BIOLOGICAL RESOURCES

When a community protects wildlife and habitat, it is also protecting biodiversity, which is important for the health and productivity of the ecosystem and its inhabitants, including humans. Biodiversity refers to the variety of genetic material within a species population, the variety of species (plants, animals, microorganisms) within a community, and the variety of natural communities within a given region. Biodiversity facilitates adaptation and evolution, improving a species' chance of survival as the environment changes. A diversity of plant and animal species is also necessary to maintain healthy human environments, working landscapes, and productive ecosystems. Lower organisms, many not well known, contribute to nutrient cycling, decomposition of organic matter, soil rehabilitation, pest and disease regulation, pollination, and water filtering. Once biodiversity declines, it is extremely hard for an ecosystem to recover or replace species.

South Harrison contains numerous types of habitats, all of which are important for maintaining biodiversity. As of 2002, forested lands, the most abundant type of natural habitat in South Harrison, occurred where land was dry and undeveloped. Forested wetlands were the second most common ecosystem type in South Harrison. These wetlands typically occur along South Harrison's stream corridors and lakeshores and support plants that require persistent standing water. The following sections will identify and describe in more detail the plant and animal communities that inhabit these unique ecosystems within South Harrison Township.

NATURAL VEGETATION

A region's vegetation is dependent on many factors, the most important of which are climate and soils. South Harrison's climate is cool and temperate with rainfall averaging 42 to 44 inches per year. For a detailed description of South Harrison's soils see the *Soils* section.

South Harrison's natural vegetation types, along with human-influenced types of land cover, have been tabulated and mapped by NJDEP's 2002 land cover analysis. This data, based on infrared aerial photography, is the most recent available. The designation of a particular land cover as a vegetation type is based on definitions provided by the Anderson Land Use Classification System, created by the U.S. Geologic Survey. The natural vegetation types found in South Harrison Township are shown on **Map 14: Natural Vegetation (2002)** and in **Table 16: South Harrison Township Natural Vegetation**.

Source: DVRPC
Deciduous Forests are the most prevalent type of natural vegetation in South Harrison Township.

Table 16: South Harrison Township Natural Vegetation

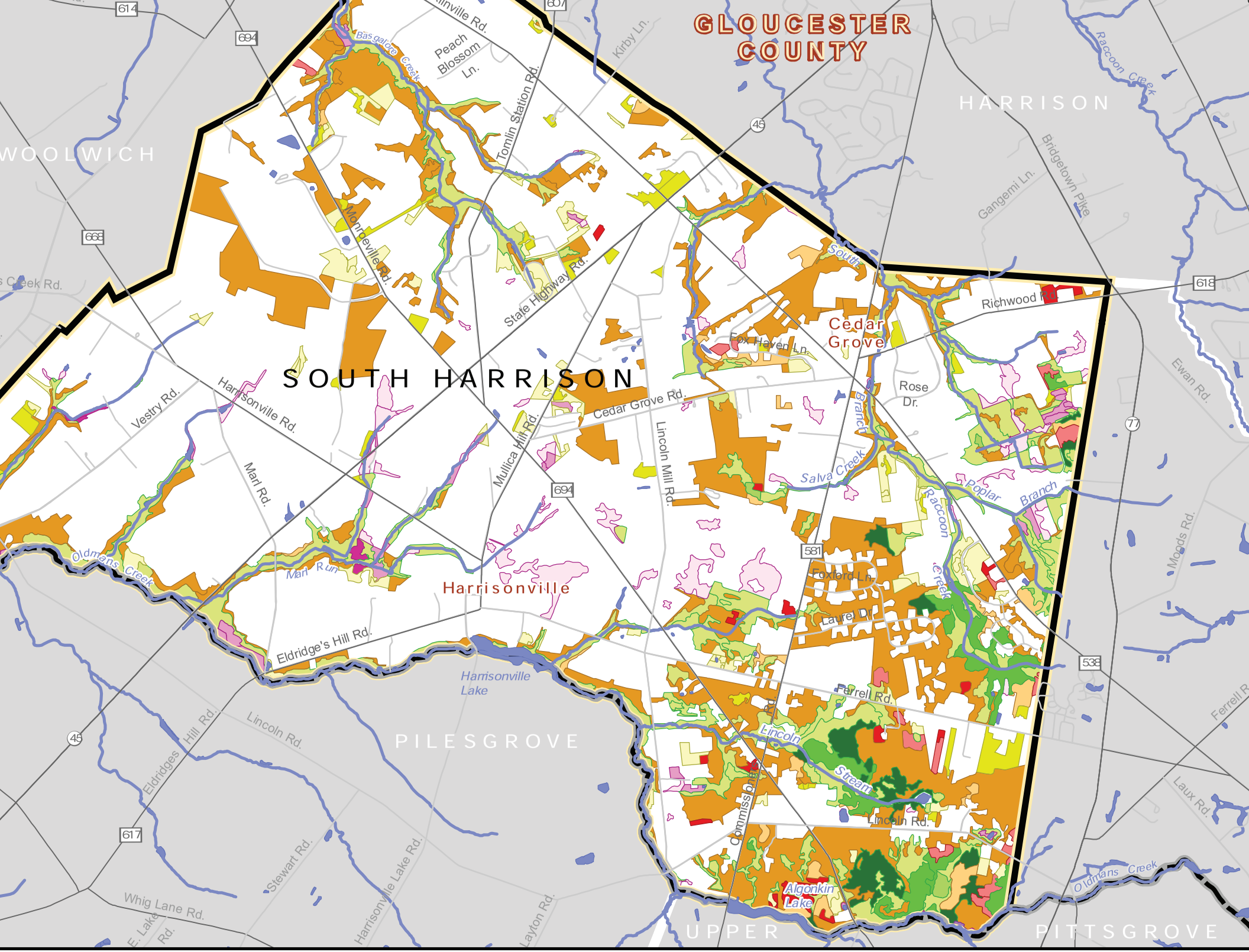
Type of Vegetation	Acres	% of Total Land Area
Deciduous Forest	1,488.51	14.59
Coniferous Forest	38.65	0.38
Mixed Forest (> 50% deciduous)	88.17	0.86
Mixed Forest (> 50% coniferous)	47.92	0.47
Brush/Shrubland - deciduous	40.55	0.40
Brush/Shrubland - coniferous	16.56	0.16
Brush/Shrubland – mixed	161.07	1.58
Old Field (< 25% brush covered)	107.17	1.05
Wetlands (herbaceous)	16.65	0.16
Wetlands (deciduous wooded)	892.51	8.75
Wetlands (coniferous wooded)	11.04	0.11
Wetlands (deciduous scrub/shrub)	44.53	0.44
Wetlands (mixed scrub/shrub, deciduous dominated)	3.99	0.04
Wetlands (mixed scrub/shrub, coniferous dominated)	7.43	0.07
Wetlands (phragmites dominate interior)	0.73	0.01
Wetlands (mixed wooded, coniferous dominated)	1.53	0.02
Wetlands (mixed wooded, deciduous dominated)	145.86	1.43
Modified Wetlands (managed in maintained lawn greenspace)	1.53	0.02
Modified Wetlands (agricultural)	145.86	1.43
Modified Wetlands (former agricultural)	13.88	0.14
Modified Wetlands (disturbed wetlands)	17.47	0.17
Artificial Lakes	40.26	0.39
Natural Lakes	2.88	0.03
Total Natural Vegetation Land Cover	**3,334.75**	**32.69**

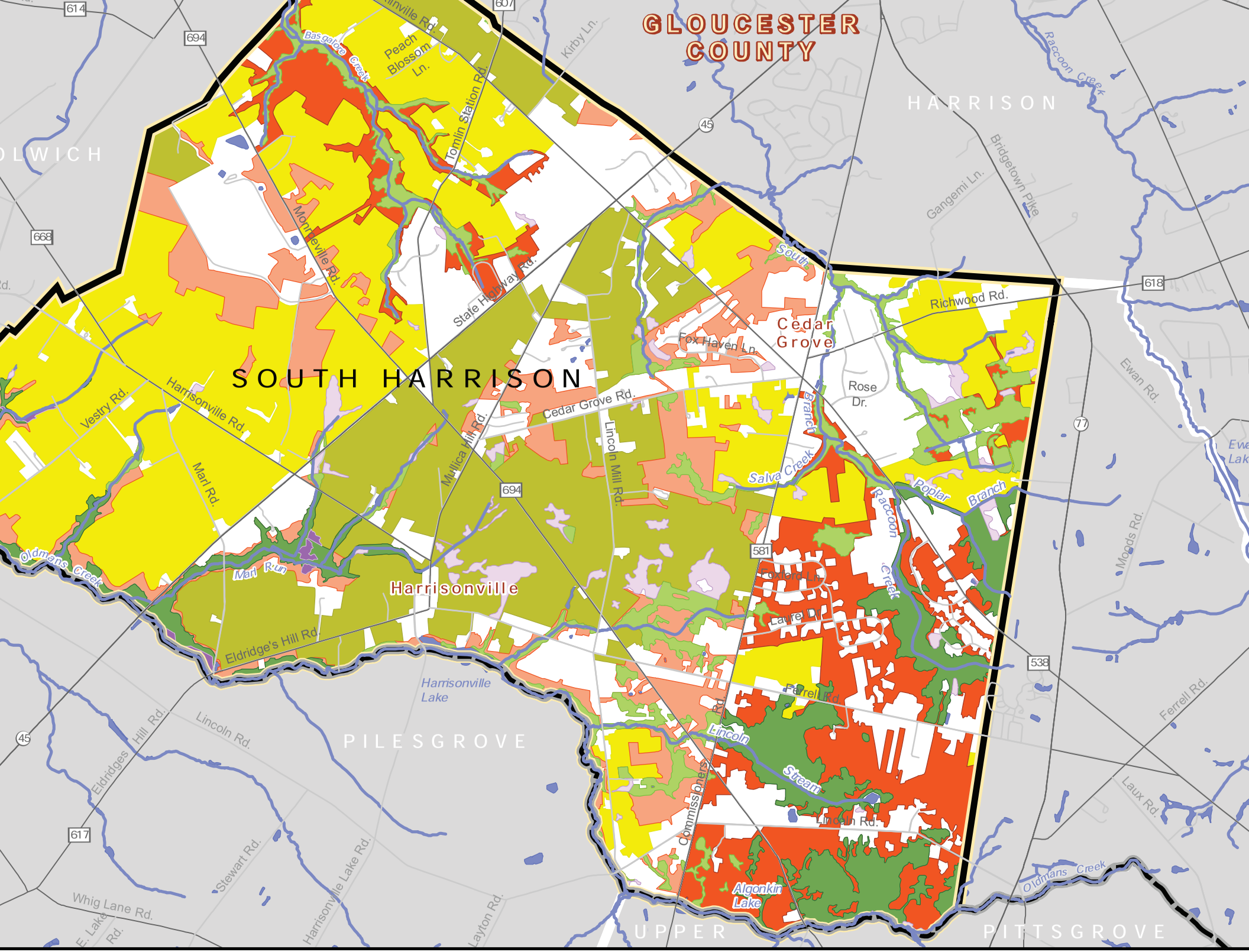
Source: NJDEP (2002 Land Cover)

Wetlands

Wetlands are a critical ecological resource, supporting both terrestrial and aquatic animals and boasting biological productivities far greater than those found on dry land. Wetlands play a vital role in maintaining water quality by cleaning surface and ground waters. The ecological importance of wetlands, however, has not always been appreciated. For over three centuries people drained, dredged, filled, and leveled wetlands to make room for development and agriculture. Although the pace of wetland destruction has slowed markedly in the past three decades, human activities have destroyed approximately 115 million of the original 221 million acres of wetlands in the United States since the beginning of European settlement.

Nearly all wetlands in South Harrison Township are found in association with major streams and their tributaries. Wetlands are dominant along the township's major waterways: Basgalore Creek, Raccoon Creek's South Branch, and Oldmans Creek and its tributaries. Wetlands provide high-quality animal and plant habitats, purify the township's surface and ground waters,


GLOUCESTER COUNTY
HARRISON
WOOLWICH
SOUTH HARRISON
PILESGROVE
UPPER
PITTSGROVE
Cedar Grove
Harrisonville
Harrisonville Lake
Algonkin Lake
Peach Blossom Ln.
Tomlin Station Rd.
Kirby Ln.
Raccoon Creek
Bridgetown Pike
Gangemi Ln.
Richwood Rd.
Ewan Rd.
Moods Rd.
Ferrell Rd.
Laux Rd.
Oldmans Creek
Basgalore Creek
Monroeville Rd.
State Highway Rd.
Vestry Rd.
Harrisonville Rd.
Marl Rd.
Mullica Hill Rd.
Cedar Grove Rd.
Lincoln Mill Rd.
Fox Haven Ln.
Rose Dr.
South Branch
Salva Creek
Poplar Branch
Foxford Ln.
Laurel Dr.
Marl Run
Eldridge's Hill Rd.
Eldridges Hill Rd.
Lincoln Rd.
Commissioners Rd.
Lincoln Stream
Stewart Rd.
Whig Lane Rd.
Harrisonville Lake Rd.
Layton Rd.
E. Lake Rd.
614
694
607
45
663
618
77
581
538
617


GLOUCESTER COUNTY
HARRISON
SOUTH HARRISON
PILESGROVE
UPPER PITTSGROVE
Harrisonville
Cedar Grove
Harrisonville Lake
Algonkin Lake
Peach Blossom Ln.
Tomlin Station Rd.
Bassgalore Creek
Monroeville Rd.
State Highway Rd.
Cedar Grove Rd.
Lincoln Mill Rd.
Mullica Hill Rd.
Harrisonville Rd.
Vestry Rd.
Marl Rd.
Marl Run
Oldmans Creek
Eldridge's Hill Rd.
Lincoln Rd.
Eldridges Hill Rd.
Stewart Rd.
Harrisonville Lake Rd.
Whig Lane Rd.
Layton Rd.
Commissioners Rd.
Lincoln Stream
Ferrell Rd.
Laurel Dr.
Foxford Ln.
Salva Creek
Poplar Branch
Raccoon Creek
Fox Haven Ln.
Rose Dr.
Richwood Rd.
South Branch
Kirby Ln.
Gangemi Ln.
Bridgetown Pike
Ewan Rd.
Moods Rd.
Laux Rd.
Oldmans Creek
Raccoon Creek
614
694
607
45
668
618
77
581
538
617

and create picturesque landscapes that add immeasurably to the quality of life for township residents. According to the Anderson Land Use Classification System, South Harrison Township has three major types of wetlands: (1) wooded wetlands dominated by deciduous trees, (2) scrub/shrub wetlands dominated by deciduous woody plants, and (3) agriculture wetlands.

