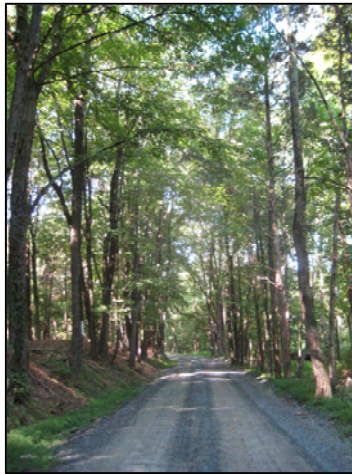


KINGWOOD TOWNSHIP CONSERVATION PLAN ELEMENT

OCTOBER 2008



Adopted October 14, 2008

Prepared for the Kingwood Township Planning Board

With Assistance from Banisch Associates, Inc.

*This plan was prepared with the assistance of a Smart Growth Planning Grant from the
Association of New Jersey Environmental Commissions*

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Introduction

This Conservation Plan Element of the Kingwood Township Master Plan has been prepared in accordance with the Municipal Land Use Law (M.L.U.L.). N.J.S.A. 40:55D-28a provides that the Planning Board may prepare and, after public hearing adopt or amend a master plan, or component parts thereof, to guide the use of lands within the municipality in a manner which protects public health and safety and promotes the general welfare. The purpose of the Conservation Plan is to establish goals, policies and strategies to protect Kingwood Township's natural resources.

The goals and policies in this document were developed by the Planning Board in response to the provisions of the Municipal Land Use Law, and are based, in part, on information and findings presented in Kingwood Township's Environmental Resources Inventory (ERI), among other studies. The goals, policies and strategies of this plan are designed to carefully guide, manage and sustain the Township's natural resources over time. This planning effort has been funded through a Smart Growth Planning Grant provided by the Association of New Jersey Environmental Commissions (ANJEC).

In this plan, the Planning Board seeks to heighten public awareness and appreciation of the degree to which maintenance of the Township's natural resources, scenic vistas, and bucolic setting are dependent on the implementation of the goals, policies and strategies of this plan. Through the adoption of this plan and the 2008 ERI update, Township residents may learn to appreciate and maintain the natural wonders that exist in their backyards. Understanding the interdependence of the variety of species habitat, surface and ground water systems, and land use policies are the foundation of responsible natural resources stewardship. This plan seeks to balance natural resource protection with private property owners' reasonable expectations to use their land, and to establish responsible stewardship of natural resources as the basis for maintaining the natural environment that sustains the Township's human population and abundant wildlife.



Kingwood and surrounding townships were originally within Burlington County until 1713 when they became part of Hunterdon County, so named after then Governor Robert Hunter. Kingwood Township was established in 1746. Previously it was part of Bethlehem Township. In 1845 there was another split when Franklin Township, formerly northeastern section of Kingwood Township, became a separate township . . .¹ Kingwood Township, located in the westerly portion of Hunterdon County, is bordered by the Delaware River and the Borough of Frenchtown on the west, Alexandria Township to the north, Franklin Township to the northeast, and Delaware

Township to the southeast (Figure 1, Existing Land Use Plan). The Township is 35.7 square miles in area with a population of about 3,895².

Kingwood Township's terrain is characterized by an expansive plateau of farmland (the Hunterdon Plateau), rolling hills of farms and forests, winding, narrow rural roads and rock outcroppings and scenic palisades along Route 29 that create a serene setting for Kingwood Township's residents just to the west of rapidly

¹ Kingwood Township website www.kingwoodtownship.com

² U.S. Census Bureau, Summary File 1 (SF 1) and Summary File 3 (SF 3), 2000, www.census.gov

suburbanizing communities in Hunterdon County. Many small streams gather in the gently sloping eastern portion of the Township flowing through steep ravines with scenic waterfalls to the Delaware River, which is designated in this section of New Jersey as part of the federal National Wild and Scenic River System.

Municipal Land Use Law

The Municipal Land Use Law describes the contents of the Conservation Plan Element at N.J.S.A. 40:55D-28b (8), as a plan

“providing for the preservation, conservation and utilization of natural resources, including to the extent appropriate,
 -energy,
 -open space,
 -water supply,
 -forests,
 -soil,
 -marshes, wetlands, harbors, rivers and other waters,
 -fisheries,
 -endangered or threatened species wildlife and other resources,
and which systemically analyzes the impact of each other component and element of the master plan on the present and future preservation, conservation and utilization of those resources;”

N.J.S.A. 40:55D-2 identifies the purpose of the M.L.U.L. and the statutory authority for municipal land use planning and regulation in New Jersey. More than one-half (nine of fifteen) of the purposes of the M.L.U.L. charge the Planning Board with a mandate to protect the environment, prevent urban sprawl, and protect the State’s natural resources. The Planning Board has prepared this Conservation Plan in response to this statutory charge and to conserve natural resources and promote the maintenance of a clean and healthy environment. Nine of the purposes of the law are listed below, which are consistent with the locally identified goals and objectives of this plan.

- (a) To encourage municipal action to guide the appropriate use of or development of all lands in the state, in a manner which will promote the public health, safety, morals and general welfare;
- (b) To secure safety from fire, flood, panic, and other natural and man-made disasters;
- (c) To provide adequate light, air and open space;
- (d) To ensure that the development of individual municipalities does not conflict with the development and general welfare of neighboring municipalities, the county and the State as a whole
- (e) To promote the establishment of appropriate population densities and concentrations that will contribute to the well-being of persons, neighborhoods, communities and regions, and the preservation of the environment;
- (g) To provide sufficient space in appropriate locations for a variety of agricultural, residential, recreational, commercial, industrial uses, and open space both public and private, according to their respective environmental requirements in order to meet the needs of all New Jersey citizens;
- (j) To promote the conservation of historic sites and districts, open space, energy resources and valuable natural resources in the State and to prevent urban sprawl and degradation of the environment through improper use of the land;
- (n) To promote utilization of renewable energy sources; and

- (o) To promote the maximum practicable recovery and recycling of recyclable materials from municipal solid waste through the use of planning practices designed to incorporate the State Recycling Plan goals and to compliment municipal recycling programs.

State Development and Redevelopment Plan

The 2000 State Development and Redevelopment Plan (SDRP), through the State Office of Smart Growth, establishes policies to guide the formulation of local land management and natural resource conservation policy³. The State Plan update, which was due for release in 2007, has not yet been released by the Office of Smart Growth. However, OSG concluded the SDRP Cross Acceptance III process in 2007, which began in 2004 and it is anticipated that OSG will be releasing a revised State Plan sometime in 2008. Cross Acceptance is a bottom up process which allows municipalities to integrate local plans into the SDRP. While OSG has not yet released an updated SDRP, OSG encourages municipalities to participate in the Plan Endorsement Process, which allows municipalities to move forward in coordinating local plans with the SDRP, even in the absence of having an updated and adopted SDRP. Municipalities may petition for Plan Endorsement at any time.

The SDRP designates Kingwood Township as the Rural (PA4), the Rural/Environmentally Sensitive Planning Area (PA4B), and the Environmentally Sensitive Planning Area (PA5). These designations recognize and are consistent with the valuable agricultural resources and environmentally sensitive natural features that Kingwood Township seeks to protect. Kingwood's local planning and zoning seeks to protect the Township's natural resource base from the siege of development pressure in central New Jersey that threatens to transform these valued resources to suburban sprawl. Kingwood acknowledges the SDRP Rural and Environmentally Sensitive planning area designations and embraces the challenge in maintaining and protecting these areas.

Aligning the goals of this Conservation Plan Element with the goals of the SDRP is an added line of defense and prudent reinforcement for the Township's vision of itself, which is essentially to maintain the town as it exists today with modest change (Figure 2, State Planning Areas).

The 2000 SDRP describes Rural Planning Area (PA4) as follows:

"Prudent land development practices are required to protect these resources and retain large contiguous areas of agricultural land. If a viable agricultural industry is to be sustained in the future, the conversion of some of the lands to non-farm uses must be sensitive to the areas predominant rural character and agricultural land base. Throughout New Jersey, some Rural Planning Areas are subject to greater development pressure than other areas. Without greater attention to maintaining and enhancing our rural areas, these economic activities are at risk. Tools and techniques need to be tailored to address the distinctive situation. In particular, new development may require additional attention in areas with environmentally sensitive features."

The Rural/Environmentally Sensitive Planning Area (PA4B) is described as:

"Having one or more environmentally sensitive features... This sub-area of the Rural Planning Area (PA4) contains valuable ecosystems or wildlife habitats. Rural/Environmentally Sensitive Planning Areas are supportive of agriculture and other related economic development efforts that ensure diversity within New Jersey. Any development or redevelopment planned in the Rural/Environmentally Sensitive Area should respect the natural resources and environmentally

³ <http://www.nj.gov/dca/divisions/osg/plan/>

sensitive features of the area. Development and redevelopment in the Rural/Environmentally Sensitive Planning Area should follow the Policy Objectives presented in the Environmentally Sensitive Planning Area (PA5). This includes promoting agricultural practices that prevent or minimize conflicts with sensitive environmental features.”

The Environmentally Sensitive Planning Area (PA5) in the State Plan offers the following description:

“The Environmentally Sensitive Planning Area contains large contiguous land areas with valuable ecosystems, geological features and wildlife habitats. . . . The future environmental and economic integrity of the state rests in the protection of these irreplaceable resources Environmentally Sensitive Planning Areas are characterized by watersheds of pristine waters, trout streams and drinking water supply reservoirs; recharge areas for potable water aquifers; habitats of endangered and threatened plant and animal species; coastal and freshwater wetlands; prime forested areas; scenic vistas; and other significant topographical, geological or ecological features, These resources are critically important not only for the residents of these areas, but for all New Jersey citizens.

The Environmentally Sensitive Planning Area is highly vulnerable to damage of many sorts from new development in the Environs, including fragmentation of landscapes, degradation of aquifers and potable water, habitat destruction, extinction of plant and animal species and destruction of other irreplaceable resources which are vital for the preservation of the ecological integrity of New Jersey’s natural resources New development in these Environs has the potential to destroy the very characteristics” (environmental sensitivities) “that define the area”.

The SDRP promotes the retention of large open land areas in PA4B & 5, and the Plan defines “large contiguous area”.

“When applied to habitat, (large contiguous area) means the area of undisturbed land required to maintain a desired community of plants and animals”, and “when applied to farmland, large contiguous area means the amount of contiguous farmland usually considered necessary to permit normal farm operations to take place on a sustained basis.”

This emphasis on resource protection is reflected in the goals and objectives in this Plan, which, include local objectives relating to natural resources. The first of these natural resource objectives summarizes the overarching intent:

“To protect sensitive environmental resources from destruction or degradation, including but not limited to steep slopes, ridgelines, trout streams, wetlands, stream corridors, potable water supplies, watersheds, aquifers, rivers, viewsheds, forests and other vegetation, soils, habitats of threatened and endangered species and unique natural systems.”

Goals and Objectives

In April 2007 Kingwood Township adopted a statement of Goals and Objectives, commencing a complete Master Plan update. The following list builds upon and refines Kingwood Township’s statement of goals and objectives to coordinate the Township’s environmental land use planning policies with the natural resource

conservation goals and objectives identified in this plan. The goals are addressed in the sections noted in the parenthesis.

- Protect sensitive environmental resources from destruction or degradation, including but not limited to steep slopes, ridgelines, trout streams, wetlands, stream corridors, potable water supplies, watersheds, aquifers, rivers, viewsheds, forests and grasslands, soils, habitats of threatened and endangered species and unique natural systems. (Groundwater/Soil/Water Supply; Scenic Views and Vistas; Steep Slopes; Stream Corridors; Wildlife; Wetlands; Woodlands)
- Maintain the rural character of Kingwood Township using design options such as minimizing impervious cover, protecting steep slopes, habitat, agriculture and open space, and preventing sprawl subdivision patterns. (Agriculture; Surface Water; Sustainability)
- Preserve large contiguous tracts of agricultural land to assure that farming remains a viable and permanent land use. (Agriculture)
- Preserve natural vegetation along stream corridors and prevent unnecessary disturbance and cutting of trees along stream corridors and within floodplains. (Stream Corridors; Wildlife; Woodlands)
- Control the rate and quality of stormwater runoff and limit the potential discharge of pollutants to ground and surface waters through the implementation of land development regulations. (Surface Water)
- Retain open space throughout the community including the preservation of trees and natural vegetation. (Wildlife, Woodlands)
- Promote and enhance the municipal recycling program, recovery of recyclable materials, and renewable energy sources to the maximum extent practicable. (Sustainability)



The Township's Environmental Commission embarked on an update of the Environmental Resources Inventory (ERI) in 2004 and will be complete in 2008. According to the ERI, its goal is to "provide a planning tool containing resource information, data and maps that can be used as part of the Master Plan, as a reference when reviewing development proposals, and as a guide in other township activities in order to better protect the township's natural resources and the overall health and welfare of the community"⁴. These goals are consistent with the purposes of the Municipal Land Use Law cited above.

Utilizing digitized data, the ERI identifies, quantifies, and describes the environmental resources in Kingwood Township. The ERI establishes "a proactive and ecological approach to protecting and preserving human and ecological health" and provides the background for policy recommendations and conservation strategies identified in this element of the Master Plan. The 2004 ERI and the draft 2008 update informs this Conservation Plan element through the following series of chapters in the Inventory, which discuss the Township's natural resources: Climate & Meteorology; Air Quality; Geology; Physiography & Topography; Soils; Hydrology : Ground Water; Hydrology : Surface Water; Historic and Present Landscape; Threatened, Endangered, and

⁴ Kingwood Township ERI, Kratzer Environmental Services, 2004.

Special Concern Species; Protecting Habitats of T&E and Special Concern Species; and Exotic Species. See Appendix A for the ERI Executive Summary.

In addition to the ERI, this Conservation Plan element focuses on the following natural resources and topics:

- Agriculture
- Conservation Easements
- Greenways
- Ground Water Quality/Water Supply/Soils
- Historic Areas
- Outdoor Lighting and Road Glare
- Scenic View and Vistas
- Steep Slopes
- Stream Corridors
- Surface Waters
- Sustainability
- Wetlands
- Wildlife
- Woodlands

The succeeding chapters in this plan, in part, set forth the basis for identification of a series of goals and objectives, and for conservative land use policies and strategies to protect the Township's natural resources. The goals and objectives identified in this Conservation Plan build upon, refine, and expand the Planning Board's 2007 Master Plan goals and objectives.

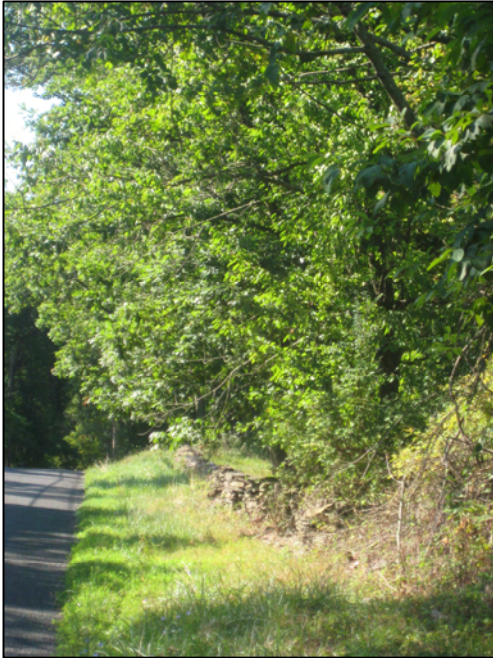
Conservation Easements

One way to ensure long term preservation and maintenance of Kingwood Township's natural resources is through the establishment of conservation easements. Conservation easements are protective covenants that are placed on the land to perpetually protect lands and natural resources. A draft Conservation Easement Ordinance crafted by the Planning Board calls for conservation easements to be deeded to the Township prior to, or as a condition of, subdivision or site plan approval. The ordinance also identifies certain limits of activities that may be conducted within a conservation easement area, or as may be determined by the Planning Board and agreed to by an applicant, including:



- A restriction on the removal or destruction of trees or shrubs on lands within the easement area, except for removal of invasive exotic tree and shrub species.
- Provisions to preserve the natural function of a floodplain, through a restriction against topsoil, sand, gravel or mineral disturbance, excavation or removal, except as may be required to build a pond, and then only when the Township approves the design and structure of the pond.
- A restriction on the construction of buildings, structures, roads, driveways, or trails for motorized vehicles of any kind.
- A restriction against fill of any kind.
- A limitation on motorized and non-motorized vehicle access within the easement other than travel or access necessary to perform activities, which may be permitted within the easement area.

In addition to these provisions, the Township and Planning Board are developing specifications for conservation easement marker placement. The draft ordinance seeks to establish standards that will require the placement of a sufficient number of permanent markers that will clearly identify boundaries of easement areas, which may include a numbering system of each marker for long-term monitoring of easement areas. In addition, the ordinance seeks to require installation of easement markers prior to disturbance or, when carefully managed limits of disturbance are identified prior to construction, erecting the easement markers prior to the issuance of a certificate of occupancy of development.



The Planning Board recognizes that the maintenance of conservation easement markers overtime will also help to ensure the easement is protected into the future. The draft ordinance calls for individual property owners or a homeowner's association, where one is established, to be responsible for maintaining conservation easement markers. A provision for deed notification is also recommended. These requirements are recommended to ensure that successive property owners are made aware of the location of boundaries and the limitations on certain activities that are established to protect natural resources within conservation easement areas.

Agriculture

GOAL: Preserve large contiguous tracts of land to assure that farming remains a viable and permanent land use.

Agriculture is a vibrant part of New Jersey's economy. With over 150,000 acres of farmland preserved throughout the state, farmland is present as a working landscape (Figure 3, Preserved Farmland). However, the state is continually losing about 50 farmland acres per day to development.⁵ Over the past 20 years Kingwood Township has also seen a decrease in farmland. In 1988 Kingwood reported 750 farm parcels. In 2007 that number was reported to decrease to 336 farms. In order to ensure the viability of farming operations, the livelihood of many New Jersey farmers, and the historical aspect of farm landscapes in the state, community plans should state the goals and objectives for farmland preservation. Kingwood Township submitted a Farmland Preservation Plan (FPP) to the State Agricultural Development Committee in December 2007. That plan will help guide the town in protecting farmland into the future.



⁵ NJ Department of Agriculture, 2006 Annual Report, located at <http://www.state.nj.us/agriculture/pdf/06AnnualReport.pdf>

Protecting farmland takes on added significance when viewed in the context of hydrologic function as the open character of these lands permits ground water recharge that is critical to aquifer recharge and ground water availability. The conversion of agricultural lands to non-agricultural use introduces impervious coverage and surface grading that reduces ground water recharge as stormwater runoff is directed away from soils disrupting the natural cycle (Figure 4, Land Use / Land Cover Change).

In addition to the loss of ground water recharge, the introduction of non-agricultural uses, particularly residential uses, results in land use conflicts as the proximity of housing to agriculture can result in private nuisance actions. To avoid such conflicts, large contiguous agricultural areas should be retained to the maximum extent achievable and development should be limited, and where permitted, concentrated so that the loss of farmland is minimized. Similarly, appropriate separation between agricultural and non-agricultural uses should be maintained. When development in agricultural areas does occur, the density and arrangement of development and the location of new neighborhoods are key factors in maintaining the viability of large contiguous agricultural areas, and protecting ecological function. In this way, agriculture as a viable economic activity can be protected (Figure 5, Farmland Capable Soils).



It is critically important that local land use ordinances provide subdivision design techniques that make the retention of large contiguous tracts of farmland possible. Kingwood Township's lot size averaging ordinance establishes provisions for this fairly common planning technique that is designed to allow development to occur on one portion of a parcel, while preserving the remaining lands, which may be agricultural lands or other high-value natural resource lands such as critical habitat. Lot size averaging ordinance provisions, as stated in the MLUL at section 40:55D-40(b), enable municipalities to provide design flexibility for subdivision layout to promote resource protection.

ANJEC has published a guide that explains the lot-size averaging technique as one, which allows the planning board to approve some lots in a subdivision to be less than the standard minimum lot size, provided that other lots created in the subdivision are larger than the minimum and conform to the overall intent of the zoning (i.e. preservation of agricultural/high-value resources). The lot-size averaging technique also facilitates the protection of environmentally sensitive areas such as stream corridors, wetlands, steep slopes, and **agricultural lands**. ANJEC suggests that ordinance requirements should include:

- establishing the minimum parcel size that qualifies (i.e. minimum tract area);
- designating the zones where allowed;
- limiting dwelling unit numbers to those allowed under conventional zoning (numbers are determined by a concept plan for conventional zoning);

- requiring the applicant to demonstrate that the lot size averaging plan is preferable to the conventional plan in achieving the goals and purposes of the ordinance and the Master Plan;
- designating the minimum lot area as well as the required average lot area throughout the subdivision;
- offering an acceptable lot area range; and
- requiring deed restrictions to prohibit further subdivision and development of lots larger than that allowed under conventional zoning.⁶

At Sections 132-30.J.-L., Kingwood Township's Zoning Ordinance provides 'cluster' and 'lot size averaging' provisions, including criteria for cluster or lot size averaging, and open space and 'open lands regulations,' respectively. Kingwood Township's ordinance addresses each of ANJEC's recommendations above. To better achieve the goals of the Master Plan for protecting farmland, the Township should consider expanding the criteria under which mandatory clustering should be required. Such criteria may include adjacency to undeveloped and underdeveloped lands, farm-assessed lands, open space lands, etc. An additional objective should be to set minimum farmland/open lands set aside criteria, such as requiring that not less than one-half of the tilled or tillable acreage of a tract remain in a single ownership. A standard such as this, can serve to retain economically viable agricultural lands. Another particularly important challenge to consistently requiring clustering or lot-size averaging is limited groundwater availability. Kingwood Township's groundwater supplies have long been of concern to residents. Clustered or lot-size averaged subdivision designs should arrange concentrations such that new water supply wells are located away from existing domestic potable water wells.

The Township's 2008 draft Farmland Preservation Plan Element of the Master Plan sets forth the Township's strategic plan to preserve and grow agriculture as an economic factor in Kingwood. Hunterdon County has many resources to assist local farmers with building or sustaining their farming business. These are discussed in the Farmland Preservation Plan. In Kingwood Township, preserving farmland and an agricultural economy has been aided in great measure through the purchase of development rights on farmland through local, County and State funding participation. While this method of preserving agriculture has shown impressive results, limited funding will remain a problem to aggressively preserve farmland through easement purchase well into the future. However, preserving agriculture in Kingwood Township may continue apace through strategic planning and zoning techniques that are designed to retain agriculture and maintain the Township's agricultural land base.

The following list of objectives summarizes the farmland preservation and agriculture management strategies and policies that are recommended in this plan.

OBJECTIVES:

- Maximize farmland retention wherever possible.
- Require retention of large contiguous areas of farmland and promote the long-term viability of continued agriculture through the use of innovative planning and zoning techniques such as clustering, non-contiguous clustering, lot-size averaging, transfer of development rights or open lands zoning to concentrate development, when possible.
- Encourage agricultural activities that keep productive farmland open and preserve the natural hydrologic cycle of ground water recharge that maintains ground water supplies available for agriculture and to meet emergent potable water demands.
- Establish impervious coverage limits for agricultural land uses that respect the needs of agriculture, maximize ground water recharge and limit stormwater runoff.

⁶ FRESHWATER WETLANDS PROTECTION IN NEW JERSEY, A Manual for Local Officials, Second Edition, 1992, The Association of New Jersey Environmental Commissions, PO Box 157, Mendham, NJ 07945

- Continue to expand efforts to preserve farmland through Township, County and State easement purchase programs. Utilize alternative means of protecting agricultural areas including easement donation, land acquisition, purchase of development rights, direct easement purchase, and other creative strategies to preserve as much farmland as possible and protect the Township's prized agricultural base.
- Establish subdivision ordinance standards for agricultural buffers to limit potential conflicts between agricultural activity and non-residential land uses.
- Reexamine, and adjust as necessary, permitted residential densities and open lands requirements to ensure that sufficient viable agricultural areas containing important farmland soils are retained when subdivision and development takes place.
- Establish ordinance standards that require open space/open lands set-asides that preserve as much viable agricultural land as possible in a single ownership as a by-product of development.

Greenways

"Greenways allow us to treat land and water as a system, as interlocking pieces in a puzzle, not as isolated entities." – Ed McMahon, American Greenways Program



Greenways are most often linear open space elements, which combine watercourses, floodplains, wetlands, forests and other natural terrain features such as steep slopes and ridgelines to form an interconnected network of open spaces. Sometimes referred to as linear parks, greenways capitalize on the general unsuitability of these lands for urban development. (Figure 6, Greenways)

Greenways foster the goals of natural resource protection by protecting these areas from more intensive development and allowing natural processes to function without impediment. In 1987 the President's Commission on Americans Outdoors called for a nationwide system of greenways to provide "... corridors of private and public recreation lands and waters to provide people with access to open spaces close to where they live and link together the rural and urban spaces in the American landscape."

