OPEN SPACE AND RECREATION PLAN

for

Township of Allamuchy
County of Warren

"Allamuchy—A Place Within the Hills"

Compiled by

Morris Land Conservancy
a nonprofit land trust

with the

Township of Allamuchy
Environmental Commission

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Community Resources

"When I cross those pleasant forests which I have saved from the axe, or hear the rustling of the young trees, which I have set out with my own hands, I feel as if I had had some small share in improving the climate, and that if mankind is happy a thousand years from now I shall have been partly responsible in my small way for their happiness."
- Anton Chekhov (Uncle Vanya, 1897), A Dictionary of Environmental Quotations.

The Township of Allamuchy is located in the northeastern corner of Warren County, New Jersey. Home to the Panther Valley community, residents enjoy the rural countryside nestled in the heart of the Pequest River Valley. The Township is bounded by Frelinghuysen Township to the northwest, Independence Township to the southwest, and the Town of Hackettstown to the south. The Township of Mount Olive in Morris County forms Allamuchy's southeastern border. Sussex County's Byram and Green Townships both are located along Allamuchy Township's northeastern border.

A community is defined by its natural, recreational, and historic resources. A planned system of open space preservation and community stewardship can protect these special resources and both preserve and enhance the quality of life for Allamuchy residents.

Natural Resources

Regional Geology and Topography

The Township of Allamuchy is uniquely located within two of New Jersey's four physiographic provinces, the (Appalachian) Valley and Ridge province and the Highlands province.

The Valley and Ridge Province occupies an area of approximately 536 square miles or approximately one-fifteenth of the state. The Valley and Ridge Province comprises a large portion of Sussex and Warren Counties, and the western half of Allamuchy Township. This province, up to 17 miles wide, is characterized by steep-sided, linear ridges and broad valleys. Kittatinny Mountain, a broad even-crested ridge ranging from 1,600 to 1,800 feet in elevation, separates the upper Delaware River Valley above the Delaware Water Gap from the Kittatinny Valley. High Point, near the northern end of Kittatinny Mountain, is the highest point in New Jersey at 1,803 feet. Valley floor elevations range from approximately 400 to 600 feet in the Kittatinny Valley and 300 to 600 feet in the upper Delaware River Valley. *(Physiographic Provinces of New Jersey, 2003)*

The Appalachian Valley consists of calcareous rocks, most typically formed by the deposits of ancient oceans. The landscape is gently rolling with much less relief then the formations of the Highlands Province. These formations tend to develop underground solution cavities and disappearing rivers, commonly referred to as sinkholes. This limestone topography, which underlays a significant portion in the northern corner of the township, has the highest propensity to form solution cavities; dolomites and other groups have a lower propensity. These materials are generally considered unstable and should be developed with much scrutiny to drainage and foundation design and in consultation of an engineering professional. These materials can affect development in many ways including the types of foundation, use of

basements, drainage protection around structures, drainage in basins, types of usable basins, roadway design, and retaining structure design. *(Township of Allamuchy Natural Resource Inventory, December 2003)*

The Highlands province occupies an area of approximately 980 square miles, about one-eighth of the State, and one half of Allamuchy Township. It lies within the southeastern portions of Sussex and Warren Counties, as well as major portions of Hunterdon, Morris, Passaic, and small parts of Bergen and Somerset. This mountainous belt is about ten miles wide at the Delaware River and twenty-five miles wide near the New York border. In general, its rugged topography consists of a series of discontinuous rounded ridges separated by deep, narrow valleys. In New Jersey, these younger sedimentary rocks are included as part of the Highlands. At 1,496 feet above sea level, Wawayanda Mountain in West Milford, Passaic County is the highest point in the Highlands province. The valleys range from less than 400 to over 800 feet above sea level with the lowest elevations located near the Delaware River. *(Physiographic Provinces of New Jersey, 2003)*

The Highlands province, comprising the eastern portion of Allamuchy Township, is highly fractured and faulted with intrusional suites and tectonic faulting zones. This province is known also as the Reading Prong, a series of geologic materials that are unique to the Highlands of New Jersey, New York, and Pennsylvania, but can be cross-correlated with the South Mountain Rock formations of Pennsylvania, the Virginia's and south. These rocks are generally resistant to erosion and result in steep tall relief including many escarpments, shear vertical rock faces, and deeply entrenched river valleys. *(Township of Allamuchy Natural Resource Inventory, December 2003)*