Source: DVRPC
Wooded wetlands are common throughout South Harrison, and result in a unique landscape.

Common throughout South Harrison Township are deciduous wooded wetlands (sometimes referred to as forested wetlands). Deciduous wooded wetlands occupy about 892 acres (8.8 percent) of South Harrison's total land area and support mixed hardwoods that flourish in lowlands.

Closely associated with deciduous wooded wetlands are scrub/shrub wetlands, occupying less than 1 percent, about 45 acres, of South Harrison. These wetlands are generally composed of young, medium-height, primarily deciduous woody plants. Large swaths of deciduous wooded and scrub/shrub wetlands, surrounded by protective upland forest, survive between residential developments along the streams within the Township, including Basgalore Creek, Oldmans Creek, and Raccoon Creek's south branch.

In South Harrison, herbaceous wetlands are rare, occupying only 17 acres and less than 1 percent of the township's land area. Herbaceous wetlands generally occur along lake edges, open floodplains, and former agricultural wetland fields. Two types of herbaceous wetlands exist. In South Harrison, herbaceous wetlands are found in close proximity to wooded wetlands along the southeast reaches of Raccoon Creek's south branch and along the westernmost portion of Oldmans Creek. Herbaceous wetland plants include rice cutgrass, reed canary grass, pond lily, tearthumb, arrow-leafed tearthumb, broadleaf cattail, and the common reed (*Phragmites*). The second type of herbaceous wetland is *Phragmites*-dominated wetlands, covering almost 1 acre in South Harrison. This plant, also called the common reed, colonizes easily and pushes into wetland areas from adjoining dryer land, growing through underground shoots that make it difficult to eradicate. As it spreads, it tends to trap silt and gradually to raise the land level, converting the habitat to one that is dryer. This conversion, plus its manner of growth, enables *Phagmites* to push out other wetland species of plants. *Phragmites* is found in patches along small tributaries in the township.

Modified wetlands are areas that have been altered by human activities and do not support natural wetland vegetation. However they do show signs of soil saturation on aerial infrared surveys. Agricultural wetlands occupy 146 acres of land that is now under cultivation. This figure may be larger because not all modified agricultural wetlands show well on aerial infrared photos. Other modified wetlands encompass former agricultural wetlands, disturbed wetlands and wetlands that occur in maintained greenspaces such as open lawns, golf courses, and storm water swales. In total, modified wetlands occupy 179 acres or 1.8 percent of South Harrison's land area.

Gloucester County is a world stronghold of Swamp Pink, *Helonias bullata*, which is a wetland plant that produces a beautiful pink flowering cluster at the top of its 12-inch stalk. Swamp pink is found in shady, forested wetland areas where the water table is at or near the surface. This plant once inhabited wetlands from New York to Georgia, but is now only found along the Atlantic Coastal Plain. The Swamp Pink population is easily damaged or destroyed, especially by changes in water levels and canopy cover within its wetland habitat. Such disturbances include water withdrawal for irrigation, discharge from sewage treatment plants, siltation from agriculture or construction, and increased nutrients or chemicals in the water. In 1988, Swamp Pink was listed as an endangered plant on the New Jersey Endangered and Threatened Species list. In New Jersey, Swamp Pink populations are found in the headwater wetland areas of the Big Timber River, the Mantua, Raccoon, and Oldmans Creeks, and in Pineland areas. Swamp Pink is found at a number of locations in South Harrison Township.

Source: Michael Hogan
Swamp Pink in bloom

Upland Forests

Upland areas are those locations without water at or near the soil surface. More than 16 percent of South Harrison were composed of upland forests as of 2002. Most of the area's original upland forests have been cleared and converted to farms. The remaining upland forests are primarily located near stream corridors although some are scattered amongst residential areas. Deciduous upland forests are especially concentrated in the southeast section of the township.

Upland forests are the second most abundant land cover type in South Harrison, behind cropland and pastureland. Approximately 1,663 acres of South Harrison is upland forest, of which the vast majority is deciduous forest. Coniferous trees occur on about 87 acres of South Harrison.

Source: DVRPC
Typical grassland along the road in South Harrison Township

Grasslands and Agricultural Lands

NJDEP defines grassland habitat as brushland, shrubland, or old fields that were cleared or disturbed at one time and then abandoned. Following abandonment, old fields are overgrown by perennial herbs and grasses. These pioneer plants remain the dominant species for 3 to 20 years time. Later, woody plants take over. This habitat is visible especially along wood

edges, roadsides, and in landscapes where mowing is infrequent and where woody plants are not yet the dominant vegetation.

According to 2002 NJDEP land cover data, over 3 percent (325 acres) of South Harrison's land cover consists of brushland, shrubland, or old fields. Old fields are sections of South Harrison's farmland that have become idle and have transitioned to land suitable for grassland and brushland species habitat. About 107 acres of South Harrison, scattered in patches throughout the township, is old agricultural field transitioning to brushland. In South Harrison, brushland is generally found adjacent to residential, commercial, and industrial development, while old fields occur more often near agricultural or wetland areas. Brushland and shrubland is scattered across the township with a particular concentration beyond the wetlands surrounding the south branch of Raccoon Creek and the southern reaches of Basgalore Creek.

In addition to brushland and old fields, active agricultural cropland and pastureland is considered suitable "grassland" habitat for wildlife. Agricultural cropland and pastureland is the single most abundant type of vegetative land cover in South Harrison Township, covering about 39 percent, or 4,006 acres, of the township's land area in 2002.

LANDSCAPE PROJECT PRIORITY HABITATS

The Landscape Project, developed by the Endangered and Nongame Species Program of the NJDEP Division of Fish & Wildlife, documents the value of various types of habitats within New Jersey. It categorizes these habitats into one of five groups according to their importance (five being the highest). Categories three through five include habitats throughout the state that possess two exceptional conditions: (1) a documented occurrence of one or more species on either the federal or the state threatened and endangered species lists, and (2) a sufficient amount of habitat type to sustain these species. These habitats are collectively known as "critical habitat." Categories one and two include habitats that either have a documented occurrence of a *species of special concern* in New Jersey or are habitat deemed suitable for species that are included on the state or federal threatened and endangered species lists but for which there are no documented occurrences or sightings. These habitats are labeled "suitable habitats."

Source: DVRPC
Each habitat sustains unique species that are important to protect.

The Landscape Project identifies both critical and suitable habitat in South Harrison Township. It is important to preserve both levels of habitat in order to maintain the diversity of species that still exists in the township. See **Table 17 Landscape Project Habitat Rankings – Acreage in South Harrison** and **Map 15: Landscape Project Priority Habitat**.

Table 17 Landscape Project Habitat Rankings – Acreage in South Harrison

Category	Rank	ACRES	% of Total Habitat	% of All Harrison Land
Emergent Wetlands	Critical Habitat (5)	18.92	0.21%	0.19%
	Suitable Habitat (1,2)	169.20	1.90%	1.66%
Forested Wetlands	Critical Habitat (5)	170.70	1.91%	1.67%
	Critical Habitat (4)	461.29	5.17%	4.52%
	Suitable Habitat (1,2)	559.61	6.27%	5.49%
Upland Forest	Critical Habitat (4)	1,715.73	19.24%	16.82%
	Suitable Habitat (1,2)	1,298.92	14.56%	12.73%
Grassland	Critical Habitat (4)	1,805.51	20.24%	17.70%
	Suitable Habitat (1)	2,719.42	30.49%	26.66%
Total Habitat		**8,919.3**	**100.00%**	**87.43%**
Total Harrison		**10,202**	**87.43%**	**100.00%**

Source: NJDEP, May 2008

Landscape Project Data on Wetland Habitat

The Landscape Project divides wetland habitats into two types – emergent and forested wetlands. Emergent wetlands are marshy areas characterized by low-growing shrubs and herbaceous (nonwoody) plants in standing water. About 19 acres in South Harrison are identified as priority emergent wetlands habitat and are ranked at the "critical" level. In South Harrison, 169 acres are ranked at the "suitable" level. Emergent wetland habitat is found throughout the township, mainly along waterways. Portions of Oldmans Creek and Marl Run are considered to be critical habitats. Animal species that can be found in these wetland habitats include endangered turtles like the bog turtle, great blue herons, rare fish, mollusks, crustaceans, and insects. Emergent wetlands are also important habitats for migratory waterfowl and passerines (smaller perching birds) such as migrating flycatchers and thrushes.

Source: Courier Post, Doug Bovitt
Turtles like this one live in stream corridors and wetlands across the Township.

The Landscape Project designates South Harrison's forested wetlands as occupying 1,192 acres, of which 632 acres are ranked as critical. "Critical" forested wetland habitat in South Harrison is located primarily along Oldmans Creek and the south branch of Raccoon Creek. Another patch of critical forested wetland habitat is located in the southeastern section of the township. "Suitable" forested wetland habitat supports wildlife along many of the

township's streams. Forested wetlands support species such as migratory and nesting warblers, many of which are species of special concern. They can also be home to various rare amphibians (frogs and salamanders). In South Harrison, forested wetland areas are primary habitats for the red-shouldered hawk, great blue heron, and bog turtle.

Landscape Project Data on Upland Forest Habitat

The Landscape Project ranks 30 percent (3,015 acres) of South Harrison's total land cover as suitable or critical upland forest habitat. Nearly 1,716 acres (17 percent of total land area) are ranked as critical upland habitat and found associated with the south branch of Raccoon Creek and tributaries to Oldmans Creek. An especially large concentration of critical upland forest habitat is found in the southeastern part of the township. Suitable upland forest habitat can also be found along Basgalore Creek and portions of Oldmans Creek. This habitat is important for red-shouldered hawk nesting and hunting, and is home to rare species such as the bald eagle and great blue heron.

Landscape Project Data on Grassland Habitat

The Landscape Project designates nearly half of the township as suitable or critical grassland habitat. Approximately 1,806 acres of farmland (18 percent of total land area) are ranked as critical grassland-species habitat. These areas are found in the center of the township between Woodstown-Mullica Hill Road and Commissioners Road. Grassland-dependent species are the most threatened group of species in New Jersey, primarily because the most common form of grassland habitat, agricultural fields, is the most threatened habitat in the State due to development pressure and rising land values. Unfortunately, some of the critical grassland habitat in South Harrison has been displaced by residential development, although a large portion of this habitat is still intact.

Source: DVRPC

Farmland, both active and inactive, is also frequently habitat for migrating birds, some of which are threatened or endangered species.

Nearly all of South Harrison's agricultural land is designated as critical or suitable grassland habitat because of some of the following reasons: (1) migrating birds cannot visually distinguish cropland from grassland; (2) cropland turns into grassland when it is fallow for one year or more; (3) some crops, like alfalfa and soybeans provide suitable nesting habitat for some birds, especially for sparrows; and (4) all or most Endangered and Threatened birds are area-sensitive, requiring large ranges that include agricultural "grasslands." The Landscape Project includes this land in its assessment because agricultural lands provide important disturbance buffers between the rare and

endangered wildlife species and humans, and between rare species and widespread predatory animals, such as domestic cats.

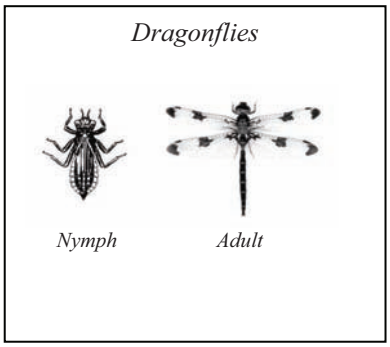
Examples of grassland-dependent species that use grassland habitat for nesting or feeding include the grasshopper sparrow, vesper sparrow, and some species of butterflies and moths. South Harrison's designated grasslands provide habitat for these species and others such as the threatened upland sandpiper, eastern meadowlark, and the bobolink that rely on agricultural lands, as well as for bog turtles that breed in wet areas found in agricultural fields.

ANIMAL COMMUNITIES

Although no comprehensive inventory of the different animal species within New Jersey, Gloucester County, or South Harrison Township exists, there are records of sightings, biological studies of range, and assessments of endangered and threatened status. Using Federal, State, and other scientific sources, it is possible to identify and describe known and possible animal communities of South Harrison Township.

Invertebrates

Invertebrates are the basis of a healthy environment and are part of every food chain – either as food for amphibians and fish, or as a part of nutrient cycling systems that create and maintain fertile soils. Invertebrates consist of insects (beetles, butterflies, moths, dragonflies, ants, termites, bees, wasps, flies, and others), arachnids (spiders, ticks, and mites), crustaceans (crayfish, microscopic copepods), mollusks (mussels, clams, snails, and slugs), and worms.



The Dragonfly Nymph – a common macroinvertebrate found in southern New Jersey's waterways

Macroinvertebrates are invertebrates that are visible to the naked eye but smaller than 50 millimeters. Benthic (bottom dwelling) macroinvertebrate communities provide a basis for ecological monitoring and are relatively simple to collect from shallow stream bottoms. These communities consist largely of the juvenile stages of many insects, such as dragonflies and mayflies, as well as mollusks, crustaceans, and worms. Monitoring for diverse assemblages of macroinvertebrates reveals the effect of pollutants over a long period of time. The Ambient Biomonitoring Network (AMNET) surveys streams for macroinvertebrate communities, which indicate certain levels of water quality, as was discussed in the Surface Water Quality section of this document (page 41).

There are nine endangered invertebrate species (two beetle species, four butterfly species, and three mussel species), and eight threatened invertebrate species (three butterfly species and five mussel species) in the State of New Jersey. Of particular interest are freshwater mussels. At one time freshwater mussels were abundant in the streams of the area and were a major food source for native peoples. Parts of Oldmans and Raccoon Creeks provided suitable mussel habitat. Unfortunately, due to destruction of suitable aquatic habitats by dams and pollution, the native

mussel population has sharply declined, although they are still present in both creeks. Of those species on the New Jersey Endangered and Threatened list, one, the triangle floater, a freshwater mussel, is listed as threatened and has been identified as present in Oldmans Creek.

