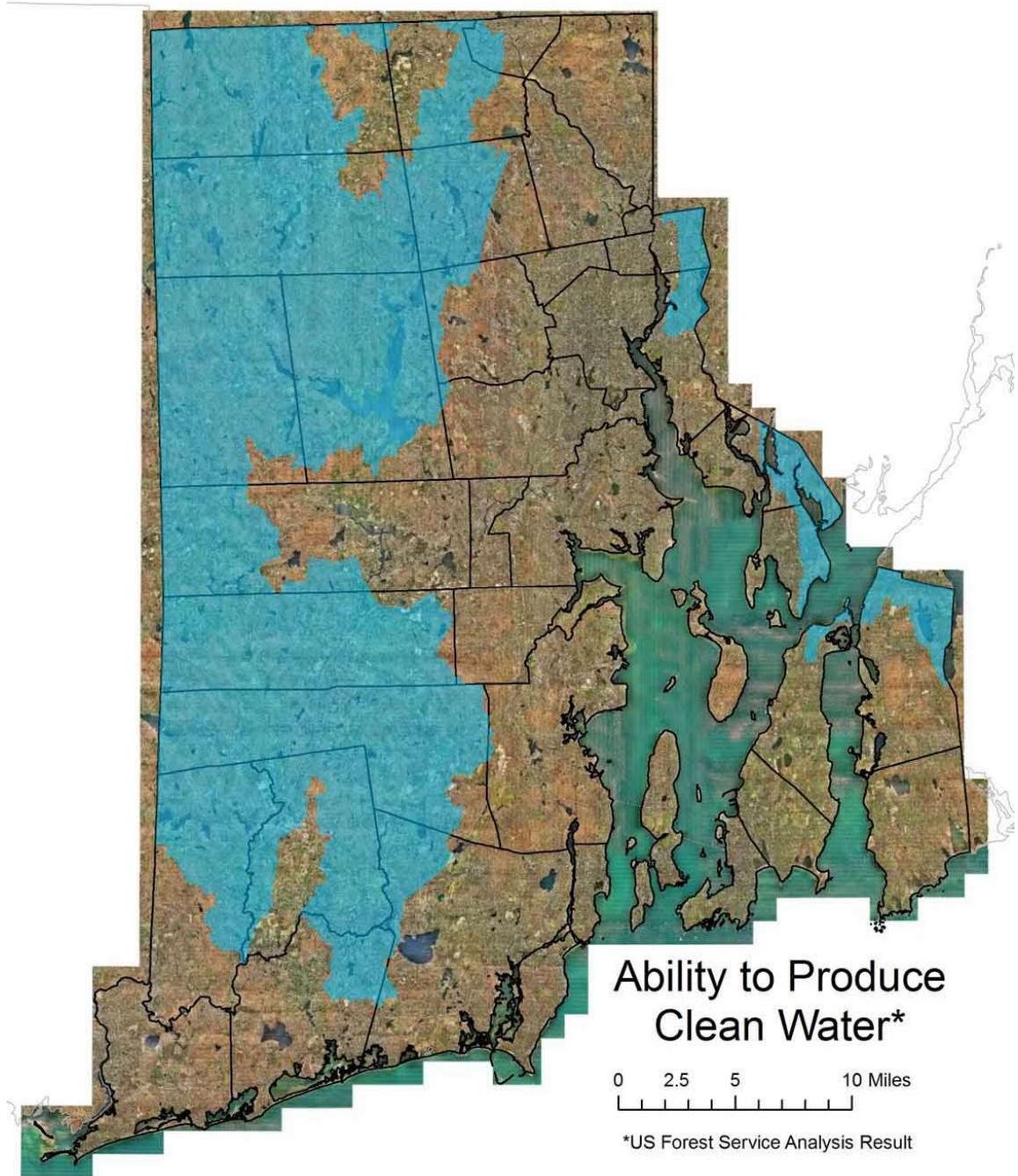
Multi-resource Forest Management Plan, approved by the State Forester, which addresses the resource elements of the USDA Forest Stewardship Program.

