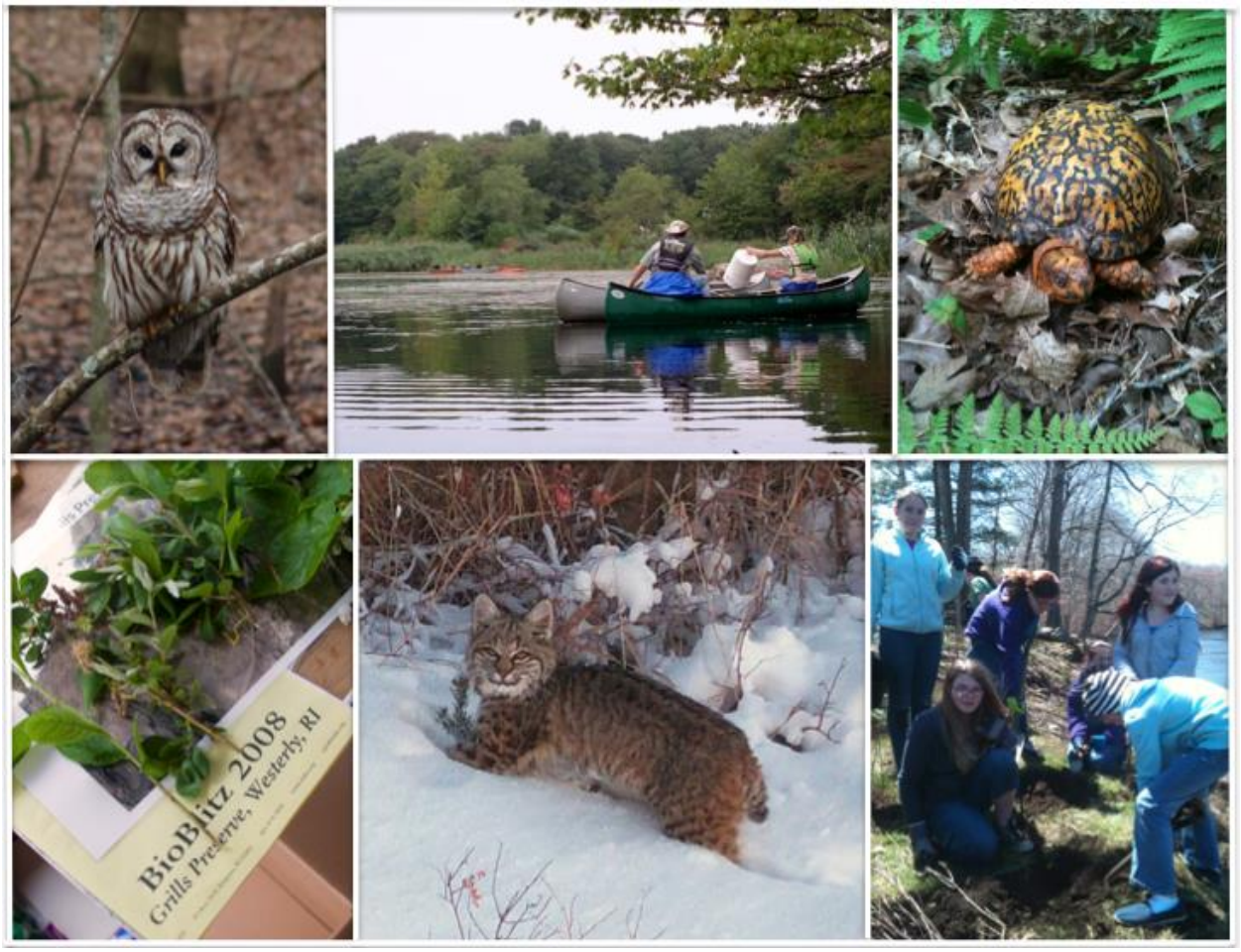
An Educator's Guide to

Westerly Land Trust Preserves



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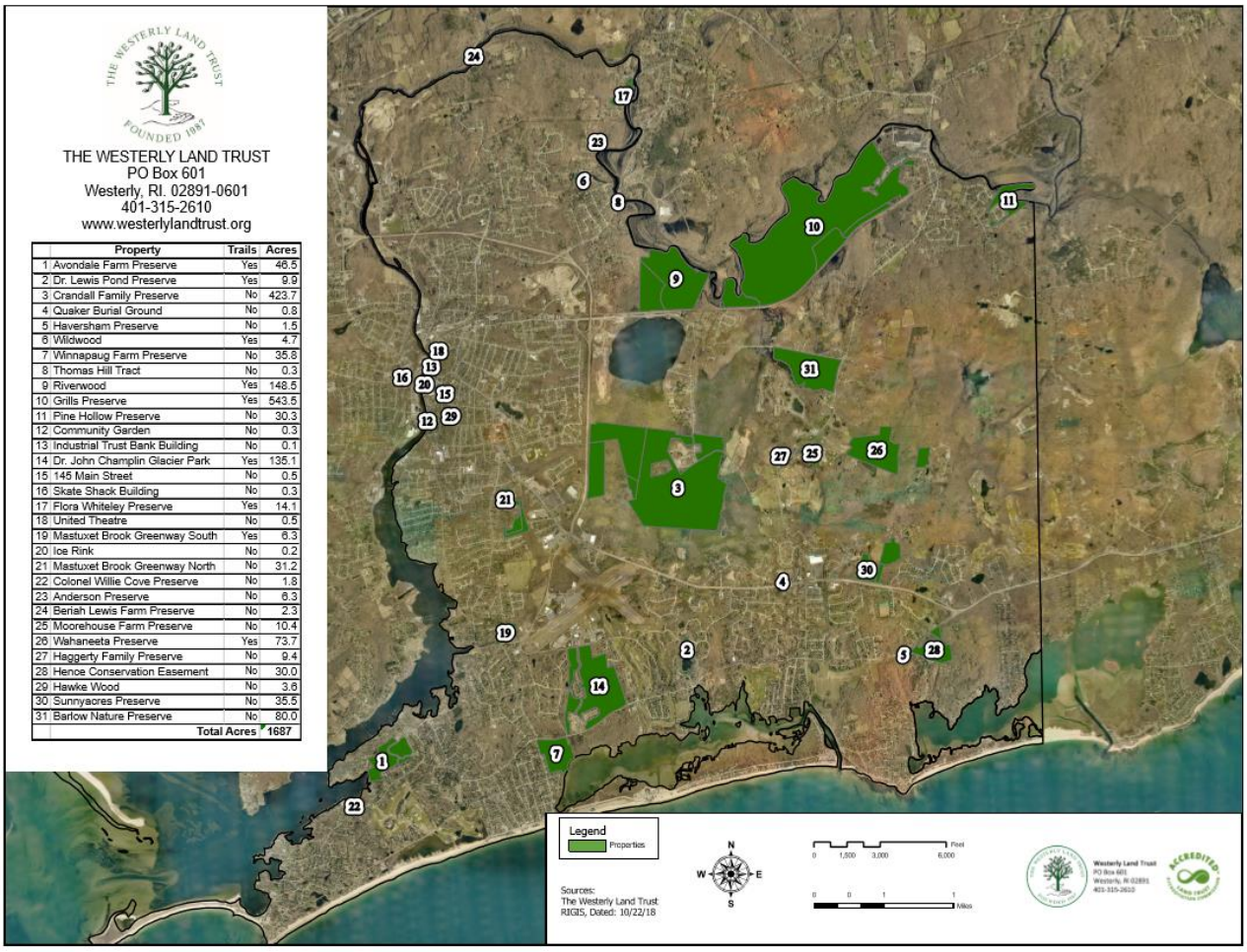
INTRODUCTION

The mission of the Westerly Land Trust is to conserve open space, revitalize culturally significant properties and provide environmental programs for the enduring benefit of our community. We hold nearly 1,700 acres of land in our care, much of which is open to the public and used for educational programming.

Westerly Land Trust preserves have a lot to offer students and educators. This document is a guide for educators who are looking for physical spaces where they can immerse students in environmental studies through real world, hands-on experiences. This guide will assist educators link their lesson plans, RI Science Standards, and field-based opportunities in WLT preserves. The Educator's Guide features five of our preserves that are best suited to be used as outdoor classrooms. For each of these preserves, you will find a description of the habitat, flora and fauna, as well as charts that illustrates alignment with GEMS-Net & FOSS modules and NGSS for each site. We hope that educators will find this information useful for tailoring lesson plans that meet RI Science Standards and incorporate field-based learning in our community. Trail maps can be downloaded at www.westerlylandtrust.org. If you have any questions or would like to coordinate and schedule a field trip with the Westerly Land Trust, you can do so by contacting Meg Lee at mlee@westerlylandtrust.org or calling 401-315-2610.