Vertebrates

Vertebrates are less numerous than invertebrates but their larger size makes them much more visible, and thus better studied and recorded. Fish species are fairly well documented, as are mammals. Birds that nest in the township are known, but migrants that depend on South Harrison's wet forests as stopover sites in which to rest and feed are not as thoroughly inventoried.

Mammals

Mammals appear to be abundant because they tend to be larger and live in habitats also ideal for human development. There are over 500 mammal species in New Jersey, of which only nine are listed as endangered and none are listed as threatened by the state. Some common mammals found in South Harrison Township include cottontail rabbits, eastern gray squirrels, skunks, little brown bats, raccoons, and white-tailed deer.

Management of white-tailed deer is an issue in New Jersey. While many residents prize the presence of mammalian life, deer often come into conflict with humans in suburban and agricultural areas. According to the US Department of Agriculture, deer cause more damage to agricultural crops than any other vertebrate wildlife species. Farmers in densely human-populated areas appear to be the most affected. Additionally, deer can devastate the understory of forests through overgrazing, destroying the growth of seedlings and young trees. Finally, as most motorists are aware, collisions between deer and automobiles frequently result in serious damage.

Controlling deer numbers has become increasingly difficult in New Jersey, primarily because suburban landscaping provides year-round food, which supports population growth, and because the principal method of culling the population – hunting – is not feasible in suburban environments.

Source: Scott VanEtten
Hummingbirds can be found in South Harrison Township

To minimize human-deer conflicts, the New Jersey Agricultural Experiment Station recommends both lethal and non-lethal deer management options for community-based deer management programs. For example, municipalities can extend the hunting season, issue depredation permits to private landowners, engage in sharp shooting, and employ traps and euthanasia to reduce deer numbers. Alternatively, communities and private landowners can choose to apply non-lethal, although more costly, deer management strategies such as installing reflectors and reducing

speed limits on rural roads to decrease deer-vehicle collisions, modifying habitat by planting bad tasting plants on commercial and residential properties, using taste-based and odor-based repellents, and employing traps and translocation techniques.

Birds

There are between 350 and 500 species of birds in New Jersey, which is an exceptional number given the state's small size. New Jersey is an important location for migratory birds heading south for the winter. Not only is the state an important "rest stop" for birds migrating to warmer climates in Central and South America, but also the New Jersey Atlantic Coast and the Delaware Bay are major parts of the Eastern Flyway (established migratory air route) in North America.

Common birds in South Harrison Township and Gloucester County are geese, ducks, vultures, woodpeckers, doves, swallows, crows, grackles, jays, robins, starlings, wrens, cardinals, finches, sparrows, and some hawks. The red-shouldered hawk, an endangered bird species; the Cooper's hawk, a threatened bird species; and other rare and endangered species have been sighted in the township. According to the Landscape Project, South Harrison contains suitable habitat for a variety of predatory birds including hawks, falcons, and eagles.

Source: DVRPC
Canada Geese are common in the State of New Jersey as well as in South Harrison Township.

Another common bird is the Canada goose. The State of New Jersey has a "resident" Canada goose population of approximately 100,000 birds that no longer migrate to more southern locales, and may double in the next 5 to 10 years. While geese are a valuable component of the urban/suburban environment, providing enjoyable wildlife opportunities for the public, they can also cause property and environmental damage. However, removing geese or preventing them from residing in park areas is a difficult task. Because geese move freely, the most effective management solutions are best conducted at the community level. Canada geese are protected by the Migratory Bird Treaty Act. Therefore a management program may require the US Department of Agriculture's approval and permits. Management techniques include planting shrubby vegetation around streams, lakes, and ponds to block waterfowl access, discouraging humans from feeding geese, and removing geese eggs and replacing with decoys.

Common Reptiles and Amphibians

Reptiles can be quite elusive when surveys attempt to document them. Some species, such as the Eastern box turtle, a species of special concern, have been well documented in South Harrison. Amphibians of some types are abundant, such as bullfrogs. Other species are rare because they depend on vernal ponds, as was discussed in the Surface Waters – Vernal Pools section of this document (page 36). The bog turtle, which is an endangered species, has been documented in South Harrison. Suitable habitats for this species are dwindling due to the loss of agricultural lands with wetlands and to pollution.

Fishes

When European settlers arrived in present-day Gloucester County, they encountered Native Americans who regularly fished along the inland streams and gathered shellfish in the Delaware River. Due to the unintended consequences of urban development, industrial advancement, and mechanized agriculture, the amount and diversity of aquatic life has decreased dramatically throughout most of New Jersey.

The New Jersey Division of Fish and Wildlife, under the Bureau of Freshwater Fisheries, monitors and actively aids the propagation, protection, and management of the state's freshwater fisheries. The bureau raises several million fish for stocking in suitable waterbodies, and conducts research and management surveys. Based on survey data supplied by the bureau, South Harrison's freshwater streams have been documented as containing the following fish: sunfish, blue gill, pickerel, pumpkinseed, Eastern mudminnow, common shiner, largemouth bass, perch, darter, and the American eel.

An additional 20 fish species are documented for South Harrison in the "Annotated Checklist and Distribution of New Jersey Freshwater Fishes…" by Rudolf G. Arndt (see Sources of Information). Both sets of records are included in the list of fish in **Appendix C: Vertebrate Animals Known or Probable in South Harrison Township.**

There are no known instances of recent fish sampling or fish advisories for the waterways in South Harrison Township, or for Algonkin and Harrisonville Lakes.

FEDERAL ENDANGERED SPECIES ACT*

An "Endangered" species is in danger of extinction throughout all or a significant portion of its range

A "Threatened" species is one that is likely to become endangered in the near future

NEW JERSEY ENDANGERED SPECIES ACT**

An "Endangered" species is in danger of immediate extinction within the state due to one of several factors: loss or degradation of habitat, over-exploitation, predation, competition, disease, or environmental pollution.

A "Threatened" species is one that may become endangered if environment conditions continue to deteriorate. It is vulnerable due to one of several factors: small population size, restricted range, narrow habitat affinities, or significant population decline.

A species of "Special Concern" is one that warrants special attention because of the evidence of population decline, environmental deterioration, or habitat modification that would result in becoming Threatened. Special Concern status also extends to species whose population size is unknown or unstudied.

* Definitions adapted from U.S. Fish and Wildlife Service, "Listing a Species and Threatened or Endangered: Section 4 of the Endangered Species Act." Washington, DC: February 2001.
** Definitions adapted from N.J. Division of Fish, Game, and Wildlife, Endangered and Non-game Species Program, "Status Definition." Trenton, NJ: April 2002.

Endangered Vertebrates

According to the Natural Heritage Database and the Landscape Project, a significant number of rare wildlife species have been sighted in Harrison Township over the course of the past 100 years. Brief descriptions of a few such species and their preferred habitat, provided by the New Jersey Fish and Wildlife Service, follow.

The red-shouldered hawk (*Bueto lineatus*) is a soaring hawk about as big as a crow. The hawk requires mature wet woods such as riparian forests for breeding and mixed woodlands near old growth forests containing standing water for nesting. Red-shouldered hawks prefer a closed canopy of tall trees with an open sub-canopy and variable amounts of understory shrubs and seedlings. In southern New Jersey, these hawks are found in vast and contiguous freshwater wetlands, especially

hardwood or mixed wood/cedar swamps containing maple, black gum, sassafras, magnolia, and Atlantic white cedar. In South Harrison, agricultural fields or low-density residential tracts usually surround these areas. The red-shouldered hawk avoids nesting near residences, roads, and development. Habitat loss and declines in population in the Northeast have resulted in the listing of this species as endangered in New Jersey.

The bog turtle (*Clemmys muhlenbergii*) is an endangered species in many eastern states, including New Jersey, and is listed as threatened on the federal list. It is the smallest native turtle in the United States. Bog turtles lay their eggs in stream banks and cover them with vegetation for protection. These turtles are one of the most difficult animals to find, as they are rare, elusive, and often dwell on swamp bottoms where they bury themselves in several inches of mud to escape predators. Suitable habitats are dwindling as wetlands are destroyed for human settlement or by pollution. The greatest numbers of bog turtles in the nation are found in the wetland areas of agricultural lands in northwestern and southwestern New Jersey.

The upland sandpiper (*Bartramia longicauda*) is an endangered species in many eastern states, including New Jersey, New Hampshire, Massachusetts, Connecticut and Maryland. Upland sandpipers migrate in winter to warmer climates in South America and thus use New Jersey's fallow farm fields for stopovers en route. The bird species prefers grasslands, fallow agricultural fields, and pastureland that contain a mix of tall and short grasses and provide foraging habitat. The upland sandpiper population boomed in the 1800s, as agriculture was the dominant land use, but declined to the verge of extinction in the early 1900s, nearly wiped out by commercial hunters. Despite recovery in the 20th Century, since the 1950s upland sandpiper populations have declined again due to habitat loss, as agricultural land is replaced by suburban development. Despite federal protection under the Migratory Nongame Species Act, state listing as endangered, and national and local environmental groups' research interest, the upland sandpiper shows no signs of population recovery in the eastern United States although it is stable in other parts of the world.

See **Appendix C** for a list of *Vertebrate Animals Known or Probable in South Harrison Township*.
See **Appendix D** for a list of *State Endangered and Threatened Species*.
See **Appendix E** for a list of *Rare Plant and Animal Species and Natural Communities Presently Recorded in the NJ Natural Heritage Database for South Harrison Township*.

NATURAL HERITAGE DATABASE & NATURAL HERITAGE PRIORITY SITES

Natural Heritage Priority (NHP) Sites are areas designated by the New Jersey Division of Parks and Forestry's Office of Natural Lands Management as exemplary natural communities within the state that are critically important habitats for rare species. Preserving these areas is a top priority for efforts to conserve biological diversity in New Jersey.

Designation as a Natural Heritage Priority Site does not carry any specific requirements or restrictions on the land. Rather, the designation is made because of a site's high biological diversity value. Owners of NHP Sites are encouraged to become informed stewards of the property and to consider working with the local community or nonprofit groups to preserve the land permanently.

Source: DVRPC
Development on former farmland is reducing the availability of critical habitat for diverse plant and animal species, especially bird populations that nest and forage in grassland areas.

NHP designations are based on the records of the Natural Heritage Database, which lists documented sightings of endangered and threatened species. Information on particular sites may also be provided by the Nature Conservancy or by the NJDEP Endangered and Nongame Species Program, and especially through the latter agency's Landscape Project. With the creation of the Landscape Project, which identifies critical habitats for endangered and/or threatened animal species, the designation of NHP Sites has changed. Previously, NHP Sites were designated because of the presence of endangered or threatened plant or animal species. Presently, this designation occurs only in areas that exhibit rare or threatened plant species and/or ecologic biodiversity. The Landscape Project is now the primary data source for identification of priority areas for animal species protection.

South Harrison Township borders one of only 410 NHP sites in New Jersey, the **Pancoasts Woods NHP Site**. This **NHP Site** is a wooded ravine located along a small stretch of Raccoon Creek's South Branch. The site contains the headwaters of Shivers Run and is all woodlands within the ravine. The surrounding agricultural fields limit this site's boundaries. The site contains a state-listed endangered plant species and is the historical location for several other state endangered and special concern plant species. It has a biodiversity rating of B4, meaning the area is of moderate significance either because it is a possible site of a globally rare species or a state imperiled species was documented on the site.

The Natural Heritage Database also lists for South Harrison several species of threatened and endangered plants and animals, or rare natural communities that have been found in the township. The sighting records for the plants (only) are shown on topographic maps. These indicate where the sightings occurred, although the map information is deliberately nonspecific. The principal locations with the rarest plant or community records are wide areas along Raccoon Creek's south branch and land area around Oldmans Creek and north to Harrisonville Road. The Natural Heritage Database's individual records of animals have been incorporated into the Landscape Project, but plant listings are not a basis for the modeling.

It is important to note that the Natural Heritage Database lists primarily those sightings that have been submitted to it, along with some ecological community data. It incorporates both historically and recently documented sightings. Areas without sightings may never have been surveyed. Conversely, land use in areas with sightings may have changed considerably over recent years, and the species once found there may be gone. Protection of threatened and endangered species could be improved by engaging in local surveys to update the database and regularly consulting records before any development is approved.

See **Map 15: Landscape Project Habitat Priorities** for the location of the NHP sites.

Source: DVRPC
Stream corridors, such as the portion of Oldmans Creek shown above, frequently provide habitat to myriad plant and animal species, making the protection of this resource very important.

THE BUILT ENVIRONMENT

POPULATION

The 1990 U.S. Census lists a population of 1,919 residents for South Harrison Township. By the 2000 Census, South Harrison's population had increased by 26 percent to 2,417 residents. DVRPC projections forecast 2,859 residents for South Harrison Township by 2005, and 3,161 by 2010. The largest population increase between 1990 and 2000 was a 59 percent increase in the number of people living in group quarters. The number of South Harrison residents aged 70 years old and older increased 78 percent within the decade, which could contribute to the significant growth of residents living in group quarters. During the same time period, the household population of the township increased by 487 persons, or 25 percent of the 1990 population.

According to 2000 U.S. Census data, the majority (93 percent) of South Harrison's housing units are single-family, owner-occupied homes. The southwest portion of the township is dominated by agricultural uses and very few residences. A large segment of residences are located in the area where CR 581 and CR 538 converge. Another concentration occurs along Woodstown Mullica Hill Road, north of Monroeville Road, and in the area of Ferrell Road in the southeast reaches of the township. Many of these homes are grouped in subdivision developments. With more housing units being approved each year, it is important that South Harrison officials carefully consider the location of these proposed developments and the impact they may have on the bucolic natural landscape characteristic of South Harrison.

According to the 2000 Census, 676 residents are under the age of 18, which is 28 percent of South Harrison's total population. Of those residents, 528 are children between the ages of 5 and 18. This age group represents those residents who are most physically active in the community and most likely to use public recreational facilities.

TRANSPORTATION

South Harrison Township is relatively accessible compared to other parts of rural southern New Jersey. U.S. Route 322 (Swedesboro Road/Mullica Hill Road), to the north of South Harrison, serves as a major east / west transportation route between Pennsylvania and the Atlantic City area. It has dramatically increased accessibility to other parts of the region from southern New Jersey. After Pennsylvania's I-476 extension was completed in the mid-1990s, traffic tripled on Route 322 as Pennsylvania residents utilized this linkage to Route 55 and shore towns on the southern New Jersey coast, while New Jersey residents now have access to Philadelphia's western suburbs and their commercial and office centers via the Commodore Barry Bridge. Throughout the last century, government agencies explored the possibility of expanding U.S. Route 322 into a freeway or turnpike spur, or building such a connector across land to the south of Route 322, such as in South Harrison Township. Each time, plans were abandoned because of the local community's protest.