The topography of Warren County is generally described in their *Environmental Resource Inventory* as mountain ranges running in a northeast-southwest direction with valleys and glacial moraine between. *(Warren County Environmental Resource Inventory, 1998)* Similarly, the topography of Allamuchy Township consists of mountains and valleys. The distinct differences in elevation and ground composition are due to the coming together of the Valley and Ridge province with the Highlands province. The topography of the Township, as described in the *Master Plan: Part 1*, is "flat to gently sloping with areas of steeper slopes across the center portion of the Township and at the southern periphery of the Township." There are two distinct topographic regions in Allamuchy Township. In the lower valley farmlands in the northern and western areas of the Township, elevations are as low as 540 feet. Elevations are higher in the more mountainous southern and eastern parts of Allamuchy, such as Panther Valley and Allamuchy Mountain State Park, where the Township's highest peak at 1200 feet can be found. The lower farming areas of Allamuchy are considered to be a valley because of the mountains to the west of Allamuchy in Independence and Frelinghuysen Townships in the area of Jenny Jump State Park. In the majority of the Township slopes are less than 8%, however there are sections of Allamuchy where slopes will exceed 15%, effectively preventing any development upon them. The most severe slopes in Allamuchy Township can be found in Allamuchy Mountain State Park, surrounding Panther Valley, and near Jenny Jump State Park *(Township of Allamuchy Master Plan, Part 1, 1991)*

Allamuchy Township Soils

Soil is the reservoir on which most life on earth depends as the primary source of food and fiber. Soil plays a vital role in sustaining human welfare and assuring future agricultural productivity and environmental stability. The study of soil as a science has provided us with a basic understanding of the physical, chemical, and biological properties and processes essential to such a complex ecosystem. *(Smithsonian Soils Exhibit, 2004)*

Soil type and quality dictate what can be grown and what can be built. Soils determine the type of vegetation that will occur in a given area and how quickly precipitation will drain to the ground. Soil is defined as having four components: rock particles, organic material, air pockets between the particles, and water. Parent material, or the source of the soil, comes from two places; either weathered bedrock from that site or from materials that were carried to their current location by running water or glacial ice.

Allamuchy Township is comprised of a variety of soils including various state designated New Jersey prime farmland soil types, farmland soils of statewide importance, and New Jersey hydric soils. Refer to *Allamuchy Township Natural Resource Inventory – Map 5: Soils Map* for locations of specific soils series.

Allamuchy is home to eighteen types and over 2,700 acres, or twenty-one percent, of the Township, of New Jersey prime farmland soils. According to the Natural Resources Conservation Service, prime farmland soils are designated as such for having the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops and is also available for these uses. They have the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed according to acceptable farming methods. Prime farmlands soils are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding. The most abundant of these in Allamuchy are the Palmyra Gravelly fine sandy loam (PaA,PaB), Hero Gravelly Loam (HrA,HrB), Hero Loam (HkA,HkB), Woodstown fine sandy loam (WmB), Bartly loam (BaB), and Woodstown sandy loam, clay substratum (WkB) among others in lesser amounts. *(New Jersey Important Farmlands Inventory: Prime Farmlands, 1990)*

Farmland soils of statewide importance are generally those that do not meet the criteria of prime farmland soils, yet these soils are nearly prime farmland and economically produce high yields of crops when treated and managed according to acceptable farming methods, some may produce yields as high as prime farmland if conditions are favorable. Over 1,800 acres, or fourteen percent, in Allamuchy Township are designated as farmland soils of statewide importance. Two-thirds of this amount is made up of the Fort Mott Sand (FrA), with other abundant farmland soils of statewide importance including Bartley Gravelly loam (BbC) and Hazen Gravelly loam (HfC). In total, 4,500 acres, or over one-third of the Township's soil, are characteristic of and suitable for agricultural production. *(New Jersey Soils of Statewide Importance, 1990)*

Allamuchy Township is also home to four thousand acres, or almost one-third of the Township, of state designated New Jersey hydric (wetland) soils. The definition of a hydric soil

is a soil that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part. The most abundant hydric soils types in Allamuchy Township are Fort Mott Sand (FrA), Wayland Silt loam (Wp), Halsey loam (Ha), Adrian muck (Ad), and Carlisle muck (Ck). *(Warren County, New Jersey Comprehensive Hydric Soils List, 1998)*