In a 1989 publication titled "The Common Wealth of New Jersey - Outdoor Recreation Resources Planning Summary," the Department of Environmental Protection highlighted the "... need to establish an interconnected accessible recreation system of countryside, suburban and urban "greenways" in New Jersey." Citing the public benefits of combined recreation and conservation, DEP outlined a policy to develop such linkages by establishing "an interconnected system of "greenways" through legislation, planning and acquisition and the utilization of multiple private/public and other land use initiatives."

The State Development and Redevelopment Plan (SDRP) also highlights Greenways as an important component in the State's open space and recreation planning. The SDRP cites the benefits of greenways to protect sensitive natural lands and wildlife corridors, enhance biological density, and to promote linkages.

Greenways can combine the multiple objectives of natural resource conservation, open space, critical habitat and farmland preservation and cultural resource protection. In a 1989 publication of the Association of New

Jersey Environmental Commissions titled "Keeping Our Garden State Green: A Local Government Guide for Greenway and Open Space Planning," ANJEC identified four principal benefits of a greenways network. These included:

- (a) Protecting environmentally sensitive areas by targeting stream corridors, floodplains, wetlands, steep slopes and woodlands.

- (b) Creating areas for passive recreation such as scenic enjoyment, hiking, jogging, picnic areas, bird watching, canoeing and fishing.

- (c) Preserving local character and "rural" qualities through the buffering of stream corridors, protection of prominent ridgelines and historic sites and scenic rights-of-way and by developing linkages to larger contiguous parcels of open space and to historic settlement areas.

- (d) Saving tax dollars by controlling development and directing new development away from environmentally sensitive lands.

Greenways typically seek to provide linkages among various public or quasi-public open space reserves, and may involve acquisitions in fee or less than fee interests (deed restrictions, conservation easements, etc.). Kingwood's inventory of expansive open lands and farmland provides a basis for linear greenway connections, as well as a more expansive approach to greenway planning. The Township's preserved open spaces and farmland establish an anchor for a greenway system, which can be built upon over time. Indeed, Kingwood Township has been active in the purchase of open space and preservation of farmland, and has been building an inventory of conservation easement areas through the development approval process, and preservation of farmland. Because so much of Kingwood Township remains open, a greenway system that acknowledges the unique tenure of the land and its natural resources is a logical extension of conservation planning.

In addition to expanding the traditional linear greenway planning concept, this plan calls for recognizing cultural resources management as a worthy greenway planning objective as a component of managing Kingwood's historic rural heritage in coordination with the conservation policies of this plan. Kingwood Township retains a wealth of cultural landscape elements that establish Kingwood's unique sense of place. These include existing farmsteads that have dotted the landscape for centuries and remain testaments to Kingwood's long agricultural land use history. Protecting the cultural landscape, or heritage management may also include recognition of the Township's various settlements or 'places' in the community that evolved historically. These places include historic Baptistown, the Colony of Byram, and smaller places such as Barbertown, Kingwood, and Oak Grove. Recognition of these places as essential elements within the Township's landscape is an important planning objective as modern-era development pressures continue to exert influence over the evolving character of the Township. Therefore, it is the policy of this conservation plan to protect cultural resources and places within an evolving system of greenways as a strategic aim of coordinating the land use changes that are permitted through local zoning and State environmental regulations. In so doing, the Planning Board will have a voice in managing these critical components of the Township's unique identity within the region when approving changes in land use.

The primary thrust of Kingwood Township's greenway is to protect natural resources and environmentally sensitive areas by targeting stream corridors, floodplains, wetlands, steep slopes and woodlands throughout the Township so as to consolidate an interconnected network of protected natural features. Kingwood's greenway plan expands the traditional linear concept of greenway linkages with a more comprehensive system of open areas that also acknowledges the need for cultural resource protection. Kingwood Township's greenway system seeks to establish linkages beyond municipal borders by connecting the Township's greenway areas to adjoining municipalities.

The Greenway is defined as an overlay consisting of wetlands and their buffer zones, State Open Waters and their buffer zones, steep slopes, wooded ridgelines, floodplains and riparian protection areas, publicly-owned lands, conservation easements, farmland protection areas, connecting corridors between these areas, and other sensitive plant or wildlife habitats or exceptional natural resource areas identified during ongoing review or during the development review process. It applies to areas exhibiting one or more of the following criteria:

Greenway Criteria

1. State, County and Municipally Owned Land, private non-profit conservation lands
2. Farmland Preservation Areas, prime soils, soils of statewide significance and other important farm soils
3. Wetlands, State Open Waters (including perennial streams), floodplains, riparian protection areas and intermittent streams
4. Stream Corridor Buffers of Streams Lacking Associated Wetlands
5. Existing Conservation Easements
6. Steep Slopes (i.e., > 25%)
7. Conservation Easements
8. Mapped Connecting Corridors Among the Above Categories
9. Significant Drainage Easements
10. Ridgeline & Hillside Protection Areas
11. Wellhead Protection Areas
12. Habitat for Threatened or Endangered Species
13. Unique cultural resource areas, including but not limited to historic settlements, sites and buildings.
14. Grassland Habitat

To effect the objectives of this plan at the time of application for subdivision, site plan or development, the applicant should determine whether any portion of the Greenway, as defined above, exists on or immediately adjacent to (e.g., within 150' for exceptional resource value wetlands) the subject property. The Township Greenway Map should be used as a general guide for this purpose, although the applicant should submit any unmapped segments of Greenway that may exist on a parcel based on application of all criteria. Any area of Greenway found to exist on the property should be depicted on a map to be reviewed by the Planning or Zoning Board, or other applicable agency as part of the subdivision or site plans. Where areas of the Greenway consist of any areas that are regulated by State regulations or other Township ordinances, the Greenway mapping and plan also should be prepared in accordance with the guidelines of those ordinances.

It is the policy of this plan that applicants are to utilize clustering, lot size averaging or similar alternative development approaches so that large connected areas may remain open as linkages and connecting corridors among Greenway areas. Donations of land to support these objectives are encouraged. Applicants for subdivision or site plan approval are encouraged to submit conceptual plans for review with the reviewing Board to determine how Greenway areas are to be protected and to examine alternative design options to avoid development in priority Greenway protection areas.

OBJECTIVES:

- Coordinate greenway natural resource and farmland protection and preservation with subdivision and site plan review.
- Adopt and implement a greenway system that protects and unifies environmentally sensitive features by providing conservation easements over floodplain areas, stream corridors, steep slopes, ridgelines and wetlands and their transition areas, and farmland and agricultural soils set aside through clustering, lot-size averaging or other similar open land subdivision zoning techniques.

- Prioritize acquisition targets in consultation with the Open Space Committee. Assess whether properties can be preserved by acquisition of fee or easement or whether some other action may be taken or pursued, i.e. donation.
- Begin a dialogue with adjoining municipalities to coordinate open space preservation across municipal boundaries.
- Update the list of properties 14 acres or larger to target as priority greenway protection areas or potential acquisitions.
- Implement mandatory clustering for parcels over 40 acres.
- Draft and implement trees preservation ordinance.
- Work in partnership with surrounding Watershed Management Areas, specifically areas 1, 8, 10, and 11, to preserve critical areas.
- Educate the owners of large private land holdings and the residents of Kingwood Township on the importance of preserving environmentally critical areas of their land and encourage protection.
- Encourage voluntary greenway conservation easement donation on private and public lands.

Ground Water / Water Supply / Soils

GOAL: Maintain and Improve Water Quality of Ground and Surface Waters Through Corresponding Development Intensity.

The Township's Environmental Resources Inventory (ERI) indicates that Kingwood lies within the Piedmont Physiographic Province. This area of the state is underlain by dense, almost impermeable, bedrock that yields water mostly from secondary porosity and permeability provided by fractures. Therefore, the distribution and orientation of these fractures controls the rates and directions of ground water flow (Figure 7, Depth to Bedrock).

Kingwood's ERI states that 63% of the Township's geology is of the Passaic Formation (sandstone, siltstone, shale), 35% Lockatong Formation (dolomitic or silty argillite, mudstone, sandstone, siltstone, and minor silty limestone), and 2% Diabase and Stockton Formation (diabase, medium- to coarse-grained, mudstone, sandstone, siltstone, and minor silty limestone). When viewed together, most soils in Kingwood have limitations from at least one of the following factors: poor drainage, high water table, shallow bedrock or steep slopes (Figure 8, Depth to Seasonal High Water Table).⁷

During periods of dry weather, the flow of water in a stream is a result of groundwater discharge to that stream. This discharge of groundwater is referred to as baseflow. Since groundwater recharge is generally considered equal to groundwater discharge, the baseflow in a stream equals groundwater recharge. The NJDEP considers baseflow as the primary criterion in managing the water resources of New Jersey. The NJDEP uses a method where the lowest streamflow over seven consecutive days of a 10-



⁷ Ibid.

year period is taken as a measurement for baseflow. This method is considered conservative because the lowest flow occurs during periods of extensive dry weather. However, the method provides the best approach for ensuring adequate and safe water supplies during extensive periods of drought. The NJDEP recommends that water supplies should be capable of sustaining withdrawals without adverse impact during dry weather conditions similar to the “Drought of Record” which occurred in the mid-1960s.⁸

Kingwood Township’s residents and businesses rely solely on water from wells. In some cases, this water is obtained by accessing ground water, directly below the surface. In most circumstances, water supply is accessed from aquifer sources that are deep under the surface of the earth. In addition to providing drinking water supply, ground water provides the baseflow to rivers and streams, critical during normal low flow periods, as described above.

In addition, Kingwood Township’s residents and businesses rely solely on septic systems for wastewater management. Where groundwater availability is of concern, the successful operation of a septic system is also typically a concern. Aside from the costly repairs and replacement that homeowners could face if a septic system fails, properly inspecting and maintaining a septic system could prevent it from failing and protect nearby water supply sources. Having both an individual well and a septic system on one property – as is the case in most of the Township – calls for extra caution and care to ensure that individual septic systems do not contaminate nearby wells (Figure 9, Septic Suitability).

Areas of the Township considered suitable for septic systems are fairly limited. As Figure 9 shows, the easterly and southerly portions of the Township are listed as “Very Limited” for their suitability to support a properly functioning septic system. The northerly and westerly portions of the Township are listed as “Somewhat Limited”. Using this information with Figures 7 and 8 (Depth to Bedrock and Depth to Seasonal High Water Table), it becomes clear that the “Very Limited” areas of the Township have very poor drainage and a high water table. This results in a less than ideal combination for a properly functioning septic system. Similarly, these maps show that the westerly and northerly portions of the Township have poor drainage as well, but are more suitable with regard to the depth of the water table. These areas do not possess ideal conditions for septic systems, but are less limited in suitability.

Wellhead Protection

The New Jersey Department of Environmental Protection has established guidelines for the delineation of Wellhead Protection Areas in New Jersey in response to the 1986 Federal Safe Drinking Water Act Amendments. The Safe Drinking Water Act (SDWA) requires states to develop a Wellhead Protection Program for both public water-supply wells. New Jersey’s Wellhead Protection Program (WHPP) was approved by the USEPA in December 1991. The goal of wellhead protection is to prevent contamination of ground water resources, and maintain safe drinking water supplies for the segment of the State’s population that relies on groundwater to meet their water supply needs. All of Kingwood Township’s residents rely upon groundwater for potable drinking water.

According to the SDWA, wellhead protection requires the following major steps:

- Delineation of the aquifer volume from which a well draws its water, known as a Wellhead Protection Area (WHPA)
- Identification of potential pollutant sources within that WHPA
- Development of a management approach to protect well water quality from pollutants

⁸ Mulhall, Matthew G. “Evaluation of Groundwater Resources of Hopewell Township, Mercer County, NJ”. March 2, 2001.

- Implementation of the management approach and monitoring of effectiveness

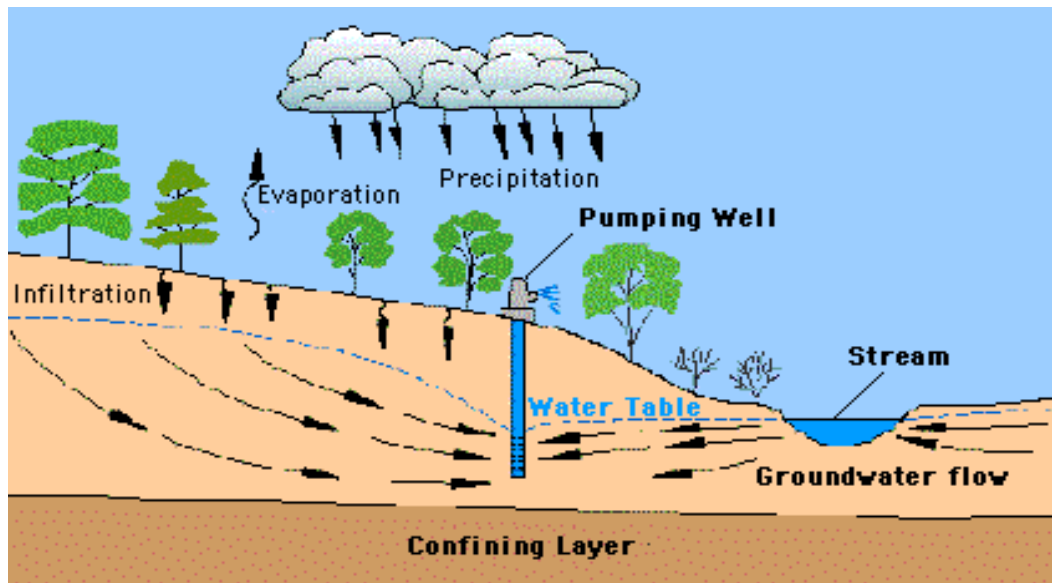
The NJDEP advises that ground water is particularly vulnerable to contamination, and once contaminated, it is costly and difficult to clean up. To demonstrate the potential cost impact, the DEP cites 1991 USEPA cost estimates to replace contaminated ground water supplies. In 1991, the EPA estimated that it cost about \$100 to obtain a million gallons of untreated ground water. Whereas, in areas of New Jersey where ground water supplies were replaced with surface water, the EPA estimated that cost increased by ten times or more. In addition, the EPA estimated replacing an untreated ground water source with a surface water supply results in an approximate increase of \$340 per household per year. The Wellhead Protection Guidelines are provided by DEP to assist counties and municipalities in identifying Wellhead Protection Areas to prevent ground water pollution and protect precious ground-water resources. There are about 20 non-community supply wells in Kingwood Township, as listed by the NJDEP. (Figure 10, Non-Community Supply Wells)

The DEP defines a Wellhead Protection Area as “an aquifer area . . . around a well, from within which ground water is reasonably likely to flow to the well and through which ground water pollution, if it occurs, is reasonably likely to pose a significant threat to the water quality of the well. The WHPA is delimited by the use of a time-of-travel and hydrologic boundaries, and is further subdivided by multiple times of travel.” In other words, the WHPA is the land surface area around a well, which is likely to influence ground and well water quality, especially if pollutants are introduced into this area, either at or below the surface of the ground. The WHPA is delineated by three tiers or areas, each based upon “time-of-travel” which is the average time it takes for water to travel underground from a given point to a pumping well. Time of travel is influenced by local geology and the rate at which water is pumped from the well. The three Tiers are delineated as follows:

Tier 1 = two years (730 days)
Tier 2 = five years (1,826 days)
Tier 3 = twelve years (4,383 days)

The purpose in delineating each tier is to identify areas susceptible to ground water pollution, so that potential sources of pollution within the WHPA can be managed, thereby protecting the quality of the ground water in the aquifer(s) that provides water to a public water supply system. For example, if a potential source of pollution is located a distance of 400' from the well, and water is estimated to travel underground toward the well at the rate of 200' per year, a spill could be expected to reach the wellhead in approximately 2 years time, and the potential pollution source would be located within Tier 1.

According to the DEP, the land uses and commercial and industrial facilities and activities which have historically been identified as major sources of ground water contamination in New Jersey include, but are not limited to underground storage tanks, septic systems, unsecured landfills, leaking drums, above ground storage tanks, road salt piles and lagoons/surface impoundments. Once the WHPA is delineated, the municipality can begin to identify potential sources of pollution and these sources can be managed in relation to their location within the protection area. Appropriate protection strategies, such as preserved open space and land use controls may then be pursued targeting the protection of the wellhead.



(Adapted from USGS)

For Kingwood's residents, identifying wellhead protection areas and sources of potential contamination to groundwater within those areas assume a high priority. It is recommended that the Township undertake a comprehensive wellhead protection program delineating wellhead protection areas for all wells and identifying strategies for protecting these areas and emergency response procedures to respond to a potential contamination event. In addition, the Township should initiate a public education campaign advising the public of the need to identify wellhead protection areas for individual private wells and non-community wells serving individual nonresidential uses. This Plan calls for the adoption of a wellhead protection ordinance requiring the delineation of all public wellhead protection areas.

The Kingwood Township Environmental Commission, in conjunction with the Hunterdon County Department of Health, should conduct an environmental audit of ground water quality, including an analysis of existing ground water samples and an identification of existing facilities, which could adversely impact ground water. This would provide the foundation for any type of cleanup program that may be necessary. For example, where necessary, the following should be mapped, inventoried and monitored:

- Wellhead Protection Areas as per Section 1453 of the SDWA Source Water Assessment Program
- Underground storage tanks as per N.J.A.C. 7:14B of the Site Remediation Program
- Gas and fuel line locations to further investigate potential causes of well and groundwater contamination
- Large septic systems for commercial/industrial users
- Permitted community septic systems
- Hazardous substance storage areas and facilities
- The MEI site and any other permitted NJPDES ground water or surface discharge facilities should be continually monitored.
- Closed landfills or dumps such as the DeRewal site along the Delaware River. The remediation of this site is listed completed as of September 2003.

The following plan objectives are recommended in order to protect and maintain groundwater and to ensure that Township wells do not go dry in periods of extensive dry weather:

OBJECTIVES:

- Establish a monitoring and education program coordinated with the Hunterdon County Board of Health, State of New Jersey or academic research programs for septic system maintenance. Hunterdon County has identified recommendations to ensure that existing septic tanks are regularly pumped and maintained at least every 3 years or at the time of property title transfer. Public education should inform residents of the vital importance of proper septic system maintenance to avoid the large expense of replacing a system as well as preventing the discharge of toxic and hazardous pollutants to ground water.
- Develop a septic system ordinance that requires the functionality of the septic system be documented at the time of property transfer and the testing results submitted to the Township.
- Adopt an ordinance or submission checklist requirement to designate two disposal sites on any new lot, one primary and one reserve, at the time of subdivision or site plan approval.
- Develop and implement landscaping standards for residential and business properties that require the use of native and locally adapted plants and designs to minimize the need for irrigation.
- Adopt a list of recommended native ornamental landscaping trees and shrubs for use in new developments. Specifically recommend landscaping that requires less irrigation. This is also known as xeriscaping.
- Investigate and provide guidance for landowners to consider installing drip irrigation for agricultural lands and home gardens, where appropriate.
- Support and enforce the Township's Well Testing Ordinance and compile resulting data.
- Conduct a ground water study and monitor ground water levels.
- Work with NJDEP to establish a volunteer monitoring program to assess stream base-flow of local streams.

Historic Villages of Kingwood

Kingwood Township is an old community steeped in history. Houses, churches, schools, barns, and shops dating back to the 18th and 19th centuries still exist and are a constant reminder of the many early settlers of Kingwood. Many of the descendants of those settlers still live in the Township and carry on the tradition of the farming community. Comprised of 35 square miles, the Township is still mostly rural with many active farms. This, coupled with the recognition and mapping of the small historic villages scattered throughout the Township, Kingwood has an opportunity to ensure the history of the community is preserved.

Historic property records tell us that many of the early landowners bought tracts of land for investment purposes. We can trace the earliest Kingwood Township settlers back to a number of little villages which are, as in earlier days, areas of heavier settlements. These villages include:

- Baptistown
- Oak Summit
- Oak Grove
- Kingwood
- Byram
- Tumble Station
- Milltown
- Barbertown

The earliest known owners of Kingwood Township land were Joseph Helmsley and Thomas Hutchinson who bought ten plots of land in Hunterdon (then Burlington) County in 1676. These pieces of land were further divided and sold to at least five separate landowners, who in turn, divided and conveyed their land further. Some of those proprietors included distinguished men such as William Penn (1677) and Colonel Daniel Bray (1774).

At the beginning of the 18th century Baptistown was settled by families fanning out in the areas near the Delaware River and toward Barbertown. Among other historic events, Baptistown is noted for General Washington's ride through town on Route 519 on his way south during the American Revolution. Many residents of that era served in the local Militias in support of the Continental Army and helped America achieve its independence from England. The old graveyard next to the post office contains tombstones over 250 years old. The farm fields in the area have been cultivated for just as long.

Just north of Baptistown is the site of the Oak Summit one-room schoolhouse. This structure was built about 1849 on land donated by the Hoff family. It is about 30 feet by 40 feet and could house up to 40 students. The structure that stands today replaced the original schoolhouse. In 1953, the school was abandoned when Kingwood Township consolidated its one room schoolhouses and the Oak Summit School Historical Society took over the school in 1979. In addition to restoring the structure which was in great disrepair, the Society furnished it with school desks of the era, to give future visitors some idea of the system of instruction and learning that once existed here.

Many Quakers also selected Kingwood as much to their liking and settled in the Oak Grove area of the Township which was, at the time, part of Bethlehem. Presbyterians also settled in the northeastern part of Kingwood Township near the Presbyterian Church on Locktown-Flemington Rd. Smaller settlements were also formed south of Baptistown and Oak Grove along Muddy Run, just east of Barbertown.

The village of Kingwood is located about in the center of the Township where Route 519 (Kingwood Road or the King's Highway) joins Spur 519 (Kingwood-Byram Road). This is where most of the earliest settlers resided.

The village of Byram is the southern-most point in Kingwood that is located along the Delaware River. In present-day Kingwood it is primarily a summer colony. In earlier days, this is where the Byram-Point Pleasant Bridge crossed the Delaware. At that time, Byram was called Point Pleasant as was the town across the River,



on the Pennsylvania side of the bridge. The Byram-Point Pleasant Bridge spanned the River until the flood of 1955. Commissioned by the Point Pleasant-Delaware Bridge Company, it was built in 1853. The list of commissioners for this project offers a look into the ancestry of the community, with names like Kugler, Wanamaker, Slack, Arnwine, Shaw, Hann, Barcroft, etc. These were mostly sons and grandsons of the early settlers and many of these names live on in Kingwood today.

About three miles north of Byram, also on the river, is Tumble or Tumble Station at the foot of Tumble Falls. This area is best known for the legendary stories passed down by Native Americans and early Kingwood settlers. One story about this village involves Warford Rock, better known as the "Devil's Tea Table", an unusual rocky prominence which looks like a table. The story about the "Devil's Tea Table" is that Chief Big, Big Mountain, a strong, cunning, and feared Indian, was resting in his favorite place where he could view the River and islands below. His enemies, resentful of his strength and power over them, pushed a large boulder down the hillside crushing his head. The chief vowed as he died that his spirit would guard this beautiful spot. To view the 'tea table' from the side, it appears to be an Indian's head with a flattened skull. This story lives on in Kingwood's history and is an image representing the original settlers of the area.

Milltown was the area where Kingwood-Byram Road (Spur 519) crossed the Lockatong Creek via an old iron bridge, one of the few left of its type. Today this area is generally referred to as Idell. Milltown with its mills, post office, stores, and other shops was a very self-sufficient area prior to the automobile.

Barbertown, named after Isaac Barber, is about a mile north of Kingwood Hotel or Tavern on Kingwood Road. Baptistown is where Routes 12 (Frenchtown Road) and 519 (Kingwood Road) cross and where the Baptists settled around 1720.

Near Slacktown was 'Peaceable Island' and 'Black Bear Swamp,' so named because of a black bear that was killed there. 'Peaceable Island' was not an island but firmer land in the middle of boggy surrounding area. An old stone house, possibly the home of the Shurts', still stands off of the main road and is only accessible by driving off of the road and across a small creek. Quaint road names such as Tumble Falls Road, Whiskey Lane, Federal Twist Road, Featherbed Lane, Stompf Tavern Road, Horseshoe Bend Road, and Muddy Run, as well as old Native American names such as Laokatong (now Lockatong), Little Nishisakawick Creek, and Wichecheoke Creek are also reminders of the history and early settlers of the area.

By the mid-1700s families such as the Wolvertons owned land on both sides of the King's Highway near the Delaware Township border; George Fox, the Inghams, Joshua Waterhouse settled near the village of Kingwood to the east; and the Slaughter's to the west, bordering land owned by the Rodman's. The exchange of property between families kept the community alive and growing. Kingwood Township's settlers came from all across Europe to begin their new lives in America. The Lequears were French Huguenots, the Opdykes and Van Syckels came from Holland, the Kuglers and Wanamakers from Germany, Magee from Ireland, Dalrymple from Scotland, Waterhouse from England, and Mathew from Wales, to name a few.