The NJ Turnpike also serves as a significant transportation artery for the entire region. Exit 2 northwest of South Harrison in Woolwich provides access to and from South Harrison via Route 322 and Route 45 (Woodstown Road).

N.J. Route 45 is the main thoroughfare in South Harrison Township. It connects to U.S. 322 north of the township in Mullica Hill, and passes through South Harrison Township and Woodstown before intersecting with Kings Highway and terminating shortly thereafter in Salem County. County roads within the township include routes 538 (Franklinville Road), 581 (Commissioners Road), 605 (Woodstown Road), 607 (Tomlin Station Road), 617 (Mullica Hill Road), 668 (Swedesboro-Harrisonville Road) and 694 (Monroeville Road). These roads provide access and connections within the township and county and are remnants of past land uses that connected farming centers of activity. In many cases, these formerly rural routes struggle to handle the increasing volumes of traffic associated with the township's suburban growth. Smaller roads in the township are a mixture of old rural lanes and newer subdivision thoroughfares. There is no public transit in the township. However, buses run through neighboring municipalities.

HISTORIC RESOURCES

Although South Harrison Township does not have any properties on National and State Registers of Historic Places, protection and preservation of historic structures, lands, and views are of high importance to local residents.

The National Park Service and the New Jersey SHPO jointly administer the Certified Local Governments (CLG) program, which provides technical assistance and funding for community-based preservation efforts. Currently, neighboring Harrison Township is the only municipality in Gloucester County designated as a CLG. To participate, a municipality must maintain a historic preservation commission, survey local historic properties, provide opportunities for public participation in preservation activities, and develop and enforce local preservation laws. If a community becomes a CLG, it is eligible to draw on an exclusive pool of matching federal and state funds for program implementation, and rehabilitation work consistent with historic preservation standards.

Source: DVRPC

Historic homes are located throughout the Township, and line both sides of the street in Harrisonville.

There are also federal incentives for individuals, organizations, or firms who own historic properties and are interested in historic preservation. Interested parties can take advantage of the Rehabilitation Investment Tax Credit, a federal tax incentive to encourage the preservation and reuse of older income-producing properties, including offices, apartment buildings, and retail stores.

Investing in historic preservation efforts can provide municipalities with important and impressive returns. Private and public efforts to preserve and rehabilitate historic districts create attractive places to live, work, and play, and stimulate new investment in older residential and commercial centers. A historic district can become a regional draw for tourists and boutique customers. Furthermore, historic preservation maintains a municipality's character, distinctly separating it from other rural and suburban communities, for both new and established residents.

UTILITIES AND SERVICES

Drinking Water & Sewer Service

Most residences in South Harrison Township are supplied with drinking water by private wells. The only public drinking water wells in the township supply water to the Harrisonville Mobile Home Park. The public drinking-water wells that serve South Harrison residents are listed in **Table 14: Public Water Supply Wells** on page 59. An explanation of non-community wells is also found there, along with **Table 15: Public Non-Community Wells**. **Map 13: Public Water Supply Wells** shows their locations.

All residences and institutions in South Harrison utilize private sewer systems. There is no approved sewer service area in South Harrison Township.

Trash and Recycling

Source :GCIA website

A view from the roadway of the sanitary landfill located in South Harrison. It is owned and operated by Gloucester County Improvement Authority.

Municipal pickup service for trash and recycling is available in South Harrison. Trash is picked up weekly and recyclable items are collected with the trash on a bi-weekly basis. Bulk items or household appliances are picked up by South Harrison's Public Works Department by appointment. Residents drop off hazardous waste at the Gloucester County Solid Waste Center in South Harrison during household hazardous waste collection days.

South Harrrison Township is also host to the Gloucester County Solid Waste Complex, situated on a 540 acre tract of land located

along Monroeville Road (CR 694). This sanitary landfill is owned and operated by the Gloucester County Improvement Authority and accepts trash primarily from neighboring states and the counties in northern New Jersey, with Gloucester County contributing ash to this landfill location. Currently the active landfill and supporting structures utilize 20 percent (just over 100 acres) of the available area. The remainder of the site is undeveloped with parts of it serving as a grassland bird habitat, for stormwater management, and as a visual buffer. Discussions are currently underway to design an expansion of the landfill that will allow it to stay open at full capacity until 2031.

Education

South Harrison has its own elementary school, located at the intersection of Harrisonville Road and Woodstown Mullica Hill Road. South Harrison Elementary School educates over 300 students each year, providing education from the kindergarten level through the sixth grade. The school also has a gifted and talented program and an after-school program.

After completing sixth grade at the South Harrison Township School, children attend Middle School and High School at facilities in Woolwich, as part of the Kingsway Regional School District. This district serves South Harrison, East Greenwich, Logan, Swedesboro, and Woolwich Townships with enrollment in the 2006-2007 school year near 600 students at the Middle School, and close to 1,500 students at the High School.

Source: DVRPC
South Harrison Elementary School serves children in grades K-6.

Students may also attend Gloucester County Vocational School District or one of the many private schools in Gloucester County. The New Jersey Regional Day School in Mannington provides special education for students from Cumberland, Gloucester and Salem counties. The school serves students ages 5 through 21. In the 2004-2005 school year[2], the school enrolled 52 students.

Parks and Recreation

Harrisonville Lake is the main recreation attraction for residents and visitors of South Harrison Township. Located on Harrisonville Lake Road, just south of Mullica Hill Road (CR 617), the water body stretches for 30 acres along the border of Gloucester and Salem counties and provides both recreation and wildlife habitat.

[2] The most recent data available from the NJ Department of Education for this school is for the 2004-2005 school year.

Stewart Park is situated at the eastern edge of Harrisonville Lake, and is the only public park in South Harrison Township. Residents also use the school grounds at the South Harrison Township School for recreation opportunities.

Map 16: Existing Open Space shows the location of vacant and preserved lands as well as parcels that are already developed and those properties owned by government entities.

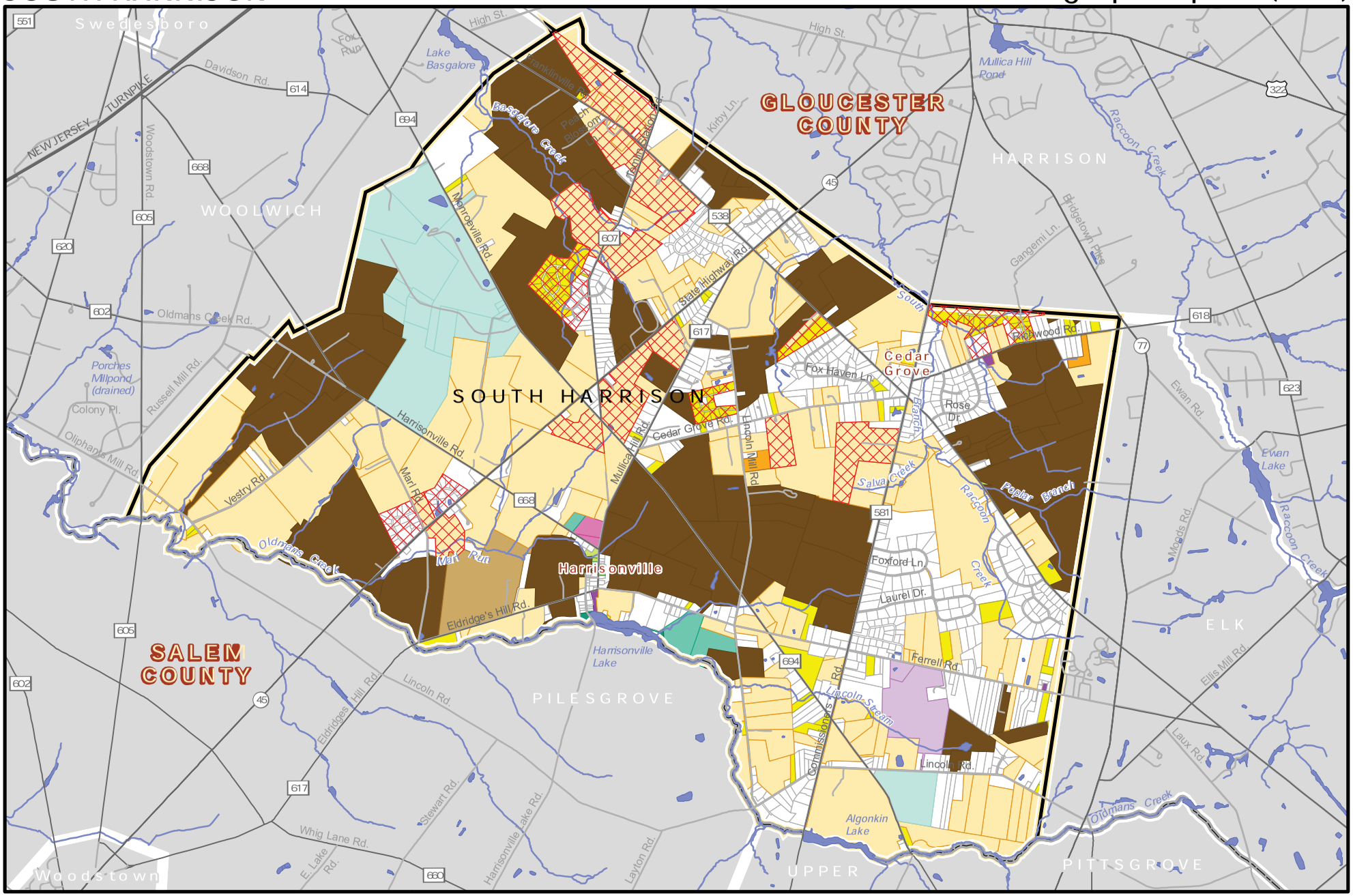
Source: DVRPC

Stewart Park includes numerous recreation amenities such as tennis courts and several baseball fields.

This page left blank intentionally.

SOUTH HARRISON

MAP 16: Existing Open Space (2008)



Sources : NJDEP,NJDOT,DVRPC and Bach Associates. This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

- Preserved Farmland
- Nonprofit Preserved
- Farmland Preservation (8years)
- Pending Preservation
- Farm - Assessed
- Approved Development
- Harrisonville Fire Co.
- County
- Municipality
- State
- Vacant Land
- Residential
- Public School Property
- Church and Nonprofit Property

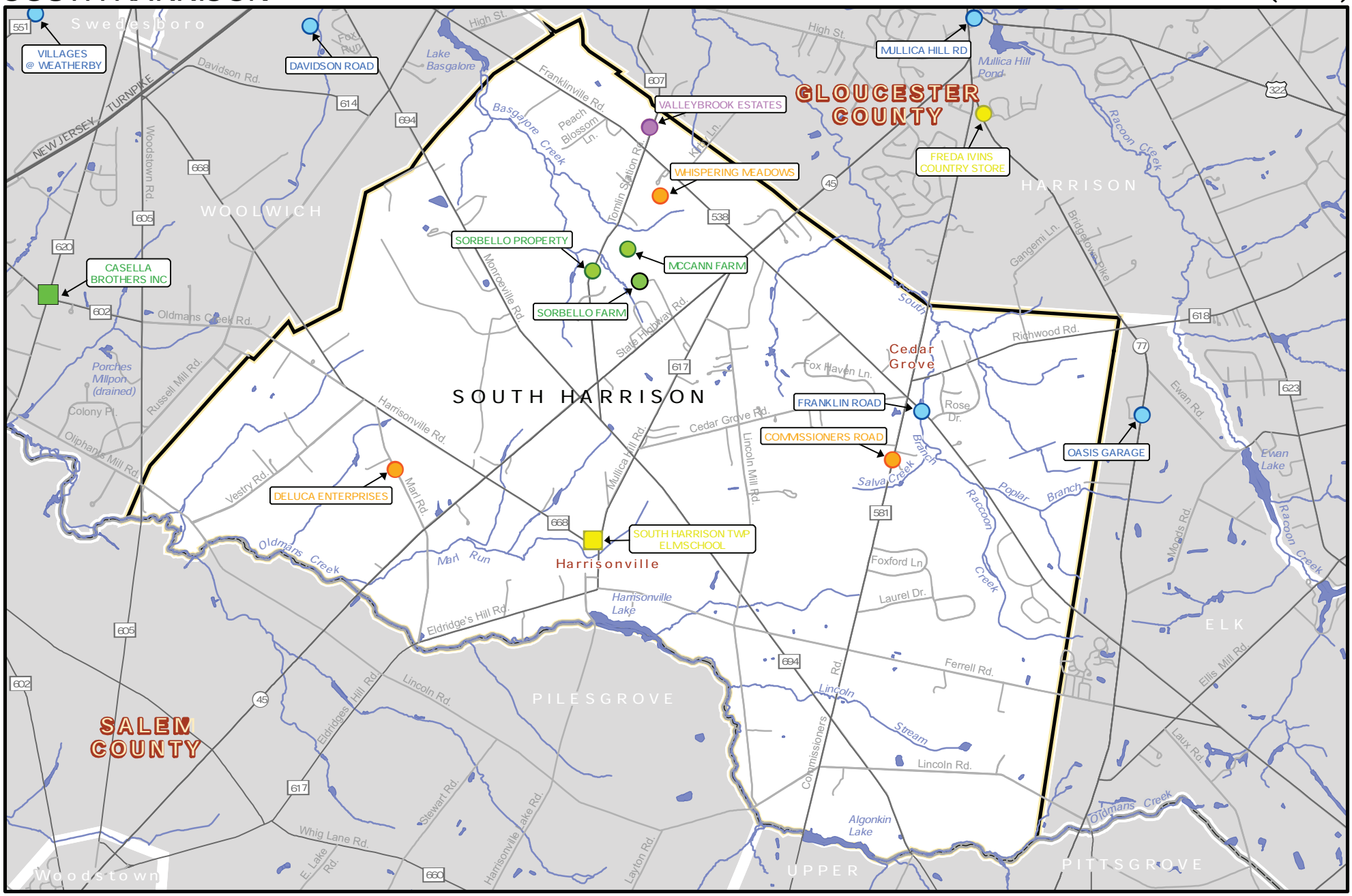
N

0 0.25 0.5 1
Miles

Delaware Valley Regional Planning Commission
December 2008

SOUTH HARRISON

MAP 17: Known Contaminated Sites (2005)



Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Status, Level of Site Complexity

- Active, B : Single Phase RA - Single Contamination Affecting Only Soils
- **Active, B : Single Phase RA - Single Contamination Affecting Only Soils
- Active, C1: No Formal Design - Source Known or Identified-Potential GW Contamination
- **Active, CI : No Formal Design - Source Known or Identified - Potential GW Contamination
- Active, C2 : Formal Design - Known Source or Release with GW Contamination
- NFA-A, Limited Restricted Use - C2
- NFA, Restricted Use: Historic - C1

**The location of these sites is not based on GIS data from NJDEP and therefore may not be exact.

N

0 0.25 0.5 1
Miles

Delaware Valley Regional Planning Commission
December 2008

ENVIRONMENTAL ISSUES

KNOWN CONTAMINATED SITES

NJDEP's 2008 inventory of Known Contaminated Sites reported 448 contaminated sites in Gloucester County. Seven of these sites are located in South Harrison. See **Table 18: Known Contaminated Sites in South Harrison Township & Region.** See also **Map 17: Known Contaminated Sites (2005)**[3].

