

Borough of Ramsey | Bergen County, NJ

2011 Environmental Resource Inventory



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INTRODUCTION

An Environmental Resource Inventory (ERI), or Natural Resource Inventory (NRI), identifies and characterizes the environmental resources within a community. An ERI can include the location, character, and quality of resources such as wetlands, streams, aquifers, floodplains, soils, forests, open space, and habitat. In addition, ERIs may also detail information on the built environment, such as landmarks and cultural resources. Collectively, these resources establish the foundation for the health and welfare of the environment, the community, and the economy. Through documentation and dissemination an ERI can inform planning and policy decisions that encourage and allow for the protection, conservation, and restoration of these fundamental resources. This ERI includes an overview of relevant current policy and legal frameworks that protect and impact natural resources in New Jersey.

The Borough of Ramsey, located in the northwestern corner of Bergen County has been heavily influenced by the existence of the natural resources in the region. A suburban community nestled at the base of the Ramapo Mountains, Ramsey's landscape and climate have been largely dictated by its underlying geology and location. Vegetation, water resources, and wildlife communities help define the community character and provide recreational opportunities for its approximate 14,000 residents. The relationship between Ramsey and its natural resources has historic roots. Prior to its incorporation Ramsey relied on the nearby excavation of mineral deposits from the mines to support its growth as a small hamlet, while soils within the region allowed for farming of fruits and vegetables. The rivers and aquifers continue to provide water for Borough residents, as well as support wetland and forest habitat for threatened and endangered species. The location and quality of all of these resources have fostered Ramsey into a convenient and beautiful place to live, work, and play. Documentation, awareness, and protection of these resources are vital to ensuring that Ramsey continues to sustain and improve its quality of life for current and future residents.

As a comprehensive listing of diverse attributes, an ERI incorporates data from a variety of sources. An ERI should be a dynamic and evolving document that incorporates new information as it become available. This ERI builds upon the Natural Resource Inventory prepared for the Borough of Ramsey in 1992 by Hakim Associates. The 1992 NRI includes extensive detail about the location and quality of natural resources within the community at that time. The current ERI uses Geographic Information Systems (GIS) data and maps to provide an updated and current assessment. Much of the data in the tables and maps has been compiled by the New Jersey Department of Environmental Protection (NJDEP). Additional federal, regional, local, and private sources were used to create this document. All of the sources referenced in the text can be found at the end of the document.



An ERI functions as a tool for local officials and community members. Its value depends on its incorporation into the municipal planning process and utilization during the review of development applications and project design. It can inform the creation and extension of protections for significant resources such as threatened and endangered species habitat, wellhead protections, and groundwater recharge. While an important and useful tool, an ERI does have limitations. Much of the data in this document was created for information purposes only and should not be used to delineate wetlands, buffers, or groundwater recharge at the site-level. An ERI does not replace or supersede documentation of a resource provided by NJDEP at the time of a permit application. This ERI is designed and intended to increase general awareness and appreciation for the resources contained within the boundaries of Ramsey and the surrounding region.

SECTION 1: POLICY REVIEW

An ERI allows for the identification and depiction of resources within a community. However, the mere documentation of these resources does not ensure awareness, understanding, or protection. Section 1 of this document details the planning and regulatory landscape that impacts the development and protection of these resources. The Municipal Land Use Law, Ramsey Master Plan, Bergen County Master Plan, and New Jersey State Master Plan provide the framework for planning and policy decisions that affect the environment. Section 1 also includes an overview of state rules including the Freshwater Wetland Protection rules, the Flood Hazard Area rules, and the Stormwater Management rules, as well as their implications for natural and cultural resources.

Municipal Land Use Law

The New Jersey Municipal Land Use Law (MLUL, N.J.S.A. 40:55D-1 et seq.) enacted in 1975, grants land use regulatory authority (e.g., planning and zoning) to municipalities. The purpose of the act, as amended in 1987, establishes 15 objectives for municipal land use law. Foremost, the act seeks to ‘encourage municipal action to guide the appropriate use or development of all lands in this State, in a manner which will promote the public health, safety, morals, and general welfare’. Additionally, the act strives to ensure safety from natural and man-made hazards; allow for

adequate, light, air, and open space; promote renewable energy; and encourage conservation of key resources to limit degradation of the environment due to improper land use.

The MLUL does not specify the regulation or protection for environmental resources. Its intent is to enable municipalities to make sound judgments and decisions. Master planning can facilitate thoughtful design and development of a community’s resources. The MLUL delineates and governs the municipal master planning process for New Jersey. According to the MLUL the Master Plan must be updated every six years and must at least include the Land Use element. The Land Use element is the basis for zoning and broad development decisions.

Within the Land Use element the statute specifies that this section must account for natural conditions ‘including, but not necessarily limited to, topography, soil conditions, water supply, drainage, flood plain areas, marshes, and woodlands’. The text does not imply appropriate uses for these areas, only that their existence must be documented. An ERI can help satisfy this documentation need if current at the time of the Master Plan update, but it is not a requirement for the process. As a voluntary undertaking, an ERI indicates an awareness and appreciation for the value of documenting natural and cultural resources.