Soon many other nationalities were represented as citizens of the Township. From there, the community continued to grow from the handful of small villages of yesteryear, to the handful of small villages and farms of today.

Outdoor Lighting and Road Glare

GOAL: Provide outdoor lighting standards necessary to prevent the negative impacts of misdirected or excessive light caused by inappropriate or misaligned light fixtures producing glare, light trespass and skyglow.



The dark, night sky is a natural and valued resource for all to enjoy. Regulation of outdoor lighting in Kingwood Township may serve to prevent misdirected or excessive artificial light, caused by inappropriate or misaligned light fixtures that produce glare, light trespass (nuisance light) and/or sky glow. Outdoor lighting regulation can also assist in preventing the waste of electricity and to improve or maintain nighttime public safety, utility and security. It is the intent of this section to establish policies that ensure that both direct and indirect glare to the extent possible, is eliminated and activities producing such glare are carried on within a structure where possible. Necessary outdoor lighting and glare producing devices such as roadway and walkway lighting should be designed, constructed and maintained in such a manner as not to be a nuisance to surrounding single-family detached dwellings and residential uses as well as to prevent such nuisances and distractions to the motoring public. Such regulation is necessary to encourage energy conservation, to improve nighttime public safety and to prevent annoying and destructive light pollution.

The night sky is a defining factor in Kingwood Township's rural character and should be preserved as such. It is the purpose and intent of Kingwood Township to utilize these guidelines to help preserve and protect the night sky. The guidelines are as follows.

- (a) Harmonize light styles and light standards with the architectural style of the principal building.
- (b) Spotlight-type fixtures attached to buildings should not be permitted unless appropriately side-shielded to prevent view of the light source and glare off site. Only downward directed lighting should be used, and area lighting, such as 'wall packs' affixed to buildings should be prohibited. When security lighting is required, low level and low intensity lighting should be used.
- (c) Parking lot lighting should be designed, located and protected to avoid being easily damaged by vehicles. Lighting levels should be minimized to maintain adequate lighting and ensure safety. Light fixture mounting heights should be installed at reduced heights (i.e. 16') to maintain 'dark sky' conditions.
- (d) Lighting should be located along streets, parking areas, at intersections and where various types of circulation systems merge, intersect or split according to local policies that seek to maintain the dark sky. Policies should be codified to provide clear direction as to where such lighting is to be required when new development and roadways are constructed.
- (e) Pathways and sidewalks should be lighted with low or mushroom-type standards.
- (f) Stairways, and sloping or rising paths, building entrances and exits that require illumination should be designed to maintain safety and minimize lighting required.

OBJECTIVES:

- Identify and document areas where outdoor lighting is required and which may have the potential to result in sky-glow, obstruct night sky viewing and result in outdoor lighting trespasses onto neighboring properties.
- Establish a monitoring and education program coordinated with the County, State or other programs, to ensure that homeowners are aware of the impacts of outdoor lighting on neighbors and on the night sky.
- Develop an outdoor lighting ordinance that requires trespass limits on lighted signs, streetlights, outdoor recreational facilities, and all other mounted or ornamental lighting on residential, non-residential, or public buildings.
- Conduct public education to inform residents of the importance of protecting the dark, night sky and to be aware of neighboring properties' when installing lighting on property.

Scenic Views and Vistas

GOAL: Identify and protect undisturbed hillside, ridgeline, and steep slope views and vistas, particularly the Delaware River Corridor, open fields, forests, and historic landscapes, for the scenic enjoyment of all NJ citizens and to maintain the rural quality of the Township.

Scenic views and vistas often provide a look into a community's past. Kingwood's scenic qualities are found in historic mills on streams, farm fields and farmsteads that are the legacy of the farmers who lived and worked the land, narrow rural roads that wind through farmland and hug the hilly terrain, and forests that stand as testaments to the history of the settlers of generations passed and present. A scenic view tells stories of the past and help a community embrace its history and understand the patterns of development and preservation that shape the community. Learning from these relics, the Township can make decisions to preserve and protect the existing unique features of the community and maintain these features for future generations to enjoy. As stated in the introduction, the Township's goal in protecting these resources is to balance that effort with the protection of private property owner's rights for use of their land.

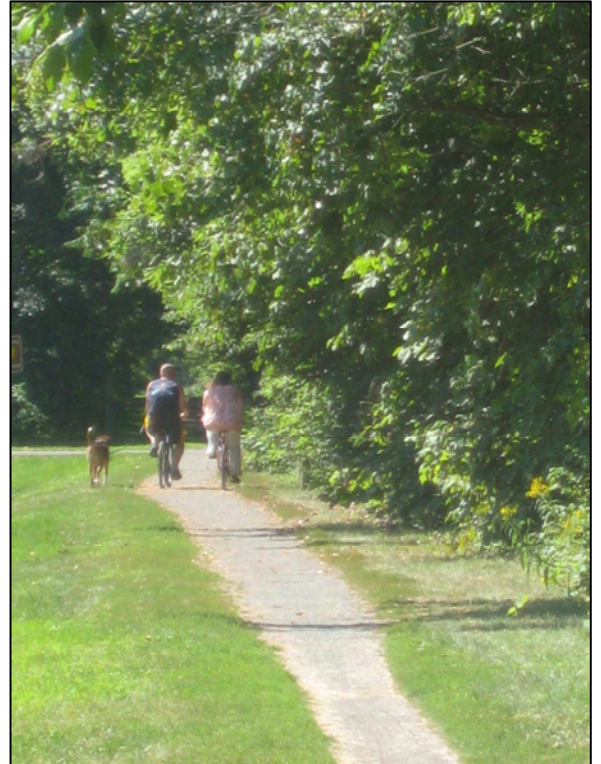


Kingwood Township's landscape provides the backdrop for an abundance of scenic views and vistas, including short range views along winding and hilly roads; and expansive, long views of the Township's farmlands on the plateau. Steep slope areas of the Township relate primarily to its waterways, including the Delaware River, a federally designated wild and scenic river, which takes on unique significance for protection. The Township's scenic views and vistas are an important element in the perceived quality of life in Kingwood. The primary steward of these resources in the community is the municipality through its local review agencies (the Planning Board and Zoning Board of Adjustment). These

Boards play an important role in shaping and protecting the visual character of the landscape when development occurs. These are the Township's regulatory agencies that are best positioned to assist in or require the protection of the scenic views and vistas of the Township at the time development is proposed, when ordinances protecting such resources are established. In the absence of regulation, scenic resources can be lost to changes in land use.

As part of the Township's update of the Master Plan, the Planning Board identified the need for strategies and standards that will serve to limit the transformation of the historic character of the rural and historic roadways in the Township. A number of these roads are under the jurisdiction of the County and the State, including the Delaware River Scenic Byway Route 29, however most are local roads. In addition to the strategies identified in this Conservation Plan, the Planning Board will seek to identify expanded strategic approaches for protecting the rural and historic road network in the Circulation Plan Element of the Master Plan (Figure 10, Township Roadway Network).

The Township's scenic corridors establish Kingwood's essential rural character and should be preserved as an important component of the Township's rural past. This plan calls for an ordinance amendment to identify and protect scenic, rural, and historic roads and roadside features by first requiring applicants to avoid disruption of the unique rural historic features that establish community character. These roadways have changed little from their historic origins, generally follow the existing terrain, and have radii and grades that do not meet current standards. They sometimes have buildings and structures within close proximity to the right-of-way.



The character of a rural historic scenic corridor can change drastically when the Township performs road improvements. In the same respect, when new developments are constructed, the creation of new access points along existing roads opens additional rural lands for development. In order to retain the visual character of the rural portions of the Township and prevent uncharacteristic development in these areas, alternate improvements or treatments are encouraged. The treatment of roadside features is an important element in maintaining the integrity of the scenic corridor and should include the following:

- A minimum scenic corridor setback of 200' along rural historic roads to protect the quality of the viewshed from the road.
- A 50-foot buffer easement adjacent to the street right-of-way with native vegetation. A shade tree easement and/or sight easement should be included. Where appropriate, policies calling for replacement hedgerows along farm fields should be established as alternative roadside planting requirements to shade tree plantings.
- A minimum 20-foot roadway width, plus two paved shoulders of two-foot width for line painting, snow removal and protection of pavement edge, or as recommended by the New Jersey residential site improvement standards, should be the roadway design criteria.
- A program to replant hedgerows, and replace natural features where feasible.

- Policies and regulations should be established to maintain historic features along the roads, such as stone rows, hedgerows, stone retaining walls and fences.
- Sidewalks, where appropriate, should be designed to maintain rural character and constructed of natural materials, separated from the roadway, and meandering alongside the road.
- Limited access for new streets and utilization of common driveways to avoid new driveway cuts.
- Limit clearing where development occurs on ridges and hillsides.



Hilltops, ridgelines, hillsides, the Delaware River Corridor, and Kingwood Township's rolling farmland landscape vistas are worthy of special protection. Forest clearing and/or development of hillsides and ridgelines can be particularly detrimental in compromising the undeveloped character of these areas as they exist today.

This plan calls for a ridgeline and hillside protection ordinance in combination with a steep slope protection ordinance, the object of which is to manage ridgeline development and clearing of trees on ridgelines and hillsides so that perceptible visual change to these scenic resource features is limited, or these feature remain intact and undisturbed, while simultaneously

protecting steep slopes. By way of example, the ridgeline and hillside protection ordinance could implement special performance standards so that when hillside development does occur, a visual 'down-slope' screen of mature forest remains undisturbed and placed under conservation easement in the foreground of the viewshed to prevent future clearing that may result in altering the undisturbed hillside or ridgeline forested condition. Where there is no existing vegetation, screen plantings of indigenous and native species should be required to maintain the integrity of undisturbed views and vistas along scenic corridors. Along ridgelines and hilltops a buffer should be established, within which no disturbance would be permitted, so that the scenic view of these areas will remain undisturbed in the post development condition.

OBJECTIVES:

- Identify, inventory, and map scenic corridors, views and vistas, and rural and historic roads.
- Map the viewshed of the Township as viewed from the Delaware River (i.e. centerline of the River dividing NJ & PA)
- Adopt a comprehensive Scenic View and Vistas, Ridgeline, Hillside, and Steep Slope Protection ordinance to protect Kingwood's valued distant views of these land features. Careful placement of development and mitigation (i.e. substantial buffer plantings) should be required where scenic views and vistas could be compromised by development.
- Adopt ordinance standards to protect undeveloped hilltops directing development 'down-slope' to areas that are not as prominent in the public view, particularly from scenic corridors and rural historic roads, and requiring the establishment of buffers to conceal development from view.
- Establish viewshed and scenic resource buffering standards that require sufficient plantings to screen development from view.

- Establish scenic conservation easements at the time of subdivision or whenever development is approved so that naturally existing or planted buffers are maintained.
- Plan and manage permitted development on hillside and ridgeline areas to protect these features from degradation and limit environmental and visual impacts through the use of performance standards.
- Develop a list of acceptable native plant species when screen plantings or re-vegetation is required. (See Appendix C for an example of NJ native plants and Appendix D for a list of invasive plants in NJ).

Steep Slopes

GOAL: Protect steep slopes from erosion and degradation resulting from permitted development and vegetation removal.

Slope is a measurement of the steepness of terrain and is defined as the vertical change in elevation over a given horizontal distance. Disturbance of areas containing steep slopes can trigger erosion and sedimentation, resulting in the loss of topsoil. It can also result in the disturbance of habitats, degradation of surface water quality, silting of wetlands, and alteration of drainage patterns. These processes, when severe, can also result in land slumping and landslides that can damage both developed property and ecosystems.⁹ The identification and classification of steep slopes is important in order to effectively manage critical natural resources in Kingwood Township.



The Township contains extensive areas of steep slopes which offer a variety of recreation, aesthetic, and ecologic functions and values. Areas of steep slope can provide popular recreation opportunities including hiking, climbing, and wildlife observation. Ridgelines, hillsides, and steep slopes provide scenic views and vistas, which contribute significantly to the Township's rural character and scenic terrain.

The Township's topography consists of the plateau dissected by deep, narrow valleys, but also includes areas that are gently sloping with more open agricultural lands and early successional vegetation. The plateau slowly rises from east to west and levels off at Route 519. The westerly half of the Township beyond this point boasts an intricacy of streams and forests that have carved this extreme topography. Among these include the Little Nishisakawick Creek, Copper Creek, Warford Creek and the Lockatong Creek, all headwater tributaries to the Delaware River (Figure 11, Steep Slopes).

During 2007, the Township developed and adopted an updated version of the town's Steep Slope ordinance. Changes to the ordinance include the definition of steep slopes in Section 114.1 as the following:

A. "Extreme Steep Slope – Any area with a slope of twenty-five percent (25%) or greater.

⁹ Highlands Draft Regional Master Plan. Highlands Water Protection and Planning Council, November 2006.

B. Prohibited Activities - Any development, construction, excavation, placement of fill, extraction, regrading, and removal of vegetation or any other activity that could destabilize soils.

C. Steep Slope – Any area with a slope of fifteen percent (15%) or greater.”

Changes to the Steep Slope Permit Standards in Section 114.4 include the following language:

A. “On lots with slopes of fifteen percent (15%) to twenty-five percent (25%), no more than fifteen percent (15%) of such steep slope area shall be developed and/or regraded or stripped of vegetation.

B. No development, regrading or stripping of vegetation shall be permitted in areas with slopes exceeding twenty-five percent (25%).”

These are somewhat long-standing traditional steep slope regulations that the Township may wish to reevaluate in light of more recently developed Highlands regulations that have been enacted into law. Highlands regulations prohibit disturbance on slopes greater than 20%. In order to continue protection of sensitive steep slope areas, the Township should consider adopting the Highlands regulations for steep slopes disturbance as the implications for surface water quality and water supply addressed through the Highlands standards are equally applicable in Kingwood Township.

OBJECTIVES:

- Ensure the steep slope disturbance standards relate the intensity of permitted development to the slope gradient, such as the adoption of an ordinance consistent with NJ Highlands Act standards that prohibit steep slope disturbance on slopes in excess of 20%.
- Develop standards that limit tree removal and soil disturbance on steep slopes.
- Avoid the disturbance of steep slopes and protect these areas through the placement of conservation easements on these areas at the time of subdivision.
- Require reforestation of steep slope and open space areas that may provide critical linkages among existing forested areas and where ground water recharge may be enhanced through the reestablishment of forests. (See Appendix C for a list of NJ native plant species)¹⁰
- Continue to monitor the performance of the Steep Slope ordinance through inspection of developments and mitigation plans approved in areas designated as steep slope areas. Review and revise the ordinance, as needed.

Stream Corridors

GOAL: Maintain stream corridor buffer areas to control stormwater runoff and improve the health of Township streams to support wildlife and enhance opportunities for passive and active recreation.

Stream corridors, maintained in their natural condition and with minimum disturbance, are instrumental in:

- Removing sediment, nutrients, and pollutants by providing opportunities for filtration, absorption, and decomposition;

¹⁰ See also <http://www.bhwp.org/native/index.htm>;
<http://njaes.rutgers.edu/njriparianforestbuffers/nativePIEDMONT.htm>; and
<http://www.npsnj.org/index.htm>

- Reducing stream bank erosion by slowing stormwater velocity, which aids in allowing stormwater to be absorbed in the soil and taken up by vegetation;
- Preventing flood-related damage by storing stormwater and releasing it slowly;
- Providing shade that maintains cooler water temperatures needed by aquatic species;
- Providing habitat for terrestrial and aquatic species;
- Providing detrital food and nutrients to aquatic species;
- Maintaining biological diversity;
- Helping maintain adequate flows of water to underground aquifers; and
- Providing greenway corridors for wildlife.¹¹

Kingwood boasts several high quality waterways, including a number of tributaries winding through the Township. Five of these streams (and their named and unnamed tributaries) have been designated as Category One (C-1) by the NJ Department of Environmental Protection. This designation provides additional protection to prevent water quality degradation and discourages development where it would impair or destroy natural resources and environmental quality. The C-1 streams and their tributaries in Kingwood include Little Nishisakawick Creek; Lockatong Creek (Muddy Run tributary); Nishisakawick Creek; Warford Creek; and Wickecheoke Creek. The Delaware River, which forms the western boundary of the Township, is a Partnership Wild and Scenic River, a Congressional designation with management support from the National Park Service, recognizing its outstandingly remarkable resource values. Kingwood Township was instrumental in obtaining the designation of the Lower Delaware as a wild and scenic river. The Township Committee has resolved to abide by the River Management Plan and to actively participate in the Wild & Scenic Lower Delaware River Management. The Township is host to many other important waterways, including smaller tributaries such as Copper Creek (Figure 12, Hydrology and Surface Water Quality).



The quality of these streams and their corridors provide significant benefits to the health of the aquatic and biotic environment. These streams also drain watershed areas spanning municipal boundaries, prompting a need for inter-municipal cooperation and coordinated strategies.

In November 2007, the NJDEP adopted the Flood Hazard Area Control Act Rules (N.J.A.C. 7:13) regulating human disturbance to the land and vegetation in the following areas – the flood hazard area of a regulated water (N.J.A.C. 7:13-3) and the riparian zone of a regulated water (N.J.A.C. 7:13-4). The flood hazard area is the land, and the space above that land, which lies below the flood hazard area design flood elevation, as defined at N.J.A.C. 7:13-1.2. Table C (Maximum Allowable Disturbance to Riparian Zone Vegetation) of the Flood Hazard Area Rules describes new or reconstructed regulated activities within the 50-Foot Riparian Zone, 150-Foot Riparian Zone, and the 300-Foot Riparian Zone. In a given municipality, these rules supersede the municipal stream corridor protection ordinance, if one exists.

¹¹ Stony Brook-Millstone Watershed Association Resources http://www.thewatershed.org/managing_resources.php?id=C0_45_32

According to the Flood Hazard Area Rules at **N.J.A.C.7:13-2.4 Regulated Activities**, any action that includes or results in one or more of the following constitutes a regulated activity under this chapter if undertaken in a regulated area, as described at N.J.A.C. 7:13-2.3:1. These include:

1. The alteration of topography through excavation, grading and/or placement of fill;
2. The clearing, cutting and/or removal of vegetation in a riparian zone;
3. The creation of impervious surface;
4. The storage of unsecured material;
5. The construction, reconstruction and/or enlargement of a structure; and
6. The conversion of a building into a private residence or a public building.¹²

Under such conditions, the requirements for a riparian corridor designation are triggered.

In order to protect stream corridors from development impacts, the following management approaches are recommended:

OBJECTIVES:

- Adopt a stream corridor protection ordinance modeled after the Delaware and Raritan Canal Commission program, which seeks to protect the stream corridor and adjacent wetlands, floodplains, and contributory uplands with steep slopes. Stream buffers should extend at least one hundred fifty (150') feet from the top of the bank on each side of the stream and 300' for streams designated as a Category 1 waterway.
- Adopt a stream restoration ordinance that identifies management practices to restore and protect native vegetation along stream corridors and management practices to limit disturbance near stream corridors and place appropriate buffers barring activities within riparian areas. Ensure that the stream corridor protection ordinance is coordinated with the NJDEP Flood Hazard Area rules as stated in N.J.A.C. 7:13.
- Maintain vegetated buffers, using native plant species, along all stream corridors in the Township. Where past land use practices have resulted in the removal of trees along stream corridors, management practices should include the reestablishment of the tree cover, when possible.
- Implement a greenway system that protects and unifies environmentally sensitive features by providing conservation easements over floodplain areas, stream corridors, steep slopes, ridgelines and wetlands and their transition areas.
- Develop management strategies and monitoring standards for stream corridor areas.
- Outreach to neighboring municipalities to develop consistent and/or compatible management strategies along stream or river corridors.
- Work with local non-profits to provide education programs about the importance of vegetated riparian buffers, to publicize available grants, to provide assistance to residents where possible, and to ensure Kingwood is adhering to the NJDEP Stormwater Management Rules (N.J.A.C. 7:8).
- Continue support for the Lower Delaware Wild and Scenic River Management Plan.

¹² <http://www.state.nj.us/dep/landuse/7-13.pdf>

Surface Waters

GOALS: Develop a regional watershed management plan that recognizes and improves the function of surface waters as an ecological system, mitigates stormwater impacts, and develops a monitoring program to assess, maintain, and improve surface water quality.

In 1998, the DEP adopted new Surface Water Quality Standards for water bodies statewide. The DEP applied several different classifications to the Township's surface waters that relate to water quality as well as a variety of uses and maintenance standards that will ensure their maintenance. Kingwood Township's C-1 streams (as discussed above), as well as all of the Township's surface waters merit protection through local ordinances. The maintenance of surface water quality has a great impact on the levels of macro-invertebrate activity in the waterway and vice versa, macro-invertebrates are indicators of stream health. There are several reasons why macro-invertebrates are used as water quality indicators:



are several reasons why macro-invertebrates are used as water quality indicators:

- They are sensitive to changes in the ecosystem.
- Many live in an aquatic ecosystem for over a year.
- They cannot easily escape changes in the water quality.
- They can be collected very easily from most aquatic systems with inexpensive or homemade equipment.

Aquatic macro-invertebrates are found in lakes, streams, ponds, marshes and puddles and help maintain the health of the water ecosystem by eating bacteria and dead, decaying plants and animals. Overall water quality impacts the types of organisms that can survive in a body of water. "Water quality" may include the amounts of dissolved oxygen and the levels of algal growth, pollutants which may be present and the pH level. Some macro-invertebrates such as stoneflies, mayflies and water pennies require a high level of dissolved oxygen and their abundance is an indication of good water quality. Several species of macro-invertebrates are indicative of water systems with lower dissolved oxygen levels and include aquatic worms and leeches. Lower dissolved oxygen levels are often associated with polluted waters while higher levels indicate good quality water.¹³

NJDEP's Surface Water Quality Standards found at N.J.A.C. 7:9B, dated October 2006 provide the following surface water classifications for the Township's surface water courses.¹⁴

¹³ NC State University, Science Junction. <http://www.ncsu.edu/sciencejunction/depot/experiments/water/lessons/macro/>

¹⁴ Fact Sheet about the Fresh Water Anti-degradation categories for New Jersey streams.
<http://www.state.nj.us/dep/wms/bwqsa/factsheet2.pdf>

Waterway	Classification*
LITTLE NISHISAKAWICK CREEK (Frenchtown) - Entire length	FW2-NT(C1)
LOCKATONG CREEK (including Muddy River) (Kingwood) - Source to Idell Bridge (Raven Rock) - Idell Bridge to Delaware River	FW2-NT(C1) FW2-TM(C1)
NISHISAKAWICK CREEK (Frenchtown) - Entire length	FW2-NT(C1)
WARFORD CREEK (Barbertown) – Entire length	FW2-TP(C1)
WICKECHEOKE CREEK (Locktown) - Source to confluence with Plum Brook (Stockton) - Confluence with Plum Brook to Delaware River	FW2-NT(C1) FW2-TM(C1)

**see descriptions below*

DEP's use and maintenance standards for these waters are described as follows:

“Category One Waters shall be protected from any measurable changes (including calculable or predicted changes) to the existing water quality. Water quality characteristics that are generally worse than the water quality criteria, except as due to natural conditions, shall be improved to maintain or provide for the designated uses where this can be accomplished without adverse impacts on organisms, communities or ecosystems of concern. Therefore, these waters are protected from changes in water quality.”

For streams and rivers classified as FW2-TM (C2), the TM denotes Trout Maintenance status, whereby a water body supports populations of trout, although these waters do not support spawning trout. C2 waters are any waterways not categorized as C1. The C2 indicates a Category 2 anti-degradation policy, as follows:

“For Category Two Waters, water quality characteristics that are generally better than, or equal to, the water quality standards shall be maintained within a range of quality that shall protect the existing/designated uses, as determined by studies acceptable to the Department, relating existing/designated uses to water quality. Where such studies are not available or are inconclusive, water quality shall be protected from changes that might be detrimental to the attainment of the designated uses or maintenance of the existing uses. Water quality characteristics that are generally worse than the water quality criteria shall be improved to meet the water quality criteria.”

Trout Production and Trout Maintenance differ from a planning perspective, as they carry different anti-degradation policies. The Trout Production waters carry the C1 designation, which require that the high quality of these waters must be maintained, and protected from any measurable changes. The Trout Maintenance C-2 waterways are slightly less restrictive, requiring protection “from changes that might be detrimental to the attainment of the designated uses or maintenance of the existing uses.” Irrespective of DEP's rating, all surface waters should be afforded careful planning consideration if critical habitat is to be protected and a diversity of species is to be encouraged.

Since the mid-1970's the Wickecheoke Creek's water quality has been impacted by the nearby manufacturing plant, MEI. In 1976, the EPA issued MEI a permit authorizing it to discharge certain pollutants into the Wickecheoke Creek. The Creek flows into the Delaware River and Raritan Canal approximately 8.5 miles downstream from MEI's discharge point. The EPA delegated administration of the permit program to the New Jersey Department of Environmental Protection (NJDEP). NJDEP issued MEI another permit in 1984, authorizing the discharge of certain pollutants into the Creek. The 1984 permit expired on November 30, 1989. Because no new permit was issued, the terms of the 1984 permit remained in effect.