The New Jersey *Known Contaminated Sites List* includes former factory sites, landfills, locations of current or former leaking underground storage tanks, sites where chemicals or wastes were once routinely discharged, and places where accidents have resulted in spills and pollution. Contamination may have affected soil, groundwater, surface water, or a combination of site conditions. The most dangerous sites, from a human health standpoint, can be listed as Superfund sites, which make them eligible for federal cleanup funds. Other sites are handled by state or individual programs, or through private funds.

Twenty-nine hazardous waste sites in Gloucester County have been nominated for the National Priority List. Eight of these sites are currently on the National Priority List, meaning they pose a major human health hazard and are in need of federal funds for cleanup. These sites are more commonly referred to as Superfund sites. None of these sites are in South Harrison Township. To learn more about a contaminated site, contact one of the lead agencies overseeing the case or visit the web site: http://www.state.nj.us/dep/srp/. Site Remediation and Waste Management, formerly known as the Site Remediation Program, is a program unit within NJDEP that provides financial aid and technical guidance in cleaning up the state's more serious contaminated sites that pose a danger to human health and the environment. SRWM maintains an inventory of 38,000 sites, of which 25,000 require no further remediation action. The bureaus within SRWM are listed below for easy reference:

Bureau	Acronym	Telephone No.	Bureau	Acronym	Telephone No.
Case Management	BCM	(609) 633-1455	Field Operation - Case Assignment Section	BFO-CA	(609) 292-2943
Construction	BC	(609) 984-2991	Field Operations - Initial Notice	BFO-IN	(609) 633-0708
Emergency Response Region I	BER-I	(973) 669-3955	Field Operations - Northern Field Office	BFO-N	(973) 669-3960
Emergency Response Region II	BER-II	(609) 584-4130	Field Operations - Southern Field Office	BFO-S	(609) 584-4150
Environmental Evaluation, Cleanup, and Responsibility Assessment	BEECRA	(609) 777-0899	Fund Management, Compliance and Recovery	BFMCR	(609) 633-0719
Environmental Measurements and Site Assessment	EMSA	(609) 584-4280	Site Management	BSM	(609) 984-2990
Underground Storage Tanks	BUST	(609) 292-8761			

[3] Due to the limited address information available at this time, not all known contaminated sites listed in Table 18 are shown in Map 17.

Table 18: Known Contaminated Sites in Harrison Township & Region

Site ID	Name	Address	Town	Status	Lead Agency*	Remedial Level*
291227	Private Property on Commissioners Rd	Commissioners Rd	South Harrison	Active	BFO-S	B
283266	Deluca Enterprises	Marl Rd	South Harrison	Active	BFO-S	B
243288	McCann Farm	Tomlin Station Rd	South Harrison	Active	BFO-S	B
236421	Sorbello Property	Peppergrass Dr	South Harrison	Active	BFO-S	B
021679	South Harrison Twp Elem School	Mullica Hill Rd	South Harrison	Active	BOMM	C1 & C2
259796	Valleybrook Estates (Sorbello Farm)	Franklinville Rd	South Harrison	Active	BFO-S	C1
270104	Whispering Meadows	Franklinville Rd	South Harrison	Active	BFO-S	B
030068	Oasis Garage	RT 77 (Bridgeton Pk)	Harrison	Active	BSCM	C1
022936	Freda Ivins Country Store	RT 77 (Bridgeton Pk)	Harrison	Active	BSCM	C2
G000061924	Mullica Hill Rd	Mullica Hill Rd	Harrison	Active	BFO-S	C1
245587	Villages @ Weatherby	Auburn Rd & Center Square Rd	Swedesboro	Active	BFO-S	C1
168587	Casella Brothers Inc	Kings Hwy	Woolwich	NFA-E (Restricted Use)	BFO-S	B
243511	Davidson Rd	Davidson Rd	Woolwich	Active	BFO-S	C1

Source: NJDEP

* See table below for explanations of Status, Lead Agencies, and Remedial Level

Explanation of Codes

Code	Status	Lead Agencies
NFA-E	No further action for the entire site	
BFO-S		Bur. of Field Operations – Southern
BOMM		Bur. of Operation, Maintenance, and Monitoring
BSCM		Bureau of Southern Case Management (formerly BUST)

Explanation of Remedial Levels

Remedial Level	Explanation of Site Complexity
B	A single-phase remedial action in emergency response; simple removal activities of contaminants; usually no impact to soil or groundwater.
C1	A remedial action with simple sites; one or two contaminants localized to soil and the immediate spill or discharge area.
C2	A remedial action with more complicated contaminant discharges; multiple site spills and discharges; more than one contaminant, with both soil and groundwater impacted or threatened.

RADON

Radon is a radioactive gas that comes from the natural decay of uranium found in nearly all soils. It is invisible, odorless, and tasteless. It moves up through the ground to the air above, and into all types of homes through cracks and other holes in foundations. A build-up of radon-contaminated air (internal alpha particle exposure hazard) within a home can pose a long-term health hazard to residents, specifically for lung cancer. The only method of detection is to conduct a test for alpha particles in the air within a home. Fortunately, radon testing is inexpensive. All radon test results conducted in the state are reported to DEP by certified companies, which perform the tests or manufacture the test kits. This data is used to classify municipalities into a three-tier system, which identifies the potential for homes with indoor radiation problems.

NJDEP classifies municipalities into three categories – high (Tier 1), moderate (Tier 2), or low (Tier 3) – as to the risk of having high radon levels. South Harrison is listed as a Tier 2 municipality with moderate potential of having high radon levels in homes.

The criteria for a Tier 2 municipality designation is that 5 to 25 percent, of 25 or more homes tested, have radon concentrations greater than or equal to 4.0 picocuries per liter in air. The level at which homeowners should take immediate action is 4.0 picocuries per liter in air. If radon levels are high in a home, NJDEP suggests that the homeowner take the following actions: (1) prevent radon from entering the house by repairing cracks and insulation and (2) dilute radon concentrations currently in the house by installing a radon extraction system and/or frequently ventilating indoor air. NJDEP maintains www.njradon.org as an information source for concerned citizens. Free information packets are available upon request. All companies conducting radon testing and mitigations are certified by NJDEP and listed on their website.

HISTORIC PESTICIDES

New Jersey is one of the first states in the nation to address issues relating to toxic pesticide residuals, such as dichloro-diphenyl-trichloroethane (better known as DDT), arsenic, and lead that remain in the soil from past agricultural operations. In 1996, NJDEP convened a task force to study the extent of the historic pesticide problem in New Jersey and to develop strategies for protecting human health. The task force's findings were issued in an April 1999 report (see ***Sources***). While the task force examined only 18 agricultural sites throughout New Jersey (one in East Greenwich, Gloucester County), it is estimated that 5 percent of the state's land area is impacted by residues from agricultural pesticides. The primary human health concern of residual contamination is the ingestion of contaminated soil. Therefore, small children who may ingest soil are at the greatest health risk. This issue may affect residents of homes and subdivisions built on former cropland and orchards. Homeowners can take precautions such as maintaining grass coverage and washing hands and toys after playing in exposed soil. Currently testing for historic pesticides is not required in South Harrison Township, although some developers may be willing to address this problem by voluntarily testing and removing the existing topsoil and bringing in clean topsoil before construction commences.

SOURCES OF INFORMATION

SECTION 1: INTRODUCTION

The New Jersey State Development and Redevelopment Plan. New Jersey State Planning Commission. Adopted March 1, 2001.

SECTION 2: HISTORY

Cammarota, Ann Marie T. *Pavements in the garden: the suburbanization of southern New Jersey, adjacent to the city of Philadelphia, 1769 - to the present*. Madison: FDU Press, 2001.

Chard, Ida M., *Township of South Harrison: Centennial Anniversary*, 1983.

Everts & Steward. *Combination Atlas Map of Salem & Gloucester Counties New Jersey.* Compiled, drawn and published from personal examination and surveys by Everts & Steward. Philadelphia, PA, 1876.

McMahon, William. *South Jersey Towns*. New Brunswick, NJ: Rutgers University Press, 1973.

Simpson, Hazel B. *Under Four Flags: Old Gloucester County 1686 – 1964: A History of Gloucester County New Jersey*. Woodbury, NJ, Board of Chosen Freeholders, Gloucester County, New Jersey, 1965.

Widmer, Kemble. *The New Jersey Historical Series, Vol. 19: The Geology and Geography of New Jersey.* Princeton, NJ: D. Van Nostrand Company, 1964.

SECTION 3: SOUTH HARRISON TOWNSHIP LOCATION, SIZE, AND LAND USE

Association of New Jersey Environmental Commissions (ANJEC) (www.anjec.org).

- *Acting Locally: Municipal Tools for Environmental Protection*. Mendham, NJ: ANJEC, 2002.
- *The Environmental Manual for Municipal Officials*. Mendham, NJ: ANJEC, 1998.

Delaware Valley Regional Planning Commission.

- *Horizons: The Year 2025 Land Use and Transportation Plan for the Delaware Valley.* Delaware Valley Regional Planning Commission. http://www.dvrpc.org/LongRangePlan/2025.htm
- Locally Funded Open Space Programs. http://www.dvrpc.org/planning/environmental/openspace/local.htm>
- *A Teacher's Guide to the Watersheds of Gloucester County*, Delaware Valley Regional Planning Commission, September 2004.
- *Environmental Resource Inventory for the Township of Harrison*, Delaware Valley Regional Planning Commission, April 2005.
- *Environmental Resource Inventory for the Township of Mannington*, Delaware Valley Regional Planning Commission, 2007.

Honachefsky, William B. *Ecologically Based Municipal Land Use Planning*. Boca Raton, FL: Lewis Publishers (CRC Press), 2000.

SECTION 4: NATURAL RESOURCES

Lewis, Jean C., Joseph J. Hochreiter Jr., Gary J. Barton, Jane Kozinski, and Frederick J. Spitz. *Hydrogeology of, and Ground Water Quality in, the Potomac–Raritan–Magothy Aquifer System in the Logan Township Region, Gloucester and Salem Counties, New Jersey.*

Mapping New Jersey's Vernal Ponds. Grant F. Walton Center for Remote Sensing and Spatial Analysis at Rutgers University. 5 August 2004 <http://www.dbcrssa.rutgers.edu/ims/vernal/>

Navoy, Anthony S. "Gloucester County Ground-Water Resources and Issues." *Watershed News Early Spring 2001, The Newsletter of the Federation of Gloucester County Watersheds and the South Jersey Land Trust*, Gloucester Co., April 2001. www.sjwatersheds.org.

New Jersey Department of Environmental Protection (NJDEP):

- Ambient Lake Monitoring Project. Bureau of Freshwater and Biological Monitoring. New Jersey Department of Environmental Protection. Division of Water Monitoring and Standards. http://www.state.nj.us/dep/wmm/bfbm/lakes.html.
- <www.state.nj.us/dep/gis> – For Geographic Information System maps and table data.
- <www.state.nj.us/dep/landuse> – For information on wetlands and flood hazard area regulations and permits.
- <www.dbcrssa.rutgers.edu/ims/vernal> – For mapping and data on Vernal Pools.
- <www.state.nj.us/dep/dwq> – To reach the Division of Water Quality.
- *The Clean Water Book: Lifestyle Choices for Water Resource Protection*, Trenton, NJ, 1997.
- *A Homeowner's Manual for Septic Systems*, Division of Water Quality, Bureau of Nonpoint Pollution Control. Trenton, NJ, 1999.

New Jersey Natural Resources Conservation Service. "New Jersey Soils of Statewide Importance," September 24, 1990, available online at www.nj.nrcs.usda.gov/technical/soils/njfarmindex.html

Rangelands West. *Overview of the Clean Water Act.* 27 Aug. 2004 <http://ag.arizona.edu/agnic/policy/cwahome.html>

South Harrison Township. *Natural Resources Inventory*, prepared by Associated Environmental Applications, Inc, 1991.

Tedrow, J.C.F. "Greensand and Greensand Soils of New Jersey: A Review." Rutgers Cooperative Extension, 2002.

U.S. Department of Agriculture.

- *Environmental Quality Incentives Program*. Natural Resources Conservation Service, <www.nrcs.usda.gov/programs/eqip/>
- *Environmental Quality Incentives Program*. Natural Resources Conservation Service, <www.nrcs.usda.gov/programs/crp/>
- *Soil Survey of Gloucester County, New Jersey*. Soil Conservation Service, in cooperation with N.J. Agricultural Experiment Station, Cook College, Rutgers, the State University, June 1962.
- Soil Survey Staff, Natural Resources Conservation Service. "Hydric Soils." Available online: <http://soils.usda.gov/use/hydric/> (Accessed July 3, 2008).
- Soil Survey Staff, Natural Resources Conservation Service. "Soil Data Mart." Available online: <http://soildatamart.nrcs.usda.gov/State.aspx> (Accessed July 3, 2008).
- Soil Survey Staff, Natural Resources Conservation Service. "Soil Series Name Search." Available online: http://soils.usda.gov/technical/classification/osd/index.html (Accessed July 3, 2008).