	Property	Trails	Acres
1	Avondale Farm Preserve	Yes	46.5
2	Dr. Lewis Pond Preserve	Yes	9.9
3	Crandall Family Preserve	No	423.7
4	Quaker Burial Ground	No	0.8
5	Haversham Preserve	No	1.5
6	Wildwood	Yes	4.7
7	Winnapaug Farm Preserve	No	35.8
8	Thomas Hill Tract	No	0.3
9	Riverwood	Yes	148.5
10	Grills Preserve	Yes	543.5
11	Pine Hollow Preserve	No	30.3
12	Community Garden	No	0.3
13	Industrial Trust Bank Building	No	0.1
14	Dr. John Champlin Glacier Park	Yes	135.1
15	145 Main Street	No	0.5
16	Skate Shack Building	No	0.3
17	Flora Whiteley Preserve	Yes	14.1
18	United Theatre	No	0.5
19	Mastuxet Brook Greenway South	Yes	6.3
20	Ice Rink	No	0.2
21	Mastuxet Brook Greenway North	No	31.2
22	Colonel Willie Cove Preserve	No	1.8
23	Anderson Preserve	No	6.3
24	Beriah Lewis Farm Preserve	No	2.3
25	Moorehouse Farm Preserve	No	10.4
26	Wahaneeta Preserve	Yes	73.7
27	Haggerty Family Preserve	No	9.4
28	Hence Conservation Easement	No	30.0
29	Hawke Wood	No	3.6
30	Sunnyacres Preserve	No	35.5
31	Barlow Nature Preserve	No	80.0
		Total Acres	1687

AVONDALE FARM PRESERVE

Suggested lesson topics for this preserve:

- Birds (especially coastal and grassland)
- Insects (meadow/grassland insects, pollinators)
- Migration (especially for birds and butterflies)
- Pollination
- Botany (especially native plants vs. invasive plants)
- Weather (especially coastal weather systems)
- Climate Change (especially coastal flooding)
- Human Development & Impact

What makes this place unique?