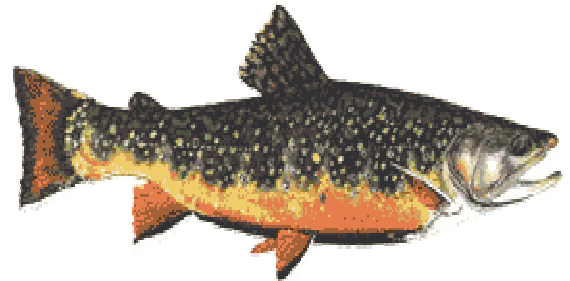
In 1996 the Public Interest Research Group (PIRG) and Friends of the Earth (FOE) filed a suit against MEI for violation of permits after the last issued permit expired. The bulk of the alleged discharge violations concerned excess emissions of salt and total organic carbon (TOC), as well as temperature excursions, caused by MEI's discharge of heated wastewater into the Creek. MEI stipulated to committing 123 permit violations. On January 23, 1992, the district court, in its first opinion, found MEI liable for an additional 27 violations for excess discharges of total organic carbon (TOC) and ruled MEI pay a \$2.6 million fine for all violations. This decision was eventually reversed on the bases that PIRG did not have legal standing to file suit against an individual organization. Although this decision was reversed, pollution remediation and prevention should continue.

Improving surface water quality is dependent on preventing point and non-point source pollution from entering waterways. Non-point source pollution can be mitigated by local land use strategies and management approaches. Non-point source pollutants include septic system effluent, agricultural runoff, stormwater runoff and construction activities. Since a portion of surface water recharges ground water, surface water pollution has the potential to impact well water quality, as well as human health.

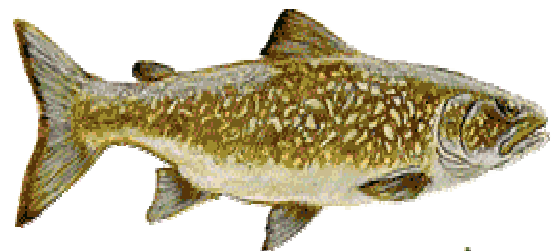
The DEP's Stormwater Management Rules, which became effective in February 2004, require enhanced buffering for development projects that adjoin C-1 waters. DEP determined that a 300-foot buffer is necessary to prevent water quality degradation and to protect the attributes for which Category One waters have been designated. Therefore all developments adjacent to C-1 surface waters must provide the required buffer when proposed development will result in the disturbance of an acre or more of land or impervious coverage of a quarter of an acre or more. However, unless development or another activity triggers the threshold disturbance or impervious coverage limit, the buffer is not required, which may suggest the need for a municipal program of requiring enhanced buffering along riparian corridors in situations when existing development receives a local approval such as a variance.

In order to mitigate potential impacts to the Township's surface waters, the following management approaches are recommended.

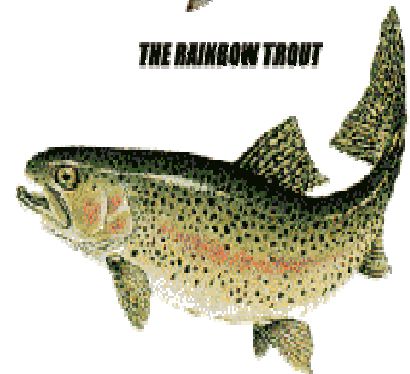
THE BROOK TROUT



THE LAKE TROUT



THE RAINBOW TROUT



OBJECTIVES:

- Preserve and protect the high quality trout production and trout maintenance waterways in the Township from point and non-point source pollution. Wherever appropriate, require Best Management Practices (BMP's) such as, but not limited to:
 - Stream Corridor Protection Ordinance
 - Enhanced Buffering
 - Created wetlands
 - Multistage stormwater treatment systems
 - Drywell infiltration systems for ground water recharge
 - Extended basins
 - Bioretention plantings in basins
- Implement a Township-wide greenway system that protects environmentally sensitive features by placing a variety of environmentally sensitive features into conservation easements whenever development is approved, such as over floodplain areas, stream corridors, wetland and their transition areas, as well as woodlands, steep slope areas, ridgelines, etc. (from critical habitat section)
- Preserve and maintain the interrelationships between land and water resources by reducing permitted residential density and impervious coverage standards that minimize potential negative impacts from non-point source pollution and that contributes to their functioning as an ecological system.
- Mitigate stormwater impacts through the use of non-structural solutions to control flooding and stormwater runoff.
- Ensure that Township activities do not impair surface water. For example, snow removal and preventative measures like sanding or salting can have an impact as snow melts and runs off into nearby water ways. Use products that are less corrosive and biodegradable so as to prevent harmful runoff into nearby waters.
- Develop guidelines for new developments that limit the widening of existing roadways adjacent to the new development. This practice typically occurs where a new development is proposed for a rural area.
- Reduce or eliminate the use of fertilizers and pesticides on municipally owned and maintained properties.
- Develop an education program to inform residents about protecting their local streams by reducing or eliminating the use of fertilizers and pesticides on their individual properties. Include other best management practices for homeowners such as water conservation and environmental stewardship strategies.
- Develop a monitoring system beyond the DEP's stormwater management rules to engage local citizens in becoming volunteer monitors. The program should require, as a minimum, biannual sampling of local waterways. Sampling locations should correspond to data provided in the township's Water Quality Management Plan, as well as the TMDL¹⁵ report for the Lockatong and Wickecheoke Watersheds.
- Research grant programs through local non-profits that offer funding and volunteer resources to assist in developing monitoring and education programs.

¹⁵ Total Maximum Daily Load (TMDL) refers to a discharge formally established pursuant to Section 7 of the Water Quality Planning Act (N.J.S.A. 58:11A-7) and Section 303d of the Clean Water Act, 33 U.S.C. §§ 12512 et seq. A TMDL is the sum of individual wasteload allocations for point sources, wasteload allocations for non-point sources of pollution, other sources such as tributaries or adjacent segments, and allocations to a reserve or margin of safety for an individual pollutant. (http://www.state.nj.us/dep/dwq/7_14a/Sub01rule.pdf)

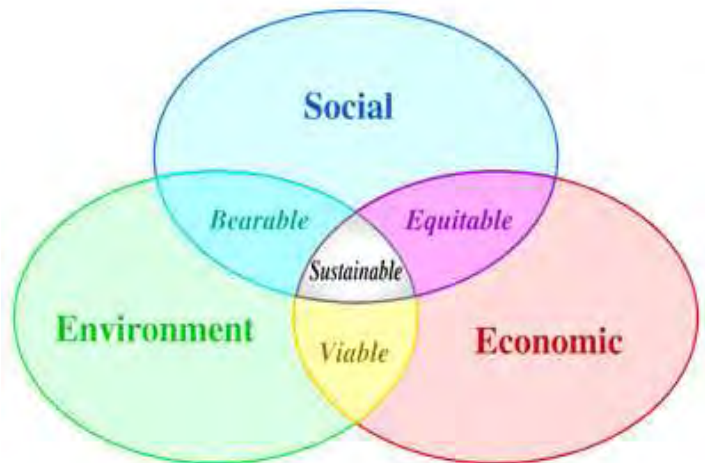
Sustainability

GOAL: Improve the Township's environmental, social, and economic sustainability by selecting appropriate sites for development, increasing water efficiency; improving air quality and energy efficiency; maintaining a successful recycling program; encouraging the use of renewable resources; reducing the use of single-occupancy vehicles; increasing shade tree cover; and improving accessibility to green power.

It is Kingwood Township's goal that new and remodeled buildings and facilities be models of environmental, economic and social stewardship, contributing to our other goals of protecting, conserving and enhancing Kingwood's environment. To that end a sustainability policy should be established.

Sustainability means planning and providing for a healthy economy, environment and society. Sustainability encourages communities to improve overall quality of life for citizens of today as well as generations of tomorrow. It incorporates:

- Energy Efficiency
- Alternative Energy
- Water Conservation
- Waste Minimization
- Stormwater Management
- Pollution Prevention
- Use of Resource-efficient Materials
- Improving Indoor Air Quality
- Woodland Conservation
- Native Species Planting
- Use of Existing Infrastructure



The concept of sustainability is rooted in the recognition that our society, our economy, and the natural environment are interdependent. Often we tackle problems in the three areas separately, without taking into account the strong links among them, and the implications of decisions in one area for the other two. The search for a sustainable society occurs through recognition that we must factor these implications into all of our decisions in order to ensure that we will meet future needs as well as current ones.

This recognition has been further supported by the State of New Jersey as new legislation amending the Municipal Land Use Law now provides for a 15th optional plan element of the master plan. This element, the Environmentally Sustainable and Green Building Plan Element of the Master Plan, establishes guidance for a municipality to adopt a green buildings and environmental sustainability plan element, which shall provide for, encourage, and promote the efficient use of natural resources; consider the impact of buildings on the local, regional and global environment; allow ecosystems to function naturally; conserve and reuse water; treat storm water on site; and optimize climatic conditions through site orientation and design.¹⁶

¹⁶ Assembly, No. 1559. State of New Jersey 213th Legislature. 6/15/2008

Sustainable building designs use natural resources efficiently while creating healthier building environments. Local land use regulations determine future land use patterns, which have a direct effect on a number of sustainability factors, as listed above. How a building is oriented on a site, the type of materials that are used in construction – and the waste diverted from landfills – amongst the many indoor decisions, impact the health and productivity of the occupants, as well as the outdoor environment. Some features of sustainable buildings include:

- Integration of natural daylight for lighting;
- High indoor environmental air quality;
- Reduced utility bills;
- Use of materials and finishes low in volatile organic compounds to improve indoor air quality;
- Increased productivity of building occupants as a result of healthier work places;
- Reduced impact from building construction on the environment through careful construction planning, including the protection of trees and reduction of construction and demolition waste going to landfills;
- Use of locally produced materials to support the local economy; and
- Enhanced social interaction through community involvement in building planning and operation.

The U.S. Green Building Council (USGBC) has developed the rating system, LEED™ (Leadership in Energy and Environmental Design), which is a voluntary, consensus-based, market-driven green building rating system by which projects are registered, evaluated and certified for an immediate and measurable impact on their buildings' performance. It is based on proven technology and evaluates environmental performance from a "whole building" perspective. LEED™ is a self-certifying system designed for rating new and existing public, commercial, institutional, and multi-family residential buildings. The USGBC also has a pilot program to include neighborhood development as part of the rating system.¹⁷

The Township should make every effort to incorporate sustainable building practices and principles into the design, construction, and operation of all public facilities and publicly funded projects. It is recommended that the LEED™ rating system be used as a design and measurement tool to determine what constitutes sustainable building principles and practices. Applicants are urged to comply with these sustainable building practices.

OBJECTIVES:

- Enhance the Township's household recycling program with an education program.
- Incorporate the USGBC's LEED™ or similar rating system incentives into Township development regulations.
- Develop a subdivision and site plan checklist that evaluates the use of energy efficient and resource conservation techniques in the application, such as arranging development in compact forms to minimize energy consumption, while retaining existing wooded areas.
- Develop monitoring indicators to gain insight into emerging trends and to better effectuate the town's vision to maintain and enhance their ecological values, natural resource capabilities, historic and cultural assets, scenic vistas and desirable community character.
- Implement design and landscaping standards that provide buildings with maximum solar access, shading, and wind protection.
- Maximize utilization of the land and reduce reliance on the automobile through multi-use and mixed use development forms in locations such as existing commercial districts and centers where public transportation routes exist.

¹⁷ US Green Building Council. www.usgbc.org/leed

- Promote alternative means of transit by providing opportunities and access for alternative transportation systems (buses, car and van pooling, bicycling, and walking).
- Design bikeways, pedestrian walkways and other routes to maximize opportunities for non-motorized travel in existing and new development.
- Allow for innovative technologies to help conserve and reuse water typically thought of as waste. Treated wastewater and stormwater can be reapplied to the site for uses such as irrigation.
- Create construction guidelines to maximize recovery of recyclable materials and the use of renewable energy sources.

Wetlands

GOAL: Protect and minimize encroachment of critical areas such as wetlands by developing criteria for flexible zoning such as lot size averaging and open space zoning.

There are several types of freshwater wetlands in Kingwood Township, such as coniferous or deciduous wooded wetlands, scrub/shrub wetlands, and herbaceous wetlands (Figure 13, Critical Habitat – Forested & Emergent Wetlands). Since the State and Federal governments regulate wetlands, the Township is preempted from adopting conflicting regulations. However, in the interest of the public, the Township should establish a management and enforcement program to protect wetlands and their transition areas, and to discourage unnecessary or undesirable alterations to these lands (Figure 14, Hydric Soils). The program should regulate activities in and around the areas of protected wetlands and transition areas and should periodically monitor and enforce conservation easement restrictions.¹⁸



According to the NJ Freshwater Wetlands Protection Act (N.J.S.A. 13:9B), freshwater wetlands:

- protect and preserve drinking water supplies by serving to purify surface water and groundwater resources;
- provide a natural means of flood and storm damage protection, and thereby prevent the loss of life and property through the absorption and storage of water during high runoff periods and the reduction of flood crests;
- serve as a transition zone between dry land and water courses, thereby retarding soil erosion;
- provide essential breeding, spawning, nesting, and wintering habitats for a major portion of the State's fish and wildlife, including migrating birds, endangered species, and commercially and recreationally important wildlife; and

¹⁸ See the Kingwood Township Conservation Easement Ordinance #XX-XX for specifications.

- maintain a critical baseflow to surface waters through the gradual release of stored flood waters and groundwater, particularly during drought periods.¹⁹

The State's freshwater wetlands classification system categorizes the resource into three main criteria for protection. A freshwater wetland system can be exceptional, ordinary or of intermediate resource value. The distinguishing factors relate to the wetlands' water quality and habitat. Freshwater wetlands of exceptional resource value are those that exhibit either a system that discharges into FW-1 water and FW-2 trout production waters and tributaries²⁰; or those where threatened or endangered species²¹ habitat are present, where the lands are suitable for breeding, resting, or feeding, and the habitat is documented by the NJDEP.

The Army Corps of Engineers' Wetlands Delineation Manual cites the definition of wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas." With regard to the environmental characteristics of wetlands, the Army Corps describes wetlands as having the following general diagnostic environmental characteristics:

"(1) Vegetation. The prevalent vegetation consists of macrophytes that are typically adapted to areas having hydrologic and soil conditions described in a above. Hydrophytic species, due to morphological, physiological, and/or reproductive adaptations), have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions. *Footnote: Species (e.g. Acer rubrum) having broad ecological tolerances occur in both wetlands and nonwetlands.*

(2) Soil. Soils are present and have been classified as hydric, or they possess characteristics that are associated with reducing soil conditions.

(3) Hydrology. The area is inundated either permanently or periodically at mean water depths <6.6 ft, or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation. *The period of inundation or soil saturation varies according to the hydrologic/soil moisture regime and occurs in both tidal and nontidal situations.*"²²

Freshwater wetlands of ordinary value are freshwater wetlands which do not exhibit the characteristics the exceptional wetlands and which are certain isolated wetlands, man-made drainage ditches, swales, or detention facilities. Freshwater wetlands of intermediate resource value include all freshwater wetlands not included in the descriptions of freshwater wetlands of exceptional or ordinary value.

OBJECTIVES:

- Include "wetlands transition areas" as required by the New Jersey Freshwater Wetlands Protection Act in the definition of Critical Areas contained in the Land Management Ordinance.
- Arrange permitted development to avoid all significant wetlands, and when road crossings are unavoidable, they should be located at the point of minimum impacts.

¹⁹ NJ Division of Land Use Regulation. http://www.state.nj.us/dep/landuse/njsa_njac.html

²⁰ "FW-1, FW-2, trout production (TP) waters" shall mean those waters delineated as such by the department under regulations adopted pursuant to the Water Pollution Control Act, P.L. 1977, c. 74 (C. 58:10A-1 et seq.) and the Water Quality Planning Act, P.L. 1977, c. 75 (C. 58:11A-1 et seq.).

²¹ "Threatened or Endangered Species" shall be those species identified pursuant to The Endangered and Nongame Species Conservation Act, P.L. 1973, c. 309 (C. 23:2A-1 et seq.) or which appear on the federal endangered species list.

²² An Unofficial Reproduction of the Wetlands Research Program's Technical Report Y-87-1 Corps of Engineers Wetlands Delineation Manual. February 25, 1997. Environmental Laboratory, Department of the Army Waterways Experiment Station, Corps of Engineers PO Box 631, Vicksburg, Mississippi 39180-0631.

- Develop identification and monitoring standards to ensure that wetlands identified at the time of development remain protected. Place wetlands and their transition areas in conservation easements that are recorded at the time of development and are monitored through the Township’s conservation easement guidelines.
- Work with a local Watershed Association, or similar non-profit, to develop an education program about the importance of wetlands and how they are currently regulated.
- Combine forces with adjacent municipalities to ensure large areas of wetlands and their transition areas are protected across municipal boundaries.
- Develop a Watershed Association for this area of the County.

Wildlife

GOAL: Protect wildlife residing in and migrating through Kingwood Township through community-wide preservation of trees and natural vegetation and retention of open space.

In 1993, the New Jersey Department of Environmental Protection Endangered and Non-game Species Program (ENSP) initiated a move to a landscape level approach for endangered species protection. With suburbanization and development occurring in all areas of the State, an increasing amount of habitat that could potentially support threatened and endangered species is being lost daily. ENSP developed the “Landscapes” Program digital data, which identify critical forest and grassland habitat (Figure 15, Critical Habitat – Forest & Grassland).

Kingwood Township is rich in critical habitat that can support populations of threatened and endangered species. The largest portion of land in Kingwood Township is agricultural cropland and pasture, followed by deciduous forest (>50% crown closure), deciduous wooded wetlands, rural residential, agricultural wetlands and water. A search of NJDEP Division of Parks and Forestry Natural Heritage Database in December 2007 for rare species presently recorded in Kingwood Township revealed the documented presence of two critically imperiled bird species (red-shouldered hawk and vesper sparrow), one imperiled bird (bobolink), one rare bird (Cooper’s hawk), two rare reptiles (map and wood turtles), and one imperiled amphibian (long-tailed salamander). Three imperiled or critically imperiled invertebrates are found within the Township (a mussel and two damselflies), as well as 6 critically imperiled vascular plants and 8 imperiled vascular plants. No lists are available for non-vascular plants. No species known to occur in Kingwood are found on the Federal endangered species list. Two tables from the ERI, reprinted here, define the State status codes used in the Natural Heritage Database and list these endangered, threatened and special concern species, their conservation status, date observed and habitat.²³



Bobolink



Red-Shouldered Hawk



Vesper Sparrow

Species Status	Definition Used by NJDEP
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²³ Kingwood Township Revised ERI, Kratzer Environmental Services, 2008

Table 3.5: Definitions of Species Status²⁴

Endangered	Applies to a species whose prospects for survival within the state are in immediate danger due to one or several factors, such as loss or degradation of habitat, over-exploitation, predation, competition, disease or environmental pollution, etc. An endangered species likely requires immediate action to avoid extinction within NJ.
Threatened	Applies to species that may become Endangered if conditions surrounding it begin to or continue to deteriorate. Thus, a Threatened species is one that is already vulnerable as a result of, for example, small population size, restricted range, narrow habitat affinities, significant population decline, etc.
Special Concern	Applies to species that warrant special attention because of some evidence of decline, inherent vulnerability to environmental deterioration, or habitat modification that would result in their becoming Threatened. This category would also be applied to species that meet the foregoing criteria and for which there is little understanding of their current population status in the state.
Stable (or increasing)	Applies to species that appear to be secure in NJ and not in danger of falling into any of the preceding categories in the near future.
Undetermined	A species about which there is not enough information available to determine the status.

New Jersey hosts 325 bird species, 90 mammal species, 79 reptile and amphibian species and over 400 species of fish. Per square mile, New Jersey has the greatest wildlife diversity of any state in the nation, according to the NJ Division of Fish and Wildlife. New Jersey's geographic position where northern ecosystems reach their southern limit and where southern ecosystems reach their northern limit provides a wide variety of habitats including mountains, valleys, rolling hills, wetlands, pinelands, beaches, estuaries and rivers (NJDEP, 2005).

The NJ Division of Fish and Wildlife website offers checklists for birds, mammals, reptiles and amphibians of New Jersey, noting the status of each (e.g. common or rare). A variety of plant and animal species enjoy Kingwood Township's diversity of habitat types, including uplands, wetlands and open water, although a catalogue of those specifically found within the boundaries of Kingwood has never been done.

Table 3.6: Species Presently Recorded in the NJ Natural Heritage Database for Kingwood Township

Scientific Name	Common Name	State Rank	Last Observed	Habitat
Vertebrates, birds:				
<i>Accipiter cooperii</i>	Cooper's hawk	S2B, S4N		forests and forested wetlands
<i>Ammodramus savannarum</i>	Grasshopper sparrow	S2B, S3N		
<i>Buteo lineatus</i> ²⁵	red-shouldered hawk	S1B, S2N	1989	remote and extensive old growth forests containing standing water for nesting sites; Hardwood, softwood, or mixed swamp featuring mature, closed overstory, variable to dense understory, near streams or open water.
<i>Catharus fuscescens</i>	veery	S1		
<i>Dolichonyx oryzivorus</i> ¹	Bobolink	S2B, S3N	1989	low-intensity agricultural habitats, such as hayfields and pastures for breeding; Open field or meadow dominated by grasses or for species. Sparse saplings and fence posts used for perches.
<i>Falco sparverius</i>	American Kestrel	S3B, S3N		
<i>Pooecetes camineus</i> ¹	vesper sparrow	S1B, S2N	1984	open areas, such as cultivated fields, grasslands, fallow fields and pastures;

²⁴ Source: <http://www.njfishandwildlife.com/spclsp.htm>

²⁵ Fact sheets with photos of these species can be found in **Appendix C of the ERI**.

Scientific Name	Common Name	State Rank	Last Observed	Habitat
				especially uncultivated strips along fence-rows
<i>Strix varia</i>	Barred owl	S2B, S2N		
<i>Sturnella magna</i>	Eastern meadowlark	S3B, S3N		
Vertebrates, reptiles:				
<i>Glyptemys insculpta</i> ¹	wood turtle	S2	1992	clean freshwater streams for mating, feeding and hibernation; undisturbed uplands for egg laying and foraging; Mosaics of forested, scrub-shrub, emergent wetlands, upland forest, old fields and agricultural lands.
		S3		ponds, river-bottoms and lakes, preferably with an abundance of aquatic vegetation and areas with fallen trees and other debris for basking
<i>Terrapene carolina carolina</i>	Eastern box turtle	S3		
Vertebrate, amphibian:				
<i>Ambystoma jeffersonianum</i>	Jefferson salamander	S3		
<i>Ambystoma opacum</i>	Marbled salamander	S3		
<i>Bufo Woodhousii fowleri</i>	Fowler's toad	S3		
<i>Eurycea longicauda longicauda</i> ¹	long-tailed salamander	S2	1990	clean, calcareous (limestone) wetlands; mines or caves with calcareous ground water; aquatic habitats within upland deciduous forests; shallow streams with shale bottoms
<i>Gyrinophilus p. porphyriticus</i>	Northern spring salamander	S3		
Vertebrate, fish:				
<i>Acipenser brevirostrum</i>	shortnose sturgeon	S1		
Invertebrates:				
<i>Lampsilis cariosa</i> ¹	yellow lampmussel	S1	1997	large rivers, often in sand/silt substrates
Vascular plants:				
<i>Agastache scrophulariifolia</i>	purple giant hyssop	S2	198?	woods and thickets
<i>Asimina triloba</i>	pawpaw	S1	1987	
<i>Carex jamesii</i>	James' sedge	S1	1987	
<i>Cheilanthes lanosa</i>	hairy lipfern	S2	1984	
<i>Cynoglossum virginianum</i> var <i>virginianum</i>	wild comfrey	S2	2006	open woods
<i>Cystopteris protrusa</i>	lowland fragile fern	S2	1987	
<i>Hybanthus concolor</i>	green violet	S1	1974	rich woods
<i>Phaseolus plystachios</i> var. <i>polystachios</i>	wild kidney bean	S2	1896	
<i>Ptelea trifoliata</i>	wafer ash	S1	1981	Woods and thickets
<i>Ranunculus micranthus</i>	rock buttercup	S2	1994	
<i>Ribes missouriense</i>	Missouri gooseberry	S1	1985	
<i>Scutellaria nervosa</i>	veined skullcap	S2	1987	Woods and thickets
<i>Selaginella rupestris</i>	rock spike-moss	S2	1984	
Note: The following species were in the November 2003 database, but were not in the December 2007 database search: Animals: <i>Graptemys geographica</i> (common map turtle), <i>Gomphus vastus</i> (cobra clubtail), <i>Stylurus spiniceps</i> (arrow clubtail). Plants: <i>Aster praealtus</i> (willow-leaf aster), <i>Aster praealtus</i> (willow-leaf aster), <i>Carex hithcockiana</i> (Hitchcock's				

Scientific Name	Common Name	State Rank	Last Observed	Habitat
sedge), <i>Carex maadii</i> (Mead's sedge), <i>Pycnanthemum torrei</i> (Torrey's mountain mint), <i>Rhynchospora globularis</i> (coarse grass-like beaked rush), <i>Valerianella radiata</i> (beaked corn salad), <i>Verbena simplex</i> (narrow-leaved vervain).				
Sources: NJDEP Natural Heritage Database, as of December 2007. Habitat information for vascular plants, where available, is from Newcomb, 1977.				