United States Geological Society (USGS).

- Water Resources. Site Information for the Nation. http://waterdata.usgs.gov/nwis/si
- Water-Resources Investigations Report 90-4142. West Trenton, NJ, 1991.

Watt, Martha K. *A Hydrologic Primer for New Jersey Watershed Management*. West Trenton, NJ: US Geological Survey, Water-Resources Investigation Report 00-4140. Available at <http//nj.usgs.gov/publications/WRIR/00–4140.pdf>

Winter, Thomas, et al. *Ground Water and Surface Water: A Single Resource*. Denver, CO: US Geological Survey, 1998.

Zapecza, Otto S. *Hydrogeologic Framework of the New Jersey Coastal Plain*. US Geological Survey Professional Paper 1404-B. Washington D.C: United States Government Printing Office, 1989.

SECTION 5: BIOLOGICAL RESOURCES

Arndt, Rudolf G. "Annotated checklist and Distribution of new Jersey Freshwater Fishes, with comments on Abundance." *The Bulletin [of the] New Jersey Academy of Science*, V. 49, No. 1, Spring, 2004.

Britton, Nathaniel, and Addison Brown. *An Illustrated Flora of the Northern United States and Canada*. New York: Dover, 1970.

Brown, Lauren. *Grasses: An Identification Guide*. New York: Houghton Mifflin, 1979.

Burton, Dr. Maurice, and Robert Burton, eds. *The International Wildlife Encyclopedia: Vol. 5.* New York: Marshall Cavendish, 1969.

Caduto, Michael. *Pond and Brook: A Guide to Nature in Freshwater Environments*. Hanover: University Press of New England, 1990.

Collins, Beryl Robichaud, and Karl H. Anderson. *Plant Communities of New Jersey: A Study in Landscape Diversity*. New Brunswick, NJ: Rutgers University Press, 1994.

Commonwealth of Australia. Department of the Environment, Sport and Territories. *Biodiversity Series Paper No. 1: Biodiversity and its Value*. 1993.

Dahl, T.E. *Status and Trends of Wetlands in the Conterminous United States 1986 to 1997.* Washington D.C.: US Department of the Interior, US Fish and Wildlife Service, 1991.

Food and Agricultural Organization of the United States. *Biological Diversity in Food and Agriculture*. 22 July 2004 <http://www.fao.org/biodiversity/index.asp>

Lane, Alexander. "The Birds Have Flown." *Star-Ledger* [Newark], 4 July 2004.

Martin, Alexander, Herbert Zim, and Arnold Nelson. *American Wildlife and Plants*. New York: Dover, 1951.

Martine, Christopher T. *Trees of New Jersey and the Mid-Atlantic States*. Jackson, NJ: NJ Department of Environmental Protection, Division of Parks and Forestry, New Jersey Forest Service, 2003.

Maryland Department of Natural Resources, Wildlife and Heritage Services. *Swamp Pink*. By Johanna Thomas. 16 July 2004 <www.dnr.state.md.us/wildlife/swamppink.html>

New Jersey Department of Environmental Protection, Division of Fish, Game, and Wildlife. *Governors Report on Deer Management in New Jersey*. NJDEP, October 2004.

Niles, L. J., M. Valent, J. Tash, and J. Myers. *New Jersey's The Landscape Project: Wildlife Habitat Mapping for Community Land–Use Planning and Endangered species Conservation*. Project report. Endangered and Nongame Species Program, New Jersey Division of Fish & Wildlife, NJ Department of Environmental Protection, 2001.

Nutty Birdwatcher. *Eastern Forests: Pine Barrens and Pinelands*. 30 Aug. 2004 <http://www.birdnature.com/pines.html>

Rutgers and New Jersey Agricultural Experiment Station. *Deer and People in New Jersey.* 14 October 2004 http://www.deer.rutgers.edu/

State of Connecticut. Department of Environmental Protection. *Learn About CT's Wildlife.* 15 Aug. 2004 <http://dep.state.ct.us/burnatr/wildlife/learn.htm>

Stokes, Donald, and Lillian Stokes. *Stokes Nature Guides: A Guide to Bird Behavior Vol. III*. New York: Little, Brown and Company, 1989.

Stokes, Donald and Lillian Stokes. *Stokes Nature Guides: Animal Tracking and Behavior*. New York: Little, Brown and Company, 1986.

Tyning, Thomas F. *Stokes Nature Guides: A Guide to Amphibians and Reptiles*. Boston, MA: Little, Brown, and Company, 1990.

Union of Concerned Scientists. *Backgrounder: The Science of Biodiversity.* 26 July 2004 <http://www.ucsusa.org/global_environment/archive/page.cfm?pageID=392>

U.S. Department of Agriculture.
- *Important Trees of the Eastern Forest.* Atlanta, GA: USDA, 1968.
- *A Community Based Approach to Dealing with Canada Goose Damage*. Animal Plant Health Inspection Service, September 1999.
- *Controlling Canada Goose Damage*. Animal Plant Health Inspection Service, September 1999.
- *New Jersey Annual Precipitation*. Natural Resources Conservation Service, Apr. 1998. 5 Aug. 2004 <ftp://ftp.ftw.nrcs.usda.gov/pub/ams/prism/ maps/nj.pdf>

Wernert, Susan, et.al., eds. *Reader's Digest: North American Wildlife.* Pleasantville, NY: Reader's Digest, 1982.

The Xerces Society. *Why are Invertebrates Important?* 30 Aug. 2004 <http://xerces.org/why_conserve_inverts.htm>

Zim, Herbert and Alexander Martin. *Trees: A Guide to Familiar American Trees*. New York: Simon and Schuster, 1956.

SECTION 6: THE BUILT ENVIRONMENT

U.S. Census Bureau. *Your Gateway to Census 2000*. < http://www.census.gov/main/www/ cen2000.html>

Philly Roads (and NYC Roads). *New Jersey Turnpike (I-95): Historic Overview.* 21 October 2004 <ttp://www.nycroads.com/roads/nj-turnpike/>

US 322 Freeway (New Jersey, unbuilt): Historic Overview. 21 October 2004. http://www.phillyroads.com/roads/US-322_NJ/

SECTION 7: ENVIRONMENTAL ISSUES

United States Environmental Protection Agency. Superfund http://www.epa.gov/superfund/. Accessed on 8/24/04.

New Jersey Department of Environmental Protection.
- *Known Contaminated Sites.* 10 August 2004 www.state.nj.us/dep/srp/kcs–nj/

CITATIONS

P.L. 93-205. *Federal Endangered Species Act of 1973 (ESA).*

P.L. 95-217. *Federal Clean Water Act.*

P.L. 96-510. *Federal Comprehensive, Environmental Response, Compensations and Liability Act of 1980 (CERCLA).*

P.L. 105-312. *Federal Migratory Bird Treaty Act of 1918.*

N.J.S.A. 13:1B-15.151 et seq. *New Jersey Endangered Plant Species Act.*

N.J.S.A. 23:2A et seq. *New Jersey Endangered and Nongame Species Conservation Act of 1973.*

N.J.S.A. 58:10A-1 et seq. *New Jersey Water Pollution Control Act.*

N.J.S.A 58:16A-50 et seq. *New Jersey Flood Hazard Area Control Act.*

N.J.A.C. 7:7A et seq. *New Jersey Freshwater Wetlands Protection Act Rules.*

N.J.A.C 7:8 et seq. *Stormwater Management Rules*

N.J.A.C. 7:9B-1.12. *New Jersey Surface Water Quality Standards.*

N.J.A.C. 7:9E. *Private Well Testing Act*

N.J.A.C. 7:13 et seq. *New Jersey Flood Hazard Area Control.*

N.J.A.C. 7:14A-2 et seq. *New Jersey Pollution Discharge Elimination System – General Program Requirements.*

N.J.A.C 7:15 et seq. *Water Quality Management Planning Rule*

N.J.A.C. 10:1B. *Open Public Records Act of 2002*

APPENDICES

A: Possible Vernal Pools in South Harrison Township

B: Private Well Testing Act

C: Vertebrate Animals Known or Probable in the Township of South Harrison

D: New Jersey State Endangered and Threatened Species

E: Rare Plant and Animal Species and Natural Communities Presently Recorded in the NJ Natural Heritage Database for South Harrison Township

This page left blank intentionally.

APPENDIX A: POSSIBLE VERNAL POOLS IN SOUTH HARRISON TOWNSHIP

ID Number	X (UTM)	Y (UTM)	Vernal?
Coordinates			
12375ocp	477874	4394627	Certified
12376ocp	477924	4394615	Certified
2653ocp	478114	4394189	Not surveyed
2654ocp	475771	4395283	Not surveyed
2655ocp	478029	4396349	Not surveyed
2656ocp	479237	4392238	Not surveyed
2657ocp	479084	4392179	Not surveyed
2658ocp	478930	4392158	Not surveyed
2659ocp	478989	4392156	Not surveyed
2660ocp	478947	4392046	Not surveyed
2661ocp	479139	4392030	Not surveyed
2662ocp	478912	4392251	Not surveyed
2663ocp	480003	4391634	Not surveyed
2664ocp	480122	4391684	Not surveyed
2665ocp	480209	4391614	Not surveyed
2666ocp	480608	4391620	Not surveyed
2667ocp	480511	4391537	Not surveyed
2668ocp	481409	4392495	Not surveyed
2669ocp	481599	4393267	Not surveyed
2671ocp	480867	4391483	Not surveyed
2672ocp	476213	4395145	Not surveyed
2681ocp	478304	4393479	Not surveyed
2682ocp	479217	4391940	Not surveyed
2683ocp	479280	4391950	Not surveyed
2684ocp	479211	4391991	Not surveyed
2685ocp	479331	4392014	Not surveyed
2686ocp	479740	4392015	Not surveyed
2687ocp	479909	4391986	Not surveyed
2688ocp	480045	4392075	Not surveyed

ID Number	X (UTM)	Y (UTM)	Vernal?
Coordinates			
2695ocp	480530	4390969	Not surveyed
2696ocp	480484	4390893	Not surveyed
2697ocp	480471	4390657	Not surveyed
2698ocp	480098	4390437	Not surveyed
2699ocp	479924	4391004	Not surveyed
2700ocp	479718	4390967	Not surveyed
2701ocp	479691	4390791	Not surveyed
2702ocp	479767	4390848	Not surveyed
2703ocp	479935	4390754	Not surveyed
2704ocp	479986	4390752	Not surveyed
2705ocp	479366	4390668	Not surveyed
2706ocp	479395	4390760	Not surveyed
2707ocp	481192	4392988	Not surveyed
2708ocp	481133	4392998	Not surveyed
2745ocp	475916	4393390	Not surveyed
2769ocp	475913	4395469	Not surveyed
4415ocp	478975	4392934	Not surveyed
4416ocp	478931	4392801	Not surveyed
4417ocp	478679	4392147	Not surveyed
4418ocp	478731	4392065	Not surveyed
4419ocp	478860	4392069	Not surveyed
4420ocp	478971	4392000	Not surveyed
4421ocp	478757	4392302	Not surveyed
4422ocp	478703	4392282	Not surveyed
4425ocp	481355	4393107	Not surveyed
4426ocp	481558	4393068	Not surveyed
4427ocp	481296	4392162	Not surveyed
4438ocp	481319	4395525	Not surveyed

Source: Rutgers University Center for Remote and Spatial Sensing Analysis

This page left blank intentionally.

APPENDIX B: PRIVATE WELL TESTING ACT

The Private Well Testing Act (N.J.S.A. 58:12A-26 et seq.), passed in 2002, and administered by NJDEP, requires that well water be tested for contaminants when properties served by certain types of drinking water wells are sold or leased. The law does not prohibit the sale of property if the water fails one or more drinking water test standards. Rather, the fundamental goal of the PWTA is to ensure that purchasers and lessees of properties served by private potable wells are fully aware of the quality of the untreated drinking water sources prior to sale or lease. The state law allows the buyer and seller to determine which party will pay for the test, as well as what actions, if any, need to be taken if test results indicate a contaminant is present in the water above an applicable standard. However, individual county health rules may mandate that certain actions are required in order for a real estate transaction to be finalized.

The PWTA program requires that water be tested for primary contaminants (health-based) and secondary parameters (aesthetic characteristics). Primary contaminants are contaminants that may cause a potential health risk if consumed on a regular basis above the established maximum contaminant level (MCL). New Jersey regulates 18 primary contaminants, five more than federal EPA requirements. Primary contaminants include bacteriological (fecal coliform and E. coli); Volatile Organic Compounds (VOCs); inorganics (arsenic, lead, mercury, and nitrates); and Radiological (radium decay) substances. A certified laboratory must collect a water sample at a point before the water goes through any treatment. This sample represents the condition of the ground water in the aquifer, which may be different from water out of a kitchen faucet. Property owners may choose to also have the tap water tested to assure that filters or treatments are working effectively.

Volatile Organic Compounds regulated by NJDEP

- Benzene
- Carbon Tetrachloride
- meta-Dichlorobenzene
- ortho-Dichlorobenzene
- para-Dichlorobenzene
- 1, 1-Dichloroethane
- 1, 2-Dichloroethane
- 1, 1-Dichloroethylene
- *cis* – 1, 2-Dichloroethylene
- *trans* – 1, 2-Dichloroethylene
- 1, 2-Dichloropropane
- Ethylbenzene
- Methyl tertiary butyl ether
- Methylene Chloride
- Monochlorobenzene
- Naphthalene
- Styrene
- 1, 1, 2, 2-Tetrachloroethane
- Tetrachloroethylene
- Toluene
- 1, 2, 4-Trichlorobenzene
- 1, 1, 1-Trichloroethane
- 1, 2, 2-Trichloroethane
- Trichloroethylene
- Vinyl Chloride
- Xylenes (Total)

The PWTA program requires tests for three naturally occurring secondary parameters: pH, iron, and manganese. Secondary drinking water standards address aesthetics such as corrosivity, taste, and color, and testing for these parameters determines if water is suitable for laundering, plumbing, and showering. For example, due to the nature of soils and geology in southern New Jersey, the ground waters tend to be acidic (pH below 7), while ground waters in the northern part are neutral (pH=7) to basic (pH above 7). If the pH is too low (less than 6.5) water has a bitter metallic taste, and causes corrosion of pipes and fixtures. If the pH is too high (greater than 8.5) the water has a slippery feel, it tastes like soda, and deposits can form on plumbing fixtures.