Ramsey Master Plan

In 1994 the Borough of Ramsey revised the municipal Master Plan. Subsequently, the Borough conducted re-examinations, as required every six years, in 2000 and 2006. The 2006 update acts as both a re-examination and a new master plan. Previous Master Plans had been adopted in 1961, 1978, 1988, and 1994. The 1994 Master Plan had been recently amended in 2004. The 2006 Master Plan expands upon the 1994 version, as amended, to identify current concerns and adapt to recent regulations. The 2006 document includes a Land Use Element, Community Facilities Element, Traffic Circulation and Transportation Element, and an Addendum containing the Housing Element per COAH requirements.

Similar to previous Master Plans for the Borough of Ramsey, the current Master Plan strives to maintain the quality of life for residents and employees of the community. A primary concern for this Master Plan is to maintain Ramsey's character as a low-density and attractive town. To protect this identity, objectives in the Master Plan discourage intensive commercial or high-density residential uses within the community, as well as oppose future developments in adjacent communities that may have implications for traffic and congestion within Ramsey. One objective specifies that future development plans, variances, and permit applications be reviewed with strict adherence to environmental regulations and municipal plans.

The Land Use Element of the Master Plan dictates future development patterns within the municipality. According to the 2006 Land Use Element, development since the 1994 Master Plan followed patterns set forth by the Master Plan. An exception to this trend occurred in response to COAH affordable housing requirements.

The Land Use Element also describes the available vacant land within Ramsey. The Borough of Ramsey is largely developed with isolated tracks of vacant and preserved land. The Land Use Element characterizes nearly 71%, approximately 22 of the 31 available acres, restricted due to existence of wetlands and other environmental sensitivities. The Land Use Element recognizes the utility provided by the 1992 NRI prepared for the Borough, to identify and protect these areas. However, the Master Plan also recognizes the limitations of these documents given the technology and data available in 1992.

The Master Plan includes GIS based maps illustrating the location of land use/land cover, critical habitat, steep slopes, and floodplains. Many of these elements are contained within this ERI. Some of the data including on these maps have been updated since the publishing of the 2006 Master Plan.

Bergen County Master Plan

The New Jersey County and Regional Planning Act, N.J.S.A. 40:27-2 et seq. requires the county planning board to develop and adopt a county master plan. The statute dictates the plan should illustrate and explain the planning board's recommendations for development within the county. Although not explicitly called for by the statute, master planning at the county level can also create an opportunity for an integrated regional vision. Many issues concerning the environment cross jurisdictions, including wildlife population concerns, water resource issues, air quality, and energy concerns. County master plans can foster cooperation between municipalities to address large-scale problems and/or implement projects that are not contained by political boundaries.

The Bergen County Planning Department is currently undergoing a Master Plan update. This will be the first update to the county plan in over 30 years. According to the Bergen County Planning Department the Master Plan is scheduled for completion by the end of 2011. Bergen County works within its partnerships and supports efforts within the region to align master planning goals and objectives among both vertical and horizontal tiers of government. This is reflected in the County's compliance with the cross acceptance of the State Plan and the intergovernmental coordination between the Bergen County and its municipalities, as well as regional organizations such as the Meadowlands Commission and the Highlands Council.

Bergen County contains 70 municipalities and approximately 900,000 residents. Compared to other New Jersey counties, Bergen has the greatest number of municipalities and the highest population. In order to produce a county plan that accurately includes and represents this diverse population, Bergen County held several visioning meetings. In May 2010 the Planning Department published a visioning plan that summarized the content of these meetings and outlined issues to address in the Master Plan. The comments, as they pertain to Ramsey and its natural, as well as, cultural resources, are summarized below.

The main body of the vision plan addresses natural resources including open space, water resources, and climate change. The vision plan emphasizes that climate change may have fiscal ramifications as well as environmental impacts. This section cites the New Jersey legislation calling for a 20% reduction in emissions. Transportation and energy are largely emphasized within the vision plan, and may be central to the county master plan update.

The public commentary section of the document includes a broad scope of ideas, issues, and concerns for natural resources throughout the county. Based on the vision plan it is unclear how these ideas will be incorporated into the Master Plan. Some key comments relevant to natural and cultural resource protection include designing future redevelopment in Ramsey to be transit orientated, addressing water quality to limit financial risk for municipal water companies, and utilizing green infrastructure to reduce stormwater runoff.

State Master Plan

The New Jersey State Development and Re-development Plan, commonly known as the State Plan, resulted from the State Planning Act of 1985. The State Legislature determined state level planning was needed to ensure the protection of natural resources, revitalization of urban areas, and effective management of development to satisfy a high quality of life for all residents. The State Plan guides municipal, county and regional planning, as well as state agency planning and infrastructure investment decisions. The planning process relied on participation from all levels of government, businesses, and residents to create a plan that addresses the concerns and meets the needs of its stakeholders.

As a comprehensive document, the State Plan provides a vehicle to increase efficiency and effective planning between horizontal and vertical levels of governments. Its strength of implementation rests on the support and endorsement of other government agencies. All local and county governments are encouraged to review their plans with the goal of bringing them into consistency with the provisions of the State Plan. Plans may be voluntarily brought to the State Planning Commission for review and endorsement. Plan Endorsement occurs when the document aligns with the goals, objectives, and policies set forth by the State Plan.