Threatened and endangered species are indicators of ecological diversity and environmental quality. The presence of these species is an indicator of the historic emphasis on land stewardship. The following activities are identified to protect and preserve these species.

OBJECTIVES:

- Protect critical habitat including woodland and grassland areas, unique habitat, and threatened and endangered species habitat areas through the placement of these areas in conservation easements. Develop a program for recording and monitoring conservation easements that includes homeowner awareness and education strategies.
- Maintain a threatened, endangered, and declining species study of the Township by coordinating community efforts and State data sources to continually update the Township's ERI of species to be protected and strategies for maintaining essential habitat.
- Identify specific habitat needs for the species of critically imperiled and imperiled birds; rare birds and reptiles; imperiled amphibians and critically imperiled invertebrates, as well as critically imperiled vascular plants. Establish development regulations appropriate to the needs of these species.
- Utilize innovative planning and zoning techniques to offer a range of development options for the maintenance and protection of interconnected natural lands, air and water systems, critical habitat, particularly rare, threatened, endangered and declining species habitat areas, and large contiguous areas that support biological diversity.
- Through subdivision regulation, limit disturbance and development of meadows, forests, grassland areas, steep slopes, ridgelines, scenic vistas and views, streams and their corridors, ground water aquifers and recharge areas, wetlands and swampy areas, unique landscapes, and agricultural areas.
- Establish and maintain reduced land use densities and intensities, which respect the capacity of the environment to sustain development, while at the same time maintain the vitality and viability of critical habitat areas and the natural resource conservation and environmental protection objectives of this plan.

Woodlands

GOAL: Identify and protect the biological diversity and critical woodland habitat of the Township's existing woodland areas from fragmentation and destruction.

Woodlands and forested areas are locally important natural resources that serve a variety of functions and uses. Removal of trees and other vegetation can result in significant ecological, hydrological, and economic impacts. Woodlands affect local climatic conditions near or within their boundaries, such as the cooling effect on trout streams. Forest habitat supports all wildlife in the region and provides an important resource to the protection of these species. (Figure 16, Land Use / Land Cover Forested Areas). As stated in the introduction, the Township's goal in protecting these resources is to balance that effort with the protection of private property owner's rights for use of their land.

Woodlands and other native vegetation perform a series of important functions related to the ecological balance. In particular,

- They stabilize steep slopes and reduce soil erosion and surface runoff, absorb pollutants and promote aquifer recharge, because of the high moisture holding capacity of forest soils.
- Forests produce oxygen, and affect local climatic conditions near or within their boundaries, such as the cooling effect on trout streams.
- Woodlands provide habitat for plants and animals and can establish critical linkages among natural systems and open space areas such as stream corridors, wetlands and agricultural areas, and protected areas such as public lands and conservation easement areas.
- Forests establish important open space and recreation lands.
- Forests enhance the visual character of the community, including ridgelines and scenic corridors.
- Woodlands serve to create a feeling of privacy and seclusion in neighborhood areas and reduce noise impacts.
- Woodlands and other native vegetation provide visual diversity in the terrain, enhancing the value of property.
- Woodlands provide a renewable resource that can be harvested and sold, thereby providing an economic benefit to landowners.



A fundamental aspect of preserving woodland function is preventing fragmentation and degradation of forests and vegetation cover. Forests establish connecting linkages among other sensitive landscape features such as wetlands, steep slopes and critical grassland habitat. The Township's forests are primarily situated on mountainous and steep slope terrain. This plan seeks to protect Kingwood's forested areas from fragmentation and ensure their health and function as an underpinning of the biodiversity in the Township. The following strategies are proposed to protect forested critical habitat and woodland areas.



Tree of Heaven
Non-native

OBJECTIVES:

- Require the use of native tree and plant species in landscaping, reforestation, stream corridors and add whenever buffering and hedgerow plantings are required. Discourage the use of non-native and prohibit use of invasive exotic species.
- Prepare and adopt a Tree Removal and Replacement ordinance that requires mitigation and establishes alternative measures such as reforestation, meadow restoration, natural hedgerow treatments, and context sensitive buffering and landscaping to limit impacts to these areas resulting from development.

- Develop a program for recording and monitoring conservation easements that includes homeowner awareness and education strategies.
- Adopt a woodland conservation ordinance to minimize the loss of critical forest habitat and require reforestation where appropriate. The woodlands ordinance should:
 - Recognize accepted forest, woodland management, agricultural, and right-to-farm plans and practices as permitted.
 - Establish performance standards to limit the extent of forest removal based upon forest type. Priority protection areas should include forested slopes, critical habitat for threatened and endangered species, 100 year floodplains, wetlands, stream corridors and slopes 15% or greater.
 - Establish standards to maintain forest habitat areas that are as large and circular as possible, gradual and undulating at the edges, and connected by wildlife corridors wide enough to maintain interior forest conditions (i.e. 300' or greater).
 - Require development to minimize the disturbance of critical forest habitat.
 - Balance the economic use with the environmental benefits of Woodlands.
 - Require open space/open lands set asides to limit loss of woodlands and forests and to promote the retention of critical forest habitat.
- Through the subdivision ordinance, limit the fragmentation and conversion of critical habitat areas to developed uses and promote the maintenance and preservation of large contiguous areas of critical habitat.
- Discourage residents from using non-native and invasive exotic species in their landscaping or other planting schedules.²⁶
- Encourage local gardening and nursery retailers to stop selling invasive species in Kingwood Township and encourage retailers to sell native plant species.²⁷



Shagbark Hickory
Native

Recommended Ordinance Amendments

Each subchapter of this Conservation Plan Element identifies a list of objectives many of which require implementation through zoning ordinance amendments in order for these objectives to become effective. These should be prioritized and implemented in conjunction with the following selection of ordinance amendments that are also recommended in this plan. The Board can refer to these recommendations as they move forward with protection efforts.

The Board should consider prioritizing and adopting the following ordinances:

- Septic System Ordinance
- Conservation Easement Ordinance
- Impervious Cover Limitation Ordinance

²⁶ See Appendix D: NJ Invasive Plants List

²⁷ See Appendix C: NJ Native Plants List

- Stream Corridor Ordinance
- Wellhead Protection Ordinance
- Tree Removal and Replacement Ordinance
- Woodlands Protection Ordinance
- Scenic Corridor Ordinance (should include ridgelines, hillsides, and road network)
- Green Design Ordinance using the USGBC's LEED™ rating system as a guide

The Board should also consider reviewing the following existing regulations:

- Subdivision Ordinance as it applies to every section in this Conservation Plan element.
- Steep Slope Ordinance as it corresponds to the Highlands Plan regulations and as it protects scenic views and vistas.
- Stormwater Management Ordinance to include recommendations for low-impact development, native plantings and non-structural elements such as rain gardens, swales, and pervious surfaces.

Recommended Policies and Programs

While the protection of natural resources is legalized in the adopting of ordinances, encouraging property owners to utilize best management practices reduces the need for additional regulation. Public education and general policies for good stewardship of the Township's natural resources will foster a greater sense of contributing to the common good of the community. In addition to the aforementioned ordinances recommended for adoption, the following education programs are recommended for implementation throughout the Township.

- Agriculture – Farmer education for creating a sustainable agricultural business. Public education for supporting local farm produce and locations of local farm markets. Continued farmland preservation and promotion of flexible subdivision design techniques.
- Conservation Easements - Homeowner awareness and education about the purpose of conservation easements, how to identify them on a property, and restrictions placed on them.
- Greenways – Continued open space preservation. Mapping and identifying linkages throughout the Township.
- Septic System Maintenance - Continue the current public education program.
- Stream Corridor Protection - Outreach to adjacent municipalities to develop consistent stream protection strategies. Public education for best management practices where streams cross private property.
- Wetlands Protection – Identify and protect wetlands on private property through public education and mapping.
- Invasive Plant Removal - Identifying invasive plants and proper removal of them to promote habitat and species survival. Encourage local garden supply retailers and nurseries to stop selling invasive plants.
- Environmental Stewardship – Public education about a variety of best management practices. This list could include, but is not limited to: sustainability, green building, non-point source pollution prevention, organic gardening and farming, energy efficiency and alternative energy options, and recycling.
- Update Subdivision Checklist – Reflect in the subdivision checklist, the changes made as a result of this master plan element.

Summary of the Conservation Plan's Relationship to Other Plan Elements

Kingwood's Conservation Plan has been prepared in coordination with the Township's Master Plan goals and objectives and land use policies. The Conservation Plan promotes the careful management of the Township's natural resources to retain ecological function, prevent destruction of sensitive resource areas, and provide long-term protection of the natural resource base.

The conservation objectives of retaining large contiguous areas of critical habitat, farmland, and other sensitive natural lands serve to reinforce the Township's Land Use Plan. The Township's low density zoning responds to, and is consistent with, the goals and objectives of this conservation plan. This Plan also supports the agriculture preservation policies and objectives of the Township's Farmland Preservation Plan, and at the same time reinforces the Township's goals to protect the countryside and the Township's rural character through coordinated conservation and preservation efforts.

Appendix A

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Appendix B: Conservation Plan Survey Summary

The Township's Environmental Commission conducted a community-wide survey to gauge the importance and attention placed on a variety of natural resources in Kingwood. While a mere 39 responses came in, the variety and detail of those responses add useful insight to the Conservation Plan and will help guide future work to ensure the protection of those natural resources.

Questions no.1 and no.2 asked about the importance and attention placed on each of the following topics in Kingwood Township.

- | | |
|--------------------------------|-----------------------------------|
| ○ Open Space Protection | ○ Scenic Views |
| ○ Farmland Preservation | ○ Steep Slope Protection |
| ○ Energy and Energy Efficiency | ○ Wetlands Protection |
| ○ Air Quality | ○ Woodlands Protection |
| ○ Wildlife Habitat | ○ Groundwater Supply & Protection |
| ○ Clean Water/Healthy Streams | ○ Recycling |

Responses for question no. 1 focused on Open Space, Farmlands, Energy, Air, Wildlife, Clean Water, Streams, and Groundwater as Very Important to protect; Steep Slopes, Wetlands, Woodlands and Recycling as somewhat important or not important; and Scenic Views as either somewhat or not important.

Responses for question no. 2 suggested that not enough attention is placed on Farmland Preservation, Open Space, Air Quality, Wildlife Habitat, Clean Water / Healthy Streams, Wetlands, Woodlands and Ground Water Supply. While the majority of people did not know about Scenic Views and Steep Slope protection, these were also thought of as receiving just enough attention. Information about Energy and Energy Efficiency was split between respondents not knowing about attention placed and not enough attention being placed on the resource.

Question no. 3 asked the community what more could be done for the natural resources of Kingwood Township. Overall, respondents felt that more public education is needed for all topic areas, that they do not want to become a sprawling suburban community, and that implementation through ordinances and incentives would be a desirable way to achieve the goals of the community.

More specifically, responses for each topic area are summarized into action items for the Township to consider:

Actions to take for Open Space Preservation in Kingwood

Public education and more funding resources

Zoning should call for less big houses and 10-acre zoning should be implemented everywhere.

Open space should be monitored to ensure there are no violations on easements.

Establish a greenway system to connect the open spaces in the township.

Review and update ordinances to implement open space protection.

Allow public access along designated riding trails.

Actions to take for Farmland Preservation in Kingwood.

Provide opportunities for small farms (less than 50 ac) to be protected.

Education programs and more funding resources for farmers

Community education about agriculture and farming, especially in schools.

Consider outright purchase of land.

Review and update easement language to protect farming and environmental features.

Review and update ordinances to implement farmland protection.

Actions to take for promoting Energy Efficiency in Kingwood.

Public Education about green building, energy efficiency, homeowner tips
Conduct an energy audit on all municipal facilities – determine average usage among individual homes.
Create ordinances that allow wind power, solar power, and green building (including regulating the size of homes).
Use the LEED rating system as a guideline for creating ordinances.
Provide incentives for homeowners and developers to build green and implement energy saving strategies on individual properties.
The municipal building – or other municipal properties – should be the model for the community.

Actions to take for Improving Air Quality in Kingwood.

Provide public education about the impacts of single automobile transportation.
Sign on to the NJ CleanPower Choice program – offer to all residents.
Conduct an air quality audit to determine where improvements would have the most impact.
Use LEED rating system as a guideline for improved air quality recommendations.

Actions to take for Wildlife Habitat Protection in Kingwood.

Provide more open space.
Develop ordinance language for Stream Corridor Protection, Woodlands Protection, Critical Habitats Protection, and for Maintaining Native Vegetation.
Develop public education programs, especially for schools.
Identify funding sources for landowners to engage in this type of work.

Actions to take for protecting Clean Drinking Water in Kingwood.

Public education for proper septic system maintenance, water conservation, and stormwater management.
Implement Septic System Ordinance, Pet Waste Ordinance
Headwaters protection (could be included in stream corridor ordinance).

Actions to take for Protecting Scenic Views.

Cell Tower Ordinance
Inventory and develop a plan for scenic views and corridors
Limit tree cutting
Overlay zone for scenic corridors.

Actions to take for maintaining Healthy Streams in Kingwood.

Stream Corridor Protection Ordinance with regulations for tree cutting.
NPS pollution reduction education
BMPs and Homeowner education. Implement River Friendly programs for Residents and Businesses.
Partner with a volunteer organization to monitor streams.
Monitor and set standards (beyond DEP?) for TMDLs on businesses and farms.

Actions to take for Protecting Steep Slopes.

Enforce the steep slope protection ordinance that the township adopted in June 2007.
Establish a protected corridor along Rte. 29.
Encourage retention of woodlands and tree canopy during development
Develop a resource conservation ordinance.
Public Education.

Actions to take for Protecting Wetlands in Kingwood.

Inventory and monitor wetlands – update mapping
Acquisition of open space.
Develop a resource conservation ordinance.
Public Education
Enforce Regulations on illegal dumping.

Actions to take for Protecting Woodlands in Kingwood.

Inventory woodlands in the township – develop a Woodlands Management Plan.
Develop regulations for Off-Road Vehicles.
Strategies for tree conservation – protection from deer.
Work with utility company to develop guidelines for overhead utility maintenance and tree protection.
Encourage / Require percentage of woodland / tree retention during development.

Actions to take for Protecting Groundwater Supplies and Aquifer Protection in Kingwood.

Enforce Well Testing Ordinance
Fact Sheets for Public Education
See also Clean Drinking Water.

Actions to take for Recycling/Solid Waste Management in Kingwood.

Establish a curb-side pickup program for the entire township. (#1 and #2 plastics, white paper, brown paper, corrugated cardboard, aluminum, and all glass colors).
Establish a central recycling center for plastics other than 1 & 2, composting, brush.
Direct residents to the appropriate recycling centers for electronics and hazardous materials disposal.

When asked what other aspects of environmental resource protection should be included in the Conservation Plan, respondents answered question no. 4 with the following considerations:

- Innovative technologies: rain gardens, green roofs, rain barrels, energy resources like wind, solar, or other green power.
- Eradicate invasive species through conservation easements and viable stewardship practices.
- Noise control – buffer uses such as kennels
- Refer to Lockatong and Wickecheoke Watershed Plan for future action items.

Question no. 5 asked if residents would be willing to pay additional local taxes if it were required for the protection of these resources. A majority (over 70%) said that they would be willing, while a few comments were made that donations could be given on a project-by-project basis.

Of those that said they would pay additional taxes for resource protection, 75% said they would pay \$0.01/\$100; 6% said they would pay \$0.02/\$100; and 18% said they would pay \$0.03/\$100.

In order to get a sense of the commitment to recycling in the Township, question no. 7 listed items typically recycled and asked residents to choose which they would be most interested in recycling. Residents were also asked to list other items that they would like to recycle. The majority of responders would like to see recycling for household batteries, computer equipment and non-corrugated cardboard. Others were interested in recycling metal/scrap metal and more types of plastic.

Kingwood Township currently does not employ curb-side pickup for household recyclables. Residents must bring their recyclables to a central facility. However, there is trash pickup and recycling is something that could be added onto that cost for homeowners. In terms of the number of responses, more than half of the respondents would like curb-side pickup

of household recyclables. Some commented that it is more convenient for those who do not have the means to drive recyclables to a facility, but that larger items and non-household recyclables could be brought to a central facility.

The last question of the survey asked residents what they felt were the Top 3 Most Important Areas for Natural Resources Protection. The responses are as follows.

- Open Space Protection / Groundwater Supply and Protection (tied)
- Clean Water / Healthy Streams
- Wildlife Habitat

As stated in the beginning, the overall sense of natural resources protection in Kingwood is mixed. Farming, open space, and woodlands are most prominent in the Township and therefore attract the most attention. However, there is a sense that protection of water supplies is critical, especially since development in the surrounding communities may be drawing down resources. In addition to protection of natural resources, residents would like to the size of homes regulated to maintain the rural feel of the community, that lot sizes increase to reduce the density of new development, and that farmers are given a financially viable opportunity to continue their practice.

Appendix C: Plants Native to Hunterdon County, NJ

TREES

<u>Common Name</u>	<u>Scientific Name</u>
Red Maple	<i>Acer rubrum</i>
Sugar Maple	<i>Acer saccharum</i>
Shadbush	<i>Amalanchier canadensis</i>
Paw Paw	<i>Asimina triloba</i>
Black Birch	<i>Betula lenta</i>
River Birch	<i>Betula nigra</i>
Ironwood	<i>Carpinus caroliniana</i>
Bitternut Hickory	<i>Carya cordiformis</i>
Pignut Hickory	<i>Carya glabra</i>
Shagbark Hickory	<i>Carya ovata</i>
Flowering Dogwood	<i>Cornus florida</i>
American Beech	<i>Fagus grandifolia</i>
White Ash	<i>Fraxinus americana</i>
American Holly	<i>Ilex opaca</i>
Red Cedar	<i>Juniperus virginiana</i>
Sweet Gum	<i>Liquidambar styraciflua</i>
Sweet Bay Magnolia	<i>Magnolia virginiana</i>
Sour Gum	<i>Nyssa sylvatica</i>
White Pine	<i>Pinus strobus</i>
Sycamore	<i>Platanus occidentalis</i>
Black Cherry	<i>Prunus serotina</i>
Sassafras	<i>Sassafras albidum</i>
White Oak	<i>Quercus alba</i>
Swamp White Oak	<i>Quercus bicolor</i>
Scarlet Oak	<i>Quercus coccinea</i>
Pin Oak	<i>Quercus palustris</i>
Chestnut Oak	<i>Quercus prinus</i>
Red Oak	<i>Quercus rubra</i>
Black Oak	<i>Quercus velutina</i>

SHRUBS AND VINES

<u>Common Name</u>	<u>Scientific Name</u>
Common Alder	<i>Alnus serrulata</i>
Red Chokeberry	<i>Aronia arbutifolia</i>
Black Chokeberry	<i>Aronia melanocarpa</i>
Buttonbush	<i>Cephalanthus occidentalis</i>
Silky Dogwood	<i>Cornus amomum</i>
Red Osier Dogwood	<i>Cornus stolonifera</i>
Sweet Pepperbush	<i>Clethra alnifolia</i>
Black Huckleberry	<i>Gaylussacia baccata</i>
Witch Hazel	<i>Hamamelis virginiana</i>
Inkberry Holly	<i>Ilex glabra</i>
Winterberry	<i>Ilex verticillata</i>
Virginia Sweetspire	<i>Itea virginica</i>
Mountain Laurel	<i>Kalmia latifolia</i>
Spicebush	<i>Lindera benzoin</i>
Virginia Creeper	<i>Parthenocissus quinquefolia</i>
Pinxter Flower	<i>Rhododendron periclymenoides</i>
Swamp Azalea	<i>Rhododendron viscosum</i>
Blackcap Raspberry	<i>Rubus occidentalis</i>
Elderberry	<i>Sambucus canadensis</i>
Highbush Blueberry	<i>Vaccinium corymbosum</i>
Early Lowbush Blueberry	<i>Vaccinium pallidum</i>
Maple-leaved Viburnum	<i>Viburnum acerifolium</i>
Arrowwood	<i>Viburnum dentatum</i>
Blackhaw Viburnum	<i>Viburnum prunifolium</i>
Grape	<i>Vitis Sp.</i>

SOURCE: AFTER ANDERSON & COLLINS, 1994.

From "Building Greener Communities: Planning for Woodlands Conservation".

Prepared for the North Jersey Resource Conservation Development Council and Hunterdon County Planning Board

Prepared By MaryBeth H. Carter, ASLA, AICP

January 2003

Appendix D: Invasive Plants in New Jersey²⁸

October, 2004

The following trees, shrubs, vines and herbaceous plants as well as their cultivars are known or believed to be invasive to natural ecosystems in New Jersey. With the exception of common reed (*Phragmites australis*), which is cosmopolitan but may include nonindigenous lineages known to aggressively invade and dominate diverse wetland habitats, all species listed are nonindigenous. While many of these species may be available at commercial nurseries for landscaping, because of their invasive nature, they are not suitable for landscaping of capital improvements, replanting of facilities, or ecological restorations administered by the Department. For each species the common name, scientific name and authority (the person or persons who formally described the plant) are provided. Scientific names should be consulted for accuracy in identifying species. Note that several species may be included under a single common name. The list will be periodically updated based on new information.

This list is intended to provide guidance for planting, landscaping and restorations on Department lands, and does not constitute an official list of invasive nonindigenous plant species for New Jersey. No legislation currently exists mandating the creation of such an official list. In addition to enabling legislation, the creation of an official list of invasive nonindigenous plant species will require additional research, a thorough review by the scientific community and governmental agencies, and an opportunity for public comment.

Trees

<u>Common Name</u>	<u>Scientific Name</u>
Black locust	<i>Robinia pseudoacacia</i> L.
Callery pear	<i>Pyrus calleryana</i>
Catalpa	<i>Catalpa bignonioides</i> Walter.
Chinese elm	<i>Ulmus parvifolia</i>
Crack willow	<i>Salix fragilis</i> L.
Devil's walking stick	<i>Aralia spinosa</i> L.
Empress tree	<i>Paulownia tomentosa</i> (Thunb.) Steudel.
Japanese cork tree	<i>Phellodendron japonicum</i> Maxim.
Mimosa	<i>Albizia julibrissin</i> Durazz
Norway maple	<i>Acer platanoides</i> L.
Paper-mulberry	<i>Broussonetia papyrifera</i> (L.) Vent.
Scotch pine	<i>Pinus sylvestris</i> L.
Siberian elm	<i>Ulmus pumila</i> L.
Sweet cherry	<i>Prunus avium</i> L.
Tree of heaven	<i>Ailanthus altissima</i> (Miller) Swingle
Umbrella tree	<i>Magnolia tripetala</i> (L.) L.
White mulberry	<i>Morus alba</i> L
White poplar	<i>Populus alba</i> L
White willow	<i>Salix alba</i> L
Yellow buckeye	<i>Aesculus flava</i> Ait

Shrubs

<u>Common Name</u>	<u>Scientific Name</u>
--------------------	------------------------

²⁸ Native Plant Society of NJ. [http://www.npsnj.org/references/Invasive%20Plants%20of%20NJ%20\(Category%201\).pdf](http://www.npsnj.org/references/Invasive%20Plants%20of%20NJ%20(Category%201).pdf)

Amur honeysuckle	<i>Lonicera maackii</i> (Rupr.) Herder
Autumn olive	<i>Elaeagnus umbellata</i> Thunb.
Black alder	<i>Alnus glutinosa</i> (L.) Gaertner.
Bramble	<i>Rubus discolor</i> Weihe & Nees., <i>R. laciniatus</i> Willd., <i>R. phoenicolasius</i> Maxim.
Bush honeysuckles	<i>Lonicera morrowii</i> A. Gray., <i>L. maackii</i> (Rupr.) Maxim
Butterfly-bush	<i>Buddleja davidii</i> Franchet
Clammy locust	<i>Robinia viscosa</i> Vent.
Common buckthorn	<i>Rhamnum cathartica</i> L.
Coral-berry	<i>Symphoricarpos orbiculatus</i> Moench
Dog rose	<i>Rosa canina</i> L.
European barberry	<i>Berberis vulgaris</i> L.
European spindle-tree	<i>Euonymus europaeus</i> L.
False indigo-bush	<i>Amorpha fruticosa</i> L.
Fragrant sumac	<i>Rhus aromatica</i> Aiton.
Garden red currant	<i>Ribes sativum</i> Syme.
Japanese barberry	<i>Berberis thunbergii</i> DC.
Japanese holly	<i>Ilex crenata</i> Thunb.
Jetbead	<i>Rhodotypos scandens</i> (Thunb.) Makino
Linden arrow-wood	<i>Viburnum dilatatum</i> Thunb.
Morrow's bush honeysuckle	<i>Lonicera morrowii</i> Gray
Multiflora rose	<i>Rosa multiflora</i> Thunb.
Oriental redbud	<i>Photinia villosa</i> (Thunb.) DC.
Privet	<i>Ligustrum obtusifolium</i> , <i>L. ovalifolium</i> , <i>L. vulgare</i> L.
Rose acacia	<i>Robinia hispida</i> L.
Rugosa rose	<i>Rosa rugosa</i> Thunb.
Russian olive	<i>Elaeagnus angustifolia</i> L.
Scotch broom	<i>Cytisus scoparius</i> (L.) Link.
Shrub lespedeza	<i>Lespedeza thunbergii</i> (DC.) Nakai
Siebold viburnum	<i>Viburnum sieboldii</i> Miq.
Smooth buckthorn	<i>Rhamnus frangula</i> L.
Snowberry	<i>Symphoricarpos albus</i> var. <i>laevigatus</i> (Fern.) S. F. Blake
Sweetbrier	<i>Rosa micrantha</i> J.E. Smith
Tartarian honeysuckle	<i>Lonicera tatarica</i> L.
Winged burning bush	<i>Euonymus alatus</i> (Thunb.) Siebold.
Winter creeper	<i>Euonymus fortunei</i> (Turcz.) Hand.-Maz.