Test results are reported by the lab to the person who requested the testing, to NJDEP, and to the local health

authority. Suspicious or unexpected results are neither confirmed nor verified by NJDEP. Local health authorities will investigate suspect results, if necessary.

In February 2004, NJDEP released an online report summarizing the initial well test results reported to the agency during the PWTA program's first six months (September 2002 to March 2003). Results for 5,179 wells are included, which represent approximately 1 percent of private wells used as potable water supplies in New Jersey. The compilation of water test results is organized by county and municipality but does not include the names of specific property owners, their addresses, or well locations, because releasing that information is prohibited by law. About 92 percent of the 5,179 wells passed all the required (health-based) standards, with the exception of lead. Of the 8 percent (417 wells) of wells sampled that exceeded the maximum contaminant level for primary contaminants, the most common reason for failure statewide was nitrate (inorganics), followed by fecal coliform (bacteriological), and VOCs. Nitrates are found in groundwater due to a number of factors, including natural deposits, runoff from fertilizer, leaching from septic tanks, and from sewage pipes.

More wells in northern New Jersey were found to have fecal coliform or E. coli bacteria than in southern New Jersey. The northern/southern difference is probably due to the different geology in these regions. Northern New Jersey is characterized by limestone subject to solution cavities, fractured bedrock, or gravel water-bearing zones, while the southern part of the state is composed mainly of coastal plain sand and gravel, which appears to provide better protection of groundwater from fecal contaminants.

For those wells in the counties where mercury testing is required, 14 wells failed for mercury. Nine southern counties, including Burlington, Camden, Gloucester, and Salem, are required to test for mercury, which has been linked to neurological problems. The test results for Gloucester County, South Harrison are summarized in the table below.

Summary of PWTA Test Results for Gloucester County (September 2002 – March 2003)

Municipality	# Wells sampled	Total # Wells over the MCL*	Fecal coliform/ E. coli	Nitrate	Mercury	Any VOC** over the MCL
South Harrison Township	14	0	0	0	0	0
Gloucester County Totals	**288**	**22**	**2**	**11**	**3**	**37**

* MCL – Maximum Contaminant Level, set as the limit of a particular substance allowable to achieve a water quality standard

** VOC – Volatile Organic Compound.

Source: NJDEP, Division of Science, Research, and Technology (DSRT)

APPENDIX C: VERTEBRATE ANIMALS KNOWN OR PROBABLE IN THE TOWNSHIP OF SOUTH HARRISON

Animal	Habitat	Location
Mammals		
Opossum	All Habitats	Throughout
Short-tailed Shrew	Woodlands	Throughout
Eastern Mole	Uplands	Throughout
Star-nosed Mole	Uplands	Throughout; Occasional
Little Brown Bat	Uplands	Throughout
Eastern Pipistrel	Uplands	Throughout
Eastern Cottontail	All Habitats	Throughout; Common
Eastern Chipmunk	Woodlands	Throughout
Woodchuck	Woodlands and Fields	Throughout
Gray Squirrel	Woodlands	Throughout; Common
White-footed Mouse	Woodlands	Throughout
Jumping Mouse	Fields	Throughout
Meadow Vole	Open Fields	Throughout
Red-backed Vole	Woodlands	Throughout
Muskrat	Wetlands	Throughout
Brown Rat	Wetlands, Homes, Farms	Throughout
House Mouse	Homes and residential areas	Throughout
Red Fox	All Habitats	Throughout
Raccoon	All Habitats	Throughout; Common
Long-tailed Weasel	Wetlands	Throughout
Striped Skunk	Uplands	Throughout; Common
White-tailed Deer	All Habitats	Throughout; Common
Mink	Wetlands	Throughout
Coyote	Woodlands and Fields	Throughout
Birds		
Great Blue Heron	Open Marsh, Lake Edges	Throughout
Great Egret	Open Marsh, Lake Edges	Throughout
Snowy Egret	Open Marsh, Lake Edges	Throughout
Green-backed Heron	Open Marsh, Lake Edges	Throughout
Mute Swan	Open Water	Large Lakes
Snow Goose	Winter Migrant in Fields	Open farms
Canada Goose	Open Water, Fields	Throughout
Wood Duck	Forested Wetlands	Throughout
Green-winged Teal	Wetlands	Winter Migrant
Black Duck	Marsh, Lakes	Throughout
Mallard	Wetlands	Throughout
Gadwall	Open Water	Winter Migrant
Blue-winged Teal	Wetlands	Winter Migrant
Northern Shoveler Duck	Open Water	Winter Migrant
Ring-necked Duck	Open Water	Winter Migrant
Greater & Lesser Scaup	Open Water	Winter Migrant
Bufflehead	Open Water	Winter Migrant

Animal	Habitat	Location
Hooded Merganser	Open Water	Winter Migrant
Ruddy Duck	Open Water	Winter Migrant
Black Vulture	Open fields	Throughout
Turkey Vulture	All Habitats	Throughout
Osprey	Open Water	Lakes and ponds
Northern Harrier	Open Fields	Throughout
Sharp-shinned Hawk	Woodlands	Throughout
Cooper's Hawk	Woodlands	Throughout
Red-shouldered Hawk	Wetland Forests	Throughout; Endangered
Broad-winged Hawk	Woodlands	Throughout
Red-tailed Hawk	All Habitats	Throughout
American Kestrel	Open Fields	Throughout
Ringed-neck Pheasant	Old Fields, Farms	Released; Throughout
Wild Turkey	Woodlands	Throughout
Bobwhite	Old Field, Woodlands	Throughout
Killdeer	Bare Ground, Lake Edges	Throughout
Lesser Yellowlegs	Lake Edges	Throughout
Solitary Sandpiper	Lake Edges	Throughout
Spotted Sandpiper	Lake Edges	Throughout
American Woodcock	Wetland Forests	Throughout
Laughing Gull	Open Water, Parking Lots	Summer Visitor
Ring-billed Gull	Open Water, Parking Lots	Throughout
Herring Gull	Open Water, Dumps	Winter Visitor
Rock Dove	Houses and Bridges	Residential areas
Mourning Dove	Woodlands	Throughout; Common
Black-billed Cuckoo	Woodlands	Occasional
Yellow-billed Cuckoo	Woodlands	Throughout
Barn Owl	Farmland	Throughout
Eastern Screech Owl	Woodlands	Throughout
Great Horned Owl	Woodlands	Throughout
Barred Owl	Wetland Forests	Wooded Wetlands
Saw-whet Owl	Wetland Forests	Wooded Wetlands
Common Nighthawk	Upland Woodlands	Summer Night Sky
Chimney Swift	Bridges, House Chimneys	Residential areas
Ruby-throated Hummingbird	Woodlands and Fields	Throughout
Belted Kingfisher	Wetlands	Throughout
Red-headed Woodpecker	Upland Forest	Raccoon Creek forests
Red-bellied Woodpecker	Woodlands	Throughout
Yellow-bellied Sapsucker	Woodlands	Fall Migrant
Downy Woodpecker	Woodlands	Throughout
Hairy Woodpecker	Woodlands	Throughout
Northern Flicker	Woodlands	Throughout; Common
Wood Pee-wee	Woodlands	Upland Woods
Eastern Phoebe	Woodlands	Throughout
Great Crested Flycatcher	Woodlands	Upland Woods
Eastern Kingbird	Fields, Farmland	Throughout

Animal	Habitat	Location
Purple Martin	Open Fields, Wetlands	Agricultural areas
Tree Swallow	Wetlands	Throughout
Barn Swallow	Buildings, Bridges	Throughout
Blue Jay	Woodland	Throughout; Common
American Crow	All Habitats	Throughout; Common
Carolina Chickadee	Woodlands	Throughout; Common
Eastern Tufted Titmouse	Woodlands	Throughout; Common
White Breasted Nuthatch	Woodlands	Throughout
Brown Creeper	Woodlands	Throughout
Carolina Wren	Edge of Woodlands	Edges; Yards
House Wren	Edge of Woodlands	Throughout
Golden and Ruby crowned Kinglets	Woodlands	Winter Migrant
Eastern Bluebird	Edge of Woodlands	Throughout
Wood Thrush	Woodlands	Throughout
American Robin	All Habitats	Throughout; Common
Catbird	Edge of Woodlands	Throughout
Mockingbird	Edge of Woodlands	Throughout; Common
Brown Thrasher	Woodlands	Throughout
Cedar Waxwing	Old Fields, Young Woodlands	Throughout
Starling	All Habitats	Residential areas; Pest
White Eyed Vireo	Woodlands	Throughout
Philadelphia Vireo	Woodlands	Migrant
Red-eyed Vireo	Woodlands	Wetland Forests
Yellow Warbler	Upland Forest	Throughout
Chestnut-sided Warbler	Woodlands	Migrant
Black-throated Blue Warbler	Woodlands	Migrant
Yellow-rumped Warbler	Woodlands	Throughout
Pine Warbler	Woodlands	Throughout
Prairie Warbler	Shrubby Areas	Throughout
Palm Warbler	Pine Woodlands	Throughout
Black and White Warbler	Pine Woodlands	Migrant
American Redstart	Rich Woodlands	Throughout
Ovenbird	Woodlands	Throughout
Yellowthroat	Shrubby Areas	Throughout
Scarlet Tanager	Woodlands	Throughout
Cardinal	Edge of Woodlands	Throughout; Common
Indigo Bunting	Edges of Old Fields	Throughout
Chipping Sparrow	Woodlands	Throughout
Field Sparrow	Old Fields	Throughout
Song Sparrow	Old Fields	Throughout
White-throated Sparrow	Woodlands	Winter Migrant
Dark-eyed Junco	Woodlands	Winter Migrant
Common Grackle	All Habitats	Throughout; Common
Brown-headed Cowbird	Open Areas	Throughout; Pest
Orioles: Orchard and	Woodlands	Throughout

Animal	Habitat	Location
Baltimore		
House Finch	Open Areas	Throughout
Pine Siskin	Woodlands	Winter Migrant
American Goldfinch	Open Areas, Old Fields	Throughout
House Sparrow	Old Fields	Residential areas; Common
Reptiles		
Bog Turtle	Muddy Agricultural Fields/Wetlands	Endangered
Common Snapping Turtle	Ponds and Lakes	Throughout
Stinkpot Turtle	Wetlands	Throughout
Spotted Turtle	Freshwater Wetlands and Ponds	Throughout
Eastern Box Turtle	Uplands	Throughout
Red-bellied Turtle	Lakes and Ponds	Throughout
Eastern Painted Turtle	Lakes and Ponds	Throughout
Northern Fence Lizard	Uplands	Throughout
Northern Water Snake	Wetlands	Throughout
Garter Snake	All Habitats	Throughout
Eastern Ribbon Snake	Wetlands	Throughout
Southern Ring neck Snake	Woodlands	Throughout
Northern Black Racer	Edge of Woodlands	Throughout
Rough Green Snake	Woodlands	Throughout
Black Rat Snake	All Habitats	Throughout
Amphibians		
Red-backed Salamander	Woodlands	Throughout
Fowlers Toad	Uplands	Throughout
Spring Peeper	Wetlands	Throughout
Bull Frog	Lakes and Ponds	Throughout
Green Frogs	Wetlands	Throughout
Wood Frog	Woodlands	Throughout
Southern Leopard Frog	Wetlands	Throughout
Fishes		
American Brook Lamprey	Streams	Throughout
Sea Lamprey	Rivers and Streams	Possible
American Eel	All Waters	Throughout
Alewife	Rivers and Streams	Possible
Goldfish	Streams and Lakes	Throughout
Golden Shiner	Streams and Ponds	Throughout
Satinfin Shiner	Streams	Throughout
Common Shiner	Streams	Throughout
Comely Shiner	Streams	Probable
Bridle Shiner	Rivers and Streams	Rare
Spottail Shiner	Rivers and Streams	Throughout
Common Carp	Rivers, Streams, and Lakes	Throughout
Eastern Silvery Minnow	Rivers and Streams	Throughout
Fallfish	Streams	Possible
White Sucker	Streams	Throughout
Creek Chub-sucker	Streams	Throughout
Brown Bullhead	River, Lakes and Streams	Throughout

Animal	Habitat	Location
Yellow Bullhead	River, Lakes, and Streams	Possible
Tadpole Madtom	Lakes and Streams	Throughout
Redfin Pickerel	Streams, Lakes, and Ponds	Throughout
Chain Pickerel	Lakes and Streams	Throughout
Eastern Mudminnow	Streams	Throughout
Pirate Perch	Streams	Throughout
Banded Killifish	Streams and Ponds	Probable
White Perch	Rivers, Streams, Lakes, and Ponds	Throughout
Mud Sunfish	Streams and Swamps	Probable
Bluespotted Sunfish	Streams and Ponds	Throughout
Redbreast Sunfish	Lakes and Streams	Probable
Bluegill	All Waters	Throughout
Pumpkinseed	All Waters	Throughout
Large mouth Bass	Lakes, ponds	Throughout
Black Crappie	Lakes, ponds	Throughout
Tessellated (Johnny) Darter	Streams	Probable
Swamp Darter	Swamps	Probable
Yellow Perch	Streams	Probable

Source: Modified version of Table 11 of the *Environmental Resource Inventory for Franklin Township, Gloucester County New Jersey.* Fish data obtained from NJ Division of Fish & Wildlife, Bureau of Fisheries and from Arndt, Rudolf G. "Annotated Checklist and Distribution of New Jersey Freshwater Fishes…" See Biological Resources in Sources of Information.

This page left blank intentionally.