The State Plan promotes 8 goals:

- Revitalize the state's cities and towns
- Conserve the state's natural resources and systems
- Promote beneficial economic growth, development and renewal for all residents of New Jersey
- Protect the environment, prevent and clean up pollution
- Provide adequate public facilities and services at a reasonable cost
- Provide adequate housing at a reasonable cost
- Preserve and enhance areas with historic, cultural, scenic, open space and recreational value
- Ensure sound and integrated planning and implementation statewide

One key element to the State Plan is the identification of land areas and designation of future land uses. The State Plan established five distinct Planning Area designations to help guide future growth. Each Planning Area has specific intentions and Policy Objectives that guide the application of Statewide Policies. Metropolitan Planning areas (Planning Area 1), Suburban Planning Areas (Planning Area 2) and Designated Centers in any planning area are considered ideal locations to absorb future growth and redevelopment within the state.

Within the Planning Area 1, policy objectives focus on establishing mixed-use transit friendly communities of varying size and character with diverse economic and housing

markets that create stable growth. The state policy objectives for natural resource conservation within this area seek to remedy previous damage, mitigate future impacts, and embrace the contribution of these areas to the character of the community. Additionally, the plan recognizes the potential for air quality to suffer in these dense regions. Furthermore, the objectives call for preservation and adaptation of historic and cultural resources that allow for redevelopment without compromising the value of the resource. This approach summarizes the broad intent of the current policy objectives for all the resources within this planning area.

The State Plan developed out of a concern for the future of the state's resources under future unplanned and expansive growth. Consideration of the natural, cultural, and historical resources in the planning process creates an opportunity to protect these valuable components to the quality of life experienced in New Jersey. Creating transit-oriented communities can alleviate traffic and air and noise pollution. Redevelopment offers an opportunity to clean up contaminated areas that continue to contribute to environmental degradation, and redesign communities with green infrastructure, and other practices, that have evolved in the past few decades.

Through the recognition of designated planning areas the State Plan proposes a conscious regional planning process that recognizes the interconnectivity of resources across political boundaries. This process could allow for adoptions of practices that protect critical resources despite future development pressures.

The Highlands Region

The Borough of Ramsey abuts the eastern boundary of the Highlands Region, which encompasses Mahwah Township. The following information related to the Highland Rules and guidance from the Highlands Regional Master Plan is for informational purposes only and does not pertain directly to the Borough of Ramsey. However, several waterways within Ramsey drain into the Ramapo River. The Ramapo River traverses through the Highlands, the quality and quantity of its flow directly impacts sensitive and important ecosystems, as well as critical drinking water supplies, in the region. While Ramsey does not have a regulatory responsibility for the Highlands Region, the decisions and management of resources within the Borough may have implications for downstream communities.

In August 2004 New Jersey passed The Highlands Water Protection and Planning Act (Highlands Act, HWPPA N.J.S.A. 13:20-1 et seq.). The intent of the act is to preserve open space and protect the diverse and important natural resources, with emphasis on the vital drinking water resources in this region. The Highlands Act sets the boundaries of the 800,000-acre New Jersey Highlands Region, which includes 88 municipalities in the counties of Bergen, Hunterdon, Morris, Passaic, Somerset, Sussex, and Warren.

The Highlands Region provides a vital source of drinking water for over half of New Jersey's 8.5 million residents. The region supplies approximately 379 million gallons of water daily for approximately 5.4 million people, or 65

percent of New Jersey residents and businesses. In addition, over 70 percent of this region includes environmentally sensitive forests, wetlands, streams, and wildlife habitats, and hosts over 30 of the state's threatened and endangered wildlife species. The region also includes many sites of historic significance and provides abundant recreational opportunities.

Overdevelopment threatens the region's natural resources and critical drinking water supplies. The NJDEP reported that within a five year period (1995-2000), the Highlands lost 17,000 acres of forests and 8,000 acres of farmland to development. Regional growth pressures continue to consume land at a rate of approximately 3,000 acres every year. Regulations implementing the Highlands Act were adopted in June 2005 and re-adopted in December 2006 (N.J.A.C. 7:38-1 et seq.).

Highlands Regional Master Plan

The Highlands Act and Regulations created the Highlands Water Protection and Planning Council (the Highlands Council), and established two distinct development zones: the Highlands Preservation Area and the Highlands Planning Area. It also required the Highland Council to develop the Highland Regional Master Plan (RMP) for the entire region, which was adopted in July 2008.

The Highlands Preservation Area is defined by its high ecological sensitivity, while the Planning Area is a more intensely developed zone. Within the Preservation Area municipal and county plans must conform to the RMP's vision. Lands under this designation are

subject to strict limitations on the amount of impervious cover; as well as limitations of development on steep slopes, in forested areas, and flood zones. In addition, all waters located within the Preservation Areas are afforded Category One water quality protections, including a 300 foot riparian zone buffer. Within the Planning Area conformance is voluntary. Mahwah Township contains land within both the Preservation and Planning areas. In 2009 the township petitioned for Plan Conformance in both its Preservation and Planning Areas.

While Highlands Conformance does not apply to Ramsey, these planning initiatives offer models for natural resource consideration in planning processes that may extend beyond other statewide or local initiatives. For example, the RMP explicitly addresses lake management, where other programs provide little guidance on this type of water body.

The RMP reports that overdeveloped, damaged, and poorly managed shore land areas can result in the degradation of water quality, harm the lake ecosystem, decrease natural aesthetic values, and cause an overall loss of property values for lake communities. Lakes can be harmed by pollutant sources in the watershed area draining to them. Polluted lakes can damage downstream waterbodies.

In addition, Plan Conformance addresses many natural resources included in this ERI, such as groundwater recharge, water use, wellhead protection, wastewater management, stormwater, forest management, and critical habitat.