Vines

<u>Common Name</u>	<u>Scientific Name</u>
Akebia	<i>Akebia quinata</i> (Houtt.) Decne
Black swallow-wort	<i>Cynanchum louiseae</i> Kartesz & Gandhi
English ivy	<i>Hedera helix</i> L
Japanese honeysuckle	<i>Lonicera japonica</i> var. <i>chinensis</i> , <i>L. japonica</i> var. <i>japonica</i>
Kudzu	<i>Pueraria lobata</i> (Willd.) Ohwi
Mile-a-minute	<i>Polygonum perfoliatum</i> L.
Matrimony vine	<i>Lycium barbarum</i> L.
Oriental bittersweet	<i>Celastrus orbiculatus</i> Thunb.
Periwinkle	<i>Vinca minor</i> L.
Porcelain-berry	<i>Ampelopsis brevipedunculata</i> (Maxim.) Trautv.

Wisteria
Yam-leaved clematis

Wisteria floribunda (Willd.) DC., W. frutescens (L.) Poiret., W. sinensis (Sims)
Clematis terniflora DC.

Herbs

Common Name

Bedstraw
Bitter-cress
Black-eyed Susan
Bull thistle
Bush clover
Butter and eggs
Canada thistle
Chickweed
Chicory
Coltsfoot
Cottonweed
Creeping primrose-willow
Crown-vetch
Curly dock
Cypress spurge
Dame' rocket
Dusty miller
Eurasian water-milfoil
Field garlic
Garlic mustard
Giant chickweed
Giant knotweed
Goosefoot
Goutweed
Ground-ivy
Hawkweed

Indian strawberry
Japanese hops
Japanese knotweed
Leafy spurge
Lesser celandine
Moneywort
Mullein
Mugwort
Orange daylily
Ox-eye daisy
Bearded beggarticks
Pondweed
Prince's feather
Purple loosestrife
Queen Anne's-lace
Ragged-robin

Scientific Name

Galium mollugo L., G. verum L.
Cardamine impatiens L.
Rudbeckia hirta var. pulcherrima Farw
Cirsium vulgare (Savi) Tenore.
Lespedeza cuneata (Dum. Cours.) G. Don
Linaria vulgaris Miller.
Cirsium arvense (L.) Scop.
Cerastium biebersteinii DC.
Cichorium intybus L.
Tussilago farfara L.
Froelichia gracilis (Hook.) Moq.
Ludwigia peploides var. glabrescens (Kuntze) Shinnars.
Coronilla varia L.
Rumex crispus L.
Euphorbia cyparissias L.
Hesperis matronalis L.
Artemisia stelleriana Besser.
Myriophyllum spicatum L
Allium vineale L
Alliaria petiolata (Bieb.) Cavara & Grande.
Myosoton aquatica (L.) Scop
Polygonum sachalinense F. Schmidt ex Maxim.
Chenopodium ambrosioides L.
Aegopodium podagraria L.
Glechoma hederaceae L.
Hieracium caespitosum Dumont., H. lachenalii C. Gmelin., H. pilosella L., H. piloselloides Villars.
Duchesnea indica (Andrews) Focke.
Humulus japonicus Siebold & Zucc
Polygonum cuspidatum Sieb. & Zucc.
Euphorbia escula L.
Ranunculus ficaria L. Lobelia chinensis Lobelia
Lysimachia nummularia L.
Verbascum blattaria L., V. thapsus L.
Artemisia vulgaris L.
Hemerocallis fulva (L.) L.
Leucanthemum vulgare L.
Bidens aristosa (Michx.) Britt. (including B. polylepis S.F. Blake)
Potamogeton crispus L.
Polygonum orientale L.
Lythrum salicaria L.
Daucus carota L.
Lychnis flos-cuculi L.

Skeleton-weed	Chondrilla juncea L.
Speedwell	Veronica beccabunga L., V. hederifolia L.
Spotted knapweed	Centaurea maculosa Lam.
Sweet clover	Melilotus officinalis (L.) Lam., (including M. albus Medik.)
Teasel	Dipsacus fullonum L., D. laciniatus L.
Thistle	Carduus acanthoides L., C. crispus L., C. nutans L., Carlina vulgaris L.
Water-chesnut	Trapa natans L.
Water starwort	Callitriche stagnalis Scop
Water-thyme	Hydrilla verticillata (L. f.) Royle
White mullein	Verbascum lychnitis L.
Wild chervil	Anthriscus sylvestris (L.) Hoffmann
Winter-cress	Barbarea verna (Miller) Aschers., B. vulgaris R. Br

Graminoid

<u>Common Name</u>	<u>Scientific Name</u>
African weeping love grass	Eragrostis curvula (Schrud.) Nees
Brome	Bromus japonicus Thunb. ex Murr., B. tectorum L.
Cane	Arundinaria gigantea (Walter) Chapman.
Canary grass	Phalaris canariensis L.
Chinese silver grass	Miscanthus sinensis Anderss.
Common reed	Phragmites australis (Cav.) Trin. (nonindigenous strains only)
Japanese sedge	Carex kobomugi Ohwi.
Japanese stiltgrass	Microstegium vimineum (Trin.) A. Camus.
Meadow fescue	Festuca pratensis Hudson., F. elatior L.
Small carp grass	Arthraxon hispidus (Thunb.) Makino
Sweet vernal grass	Anthoxanthum odoratum L.
Umbrella-sedge	Cyperus amuricus Steudel., C. brevifoloides Thieret & Delahoussaye., C. iria L.

Existing Land Use Plan

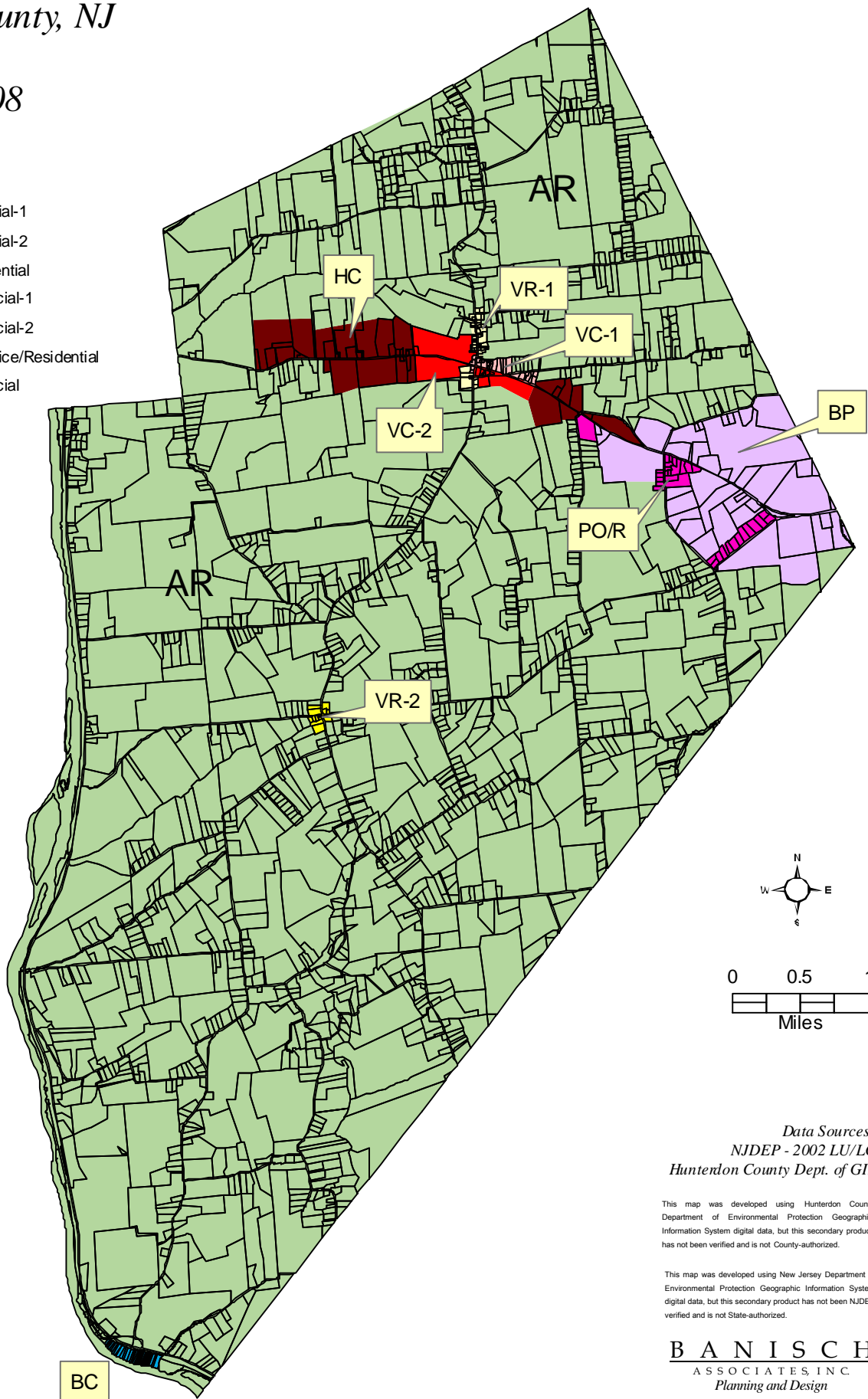
Kingwood Township, Hunterdon County, NJ

Figure 1

September 2008

Legend

- VR-1: Village Residential-1
- VR-2: Village Residential-2
- AR: Agricultural/Residential
- VC-1: Village Commercial-1
- VC-2: Village Commercial-2
- PO/R: Professional Office/Residential
- HC: Highway Commercial
- BP: Business Park
- BC: Byram Colony



State Planning Policy Areas







Kingwood Township,
Hunterdon County, NJ

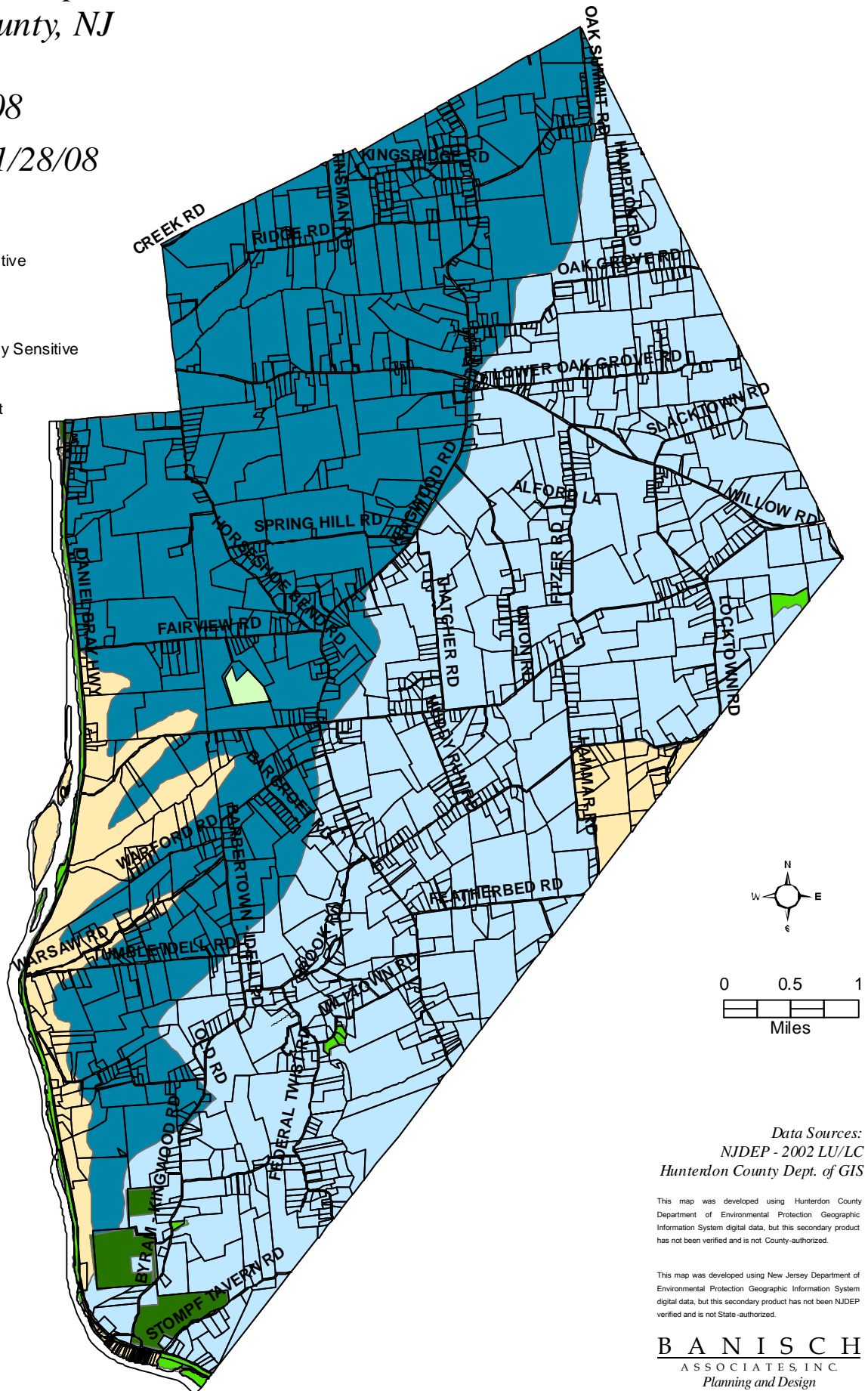
Figure 2

September 2008

Revised As Of 1/28/08

Legend

-  Environmentally Sensitive
-  Local Park
-  Rural
-  Rural - Environmentally Sensitive
-  State Park
-  State Park - Easement



Data Sources:

NJDEP - 2002 LU/LC
Hunterdon County Dept. of GIS

This map was developed using Hunterdon County Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified and is not County-authorized.

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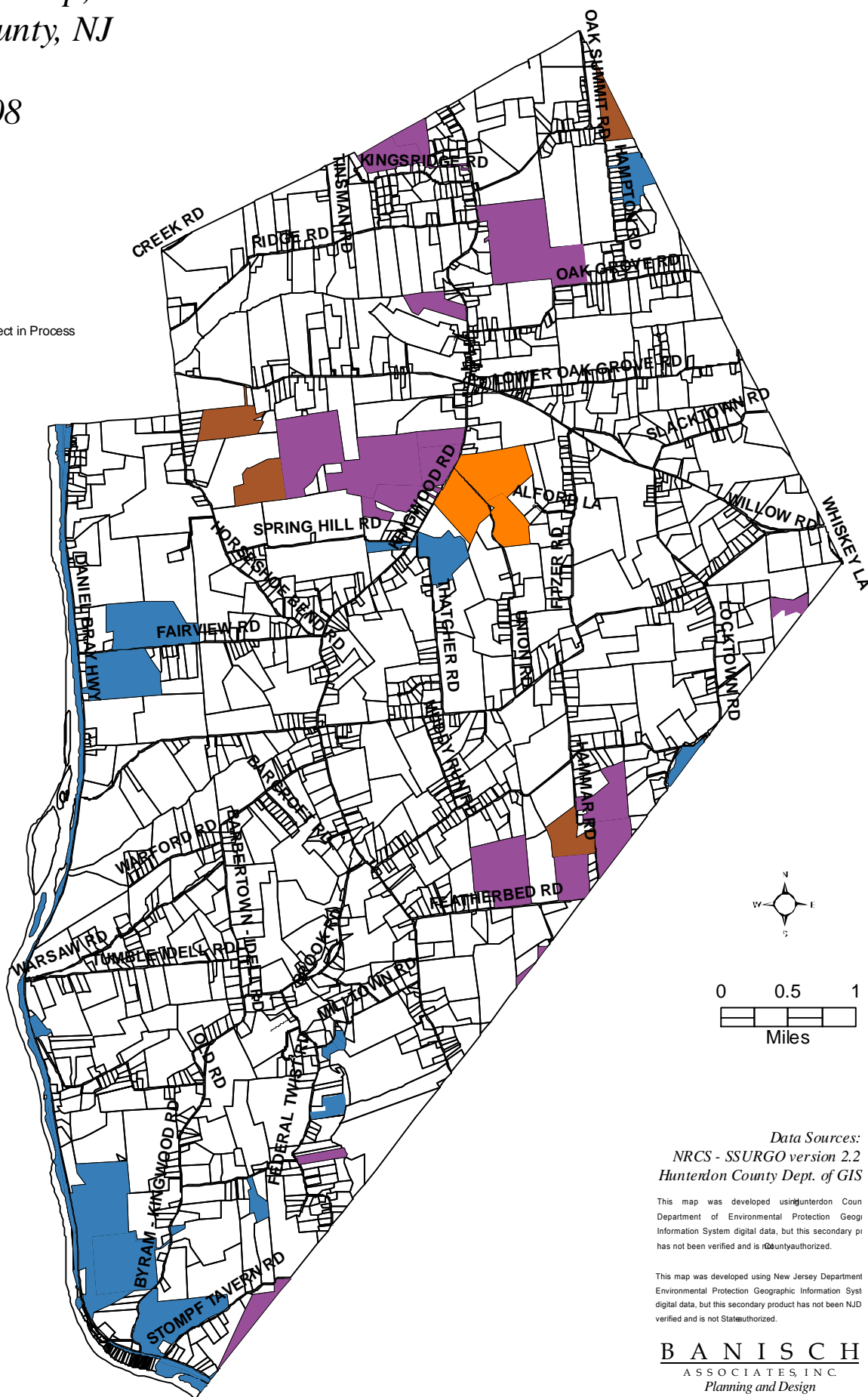
Preserved Farmland Kingwood Township, Hunterdon County, NJ

Figure 3

September 2008

Legend

- Green Acres Preserved
- Township Preserved
- Preserved Farm
- Farmland Preservation Project in Process



Data Sources:
NRCS - SSURGO version 2.2
Hunterdon County Dept. of GIS

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Figure 4

Legend

- Map of the Township of Hightstown, New Jersey, showing the 2002 Land Use Designation**

Data Source:
NJDEP - 2002 LU/
Huntenon County Dept. of C

This map was developed using Huntenon County Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified and is not County-authorized.

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified and is not State-authorized.

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A number line from 0 to 1 mile, divided into four equal segments. The first segment is labeled '0.25' and the second segment is labeled '0.5'.

Data Sources:
NJDEP - 2002 LU/LC
Hunterdon County Dept. of GIS

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Farmland Capable Soils

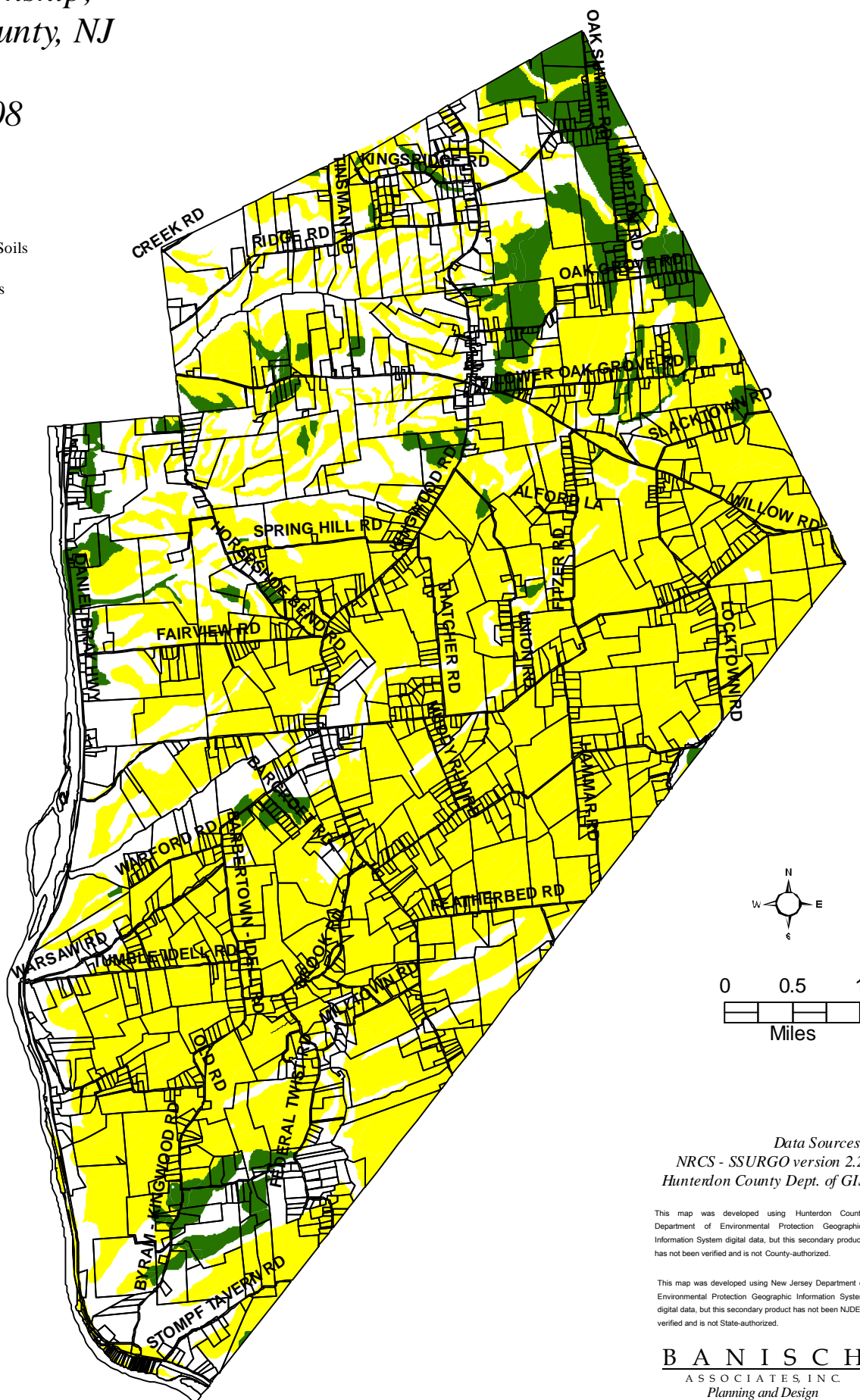
Kingwood Township,
Hunterdon County, NJ

Figure 5

September 2008

Legend

- Statewide Important Soils
- Prime Farmland Soils



Data Sources:
NRCS - SSURGO version 2.2
Hunterdon County Dept. of GIS

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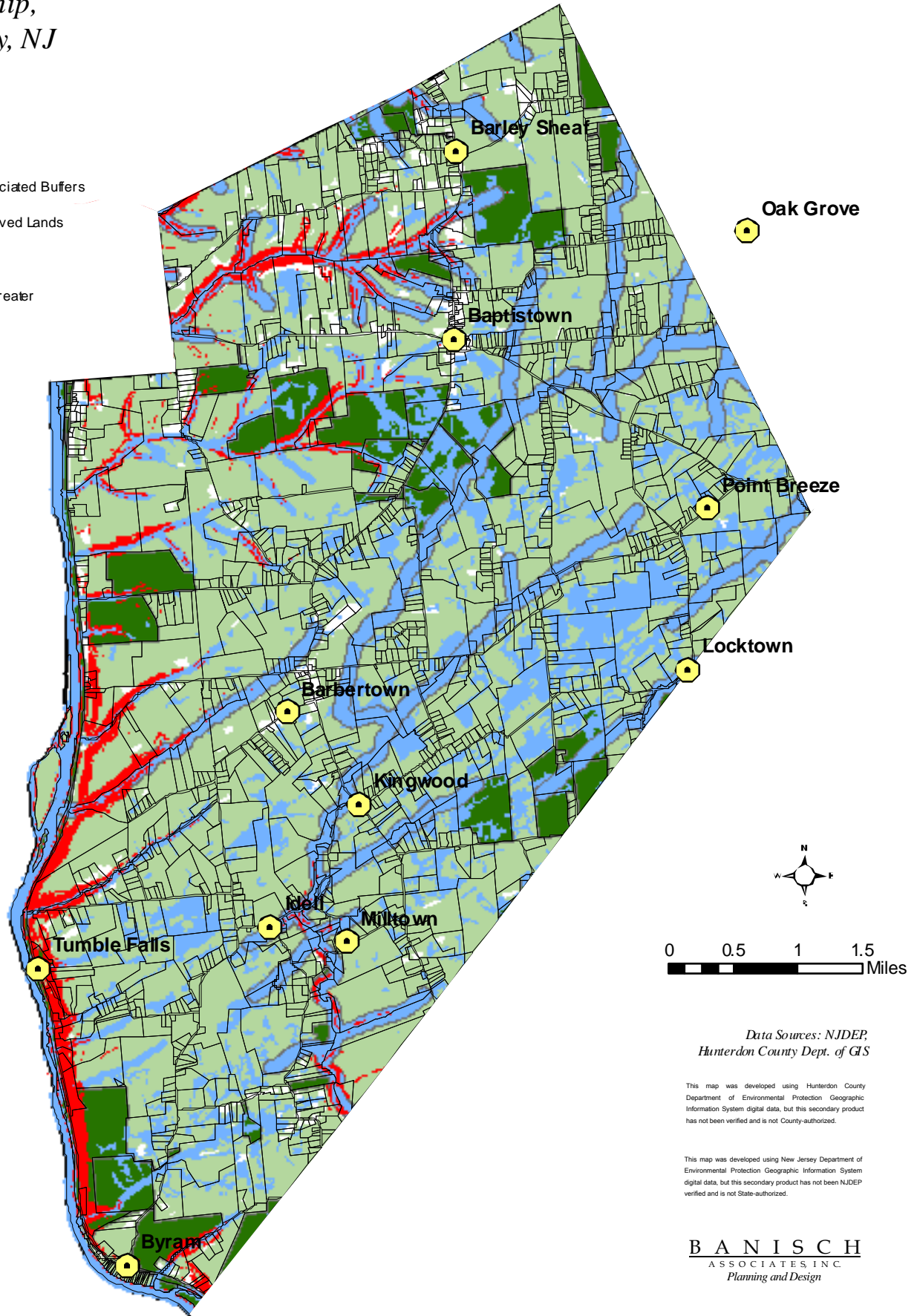
Greenways Kingwood Township, Hunterdon County, NJ