Alignment with GEMS-Net/FOSS Modules

Grades	Earth Science	Life Science
K		Animals 2 by 2
1-2	Pebbles, Sand, and Silt	Insects and Plants & Plants and Animals
3	Water and Climate	
4-6	Weather on Earth	Environments & Living Systems
6-8	Weather and Water	Diversity of Life & Populations and Ecosystems

Alignment with Next Generation Science Standards

K-5	Middle School	High School
K, 1, 2, 3 Interdependent Relationships in Ecosystems	MS. Matter & Energy in Organisms & Ecosystems	HS. Natural Selection & Evolution
K, 3, Weather & Climate	MS. Interdependent Relationships in Ecosystems	
1, 4, Structure, Function, & Information Processing	MS. Growth, Development, & Reproduction of Organisms	
3, Inheritance & Variation of Traits: Life Cycles & Traits	MS. Human Impacts	HS. Weather & Climate
5. Matter & Energy in Organisms & Ecosystems		HS. Human Sustainability
5. Earth's Systems		

Habitat:

Approximately 50 acres of coastal sandplain grassland, fresh water ponds and wetlands, brushland, salt marsh with two tidal inlets from frontage on the Pawcatuck River estuary. There are nesting boxes throughout the preserve.

Unique Flora and Fauna:

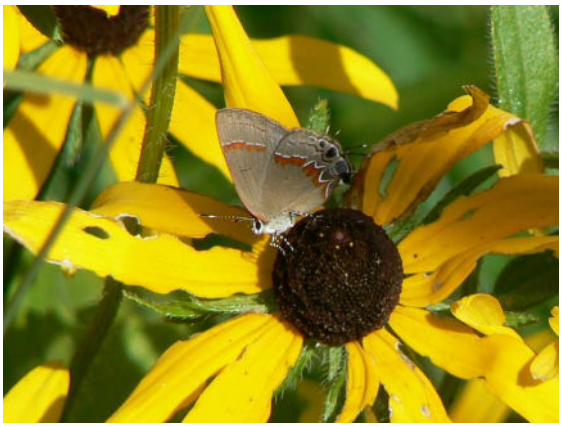
Birds:

This is a popular birding site and grassland nesting birds that are now rare in RI nest here, such as the bobolink.

Sparrows that can be found here include: American Tree Sparrow, Chipping Sparrow, Field Sparrow, Vesper Sparrow, Savannah Sparrow, Song Sparrow, Lincoln's Sparrow, Swamp Sparrow, White-throated Sparrow and White-crowned Sparrow. Palm Warblers and Yellow-rumped Warblers can be plentiful and Bobolink, Indigo Bunting and Eastern Meadowlark also show up in the fall. During migration, Rusty Blackbirds can occasionally be found.

A variety of raptors hunt over the fields, especially during migration season. Northern Harriers are regular and Red-tailed Hawks, Red-shouldered Hawks, Cooper's Hawks, Sharp-shinned Hawks, American Kestrels, Merlin and Peregrine Falcons are frequent visitors.

The preserve has also produced several rarities, including: Yellow-breasted Chat, Clay-colored Sparrow, Blue Grosbeak, Sedge Wren, Northern Shrike, Le Conte's Sparrow and Dickcissel. Visit http://ribird.org/ for more information and images.



Insects:

Local butterfly observers have made some remarkable finds here. Rare specimens such as the Sleepy Orange butterfly and the Funereal Duskywing butterfly have been discovered in the preserve. According to butterfly expert Matthew Arey, the appearance of these unusual “migrants” in southern New England is due in part to global climate change and the resulting increased warming at our latitude. The Sleepy Orange (*Eurema nicippe*) typically ranges on the East Coast from Florida north along the coastline to the Carolinas and Virginia. The Funereal Dusky- wing (*Erynnis funeralis*) is western and rarely ranges east of the Rocky Mountains.

Since most New England grassland habitats like Avondale Farm Preserve have fallen victim to development projects, these wonderful places have become exceedingly rare,

and the few that remain provide much needed resources for species that rely upon them. Upon recognizing the ecological significance of the preserve's grasslands, the Land Trust worked with the Natural Resources Conservation Service (NRCS) to plant native warm season grasses and wild- flowers that would benefit wildlife and provide a lovely place for people to enjoy as well.

The site serves as a habitat for unique meadow insects such as the monarch butterfly larvae, which subsist solely on milkweed plants that can be found growing in the preserve.

Vegetation:

The preserve is being managed to remove exotic invasive vegetation and restore native grassland species. This is an ongoing effort. However, this preserve has numerous native grasses, a diverse shrubland habitat and a large area of native pollinator plants that provide great educational opportunities.

Trails:

This preserve is open and flat with a paved 0.6-mile loop road, which is excellent for walking, jogging, and biking. This protected grassland habitat has been enhanced by the planting of native species and ongoing invasive plant species management. Other than the paved 0.6 mile loop road for recreation, there are walking trails along stone walls within the grassland.

Location:

Parking is at the end of either Quail Run or Grassland Way, both of which are off Watch Hill Road in Westerly.

CRANDALL FAMILY PRESERVE

Suggested lesson topics for this preserve:

What makes this place unique?

- Ecosystems (especially wetlands)
- Fish
- Amphibians
- Beavers & Engineering
- Hydrology
- Water Quality
- Bees/pollination (WLT has honey bee hives at this preserve)
- Human Development & Impacts
- Botany (unique wetland plant species including the Carnivorous Pitcher Plant)

Alignment with GEMS-Net/FOSS Modules

Grades	Earth Science	Life Science
K		
1-2	Pebbles, Sand, and Silt	Insects and Plants & Plants and Animals
3	Water and Climate	
4-6	Weather on Earth	Environments & Living Systems
6-8	Weather and Water	Diversity of Life & Populations and Ecosystems

Alignment with Next Generation Science Standards

K-5	Middle School	High School
5. Matter & Energy in Organisms & Ecosystems	MS. Matter & Energy in Organisms & Ecosystems	HS. Matter & Energy in Organisms & Ecosystems
5. Earth's Systems	MS. Interdependednt Relationships in Ecosystems	HS. Interdependent Relationships in Ecosystems
	MS. Growth, Development, & Reproduction of Organisms	HS. Natural Selection & Evolution
	MS. Natural Selection & Adaptations	HS. Earth's Systems
	MS. Human Impacts	HS. Weather & Climate
		HS. Human Sustainability

Habitat:

Crandall Swamp (Aguntaug Swamp) as a whole has been identified as an environmentally important ecosystem. The preserve is at the center of Rhode Island's largest Atlantic white cedar swamp, consisting of a wide variety of wetlands, including fen and bog. The excellent water quality and its isolation from heavily developed areas

have made the Crandall Swamp an important habitat for resident and migratory birds and other wildlife.