Wetland Protection Rules

Wetlands are defined by the presence of hydric soils, hydrophytic vegetation that is typically adapted for life in saturated conditions, and area hydrology that is inundated or saturated by surface or groundwater at a frequency and duration to support hydrophytic vegetation. All three parameters must be met to qualify as a wetland.

New Jersey passed the Freshwater Wetlands Protection Act in 1987, and subsequently developed rules to regulate these unique and undervalued resources. Wetlands provide flood storage, unique water quality filtering, and critical habitat, among other environmental services to the regional ecosystems. It has been estimated that New Jersey has already lost 39 percent of its original wetland acreage. NJDEP amended the Freshwater Wetlands Protection Act Rules (N.J.A.C 7:7a) most recently in November 2009. These rules regulate, but do not ensure complete protection for freshwater wetlands in the state.

Activities that may disturb freshwater wetlands or transition areas surrounding freshwater wetlands require state issued permits under New Jersey laws. The permitting process determines if mitigation may be required to achieve the 0 percent net loss of wetlands policy, adopted by New Jersey. The transition areas are designated based on the determined ecological value of the wetland. For more information on regulated buffers for wetlands within Ramsey, see the *Protective Buffers* section.

The Freshwater Wetlands Protection Act

preempts municipal authority to regulate wetlands. However, state law does not hinder local officials from increasing certain protections through the authority granted by the MLUL. Additionally, the local development process can create an opportunity for local officials to ensure the enforcement of state regulations.

The state law does not preclude the locality from establishing overlay zoning, cluster zoning, or transfer of development rights programs that would further heighten awareness and protections for freshwater wetlands. The site development checklist administered by the Borough of Ramsey requires applicants to delineate the presence of wetlands on or within 200 feet of the site, as allowed by the Freshwater Wetlands Rules. This procedure in the development process creates a review system that encourages compliance with the permit requirements set forth by the Freshwater Wetland Rules for projects that warrant municipal site review.

Stormwater Management Rules

In 2004, the State of New Jersey adopted the Stormwater Management Rules, which provide a framework and incentives for managing runoff and resolving nonpoint source impairment on a drainage-area basis for new development, redevelopment and existing developed areas. The rules establish a hierarchy to implement stormwater best management practices (BMP), with initial reliance on low impact development (LID) site design techniques to maintain natural vegetation and drainage patterns before incorporating structural measures.

These new rules also establish runoff control performance standards encouraging the infiltration of stormwater, groundwater recharge, improved water quality, and reduced stormwater runoff, establish special protection areas (riparian zones) to buffer pristine and exceptional value waters; provide regulatory consistency among local and State regulatory agencies; and provide safety standards for stormwater management basins.

Under the Stormwater Rules, each municipality is classified as either Tier A or Tier B based on population density. The Borough is regulated under a NJPDES Stormwater Tier A General Permit. The permit requires the Borough to develop, implement and enforce a Stormwater Program and Statewide Basic Requirements (SBRs), including: adopting a stormwater management plan and ordinance, ensuring compliance with Residential Site Improvement Standards for stormwater

management, ensuring adequate long-term operation and maintenance of BMPs, ensuring that new storm drain inlets meet specific new design standards, conducting annual public education regarding non-point source pollution (NPS), and conducting a storm drain inlet labeling program. Each requirement has an established implementation schedule over a sixty- (60) month compliance timeframe from 2004 to 2009, and annual reports are to be submitted to the County indicating municipal compliance.

A municipal Stormwater Mitigation Plan is an optional element of the Stormwater Management Plan, but is required for a municipality to grant a variance or exemption to the Stormwater Management rules N.J.A.C. 7:8-5. A Mitigation Plan can list alternative stormwater projects, repairs or retrofits within the community that could be completed by a developer if a stormwater variance is being requested at a development site. The stormwater plans are required to be updated every six years (N.J.A.C. 7:8-5.3(b)), along with the municipality's master plan and development regulations (including land use ordinances).

Flood Hazard Control Area

Rules

The NJ Department of Environmental Protection adopted the new Flood Hazard Area Control Rules (N.J.A.C. 7:13) in November 2007 in order to incorporate more stringent standards for development in flood hazard areas and riparian zones adjacent to surface waters throughout the State. The Department adopted these new rules to better protect against the loss of life and property during flood events, preserve the quality of surface waters, and protect the wildlife, vegetation and habitat areas within the riparian zones. The program also minimizes flood damage by ensuring that buildings are placed in safe areas, and are constructed to withstand high water.

In order to minimize the impacts of development on flooding, a 0 percent net-fill requirement will now apply to all non-tidal flood hazard areas of the State (which was previously implemented only in the Highlands Preservation Area and Central Passaic Basin). The new rules define stream buffers as riparian zones and expand the required preservation from 25 feet to 50, 150 or 300 feet in width along specified waterways throughout the State. The riparian zone width depends on the environmental resources being protected, with the most protective 300-foot riparian zone applicable to waters designated as Category One.

The Flood Hazard Area Control Rules include an Applicability Determination which establishes whether or not a project is subject to

these regulations. The application process includes a provision to verify the flood hazard design elevation, floodway limits, and riparian zone limits. The Rules include sixteen activities that require a General Permit including: stream cleaning, scour protection, various agricultural activities, relocation and reconstruction of damaged buildings, maintenance of stormwater structures and certain activities along small streams and in tidal flood hazard areas. The Rule also created a Permits-By-Rule list of de minimis activities that do not require NJDEP approval.