Watersheds

Allamuchy Township is located wholly within Watershed Management Area 1, also known as the Upper Delaware River watershed. Watershed Management Area 1 (WMA 1) includes portions of Sussex, Morris, Hunterdon Counties, and all of Warren County. It contains 54 municipalities, including Allamuchy Township. This area encompasses 746 square miles in the mountainous northwestern corner of the state. WMA 1 can be divided into six major drainage basins, two of which, the Musconetcong and Pequest Rivers, are located within Allamuchy Township. *(Watershed Management Area 1: Upper Delaware, 2004)*

There are three HUC 11 watersheds (eleven digit hydrologic unit code) in Allamuchy as designated by the New Jersey Department of Environmental Protection (NJDEP). These areas represent larger drainage basins in the Township. They are Bear Creek, the Pequest River, and the Musconetcong River. Bear Creek flows into the Pequest therefore it is part of its major drainage basin. The Township's drainage can be further divided into seven HUC 14 sub-watersheds (fourteen digit hydrologic unit code) in Allamuchy as designated by NJDEP. Five are part of the Pequest major drainage area and they are Bear Creek, Pequest River (Trout Brook to Brighton), Pequest River (below Bear Swamp to Trout Brook), Trout Brook/Lake Tranquility, and Pequest River (Cemetary Road to Drag Strip). The remaining two are part of the Musconetcong major drainage area and these are the Musconetcong River (Saxton Falls to Waterloo) and (Trout Brook to Saxton Falls).

Rivers, Streams, and Waterbodies

The Pequest River drainage basin is 158 square miles. The river is thirty-two miles long and flows from southern Sussex County southwest through Warren County to the Delaware River, downstream of Belvidere. This river is monitored for physical and chemical parameters by the U.S. Geological Survey at the village of Pequest. *(Watershed Management Area 1: Upper Delaware, 2004)* The Pequest River enters Allamuchy Township as it flows southwest from Green Township, Sussex County. The Pequest is a generally narrow river that briefly widens near the Township's "Mansions of Allamuchy" preserved parkland. While in Allamuchy Township, the Pequest River is commonly surrounded by primarily preserved farmland. Refer to the *Natural Features Map* for the course of the Pequest River. The Pequest River in Allamuchy Township has been classified by NJDEP as an "FW2-NT" waterway. By definition, these waters are generally not suitable for trout because of their physical, chemical, or biological characteristics, but are suitable for a wide variety of other fish species. *(New Jersey Department of Environmental Protection, Bureau of GIS)*

Many unnamed tributaries join the Pequest River throughout this agricultural area until its confluence with a major tributary, Bear Creek. Bear Creek has been designated by NJDEP as a TM or trout maintenance waterway for its ability to support trout year round. One significant named tributary, Trout Brook, has two major branches. One flows from Tranquility Lake in

Green Township, Sussex County southwest and another from Allamuchy Pond within Allamuchy Mountain State Park north and then west. The two branches meet and together flow southwest to the Pequest River. All of Trout Brook has been recognized as a C1, or category one, waterway. Designated by NJDEP, category one waterways are protected from measurable changes in water quality characteristics determined by their clarity, color, scenic setting, other characteristics of aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resource(s). The C1 classification also signifies the highest level of protection for a stream in New Jersey; among other regulations, no new development can occur within 300 feet of category one waterway. A significant unnamed tributary flows south and almost parallel to the Pequest, has been designated as a TP, or trout production waterway, as the highest quality waterway for its ability to provide a place for trout to use for spawning. Independence Creek, tributary to the Pequest, has also been designated as a category one (C1) waterway. The Pequest River exits Allamuchy Township flowing south into Independence Township, Warren County.