Unique Flora and Fauna:

This preserve provides habitat for a variety of migrating waterfowl and some rare or endangered plant and animal species such as the bog-haunter dragonfly. WLT also keeps active bee colonies at this property, which produce honey.

Beavers:

The beaver is the largest North American rodent. Its webbed hind feet with clawed toes, rich brown fur that is both waterproof and insulating, and unusual hairless, paddle-shaped tail make the beaver well-adapted to its semi-aquatic lifestyle. These animals are best known for their unique dam-building ability. Beavers first use their teeth to fell trees and to cut branches, which they shove into the stream bed. By piling mud and other debris on top, they are able to dam a stream to create a pond. The water in and around the lodge provides both access to food and protection from terrestrial predators

Beavers have created and altered wetlands across the country for thousands of years to the benefit of some and dismay of others. Their well-engineered lodges dot the local landscape and are truly admirable architecture. Reflecting on the industrious work they perform and the important role that they have played in ecological and cultural heritage, it's easy to see that beavers are the over-achievers of the natural world.

Beavers and are drawn to the sound of running water, often water that is flowing through a culvert. At the Crandall Family Preserve, some eager beavers added a bit of challenge to the recent culvert replacement project. Beavers filled one of them with sticks and debris in an attempt to build a lodge. Once that was removed and beaver exclusion fencing was installed, they simply moved downstream to begin their next attempt.

Vegetation:

The site is largely Atlantic white cedar swamp with floating bogs and a variety of unique bog plants such as the carnivorous pitcher plant. Forested areas consist of with cedar, red maple, oak and lovely stands of mountain laurel and American holly.

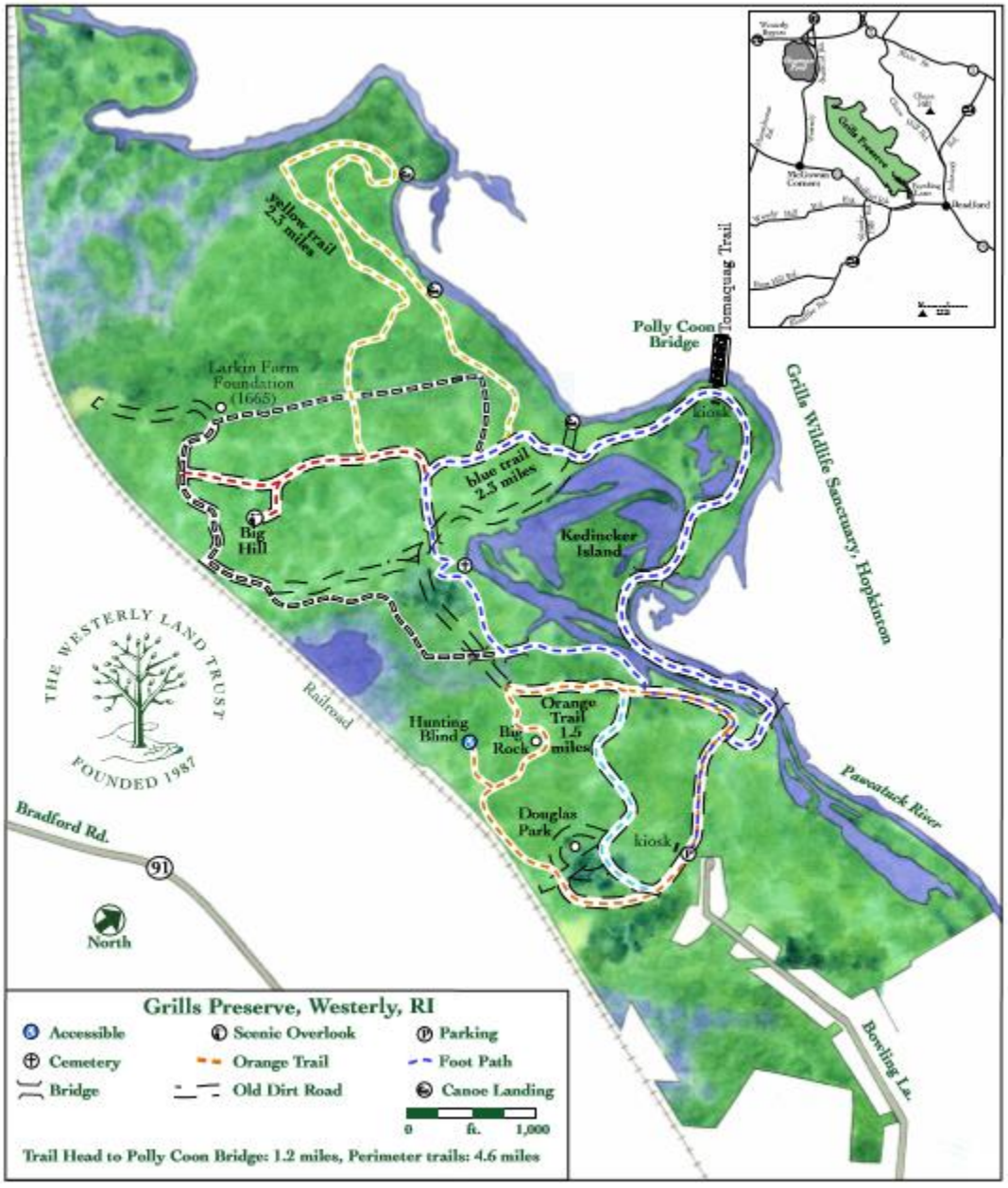
Trails:

Due to the nature of their environment, the largest section of Crandall Family Preserve is not open to the public. Periodically, the Westerly Land Trust will lead special guided tours through the preserve, including educational field trips for schools. However, the smaller portion of Crandall Family Preserve directly ahead of the parking area is open to the public. This path will lead you down to a platform overlooking the beautiful wetlands complete with several educational signs about the local species and habitat you can see from the platform.