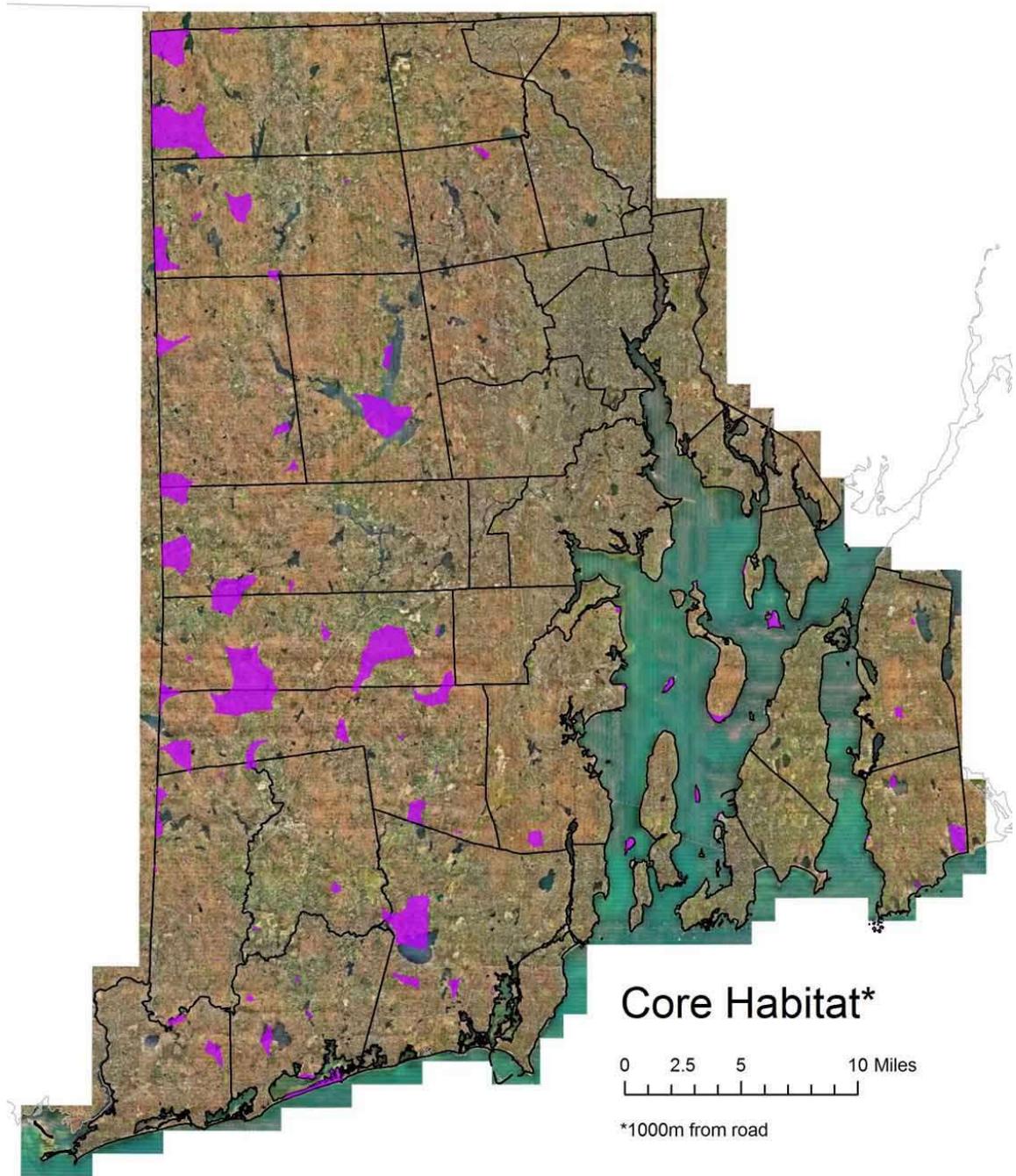
Appraisal and appraisal review that meets Uniform Appraisal Standards for federal acquisitions.

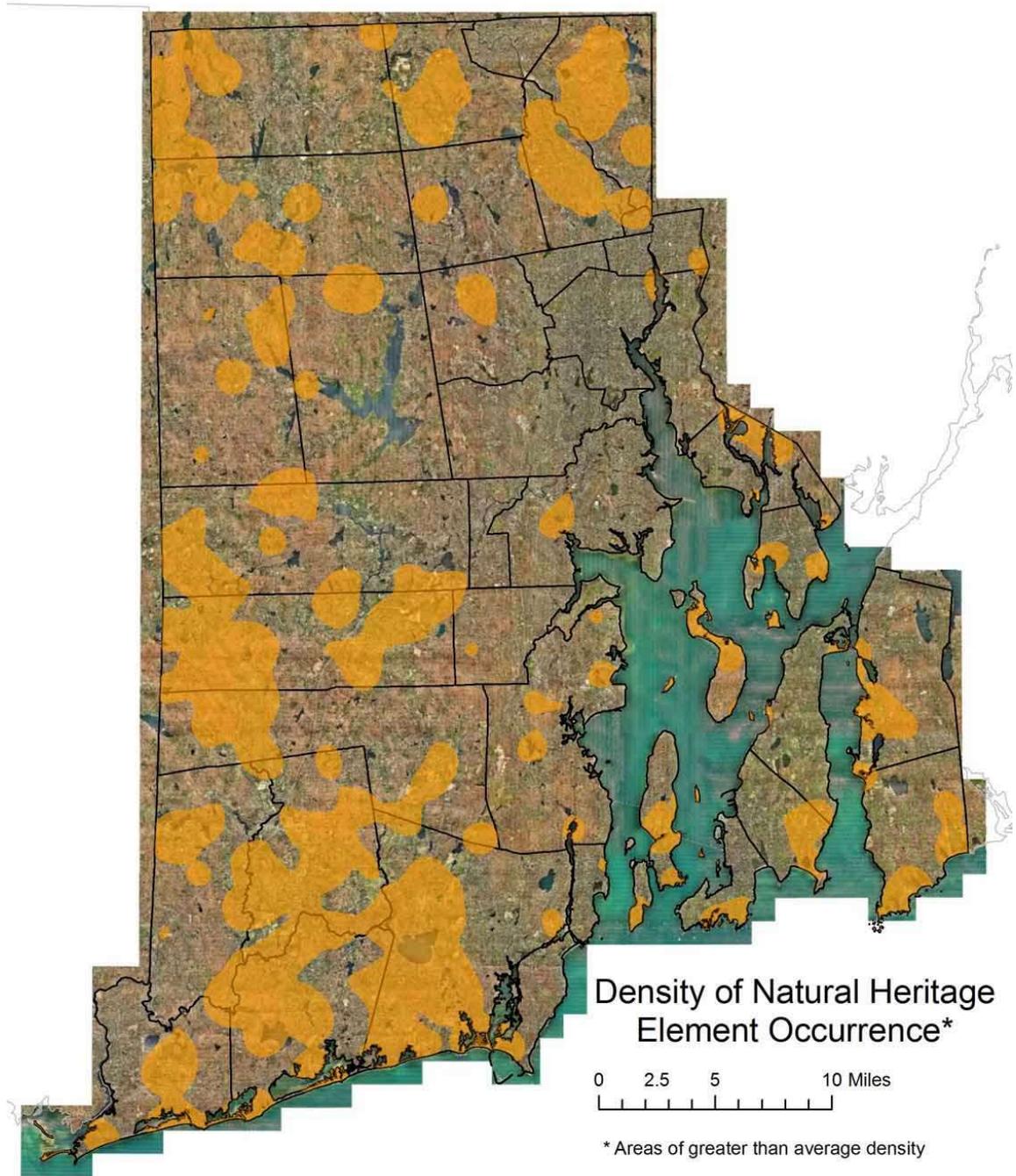
Amicable Agreement letter that documents that the sale is strictly voluntary and that the value of property has been determined by an approved appraisal.