SECTION 2: RESOURCES

Municipal Summary

Officially incorporated in 1908, the Borough of Ramsey is located in northwestern Bergen County, New Jersey. Encompassing 5.57 square miles (3566 acres) Ramsey sits at the base of the Ramapo Mountains, twenty-six miles west of New York City. Ramsey borders three municipalities: Upper Saddle River to the east, Allendale to the southeast, and Mahwah to the north, west, and south. The Regional map shows Ramsey with respect to these boundaries and notes the location of the community transportation network. Ramsey's proximity to New York City, its two train stations, and the quick entrances to major roadways offers residents convenient access to the region's many natural, cultural, and urban attractions.

The 2010 Census estimates 14,473 people currently reside in Ramsey. The population of Ramsey has grown by nearly 800 percent since its incorporation. In 1910, only two years after incorporation, approximately 1,667 people lived in Ramsey. The greatest population growth in the community occurred between 1950 and 1960, when the population more than doubled from 4,670 to 9,527. Between 1960 and 1970 Ramsey continued to experience a high growth rate of nearly 32 percent.

In the years following, however, the population stabilized to a growth rate of approximately 2.5 percent. Between 1990 and 2000 Ramsey experienced a small surge of growth (8.5%), just slightly greater than the 7.1 percent increase recorded in Bergen County as a whole.

Based on the 2010 US Census estimation by the US Census Bureau, this spike in growth between 1990 and 2000 is not a reoccurring trend for the subsequent decade.

The New Jersey State Plan identifies the majority of Ramsey as a Metropolitan Planning area – Pa1 (*see State Plan Policy Map*). The Metropolitan Planning areas in the state have been characterized by their proximity to a major urban center, major settlement patterns, aging infrastructure and housing stock, and a high stage of build-out. The policy approach set forth in the State Plan for these areas includes using redevelopment to absorb future growth into these areas, promote compact and smart growth, protect the character of stable communities and revitalize centers in needed areas. For more information regarding the State Plan, see the section *New Jersey State Plan*.



A Brief History

Although the Borough of Ramsey was incorporated in 1908, the community's history has roots dating back to the Revolutionary War. Structured settlement of Ramsey initially coincided with the building of the Erie Railroad in Bergen County prior to incorporation of the municipality. A key resting place for travelers between the mines and the regional marketplaces, Ramsey developed slowly. In 1900 the US Census recorded 1,074 residents in Ramsey. Farmers cultivating strawberries, among other goods, took advantage of rich soils in the region, while businesses along Main Street developed in reaction to growing transportation networks.

The Vermuele map gives a snapshot of the settlement pattern in the 1880s. This map depicts the first topographic survey of New Jersey conducted by CC Vermuele. It should be noted that the Borough of Ramsey boundary outlined on the map follows the current political boundaries of the municipality, not the boundaries at the time. The dots on the map indicate the presence of structures or buildings.

The concentration of structures around what is now Main Street and the railroad represents the initial formation of the village of Ramsey. The influence of this early development remains visible downtown. The original settlement pattern of the village continues to define Ramsey's Main Street district with narrow corridors and dense pedestrian-scaled

development. In 1892 the town furthered the reliance on the downtown area by building a school on North Central Avenue. This building currently serves the community as the Municipal Building. The stately architecture of the building reflects the historic roots of Main Street district.

The Vermuele map also creates an opportunity to view the natural features of the landscape prior to development. Van Gelders Pond, unnamed on the map, appears in the southwestern corner. Additionally, this snapshot illustrates the presence of extensive wetlands systems in the central and western sections of Ramsey at the time. Until recently the value of wetlands was not recognized by governments and many wetland areas have since been filled in or drained. For more information on wetlands see the section on *Freshwater Wetlands*.

The 1955 USGS Topographic Map provides another snapshot in time. The juxtaposition of these maps visualizes trends in development that occurred in Ramsey. The USGS map from 1955 captures the municipality during its stage of peak growth. Development continued to concentrate along Main Street and the train station, the addition of Route 17 and Route 85 spread development to the northern reaches of the municipality. In the southeastern corner the golf course and adjacent homes developed along Route 507.

According to the map the wetland area in the central section of Ramsey disappeared under a network of streets and structures. The western portion of the community appears to have remained undeveloped for the first half of the century, leaving the wetland system intact at the time of the 1955 survey.

The Aerial Map illustrates a recent snapshot of the suburban character of Ramsey. This aerial imagery highlights the recreation fields, wooded areas, roadways, and waterbodies. Following in the pattern of the previous maps, the aerial shows the remaining wooded areas to be concentrated in the western region of Ramsey. Recreation opportunities are dispersed through the town. The major roadways are largely to the east of downtown Ramsey. This aerial imagery creates the foundation for the land use and land cover data created by the NJDEP.

Land Use/Land Cover

Data on land use and land cover create a visualization of development patterns and can inform future planning decisions. The NJDEP 2007 land use/land cover data set used for this ERI classifies land into five categories. Using aerial photography and known land use information, land is identified as forest, wetlands, barren land, agricultural, or urban. Ramsey is almost fully developed with only 22 percent of its land remaining as forests and wetlands. The Land Use/Land Cover, based on 2007 data, illustrates the classifications of land use within the Borough.

Historically, Ramsey developed into a Main Street village and then along its major roadway networks. In looking at the Vermuele map and the USGS map, it appears early settlement concentrated around the train station and then spread eastward with the development of Route 17 and other arterial roads. This pattern resulted in the western portion of Ramsey remaining less developed. The land use/land cover data from 2007 shows the western area of Ramsey contains the majority of the remaining forests and wetland areas.