The Musconetcong River drains a 156 square mile watershed area. The Musconetcong River is forty-two miles long with its headwaters at Lake Hopatcong all the way to the Delaware River at Riegelsville. The drainage basin of the river includes parts of Hunterdon, Morris, Sussex and Warren Counties. *(Watershed Management Area 1: Upper Delaware, 2004)* The Musconetcong River, similarly to the Pequest River, flows on a generally southwestern course along the border of Byram Township, Sussex County and Mount Olive Township, Morris County. In Allamuchy Township the Musconetcong also forms a border, not only between Allamuchy and Mount Olive, but also the County boundaries of Warren and Morris. Here, the Musconetcong passes historic sites including Waterloo Village, the Morris Canal, and Saxton Falls eventually flowing southwest to the Town of Hackettstown, Warren County. The Musconetcong River has been recognized for its quality as a trout maintenance (TM) waterway in Allamuchy Township. It has also already been partially designated a "Wild and Scenic River" by the National Parks System. One significant tributary to the Musconetcong in Allamuchy Township is the Deer Park Pond Brook. Deer Park Pond Brook flows from Deer Park Pond within Allamuchy Mountain State Park southeast to the Musconetcong. This tributary has been designated as not only trout maintenance (TM), but is also a category one (C1) water. Further to the southwest near the township boundary with Hackettstown, is an unnamed tributary to the Musconetcong River, which is another TM waterway.

The major bodies of water within Allamuchy Township are Allamuchy Pond and Deer Park Pond, both of which are in Allamuchy Mountain State Park. Allamuchy Pond is a 50 acre pond located along County Road 517 at the edge of the State Park property. Deer Park Pond is 46 acre and located in the higher elevations and more remote areas of Allamuchy Mountain State Park. *(See Natural Features Map)*

Groundwater Resources

As are many Warren County municipalities, the residents of Allamuchy Township are dependent upon groundwater to provide their drinking water. Allamuchy Township is within the very large Northwest New Jersey Fifteen Basin system of sole source aquifers. These aquifer systems cover an area of 1,735 square miles. Aquifer systems in Allamuchy, and northwestern New Jersey as a whole, are defined by the surface water drainage basin area; the stream flow

source is the same as the recharge zone for each aquifer system. Sole source aquifers (SSA's) are designated as such by the U.S. Environmental Protection Agency (EPA) for being the sole or principal source of drinking water for the residents and if it were to be contaminated, it would create a significant risk to public health, pursuant to the Safe Water Drinking Act of 1974. A June 1988 EPA study estimated the drinking water resources of the aquifers within the Northwest New Jersey Fifteen Basin Sole Source Aquifer. In Allamuchy, two aquifer basins supply drinking water, primarily the Pequest River and in part, the Musconetcong River. In 1988, the Pequest River served a population of just under 30,000 with an estimated 2,444,600 gallons per day of drinking water. The Pequest River basin ground water at that time supplied an estimate 83% of the aquifer service area's (ASA) drinking water supply. The Pequest is a 35%/65% combination of Highlands and Ridge and Valley physiographic types. The Musconetcong River basin is 100% in the Highlands and serves a population of almost 90,000 people an estimated 7,750,500 gallons of water per day. This represents 87% of that ASA's drinking water supply. *(Northwest New Jersey Fifteen Basin Sole Source Aquifer Designation Support Document, 1988)*

The features of the aquifers in Allamuchy Township and this SSA region are dependent upon the physiographic province in which they fall. In the Highlands area, all the formations transmit water due to secondary openings in the Kittatinny Limestone, which contain solution cavities to permit conduit flow. The aquifers in this region are quite shallow with little opportunity for filtration; therefore care should be taken in regards to the water that recharges these areas. In the Ridge and Valley province area of Allamuchy Township, the area is characterized by Kittatinny ridges and the Pequest River valley. The valleys of Allamuchy Township, part of the Ridge and Valley province, are formed by carbonate rocks that are easily penetrable. Similarly to the Highlands, all of the formation transmit water due to secondary openings, however, Ridge and Valley aquifers are even more shallow than those of the Highlands province due to fractures in Kittatinny formations. *(Northwest New Jersey Fifteen Basin Sole Source Aquifer Designation Support Document, 1988)*