Water Quality:

The entire Crandall Family Preserve is situated in the designated wellhead protection zone and recharge area for the Westerly Water Department's Crandall well. Consequently, the preserve will contribute to the protection of the quantity and quality of the water in the system that supplies much of Westerly and Pawcatuck.

GRILLS PRESERVE



What makes this place unique?

Suggested lesson topics for this preserve:

- Biodiversity
- Human Development & Impacts (historic industrial mills, canals, and dams can be seen along the river in the preserve)
- Hydrology
- Botany (rare plant species discovered during BioBlitz)
- Local History (granite quarry and historic cemetery with a Revolutionary War soldier's tombstone)
- Weather & Climate (a stone cairn notes the high-water mark of the flood of 2010
- Geology (exposed bedrock)

Alignment with GEMS-Net/FOSS Modules

Grades	Earth Science	Life Science
K	Trees and Weather	
1-2	Pebbles, Sand, and Silt	Insects and Plants & Plants and Animals
3	Water and Climate	
4-6	Weather on Earth & Soils, Rocks, and Landforms	Environments & Living Systems
6-8	Weather and Water & Earth History	Diversity of Life & Populations and Ecosystems

Alignment with Next Generation Science Standards

K-5	Middle School	High School
3. Weather & Climate	MS. Matter & Energy in Organisms & Ecosystems	HS. Matter & Energy in Organisms & Ecosystems
3. Inheritance & Variation of Traits: Life Cycles & Traits	MS. Interdependednt Relationships in Ecosystems	HS. Interdependent Relationships in Ecosystems
5. Matter & Energy in Organisms & Ecosystems	MS. Growth, Development, & Reproduction of Organisms	HS. Natural Selection & Evolution
5. Earth's Systems	MS. Weather & Climate	HS. Weather & Climate
	MS. Natural Selection & Adaptations	HS. Human Sustainability
	MS. Human Impacts	

Habitat:

This preserve consists of extensive freshwater wetlands along the Pawcatuck River, an extensive lagoon, marshland, native cranberry bog, upland forest, and a high hill with exposed bedrock.

Flora and Fauna:

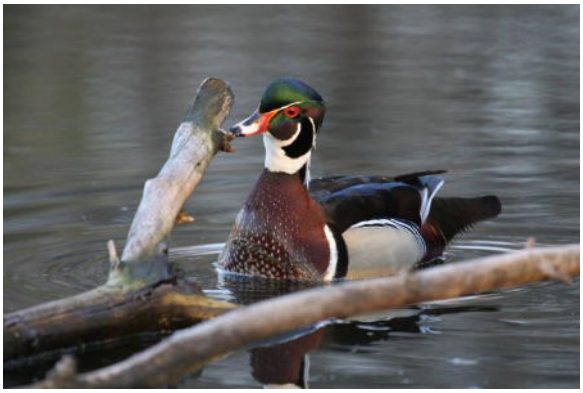
Information from **BioBlitz 2008** (http://rinhs.org/bioblitz-2008-westerly/):

The 9th annual Rhode Island BioBlitz was held June 6 & 7, 2008, at the Grills Preserve in Westerly. It was organized by RINHS and local host The Westerly Land Trust. With a total of 1,113 species counted over the 24 hour period by 115 participants, this was a record breaking year! Some especially interesting finds this year include:

- Carex styloflexa (Bent Sedge): A regionally rare plant that has never been observed in RI
- Thalictrum revolutum (Waxyleaf Meadow-rue): Previously listed as state historic, had not been observed in RI since 1921
- Other rare plant finds include: Asclepias tuberosa var. tuberosa (Butterfly-weed), Asclepias amplexicaulis (Clasping Milkweed), Aster macrophyllus (Big-leaved Aster), Rhododenron periclymenoides (Pinxter), Quercus prinoides (Dwarf Chestnut), and Pyrola chlorantha (Pyrola) [all species of concern; click here to see all rare species observed during this Bioblitz]
- Over 133 species of fungi (70 lichens and 63 non-lichenous fungi) and 68 species of mosses and liverworts
- Some birds of note included the Whippoorwill, Red-Shouldered Hawk, and Yellow-billed Cuckoo
- Other listed animals observed were the Black Rat Snake and the Dusted Skipper (both species of concern)

64 species of non-native plants and 9 non-native animals were tallied (represent 13% of total plant, and 2% of all animals observed during event.

You can also...
Download a summary table of findings by taxa .xlsx:18K
Download the species list for BioBlitz 2008 .xlsx:91K
Download a list of non-native species found during BioBlitz 2008 .xlsx:15K



Local History:

The Polly Coon pedestrian bridge that spans the Pawcatuck River is the site of a historic bridge where local granite was hauled from quarries. Within the preserve, you will notice other remnants of local industry, including a manmade canal system along the Pawcatuck River, which once served historic mills in the area. Visitors can also explore a historic cemetery dating back to early settlers and includes the tombstone of a

Revolutionary War soldier. A more recent historic event is marked by a stone cairn, which notes the high-water mark of the flood of 2010.