Urban or developed land makes up approximately three-quarters of the Borough (75.6%). Low-density residential land is the most common type of land use in Ramsey, accounting for approximately 31 percent of the total acreage. Other significant urban land uses, in terms of acreage, include single unit medium density residential areas, commercial services, high-density residential districts, roadways, and recreation land. Table 2 lists

the sub-classifications of land use/land cover in the municipality.

The second most common land cover is forested land with 14.5 percent of Ramsey remaining forested. These tracts are primarily deciduous forest with a dense canopy cover. Many of these parcels have already been preserved. For more information see the *Open Space* section. While Ramsey has preserved its natural beauty through retention of forested land, its historical roots as a farming region have virtually disappeared.

Currently agricultural land is the least common land use in Ramsey, accounting for only an estimated 12 acres, or .4 percent. Although the existing farmland still functions, agricultural production no longer plays a significant role in the local economy. The remaining farmland in the Borough has not been preserved through the New Jersey Farmland Preservation Program.

Ramsey's lakes, streams, and ponds cover 1.4 percent of Borough land, with an additional 226 acres of wetlands (7.5%). The majority of these wetlands are wooded wetlands, found within and on the fringe of the deciduous forest stands throughout the Borough. Wetlands offer unique habitat, flood protection, and water quality filtration. For more information see the Wetlands section.

Only 0.6 percent of Ramsey falls into the category of barren land. The NJDEP defines barren land as lands with thin soil coverage, sand or rocks and a lack of vegetative cover in a non-urban setting; meaning vegetation, if present, is widely spaced. Barren land can be a natural state or induced by human activities. The NJDEP cites extraction-mining operations, landfills and other disposal sites as the major source of human-altered barren lands.

Table 1: Land Use Type

Land Use	Acres	Percent
URBAN	2697.49	75.64
FOREST	518.46	14.54
WETLANDS	266.25	7.47
WATER	50.14	1.41
BARREN LAND	21.61	0.61
AGRICULTURE	12.37	0.35

MUNICIPAL OVERVIEW

Table 2: Land Use Category

Land Use Category	Acres	Percent
RESIDENTIAL, SINGLE UNIT, MEDIUM DENSITY	1107.99	31.07
RESIDENTIAL, SINGLE UNIT, LOW DENSITY	552.92	15.50
DECIDUOUS FOREST (>50% CROWN CLOSURE)	458.23	12.85
COMMERCIAL/SERVICES	427.76	11.99
DECIDUOUS WOODED WETLANDS	251.35	7.05
RESIDENTIAL, RURAL, SINGLE UNIT	125.22	3.51
RECREATIONAL LAND	117.57	3.30
RESIDENTIAL, HIGH DENSITY OR MULTIPLE DWELLING	117.01	3.28
OTHER URBAN OR BUILT-UP LAND	61.95	1.74
ARTIFICIAL LAKES	48.93	1.37
MAJOR ROADWAY	48.48	1.36
INDUSTRIAL	44.49	1.25
ATHLETIC FIELDS (SCHOOLS)	42.29	1.19
DECIDUOUS BRUSH/SHRUBLAND	24.40	0.68
DECIDUOUS FOREST (10-50% CROWN CLOSURE)	22.96	0.64
TRANSITIONAL AREAS	21.61	0.61
RAILROADS	20.06	0.56
UPLAND RIGHTS-OF-WAY UNDEVELOPED	14.46	0.41
TRANSPORTATION/COMMUNICATION/UTILITIES	9.60	0.27
DECIDUOUS SCRUB/SHRUB WETLANDS	8.65	0.24
CROPLAND AND PASTURELAND	6.74	0.19
ORCHARDS/VINEYARDS/NURSERIES/HORTICULTURAL AREAS	5.63	0.16
MIXED FOREST (>50% CONIFEROUS WITH >50% CROWN CLOSURE)	4.75	0.13
CEMETERY	4.20	0.12
MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA	3.65	0.10
STORMWATER BASIN	3.22	0.09
MIXED DECIDUOUS/CONIFEROUS BRUSH/SHRUBLAND	2.87	0.08
MIXED FOREST (>50% DECIDUOUS WITH 10-50% CROWN CLOSURE)	3.03	0.08
MIXED FOREST (>50% DECIDUOUS WITH >50% CROWN CLOSURE)	2.02	0.06
WETLAND RIGHTS-OF-WAY	1.26	0.04
DISTURBED WETLANDS (MODIFIED)	0.60	0.02
NATURAL LAKES	0.81	0.02
CONIFEROUS FOREST (10-50% CROWN CLOSURE)	0.20	0.01
HERBACEOUS WETLANDS	0.41	0.01
MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE	0.34	0.01
MIXED TRANSPORTATION CORRIDOR OVERLAP AREA	0.27	0.01
STREAMS AND CANALS	0.40	0.01
INDUSTRIAL AND COMMERCIAL COMPLEXES	0.01	0.00



Photo credit: Alison Clarke

SURFACE LANDSCAPE

The surface landscape section of this document describes physical features that influence the appearance and character of Ramsey. The topography, geology, soil composition, climate, and air quality dictate the suitability of land for habitat, vegetation, agriculture, and development. Furthermore, these features have implications for the vulnerability of the environment to natural and man-induced hazards such as contamination, earthquakes, erosion, flooding, and climate change. Understanding the features that define the surface landscape informs responsible planning, appropriate mitigation efforts, and the conservation of natural resources.