Figure 6

September 2008

Legend

-  Surface Water and Associated Buffers
-  Open Space and Preserved Lands
-  Greenway Areas*
-  Steep Slopes 25% or Greater
-  Village



Data Sources: NJDEP
Hunterdon County Dept. of GIS

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*Greenway Criteria identified on this map include:

- Preserved Lands
- Agricultural Soils
- Wetlands, water, floodplains, riparian areas and associated buffers
- Steep Slopes greater than 25%
- Threatened or Endangered Species Habitat (NJ Landscapes Rank 3 or greater)
- Grasslands Habitat

Greenway Criteria not identified on this map include:

- Existing Conservation Easements
- Drainage Easements
- Ridgeline and Hillside Protection Areas
- Unique Cultural Resource Areas

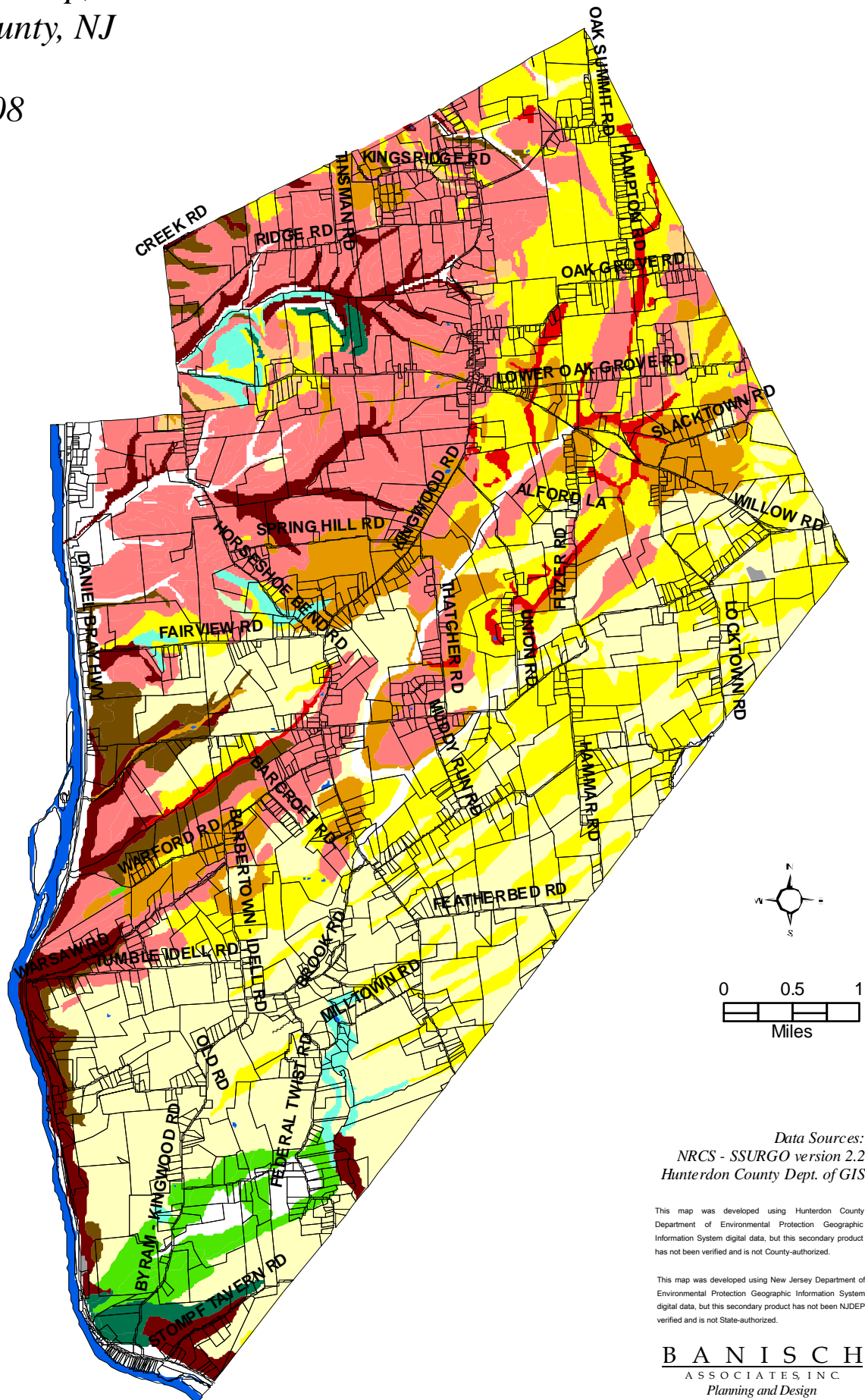
Depth to Bedrock Kingwood Township, Hunterdon County, NJ

Figure 7

September 2008

Legend

- 0 Inches
- 10 to 20 Inches
- 18 to 33 Inches
- 20 to 33 Inches
- 20 to 40 Inches
- 40 to 53 Inches
- 40 to 60 Inches
- 42 to 72 Inches
- 44 to 56 Inches
- 48 to 60 Inches
- 48 to 99 Inches
- 54 to 66 Inches
- No Restrictive Layer
- Pits, sand and gravel
- Water



Data Sources:
NRCS - SSURGO version 2.2
Hunterdon County Dept. of GIS

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

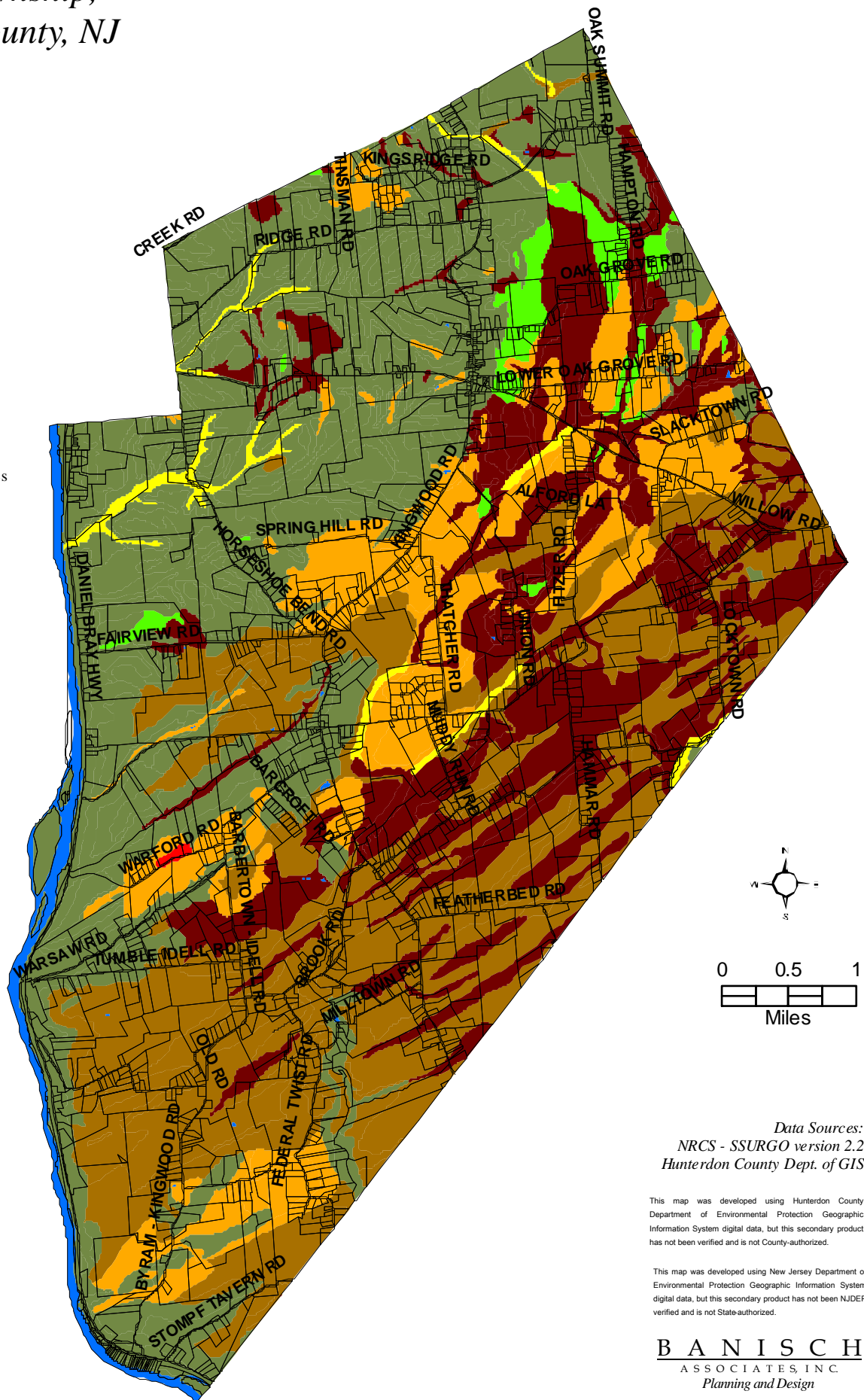
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Depth to Seasonal High Water Table

Kingwood Township,
Hunterdon County, NJ

June 2007

Legend



Data Sources:
NRCS - SSURGO version 2.2
Hunterdon County Dept. of GIS

This map was developed using Hunterdon County Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified and is not County-authorized.

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Septic Suitability

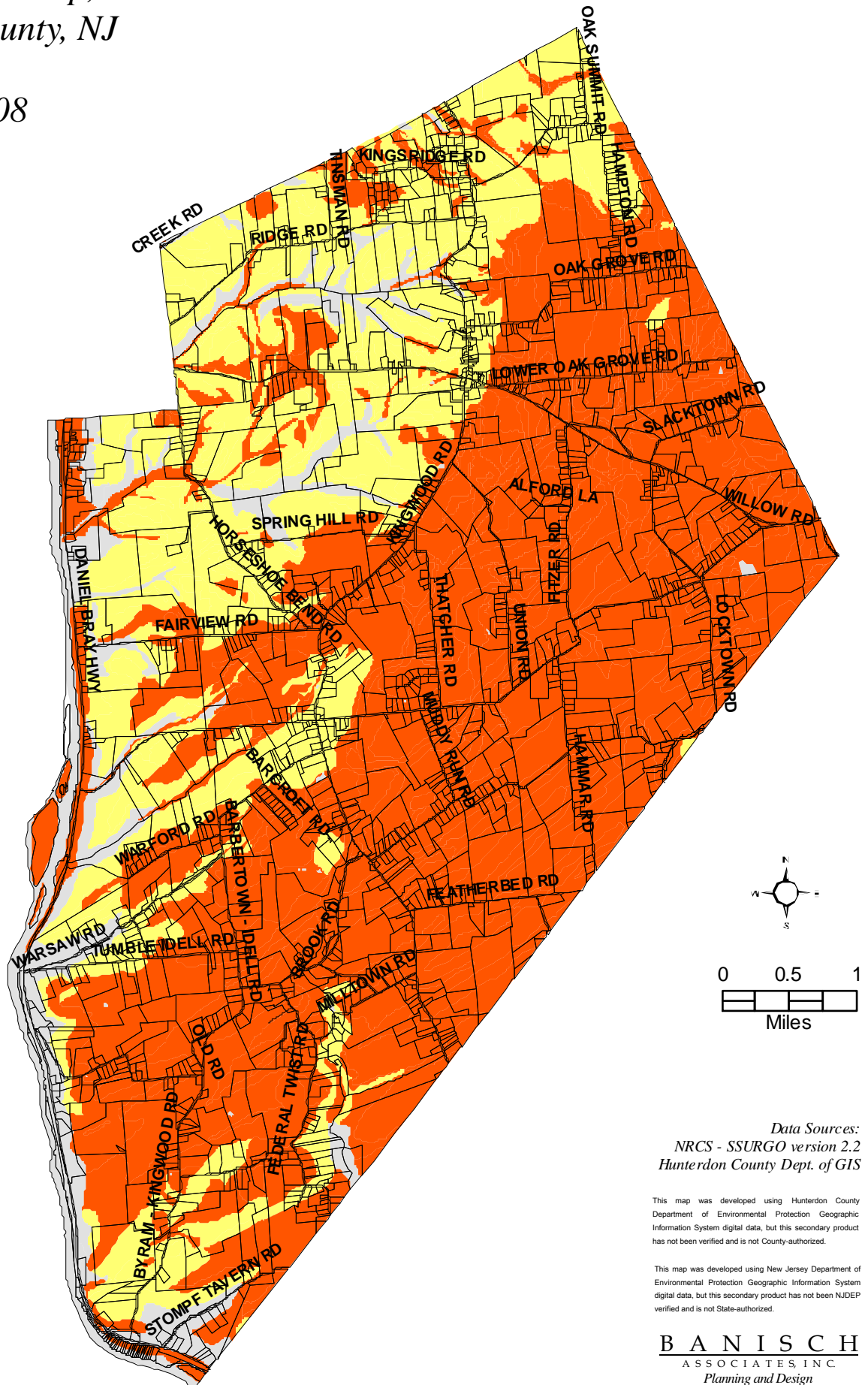
Kingwood Township, Hunterdon County, NJ

Figure 9

September 2008

Legend

- Not Rated
- Somewhat Limited
- Very Limited



Data Sources:
NRCS - SSURGO version 2.2
Hunterdon County Dept. of GIS

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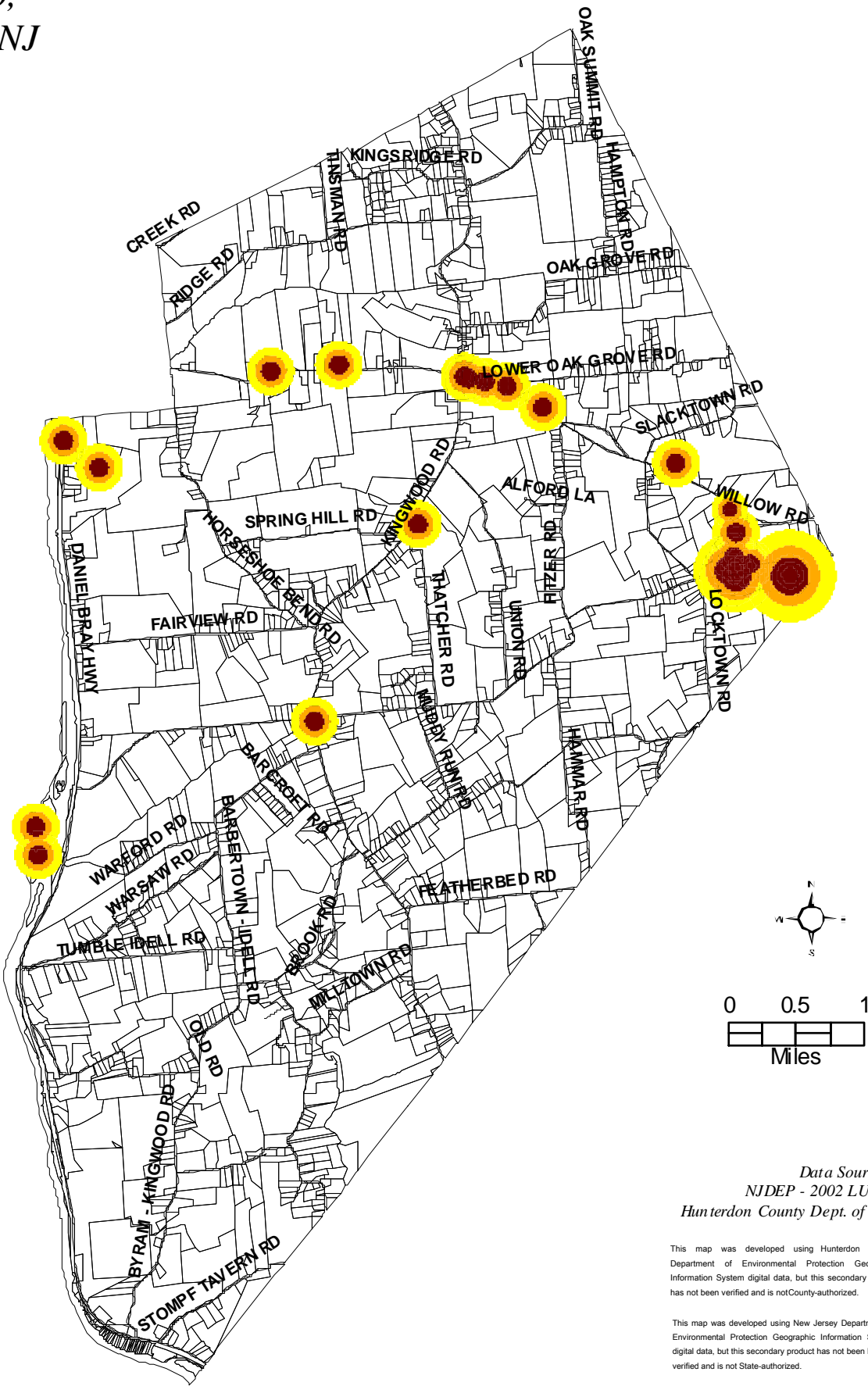
Non-Public Wells
Kingwood Township,
Hunterdon County, NJ

Figure 10

September 2008

Legend

- Tier 1 (2 years)
- Tier 2 (5 Years)
- Tier 3 (12 Years)



Data Sources:
NJDEP - 2002 LU/LC
Hunterdon County Dept. of GIS

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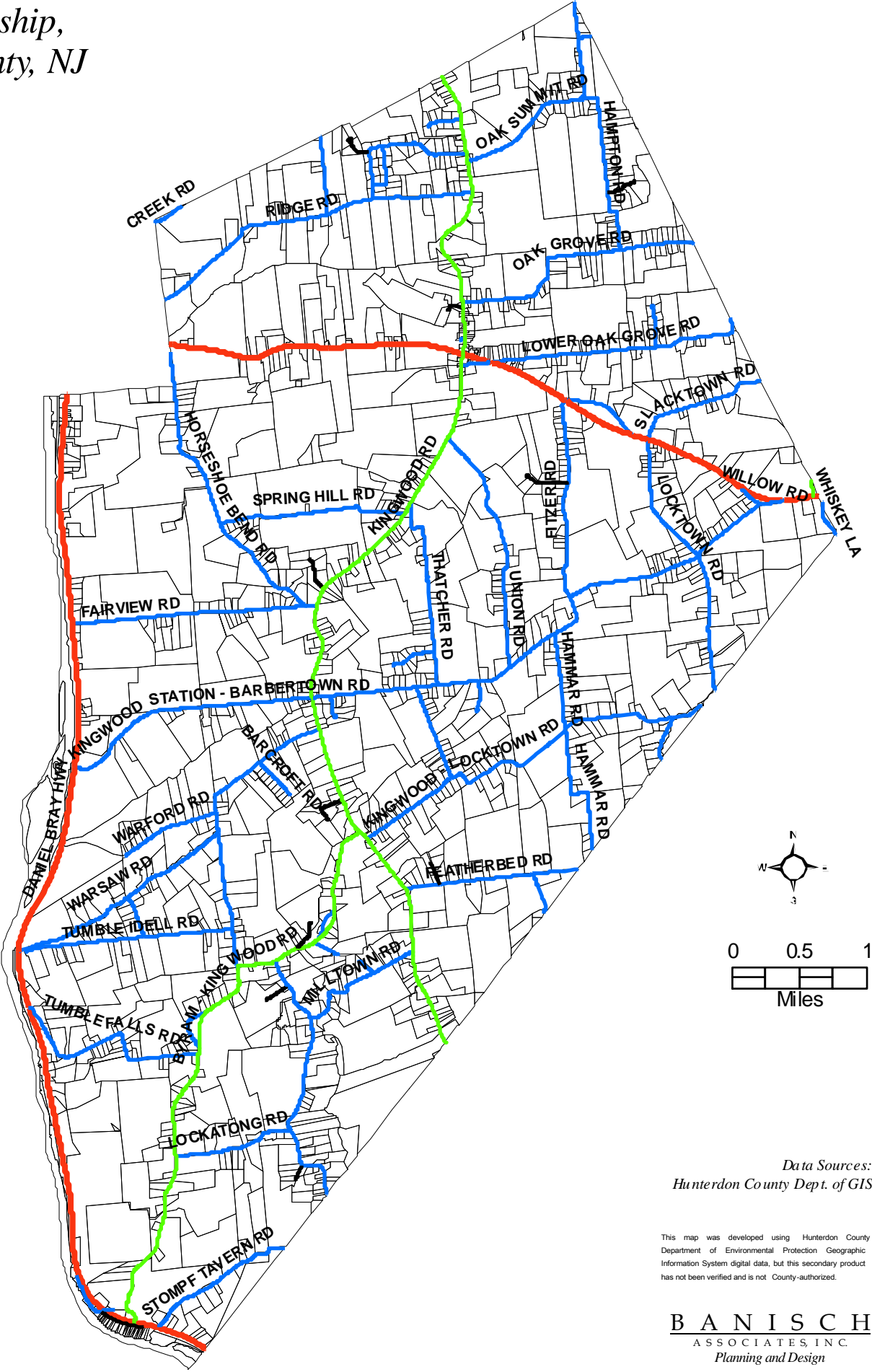
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been NJDEP verified and is not State-authorized.

Township Road Network
*Kingwood Township,
Hunterdon County, NJ*

Figure 11

September 2008

- Legend**
- PRIVATE
 - LOCAL
 - COUNTY
 - STATE ROUTE



*Data Sources:
Hunterdon County Dept. of GIS*






This map was developed using Hunterdon County Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified and is not County-authorized.