Allamuchy Township Land Use

Land use and land cover types and areas in New Jersey are determined by the NJDEP's, Bureau of Geographic Information Systems (GIS) using remote image sensing and analyzation. The current data available for land use is from the 1995 digital photography. Land use types in Allamuchy Township as of 1995 are primarily forest, wetlands, and agriculture. *(See Land Use Map)* Forested land use is the most prevalent at forty-six percent of the Township, followed by wetlands at twenty-five percent and agriculture at eighteen percent. Most of the forested land use is more specifically denoted as deciduous forest, thirty-seven percent of all land uses in the Township, and is located in the south and eastern parts of the Township, near Allamuchy Mountain State Park. Almost all of the agricultural lands are further categorized as cropland and pastureland, just less than eighteen percent, and located in the western farming belt of the Township. Most of the wetlands areas are deciduous shrub/scrub wetlands, eleven percent, and are located surrounding the Pequest River valley. Urban lands account for nine percent of Allamuchy's land use, most of which is residential development centralized in the Panther Valley community. *(NJDEP, 1995 Land Use/Land Cover Data)*

Preserved Natural Areas in Allamuchy

Allamuchy Mountain State Park is the largest preserved natural area in the Township. *(See Open Space Map)* The features of this park include the Musconetcong River, Kittatinny Mountains, mature forests, spectacular views from its ridgelines of the rural valleys below, and extensive trail networks to explore. Activities in this park include hiking, bicycling, horseback riding, cross-country skiing, fishing, picnicking, hunting, and canoeing.

The Pequest Properties are state owned lands surrounding the Pequest River in Allamuchy Township. They are part of a state initiative to acquire property for the protection of the Pequest River Valley and expansion of the Pequest Wildlife Management Area. The water quality here has a direct impact on the health of the fish at the Pequest Trout Hatchery, just downstream from Allamuchy. Many of these lands are leased back to farmers.

The "Mansions of Allamuchy" property was purchased by the Township of Allamuchy in 2000. Currently half of this land is being farmed and half is in its natural state. This land provides an excellent buffer for a particularly scenic section of the Pequest River as it flows south from Green Township.

The Tranquility Farms preservation area was a collaborative project of the Allamuchy Township, Nature Conservancy, the Ridge and Valley Conservancy, Warren County Agriculture Development Board, and the State Agricultural Development Committee (SADC). Half of it is currently being farmed. The Nature Conservancy also owns some land in the northern part of the Township, known as the Glovers Pond Preserve, located near Bear Creek which flows through the property.

The New Jersey Audubon Society owns thirty-one acres in Allamuchy Township, known as the Catswamp Sanctuary. This is used for preservation of the wetlands habitat on the site and for the protection of a trout production tributary to the Pequest River that runs through the property.

There is a small portion of Jenny Jump State Park in the westernmost corner of Allamuchy Township. The rest of the Park is in nearby Frelinghuysen and Independence Townships. Activities at this state park include camping, hiking, fishing, boating, picnicking, as well as activities at the observatory.

Natural Heritage Priority Sites

Allamuchy Township is home to two state designated Natural Heritage Priority Sites. The Natural Heritage Priority Sites program is part of the New Jersey Division of Parks and Forestry, Office of Natural Lands Management. The New Jersey Natural Heritage Program identifies the state's most significant natural areas through a comprehensive inventory of rare plant and animal species and representative ecological communities. From the inventory, the Natural Heritage Database compiles information on the distribution, biology, status, and preservation needs of these species and communities. Natural Heritage Priority Sites contain some of the best and most viable occurrences of endangered and threatened species and natural communities, but they do not cover all known habitat for endangered and threatened species in New Jersey. *(See Natural Features Map) (NJ Natural Heritage Priority Program)*

The first, smaller, Natural Heritage Priority Site is located entirely in Allamuchy in the western corner of the Township. This site is known as the "Warren Swale" and contains a small, shrubby calcareous fen and the adjacent wooded swamp. The Natural Heritage Priority program has designated this site as having a biodiversity rank of "b3", and contains one globally imperiled element, several state imperiled elements, and several state rare elements. The biodiversity ranking system ranges from the most endangered value of "b1" decreasing to "b5", with "b1","b2","b3" indicating sites that are of a global significance, and values of "b4" and "b5" being those that are of a state significance. For example, a value of "b1" would indicate the last occurrence of this species in the world. The second Natural Heritage Priority Site in Allamuchy Township, the "Great Meadows", is much larger and also extends into Independence Township. It is a marshland area created by the former Glacial Lake Pequest. This site was designated for being a large wetland complex along the Pequest River in Bear Swamp. It contains swamp forest and marsh habitat and is critical habitat for two State Threatened bird species. The Natural Heritage Priority program has assigned a biodiversity rank of "b5" to this site. *(NJ Natural Heritage Priority Program)*