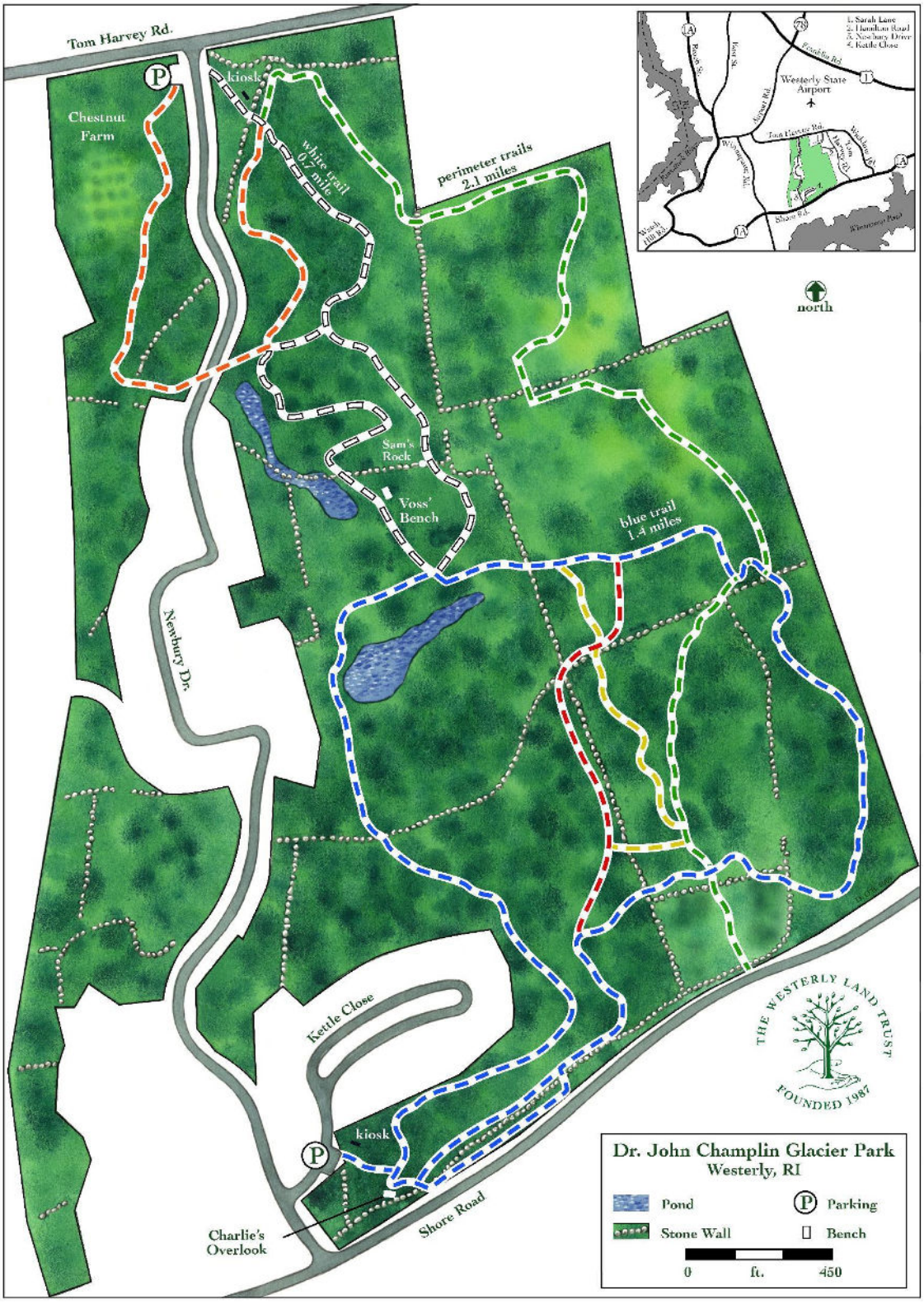
Trails:

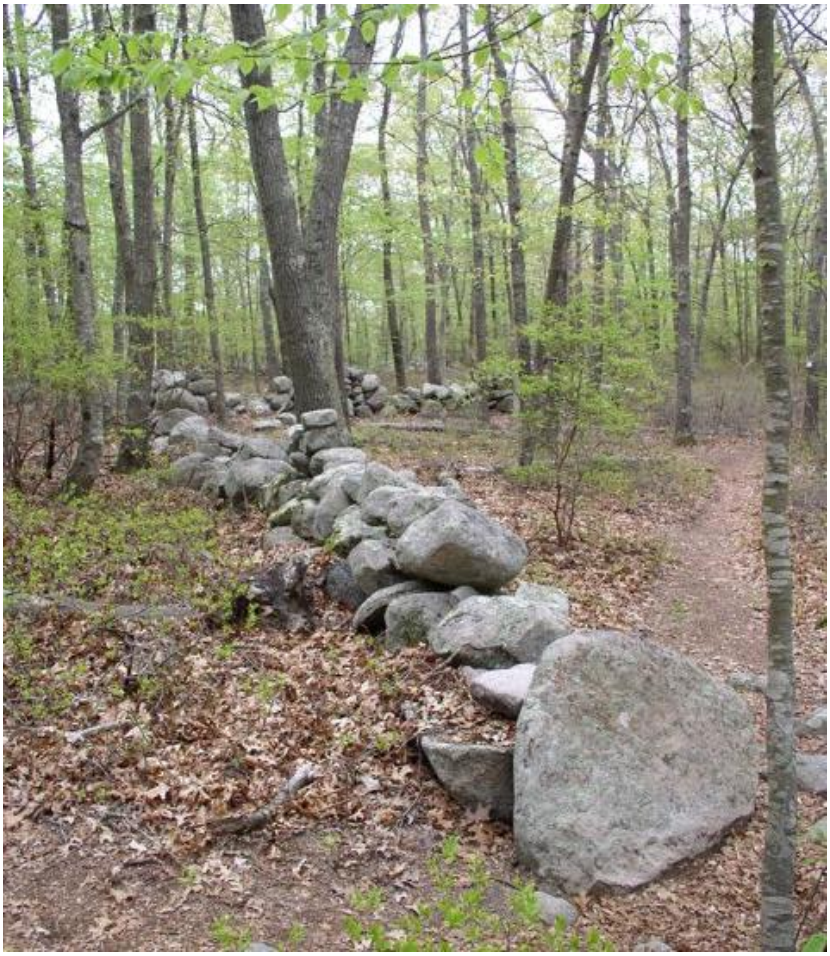
There is an extensive trail system, beginning at the public parking area at the end of Bowling Lane. Approximately 7 miles of trails cover the preserve, including a cross-country loop that is used by the Westerly High School and Middle School teams.