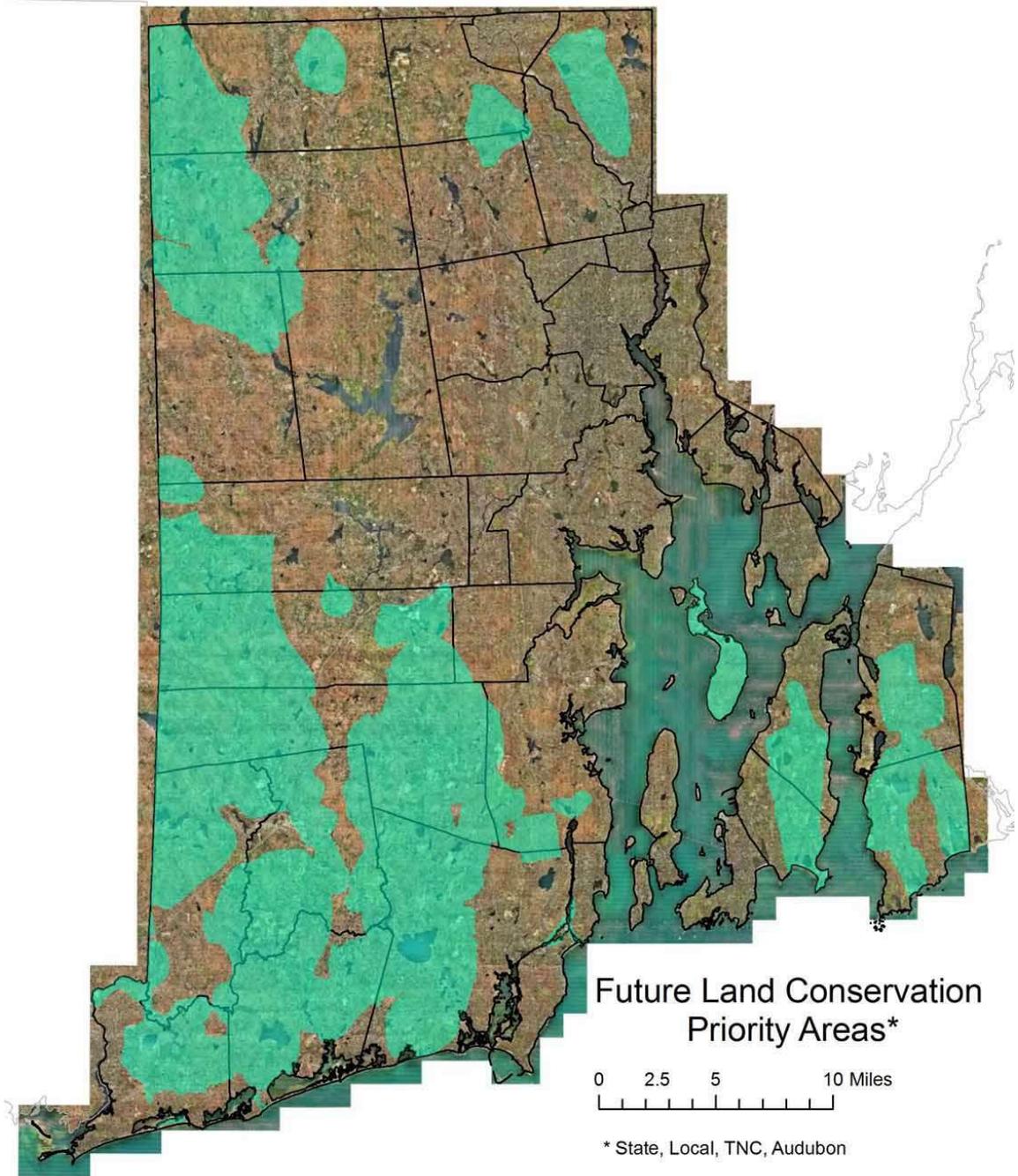


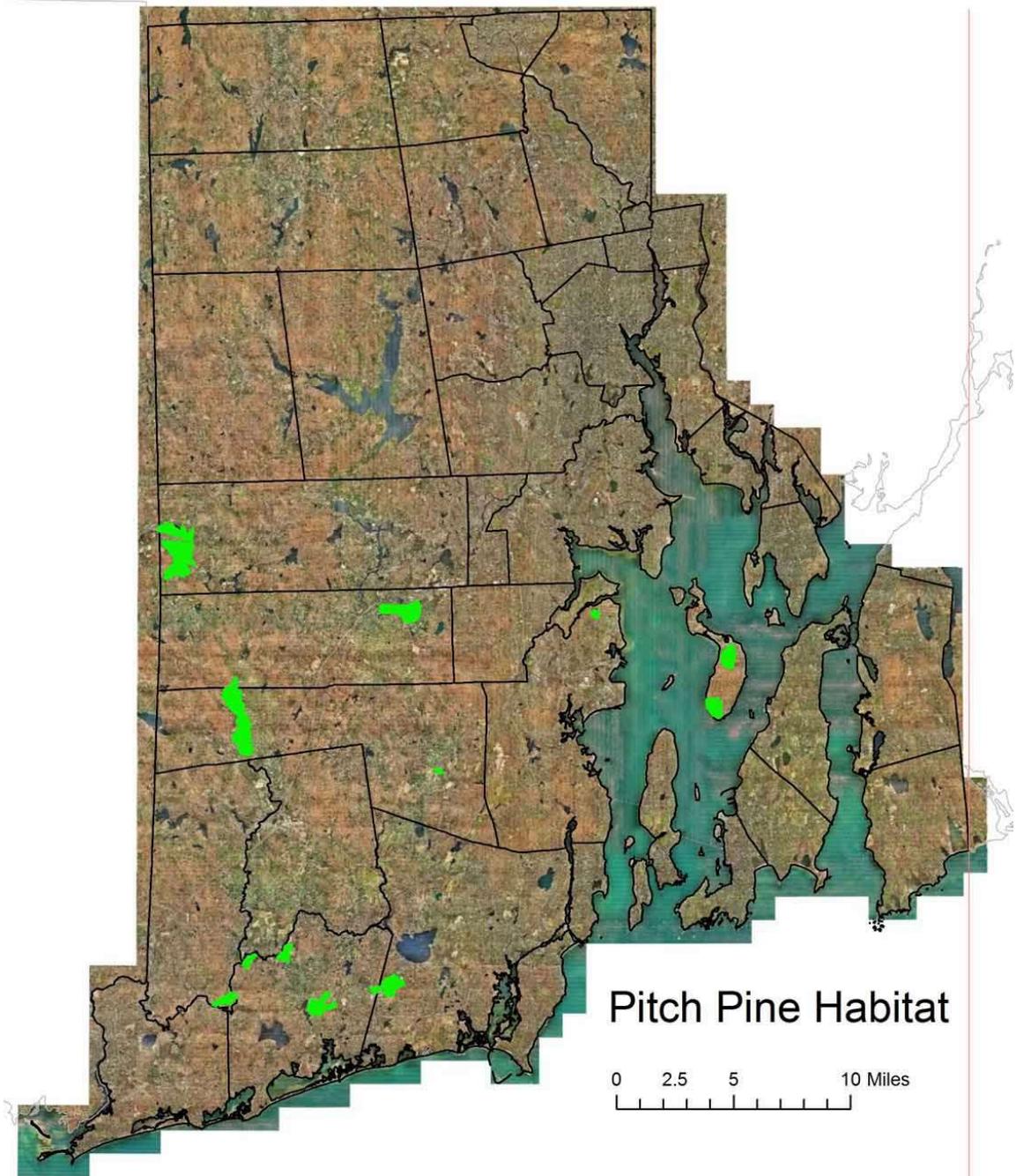
APPENDIX A. Maps of Important Resources within the Proposed Forest Legacy Areas