Topography

The topography of a community defines its character, provides spatial definition, and influences development. The ridgelines and valleys that characterize the Borough's topography also create the boundaries of its watershed and sub-watersheds. These physical landscape characteristics effect the pattern of surface water flows and stormwater runoff. The Elevation Hillshade map illustrates the landscape using high-resolution elevation data – LiDAR data collected in 2007 – emphasizing shifts in elevation and slope. This hillshade image for Ramsey is color-coded to express relative differences in elevation and slope. Shades of blue and gray are representative of lower elevations, while brown shades are indicative of higher elevations. More uniform areas of color are relatively flat and lack significant topographic relief. Green shades denote a range of mid- elevation values. Areas of

changing colors are areas of significant relief.

The Borough is divided down the middle by a subtle watershed ridgeline, comprised of a series of small shifts in elevation. As depicted on the map Ramsey has a predominantly flat terrain throughout the heart of the Borough; elevation gains are moderate.

Steep Slopes

The significance of steep slope is a function of the composition of hillside natural resource and the fragility of these resources to disturbance or alterations arising from land development. Steep slopes present a constraint for development, requiring expensive engineering techniques to secure the structure. Thus they frequently remain undeveloped longer than other lands within the community. The subject of steep slopes is important for two main reasons: the potential for excessive erosion and the physical limitation of development.

Steep slopes present concerns for development, and careful planning is essential to avoid adverse impacts to the surrounding environment. Vegetation holds the soils in place and intact, mitigating the erosive forces of precipitation and wind. When vegetation is removed, the soils on steep slopes become less stable and prone to erosion.

This erosion in turn degrades water quality through high turbidity/poor clarity, sediment deposition, and additional pollutant loads of contaminants bound to soil particles. Sediment deposition shifts the hydrology of the region and could have consequences for

flooding. Excessive erosion may also lead to slope failure, posing a hazard to surrounding building and/or transportation corridors.

Besides erosional related issues, the biological community of steeply sloped areas is often times unique owing to the rigors of exposure, shallow soils, hydrology and other natural factors that define such environs. As a result, the ecological composition of these areas merits special protections. Additionally, vegetated/forested slopes have environmental benefits that increase soil stability, reduce runoff, protect water quality, and offer a wider array of wildlife habitat than denuded or developed slopes. Limited accessibility enhances the attractiveness of this habitat to use by a variety of wildlife species, including birds, turtles, and plants, some of which may be threatened and endangered.

Steep slopes are also treasured for their scenic and environmental qualities. Ravines and steep hillsides can provide impressive scenic vistas. These resources are important to the overall characteristics of the Borough. Steep slopes also serve as natural boundaries between land uses and districts within a community.

As depicted in the Percent Slope map the majority of Ramsey, approximately 60.2 percent by area, has slopes from 0% to less than 5%. Slopes ranging from 5% to less than 10% account for nearly 22.5% of the land area. Approximately 8.3% of the community has slopes greater than 10%, but less than 15%. These elevation shifts give Ramsey gently rolling hills and scenic vistas. About 9% of the land

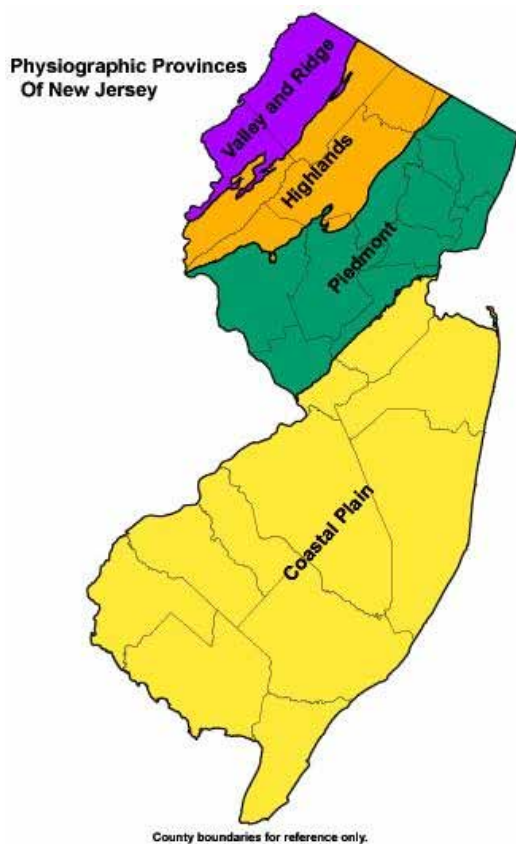
has slopes greater than 15%. These steeper areas are scattered throughout the Borough.

The most steeply sloping areas are usually the last areas to be developed, due to inherent development constraints; therefore, they are often the remaining vestiges of open space, scenic vistas, and wildlife habitats. While many of the steeply sloping areas of the Borough remain forested, a number of ridge-lines have already witnessed development.

The Borough does not have specific ordinances restricting development and construction grading on steep slopes. Development on slopes has potentially drastic implications for water quality, biodiversity, and flooding concerns. The traditional development process replaces vegetated, permeable land areas with impermeable roadways, parking lots, driveways, and homes.