Location:

This Preserve is accessed from its large gravel parking area at the end of Bowling Lane. Largely forested with excellent access along the river, the parcel features a beautiful panoramic view from the top of Big Hill. Trails are primarily old dirt roads, easily followed and ideal for walking, jogging, biking and snow shoeing. Additional smaller trails strictly for foot traffic are also maintained.

DR. JOHN CHAMPLIN GLACIER PARK





Suggested lesson topics for this preserve:

- Human Development & Impacts
- Soil (3 different types found here)
- Vernal pools
- Amphibians
- Evolution (Prehistoric creatures and Ice Ages)
- Botany (noteworthy: American Chestnut nursery)
- Geology (large erratics scattered by glacial movement)
- Glaciers (Glacial activity responsible for the terrain of the preserve)
- Topography (recessional moraine kettle and kame topography)

Alignment with GEMS-Net/FOSS Modules

Grades	Earth Science	Life Science
K		
1-2	Pebbles, Sand, and Silt	Insects and Plants & Plants and Animals
3	Water and Climate	
4-6	Weather on Earth & Soils, Rocks, and Landforms	Environments & Living Systems
6-8	Weather and Water & Earth History	Diversity of Life & Populations and Ecosystems

Alignment with Next Generation Science Standards

K-5	Middle School	High School
2, 4. Earth's Systems: Processes that Shape the Earth	MS. Matter & Energy in Organisms & Ecosystems	HS. Matter & Energy in Organisms & Ecosystems
3. Weather & Climate	MS. Interdependednt Relationships in Ecosystems	HS. Interdependent Relationships in Ecosystems
5. Matter & Energy in Organisms & Ecosystems	MS. Growth, Development, & Reproduction of Organisms	HS. Natural Selection & Evolution
5. Earth's Systems	MS. Natural Selection & Adaptations	HS. History of Earth
	MS. History of Earth	HS. Earth's Systems
	MS. Earth's Systems	HS. Weather & Climate
	MS. Weather & Climate	HS. Human Sustainability
	MS. Human Impacts	

Habitat:

The Dr. John Champlin Glacier Park consists of two parcels totaling 134 acres. You will find kettle ponds, sand barrens, vernal pools, and ridges overlooking Winnapaug Pond, Block Island Sound, Block Island and Long Island.

Flora and Fauna:

The property is largely made up of Oak-Heath forest. However, there is also a chestnut nursery on premise. The American Chestnut was once a common and abundant tree, but blight has devastated this native American species. The Westerly Land Trust began the Chestnut nursery project with the goal of establishing healthy chestnut forest stands in Westerly.

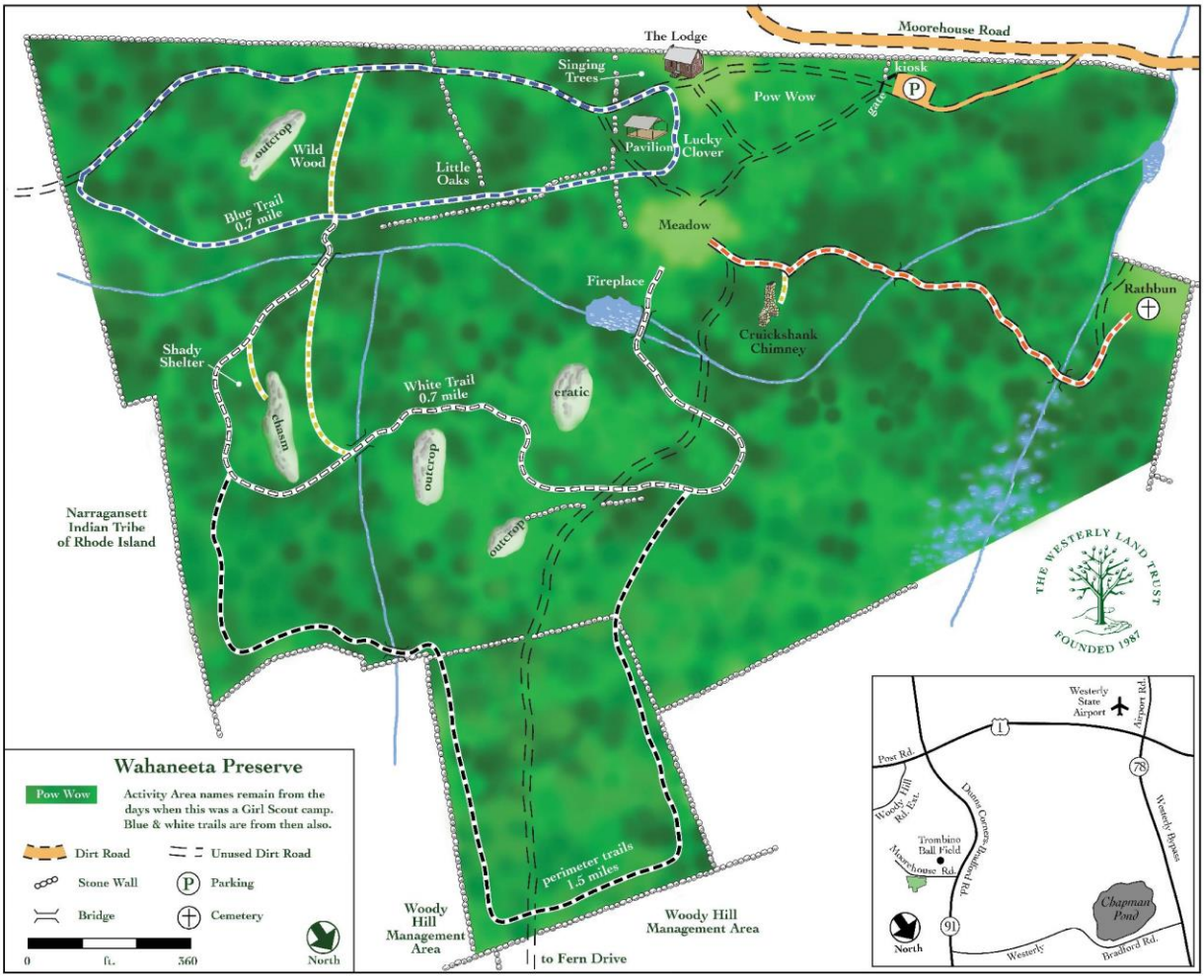
Geology:

The preserve's terrain consists of recessional moraine kettle and kame topography, the result of glacier melts. The terrain features three soil types and its geology is linked to the Charlestown Terminal Moraine and the glacial till and deposits that occurred in this area ~15,000 years ago. Throughout the preserve, you'll find erratics scattered by glacial movement in addition to stonewalls left behind by early settlers, and mysterious quarry stones.

Trails:

A large trail system through hilly terrain is accessible from two parking areas; one off of Tom Harvey Road and another on Kettle Close that is just off Shore Road at the Winnapaug Cottages' entrance.

WAHANEETA PRESERVE



Suggested lesson topics for this preserve:

- Ecosystems (wooded wetlands, forest)
- Glacial Geology
- Food Web
- Wildlife (Interior forest critters)
- Botany (noteworthy: 82ft tall Sweet Black Birch tree that is recognized as a Champion Tree)

What makes this place unique?

Alignment with GEMS-Net/FOSS Modules

Grades	Earth Science	Life Science
K		
1-2	Pebbles, Sand, and Silt	Insects and Plants & Plants and Animals
3	Water and Climate	
4-6	Weather on Earth & Soils, Rocks, and Landforms	Environments & Living Systems
6-8	Weather and Water & Earth History	Diversity of Life & Populations and Ecosystems

Alignment with Next Generation Science Standards

K-5	Middle School	High School
K, 1, 2, 3. Interdependent Relationships in Ecosystems	MS. Matter & Energy in Organisms & Ecosystems	HS. Matter & Energy in Organisms & Ecosystems
K, 3. Weather & Climate	MS. Interdependednt Relationships in Ecosystems	HS. Interdependent Relationships in Ecosystems
1, 4. Structure, Function, & Information Processing	MS. Growth, Development, & Reproduction of Organisms	HS. Natural Selection & Evolution
1. Space Systems: Patterns & Cycles	MS. Natural Selection & Adaptations	HS. Earth's Systems
2, 4. Earth's Systems: Processes that Shape the Earth	MS. History of Earth	HS. Weather & Climate
3. Inheritance & Variation of Traits: Life Cycles & Traits	MS. Earth's Systems	HS. Human Sustainability
5. Matter & Energy in Organisms & Ecosystems	MS. Weather & Climate	
5. Earth's Systems	MS. Human Impacts	

Habitat:

This 72-acre property is the former Girl Scouts of Rhode Island Camp Wahaneeta. It is primarily wooded wetlands and includes a stream, pond, and the former Girl Scout lodge. The preserve is home to an abundance of wildlife and interesting glacial geology as well. The preserve also abuts the 800-acre Woody Hill Management Area to create a large-scale greenway that provides critical habitat for interior forest species.

Flora and Fauna:

The preserve consists of mature upland forest habitat and wetlands. The property is composed primarily of oak and red maple forest. Thick huckleberry is present in the shrub layer, along with lowbush blueberry.

Wahaneeta Preserve is home to an 82-ft. tall Sweet Black Birch tree that is recognized as a Champion Tree by the Rhode Island Tree Council. A Champion Tree is designated as the largest of its species in the state.

Small ponds and vernal pools in the preserve provide critical habitat for amphibians while Brook Trout dwell in the cold-water stream. These wetlands are protected by shade trees and walking trails are kept away from these sensitive habitats.

Wahaneeta also provides habitat for interior birds such as the Scarlet Tanager, Red-Eyed Vireo, Ovenbird, Eastern Wood Pewee and Great Crested Flycatcher, the latter of which is listed as a species of Greatest Conservation Need by RIDEM's Wildlife Conservation Strategy.

Local History:

The hiking trails and camp areas retain their names from the days when it was Girl Scout camp, adding to the charm of this unique property. History buffs will enjoy exploring relics such as the Cruickshank Chimney and the historic Rathbun Cemetery.

Trails:

There are walking trails throughout the preserve that retain their names from the era when it was a Girl Scout Camp.

Location:

The property is adjacent to the Paul E. Trombino Memorial Foundation Little League complex, and to the 800-acre Woody Hill Management Area of the Department of Environmental Management. Access is from Moorehouse Road, off Dunns Corners – Bradford Road (118 Moorehouse Rd. in Westerly).