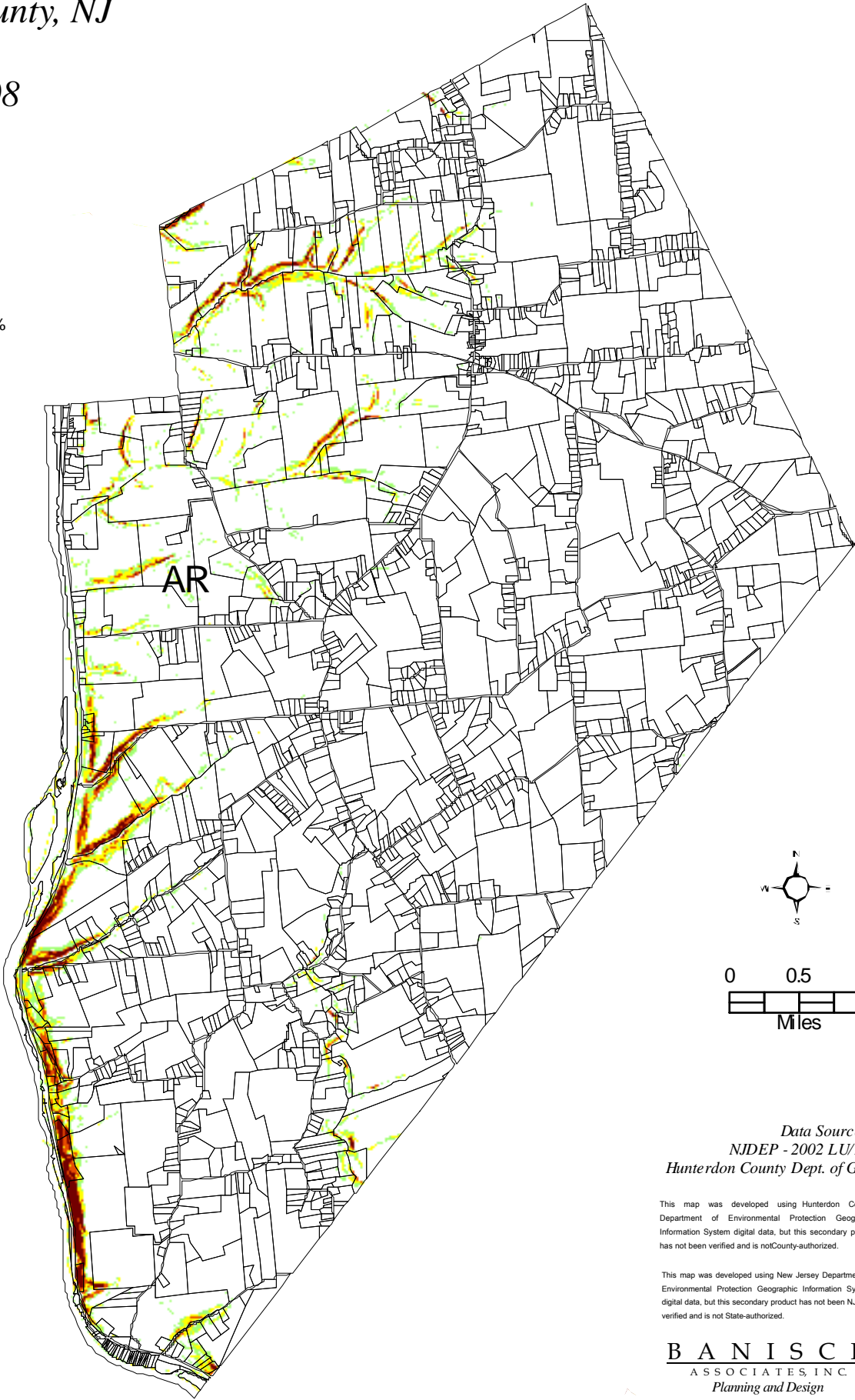
Steep Slopes
*Kingwood Township,
Hunterdon County, NJ*

Figure 12

September 2008

Legend

-  Slopes 0-12%
-  Slopes 12%-15%
-  Slopes 15%-20%
-  Slopes 20%-25%
-  Slopes greater than 25%



Data Sources:
NJDEP - 2002 LU/LC
Hunterdon County Dept. of GIS

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Hydrology and Surface Water Quality

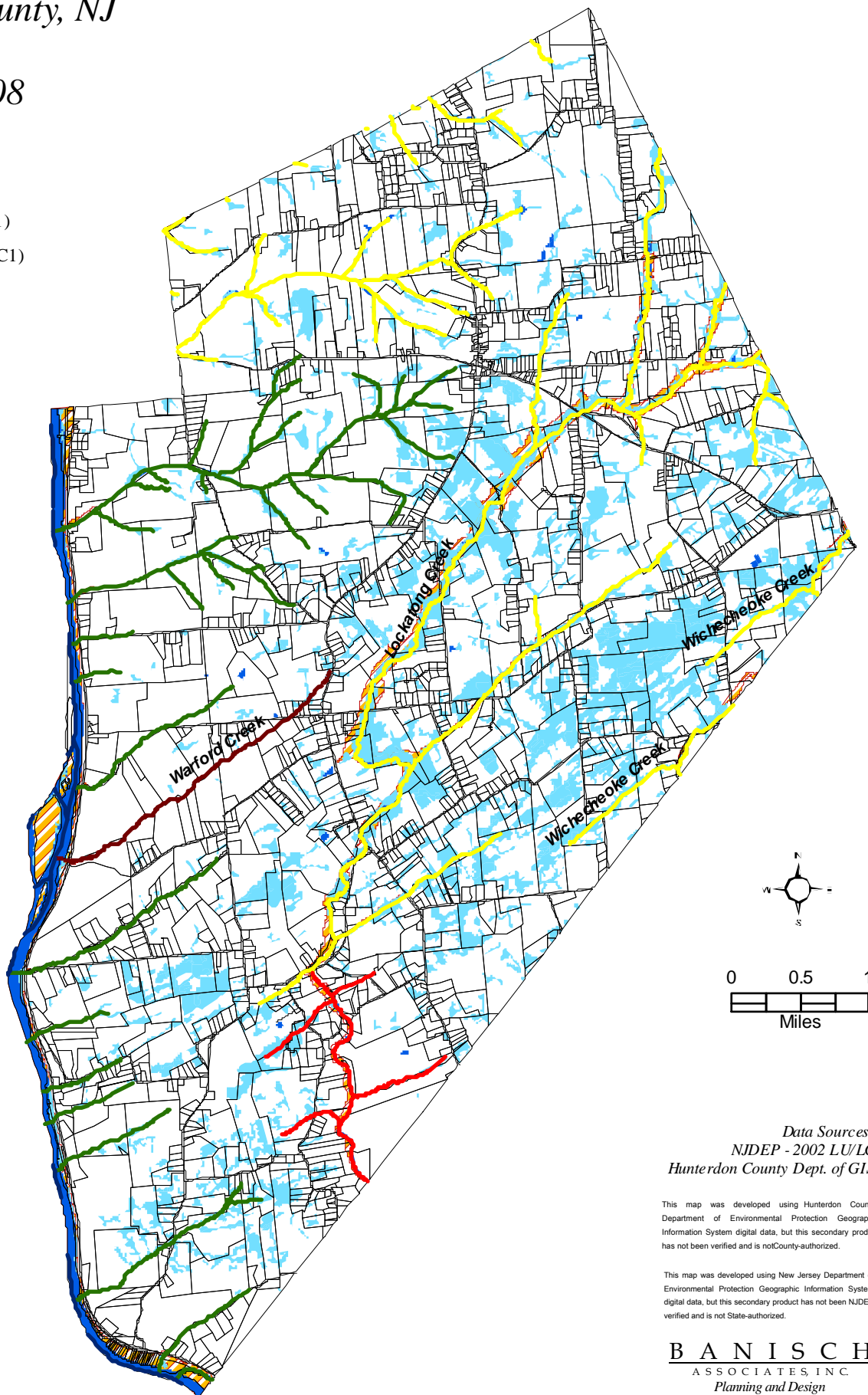
Kingwood Township,
Hunterdon County, NJ

Figure 13

September 2008

Legend

-  Trout Production (C1)
-  Trout Maintenance (C1)
-  Non-Trout (C1)
-  Non-Trout
-  Delaware River
-  Water
-  Wetlands
-  100 yr Floodplain



Data Sources:
NJDEP - 2002 LU/LC
Hunterdon County Dept. of GIS

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Critical Habitat - Forested Wetlands and Emergent

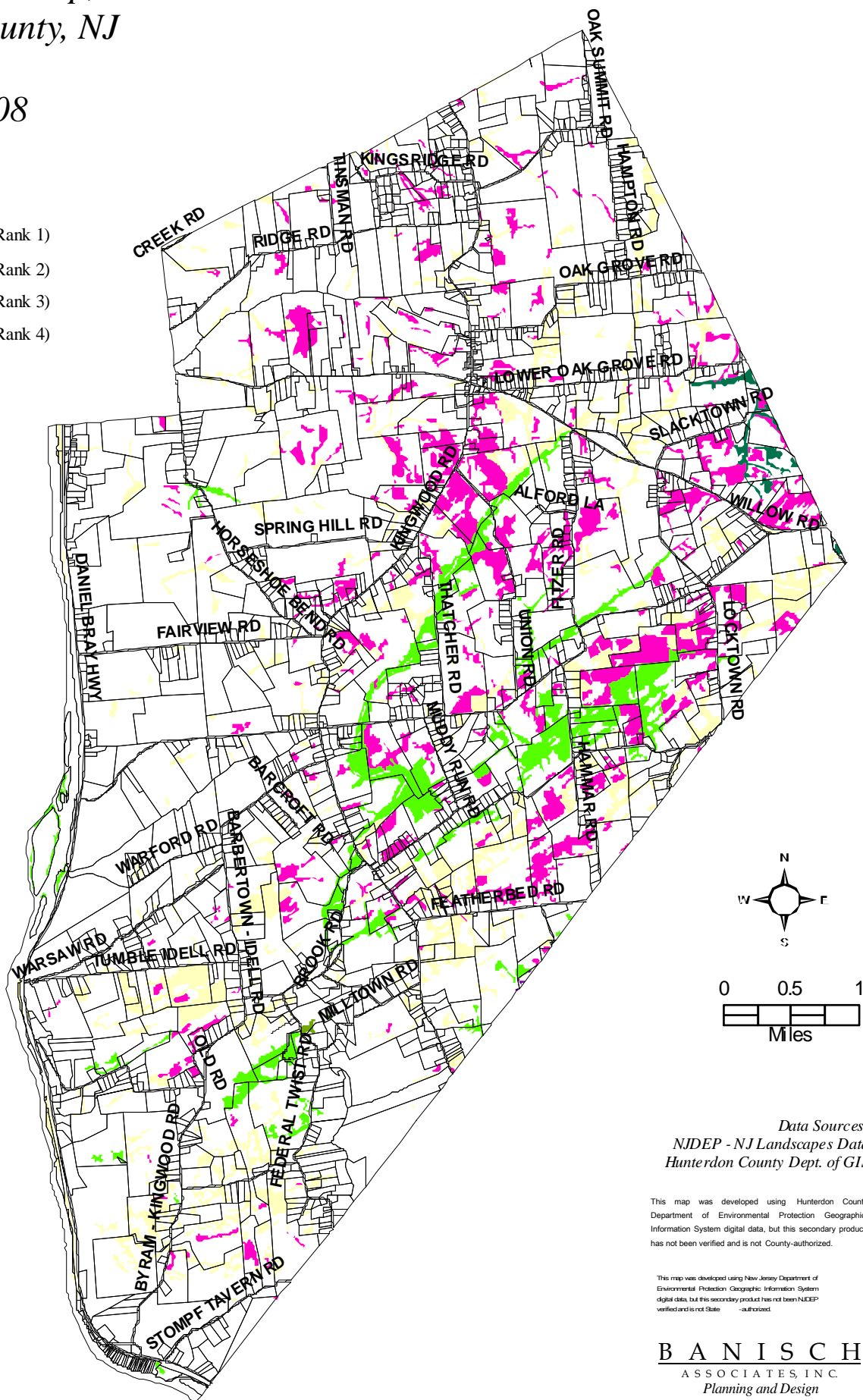
Figure 14

Kingwood Township,
Hunterdon County, NJ

September 2008

Legend

- Forested Wetlands (Rank 1)
- Forested Wetlands (Rank 2)
- Forested Wetlands (Rank 3)
- Forested Wetlands (Rank 4)
- Emergent (Rank 1)
- Emergent (Rank 2)



Data Sources:
NJDEP - NJ Landscapes Data
Hunterdon County Dept. of GIS

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Hydric Soils

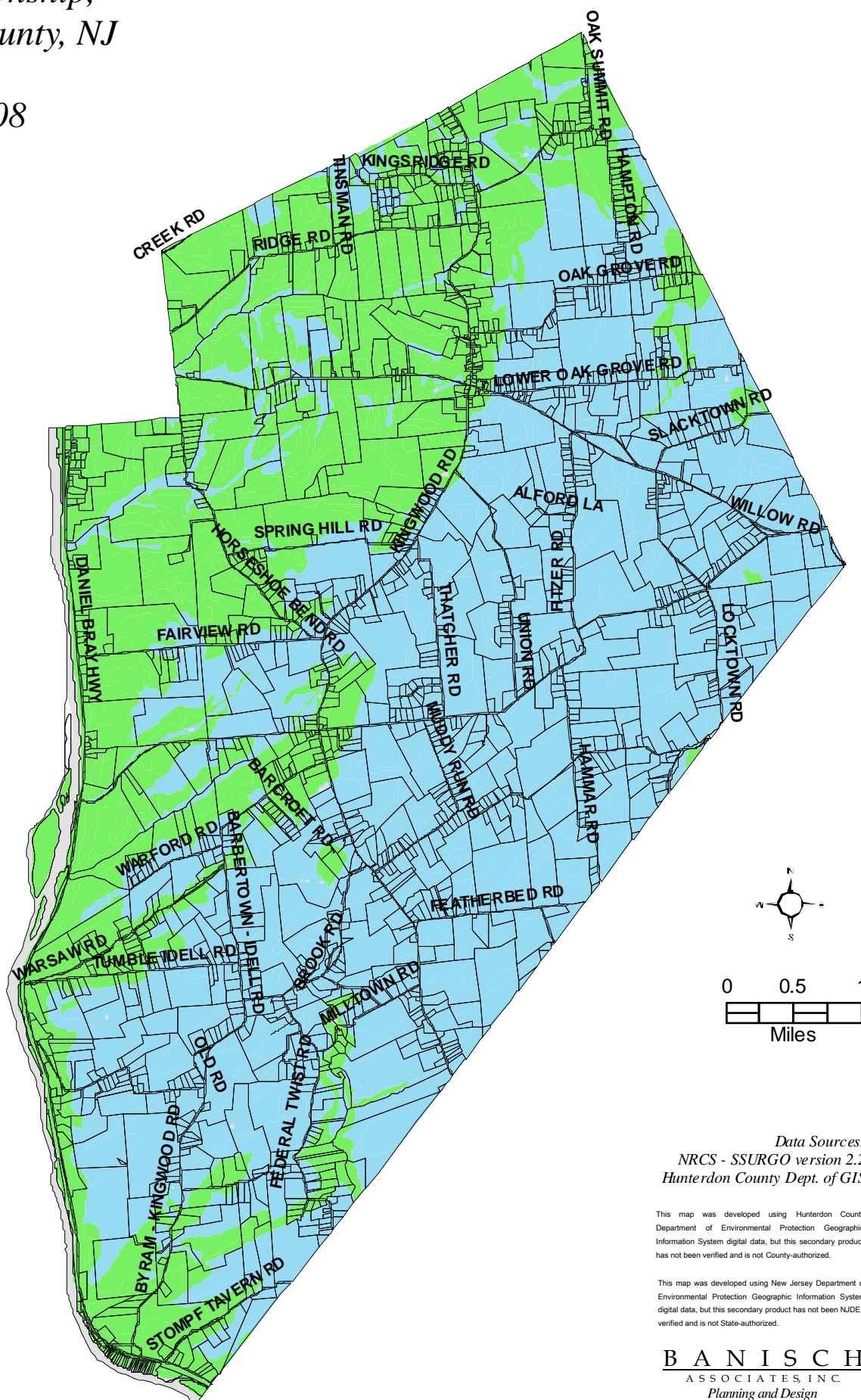
Kingwood Township, Hunterdon County, NJ

Figure 15

September 2008

Legend

- Not hydric
- Partially hydric
- Unknown



Data Sources:
NRCS - SSURGO version 2.2
Hunterdon County Dept. of GIS

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

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Critical Habitat - Forest and Grassland

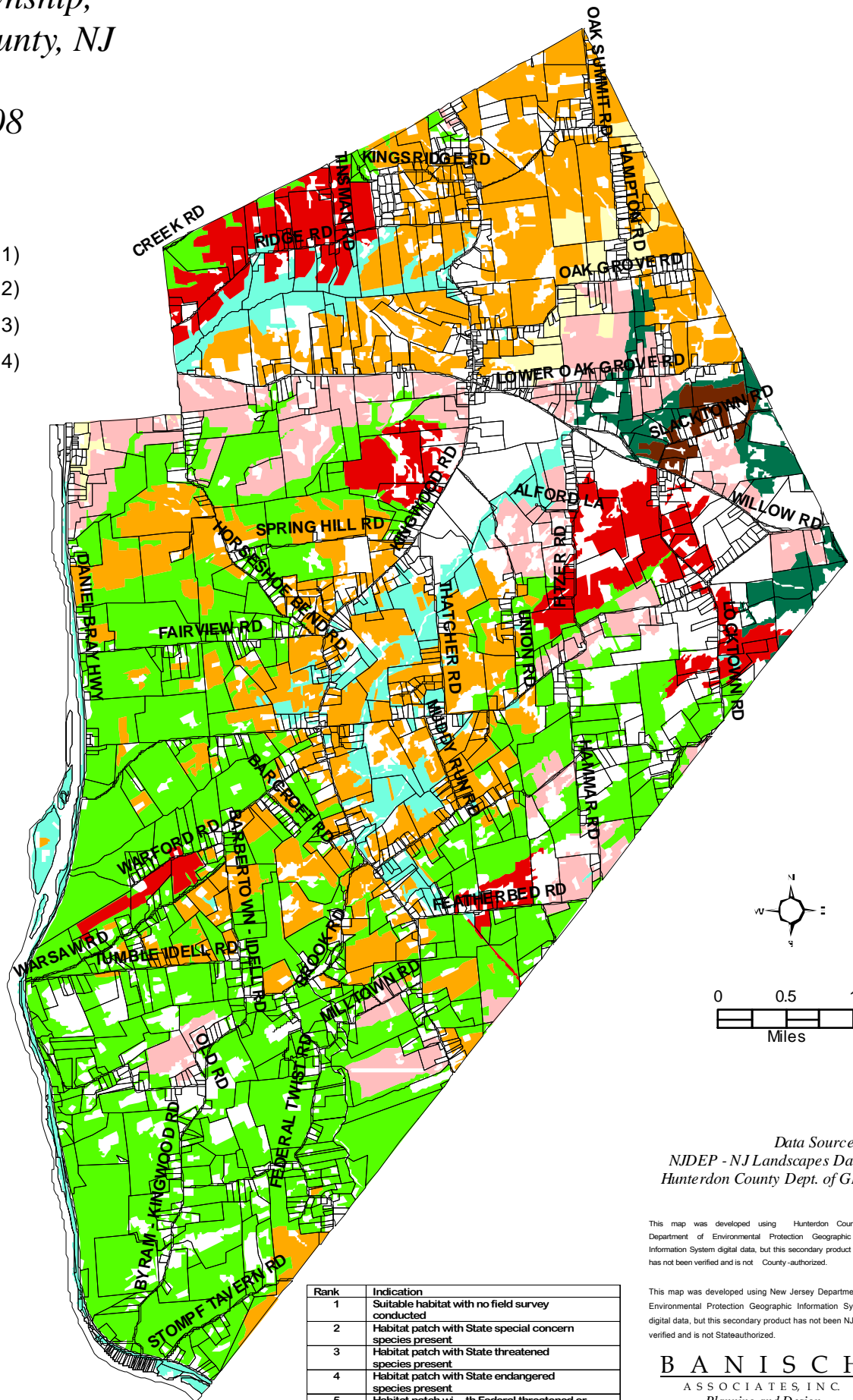
Kingwood Township,
Hunterdon County, NJ

Figure 16

September 2008

Legend

- Grassland (Rank 1)
- Grassland (Rank 2)
- Grassland (Rank 3)
- Grassland (Rank 4)
- Forest (Rank 1)
- Forest (Rank 2)
- Forest (Rank 3)
- Forest (Rank 4)



Data Sources:
NJDEP - NJ Landscapes Data
Hunterdon County Dept. of GIS

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Rank	Indication
1	Suitable habitat with no field survey conducted
2	Habitat patch with State special concern species present
3	Habitat patch with State threatened species present
4	Habitat patch with State endangered species present
5	Habitat patch with Federal threatened or endangered species present

Forested Areas 2002 Land Use/Land Cover

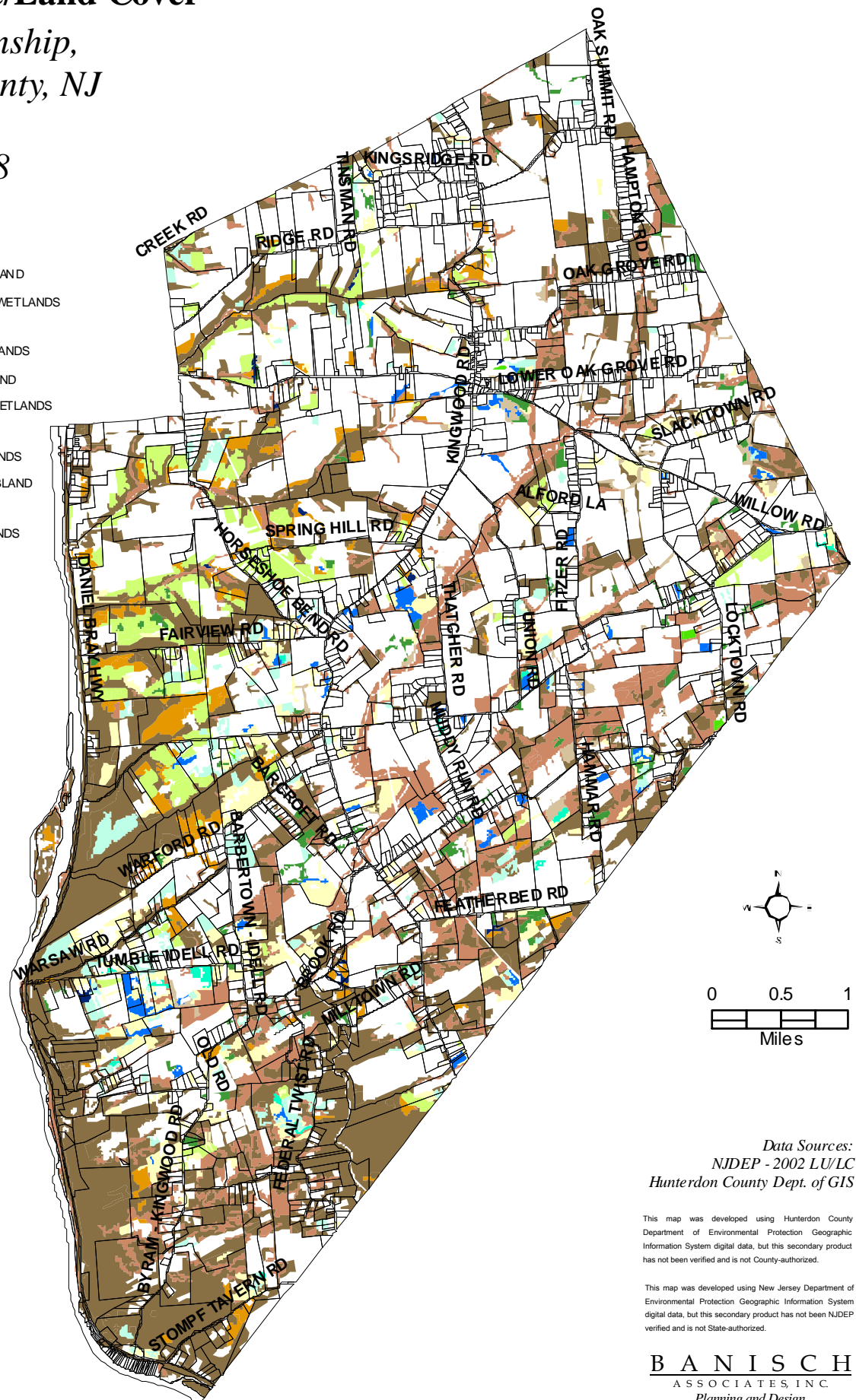
Figure 17

*Kingwood Township,
Hunterdon County, NJ*

September 2008

Legend

- CONIFEROUS BRUSH/SHRUBLAND
- CONIFEROUS SCRUB/SHRUB WETLANDS
- CONIFEROUS FOREST
- CONIFEROUS WOODED WETLANDS
- DECIDUOUS BRUSH/SHRUBLAND
- DECIDUOUS SCRUB/SHRUB WETLANDS
- DECIDUOUS FOREST
- DECIDUOUS WOODED WETLANDS
- MIXED FOREST BRUSH/SHRUBLAND
- MIXED FOREST
- MIXED SCRUB/SHRUB WETLANDS
- MIXED WOODED WETLANDS



*Data Sources:
NJDEP - 2002 LU/LC
Hunterdon County Dept. of GIS*

This map was developed using Hunterdon County Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified and is not County-authorized.

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

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