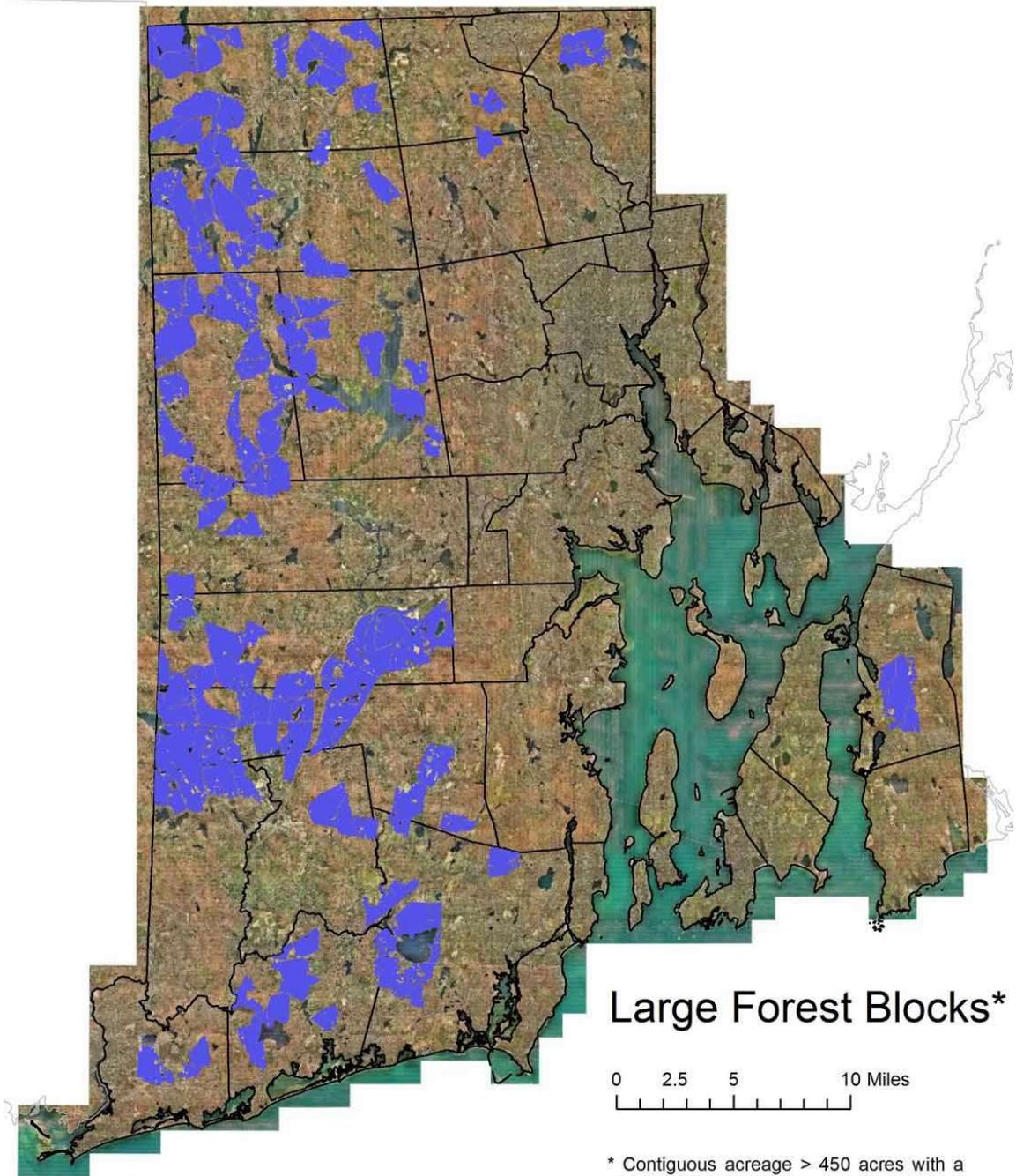






Pitch Pine Habitat

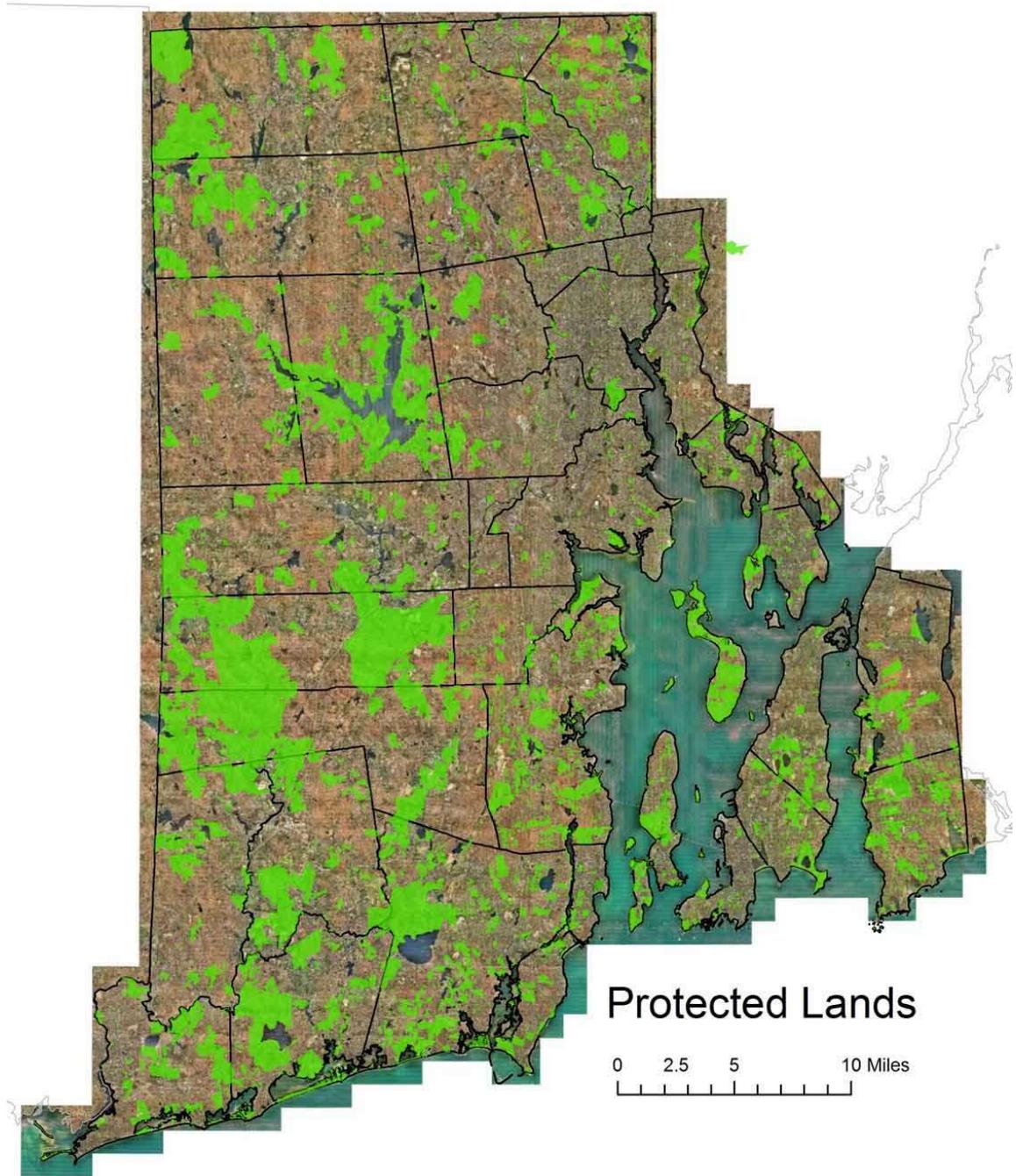
0 2.5 5 10 Miles

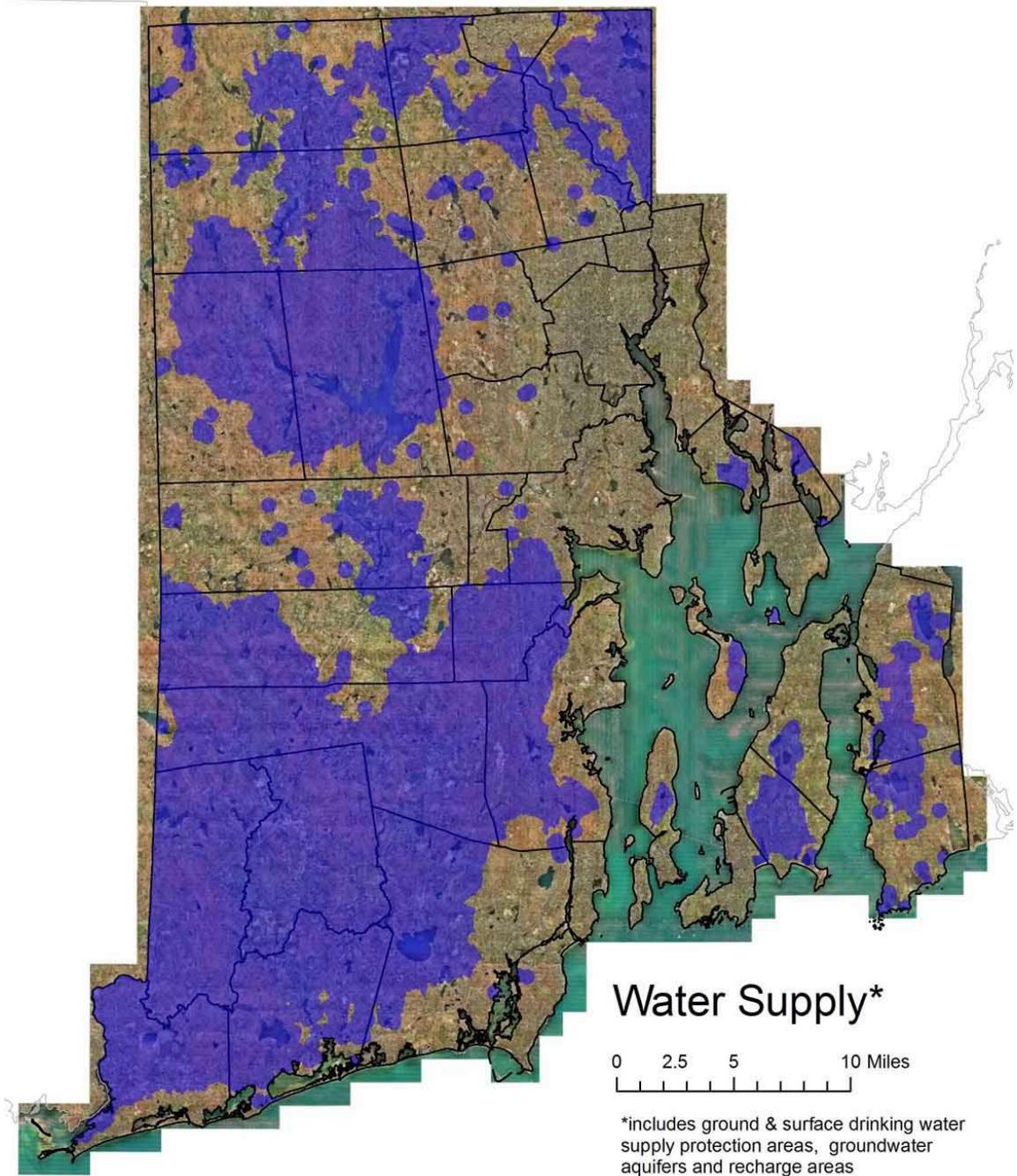


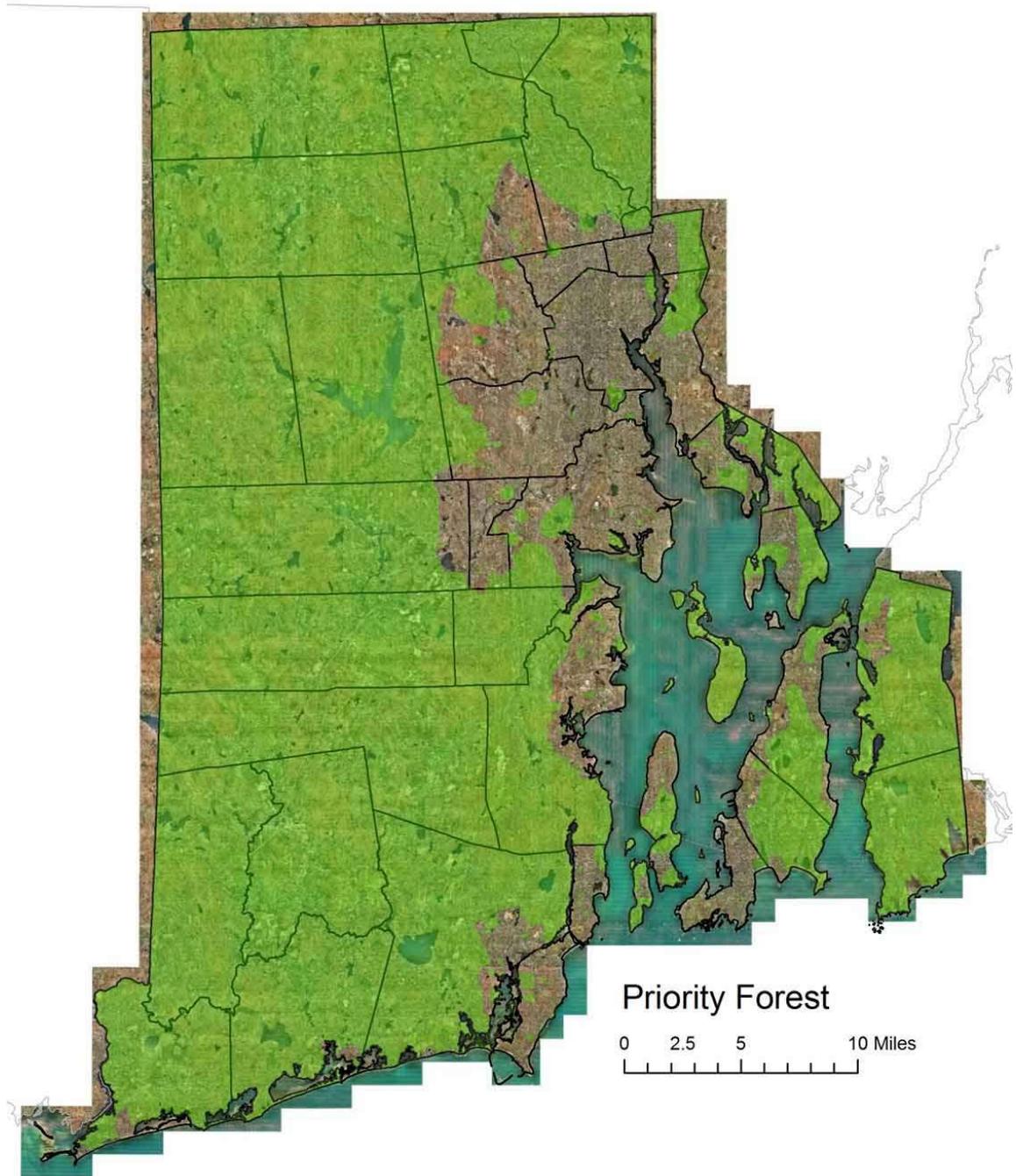
Large Forest Blocks*

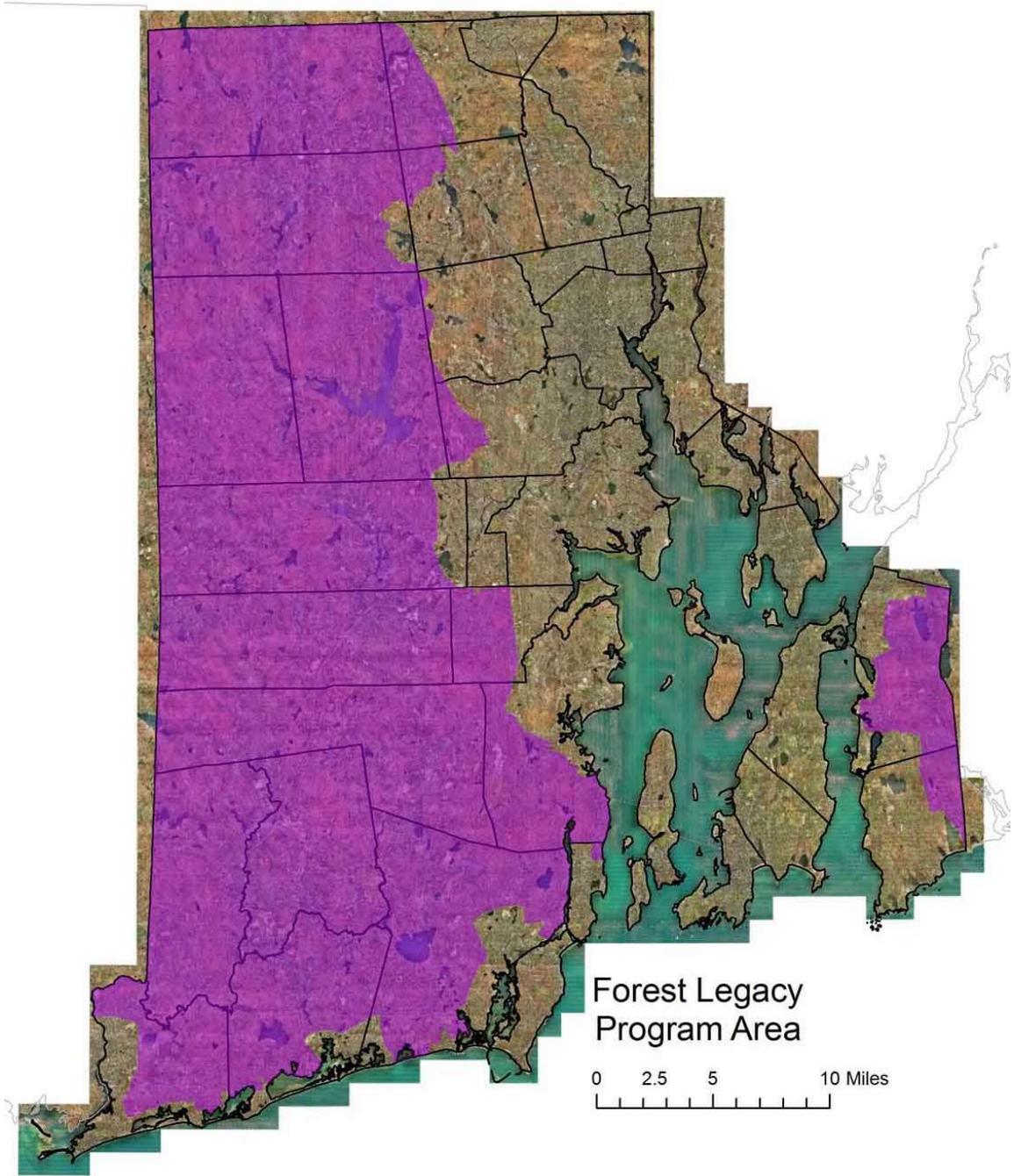
0 2.5 5 10 Miles

* Contiguous acreage > 450 acres with a compact footprint









APPENDIX B.

Summary of important public resources to be protected in each of the two Forest Legacy Areas

"East Bay - FLA"

1. Description - The "East Bay" proposed area is about 20,000 acres and located in the towns of Tiverton and Little Compton in the southeast corner of the State, east of Narragansett Bay. Its eastern boundary follows the State line between Rhode Island and southeastern Massachusetts. The numbers of ownerships are in the low hundreds with most of the key areas contained in dozens of larger unfragmented forest tracts. See the attached USGS maps which has the proposed Forest Legacy Area boundary delineated.

2. Summary of important environmental values and how they will be protected - Enclosed within this area are several key open space areas, a state management area, and several rare, threatened, and endangered species habitats. It includes the last remaining significant forest tracts in this portion of the