APPENDIX D: NEW JERSEY ENDANGERED AND THREATENED SPECIES

Birds			
Endangered		**Threatened**	
American Bittern	*Botaurus lentiginosos*	Bobolink	*Dolichonyx oryzivorus* BR
Eagle, bald	*Haliaeetus leucocephalus* BR **	Eagle, bald	*Haliaeetus leucocephalus* NB **
Falcon, peregrine	*Falco peregrinus*	Hawk, Cooper's	*Accipiter cooperii*
Goshawk, northern	*Accipiter gentilis* BR	Hawk, red-shouldered	*Buteo lineatus* NB
Grebe, pied-billed	*Podilymbus podiceps**	Night-heron, black-crowned	*Nycticorax nycticorax* BR
Harrier, northern	*Circus cyaneus* BR	Night-heron, yellow-crowned	*Nyctanassa violaceus*
Hawk, red-shouldered	*Buteo lineatus* BR	Knot, red	*Calidris canutus* BR
Owl, short-eared	*Asio flammeus* BR	Osprey	*Pandion haliaetus* BR
Plover, piping	*Charadrius melodus***	Owl, barred	*Strix varia*
Sandpiper, upland	*Batramia longicauda*	Owl, long-eared	*Asio otus*
Shrike, loggerhead	*Lanius ludovicianus*	Rail, black	*Laterallus jamaicensis*
Skimmer, black	*Rynchops niger* BR	Skimmer, black	*Rynchops niger* NB
Sparrow, Henslow's	*Ammodramus henslowii*	Sparrow, grasshopper	*Ammodramus savannarum* BR
Sparrow, vesper	*Pooecetes gramineus* BR	Sparrow, Savannah	*Passerculus sandwichensis* BR
Tern, least	*Sterna antillarum*	Sparrow, vesper	*Pooecetes gramineus* NB
Tern, roseate	*Sterna dougallii***	Woodpecker, red-headed	*Melanerpes erythrocephalus*
Wren, sedge	*Cistothorus platensis*		
Reptiles			
Endangered		**Threatened**	
Rattlesnake, timber	*Crotalus h. horridus*	Snake, northern pine	*Pituophis m. melanoleucus*
Snake, corn	*Elaphe g. guttata*	Turtle, Atlantic green	*Chelonia mydas***
Snake, queen	*Regina septemvittata*	Turtle, wood	*Clemmys insculpta*
Turtle, bog	*Clemmys muhlenbergii***		
Atlantic hawksbill	*Eretmochelys imbricata***		
Atlantic leatherback	*Dermochelys coriacea***		
Atlantic loggerhead	*Caretta caretta***		
Atlantic Ridley	*Lepidochelys kempi***		
Amphibians			
Endangered		**Threatened**	
Salamander, blue-spotted	*Ambystoma laterale*	Salamander, eastern mud	*Pseudotriton montanus*
Salamander, eastern tiger	*Ambystoma tigrinum*	Salamander, long-tailed	*Eurycea longicauda*
Treefrog, southern gray	*Hyla chrysocelis*	Treefrog, pine barrens	*Hyla andersonii*

Mammals			
Endangered		**Threatened**	
Bat, Indiana	*Myotis sodalis***	N/A	
Bobcat	*Lynx rufus*		
Whale, black right	*Balaena glacialis***		
Whale, blue	*Balaenoptera musculus***		
Whale, fin	*Balaenoptera physalus***		
Whale, humpback	*Megaptera novaeangliae***		
Whale, sei	*Balaenoptera borealis***		
Whale, sperm	*Physeter macrocephalus***		
Woodrat, Allegheny	*Neotoma floridana magister*		
Fishes			
Endangered		**Threatened**	
Sturgeon, shortnose	*Acipenser brevirostrum***	N/A	
Invertebrates			
Endangered		**Threatened**	
Beetle, American burying	*Nicrophorus mericanus***	Elfin, frosted (butterfly)	*Callophrys irus*
Beetle, northeastern beach tiger	*Cincindela d. dorsalis***	Floater, triangle (mussel)	*Alasmidonta undulata*
Copper, bronze	*Lycaena hyllus*	Fritillary, silver-bordered (butterfly)	*Bolaria selene myrina*
Floater, brook (mussel)	*Alasmidonta varicosa*	Lampmussel, eastern (mussel)	*Lampsilis radiata*
Floater, green (mussel)	*Lasmigona subviridis*	Lampmussel, yellow (mussel)	*Lampsilis cariosa*
Satyr, Mitchell's (butterfly)	*Neonympha m. mitchellii***	Mucket, tidewater (mussel)	*Leptodea ochracea*
Skipper, arogos (butterfly)	*Atrytone arogos arogos*	Pondmussel, eastern (mussel)	*Ligumia nasuta*
Skipper, Appalachian grizzled (butterfly)	*Pyrgus wyandot*	White, checkered (butterfly)	*Pontia protodice*
Wedgemussel, dwarf	*Alasmidonta heterodon***		

**** Also on the federal Endangered and Threatened list**

APPENDIX E: RARE PLANT AND ANIMAL SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN THE NJ NATURAL HERITAGE DATABASE FOR SOUTH HARRISON TOWNSHIP

Scientific name	Common Name	Federal Status*	NJ Status*	State Rank**
Vascular Plants				
Carex frankii	Frank's Sedge			S3
Carex prairea	Prairie Sedge			S2
Croton willdenowii	Elliptical Rushfoil			S2
Helonias bullata	Swamp-pink	LT	E	S3
Phlox maculata var maculata	Spotted phlox			S3
Polygonum hydropiperoides var. opelousanum	Opelousas Water-pepper			S2
Rhynchospora scirpoides	Long-beak Bald-rush			S2
Sphenonpholis pensylvanica	Swamp oats			S2
Vernonica glauca	Broad-leaf ironweed		E	S1
Vertebrates				
Bartramia longicauda	Upland Sandpiper		E	S1B
Buteo lineatus	Red-shouldered hawk		E	S1, S2
Clemmys muhlenbergii	Bog turtle	LT	E	S2

* Key to Federal and State Status Codes

LT	Formally listed as threatened
E	Endangered species – one whose prospects for survival within the state are in immediate danger due to one or many factors.

** Key to State Element Rank

S1	Critically imperiled in NJ because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres).
S2	Imperiled in NJ because of rarity (6 to 20 occurrences).
S3	Rare in state with 21 to 50 occurrences. Includes elements which are widely distributed but with small populations/acreage, or with restricted distribution but locally abundant.
B	Refers to the breeding population in the state

CAUTIONS AND RESTRICTIONS ON NATURAL HERITAGE DATA

The quantity and quality of data collected by the Natural Heritage Program is dependent on the research and observations of many individuals and organizations. Not all of this information is the result of comprehensive or site-specific field surveys. Some natural areas in New Jersey have never been thoroughly surveyed. As a result, new locations for plant and animal species are continuously added to the database. Since data acquisition is a dynamic, ongoing process, the Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of New Jersey. Information supplied by the Natural Heritage Program summarizes existing data known to the program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The attached data is provided as one source of information to assist others in the preservation of natural diversity.

This office cannot provide a letter of interpretation or a statement addressing the classification of wetlands as defined by the Freshwater Wetlands Act. Requests for such determination should be sent to the DEP Land Use Regulation Program, P.O. Box 401, Trenton, NJ 08625-0401.

The Landscape Project was developed by the Division of Fish & Wildlife, Endangered and Nongame Species Program to map critical habitat for rare animal species. Some of the rare species data in the Landscape Project is in the Natural Heritage Database, while other records were obtained from other sources. Natural Heritage Database response letters will list all species (if any) found during a search of the Landscape Project. However, any reports that are included with the response letter will only reference specific records if they are in the Natural Heritage Database. This office cannot answer any inquiries about the Landscape Project. All questions should be directed to the DEP Division of Fish and Wildlife, Endangered and Nongame Species Program, P.O. Box 400, Trenton, NJ 08625-0400.

This cautions and restrictions notice must be included whenever information provided by the Natural Heritage Database is published.

NJ Department of Environmental Protection
Division of Parks and Forestry
Natural Lands Management

SOUTH HARRISON TOWNSHIP PLANNING/ZONING BOARD

RESOLUTION NO: R-08-__24____

RESOLUTION ADOPTING THE ENVIRONMENTAL RESOURCE INVENTORY AS A COMPONENT OF THE 2008 MASTER PLAN

WHEREAS, pursuant to N.J.S.A. 40:55D-28, the South Harrison Township Planning/Zoning Board, hereinafter the "Board" has jurisdiction to prepare, and after public hearing, to adopt an Environmental Resource Inventory as a component of the 2008 Master Plan to guide the use of lands within South Harrison Township; and

WHEREAS, an Environmental Resource Inventory was prepared by the Delaware Valley Regional Planning Commission with input from the Board and public; and

WHEREAS, a notice of a hearing on adoption of the Environmental Resource Inventory as a component of the 2008 Master Plan was published in the Gloucester County Times; was given to the Clerk of each adjoining municipality by certified mail; and was given to the Gloucester County Planning Board by personal service or by certified mail not less than ten (10) days prior to the public hearing; and

WHEREAS, a copy of the Environmental Resource Inventory was on file and available for public inspection at least ten (10) days before the public hearing during normal business hours in the Municipal Building; and

WHEREAS, a public hearing was held on July 28, 2008, which hearing was continued to and concluded on August 11, 2008; and

WHEREAS, the Board made the following findings and conclusions based thereon:

Findings

1. The Environmental Resource Inventory will guide the use of lands within South Harrison Township in a manner which promotes the general welfare.

2. The Environmental Resource Inventory is an important component of the 2008 Master Plan.

Conclusions

1. The Environmental Resource Inventory should be adopted by the Board as a component of the 2008 Master Plan.

NOW, THEREFORE, BE IT RESOLVED by the South Harrison Township Planning/Zoning Board that the Environmental Resource Inventory attached hereto be and hereby is adopted by the South Harrison Township Planning/Zoning Board as a component of the 2008 Master Plan.

BE IT FURTHER RESOLVED by the South Harrison Township Planning/Zoning Board that a notice advising of the adoption of the Environmental Resource Inventory as a component of the 2008 Master Plan shall be published in the Gloucester County Times.

BE IT FURTHER RESOLVED by the South Harrison Township Planning/Zoning Board that a copy of the Environmental Resource Inventory shall be provided to the Gloucester County Planning Board together with written notice of the adoption of the Environmental Resource Inventory as a component of the 2008 Master Plan together with a copy of the within resolution.

BE IT FURTHER RESOLVED by the South Harrison Township Planning/Zoning Board that written notice of the adoption of the Environmental Resource Inventory as a component of the 2008 Master Plan together with a copy of the within resolution shall be sent to the municipal clerk of each adjoining municipality who may on behalf of the governing body of each such municipality request a copy of the Environmental Resource Inventory.

ADOPTED by the South Harrison Township Planning/Zoning Board at a meeting held on September 8, 2008 as a memorialization of the motion adopted by the South Harrison Township Planning/Zoning Board to adopt the Environmental Resource Inventory as a component of the 2008 Master Plan on August 11, 2008.

ATTEST:

SOUTH HARRISON TOWNSHIP
PLANNING/ZONING BOARD

Celeste Keen

Celeste Keen, Secretary

By: Marc Nagtegaal

Marc Nagtegaal, Chairperson

On the motion to memorialize the adoption of the Environmental Resource Inventory as a component of the 2008 Master Plan, 7 members voted yes; 0 members voted no and 0 members abstained.

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

Publication Abstract

Title: ***Environmental Resource Inventory for the Township of South Harrison, Gloucester County, New Jersey***

Date Published: **December 2008**
Publication No. **08035**

Geographic Area Covered: South Harrison Township, Gloucester County, New Jersey

Key Words: Conservation, conservation planning, endangered species, environment, environmental resource inventory, environmental commission, Gloucester County, master planning, natural resources, South Harrison Township, threatened species, wildlife.

ABSTRACT

This publication documents the natural and community resources of South Harrison Township, Gloucester County, New Jersey. The natural resource information includes descriptions, tables and maps of land use; soils; steep slopes; drinking water aquifers and wells; surface waters including watersheds, streams, lakes, wetlands, and floodplains; impacts on water resources; groundwater; vegetation including forests and grasslands; animal communities; threatened and endangered species; NJ Landscape Project, Natural Heritage Priority Sites; and known contaminated sites. Community resources that are briefly described include population, transportation, township utilities and services, historic resources, and protected open space and farmland. A short history of the community is also included.

For More Information Contact:

Delaware Valley Regional Planning Commission
190 North Independence West
Philadelphia, PA 19106-1572
Phone: 215-592-1800
Fax: 215-592-9125
Internet: www.dvrpc.org

Staff Contacts:	**Direct Phone:**	**Email**
Kelly Rossiter, Project Manager	215-238-2890	krossiter@dvrpc.org
Suzanne McCarthy, Manager, Environmental Planning	215-238-2934	smccarthy@dvrpc.org
Guinevere Pascale, GIS Analyst	215-238-2932	gpascale@dvrpc.org

for the TOWNSHIP of

SOUTH HARRISON

GLOUCESTER COUNTY, NEW JERSEY

Delaware Valley
Regional Planning
Commission

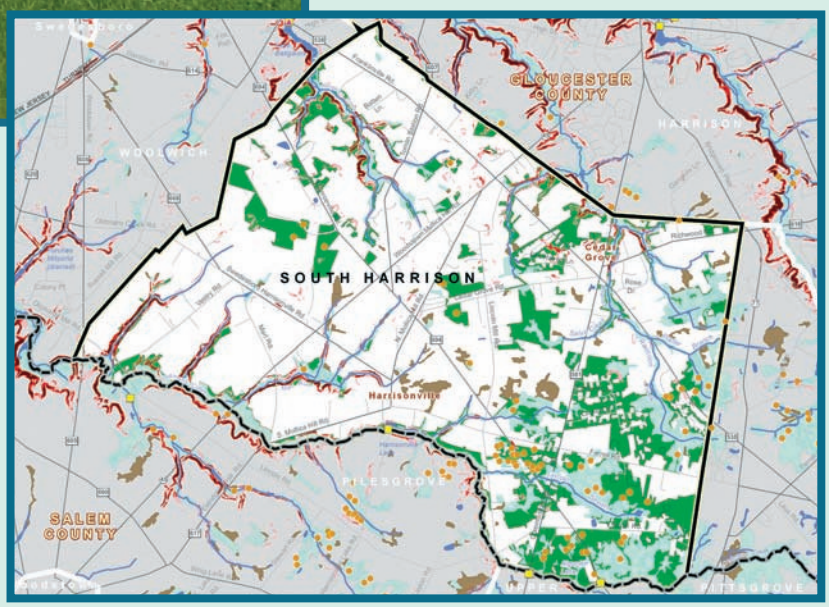
190 N. Independence Mall West
8th Floor
Philadelphia, PA 19106-1520
215.592.1800
www.dvrpc.org

ENVIRONMENTAL RESOURCE INVENTORY

for the TOWNSHIP of

SOUTH HARRISON

GLOUCESTER COUNTY, NEW JERSEY



prepared by:

Delaware Valley
Regional Planning
Commission

with:

The Environmental
Commission of
South Harrison Township

2008