State. Although there is relatively little development now, pressures are increasing from the Newport, Fall River, and Providence expansions. This area comprises a significant portion of the watershed of the only public drinking water supply available to these two communities. Some of the interests that in these lands that will likely be acquired include, but are not limited to: development rights, public access (ROW's), scenic easements, and occasional fee simple acquisitions for tracts with many key resources.

3. Public benefits to be derived -

- a. Protected habitats for fish and wildlife
- b. Ground water aquifers
- c. Rare and endangered species habitat
- d. Scenic views/aesthetics
- e. Recreation and recreation access
- f. Traditional forest uses including vegetative manipulation
- g. Jobs and economic developments (products and tourism).

4. Potential management responsibility entities - Many options exist in the area. Specific assignments will depend on the specific tracts identified when selection criteria are applied to candidates. They may include: U.S. Fish and Wildlife Service, local towns, DEM - Division of Forest Environment, and a host of other federal, state, and public entities.

"Mainland - FLA"

1. Description - The "Mainland" proposed area encompasses a large portion of the Western and southern portions of the State and is over 250,000 acres in size. Thousands of ownerships averaging less than 100 acres are contained in this area. Its western boundary borders Connecticut for about 40 miles, while the eastern boundary bisects the State about mid-point north to south. See the attached USGS maps which has the proposed Forest Legacy Area boundary delineated.

2. Summary of important environmental values and how they will be protected - Included in this area are most of the State's significant forested land, most of the major State-owned open spaces and other significant inland recreation areas, the watersheds of three (3) public drinking water supplies which service over half the State's population, many historic villages, a number of threatened and endangered species and/or their habitats. Fragmentation and conversion of the forest resource base continues as population growth and development pressure is felt primarily from portions of the eastern megalopolis. Potable water is an essential resource that needs to be protected. Major groundwater aquifers and surface reservoirs are present, such as the Wood-Pawcatuck Rivers System, the Scituate and Slatersville Reservoirs, and the watershed of the Big River Reservoir. Some of the kinds of interests in land that will likely be acquired after a tract by tract analysis is done include, but are not limited to: development rights, public access (ROW's), mineral rights, timber rights, scenic easements, and occasionally fee simple acquisitions for tracts with many key resource values.

3. Public benefits to be derived -

- a. Potable drinking water
- b. Protected habitats for fish and wildlife
- c. Protected rare and endangered species habitat
- d. Scenic views/aesthetics
- e. Recreation opportunities and recreation access
- f. Traditional forest uses including vegetative manipulation for forest products and other values

g. Jobs and economic development from forest products
and tourism/recreational pursuits

4. Potential management responsibility entities - Many options exist in the area. Specific assignments will depend on the specific tracts identified when selection criteria are applied to candidates. They may include: U.S. Fish and Wildlife Service, DEM - Division of Forest Environment, State and local water supply boards, local town governments, and a host of other public and quasi-public conservation land trusts entities.

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^{xxii} Burr, Judy et.al. The Value of Rhode Island Forests. Rhode Island Tree Council. August 2019.