The volume (or amount), of surface water and the rate of runoff, substantially increases as land development occurs. This in turn increases the rate of erosion and potential mobilization of pollutants such as soil, antifreeze, oil, pesticides, fertilizers and other contaminants. The slopes affect storm runoff and pollutants which can impact the community's wetlands, lakes and streams. The steeply sloping areas also affect the recharge of groundwater resources, and provide wildlife habitats and scenic views.

SURFACE LANDSCAPE



Physiography

Physiography is the study of a location in relation to its underlying geology. New Jersey lies upon four physiographic provinces. From the northwest to the southeast, the four regions are the Valley and Ridge, Highlands, Piedmont, and Coastal Plain Provinces. The northern three regions are classified within the larger Appalachian Highland region, while the Coastal Plain is part of the Atlantic Slope. The boundary between each physiographic province is determined by a major change in topography and regional classifications of landform, rock type and structure.

The Borough of Ramsey is entirely contained within the Piedmont Province. An area of about 1,600 square miles, this province makes up approximately one-fifth of New Jersey. The Piedmont is chiefly a low rolling plain divided by a series of higher ridges. The highest point within the province is Barren Ridge on the northern side of the Hunterdon Plateau, at 914 feet. The highest local ridge is High Mountain (885 feet) located in nearby Wayne Township.

The Piedmont includes sandstone, shale, and conglomerates, which create the foundation of the broad lowlands, while basalt and diabase form the intermittent ridges of the province. The rocks of this province are largely of the Late Triassic and Early Jurassic age, 230 to 90 million years old and reside on a crustal block that dropped during the initial stages of the opening of the Atlantic Ocean.

To the north the Piedmont borders the Highlands Province. A series of major faults, including the Ramapo Fault, separates the two provinces. Ramapo Mountain (1,171 feet) is the highest point in the southeast section of the Highlands province. To the south, the Piedmont slopes into the Coastal Plain. Of the four provinces, the Coastal Plain underlies the largest percentage (60%) of the state. The border with the Piedmont is known as the Fall Line due to its notable series of waterfalls and rapids all along the East Coast.

Geologic Formations

The geology of a region sculpts and influences every component of the environment. On the surface geological formations create the topography and the visual landscape of the environment. Beyond their aesthetic value, mountains and valleys form surface water systems and influence climate. Bedrock formations create aquifers and dictate the flows of groundwater. The soils created from surficial geology influence land use decisions and development. Soils also determine suitability of vegetation and habitat growth. Understanding geology and the evolution of formations informs knowledge about the earth's complex systems.

The loose materials that overlie bedrock formations are commonly understood as 'surficial geology'. Surficial geology refers to deposits that remain from glacial, post-glacial, and human related processes. The Surficial Geology map shows five surficial materials within Ramsey. The map details the character of these components.

The Borough of Ramsey lies above a single bedrock unit within the Piedmont Province. The Passaic Formation (Lower Jurassic and Upper Triassic) underlies 100 percent of Ramsey and is described as reddish-brown to brownish-purple and grayish-red siltstone and shale. At places the formation contains sandy mudstone, sandstone, conglomeratic sandstone and conglomerate containing clasts of quartzite or limestone. The Quartzite conglomerate unit found in the Borough has a reddish-brown pebble conglomerate. The

sandstone is medium to coarse grained, and locally contains pebble and cobble layers.

Soils

Soils provide the foundation and determine the suitability for all land uses. A region's soils dictate vegetation growth, agricultural potential, and have implications for other types of land development. Soil properties affect farming practices, woodland management, and engineering projects such as roads, buildings, septic systems, and other structures. The tendency of certain soils to retain water creates wetland areas, while other soils drain quickly to allow for groundwater recharge.

Additionally, soils play a vital role in ecosystem functions, filter stormwater, and serve as the matrix for groundwater storage, as well as large amounts of organic carbon storage. Soils retain and provide the basic minerals and nutrients needed to support a functioning ecosystem, but soils also absorb and often retain the contaminants and pollutants that may negatively affect the services and function of an ecosystem.

The formation of soil is a dynamic and complex process. Soil characteristics such as particle size, water-holding capacity, and nutrient content are factors determined by the underlying bedrock, topography, and hydrology. In turn, microorganisms, plants, and other biotic communities affect and contribute to soil formation. The variations in the parent material, climate, biological factors, and topography, and time result in differing soil properties.

SURFACE LANDSCAPE

The Natural Resource Conservation Service (NRCS), an arm of the United States Department of Agriculture (USDA) classifies and maps soil properties through soil surveys. This information is contained within the Soil Survey Geographic Database (SSURGO), maintained by the NRCS. The soil characterization process is directed by nationwide uniform procedures that account for particulate composition and size (clay, silt, and sand), stratification, and color. Soils are also characterized by crop suitability, compaction, strength, shrink-swell potential, available water capacity, erodibility, and permeability. Soils of similar origin, chemical, and physical properties are grouped into series. Series is the lowest level in the national classification system.

In Bergen County, the NRCS published a Soil Survey of Bergen County, New Jersey in 1995. This survey provides an overview of the county, as well as detailed site-specific information contained in more in depth mapping. This soil survey provides the mapping data used within the ERI. The full soil survey document is available at the local NRCS office and online at the NRCS website. The Soils Survey map shows the distribution of the soil series present in Ramsey. There are ten distinct soil series within the Borough, excluding water, urban land, and pits, sand, and gravel. A brief description of these soil series is below.

Soil series

Boonton

The Boonton series includes deep or very deep soils formed in till on uplands. These soils are moderately well and well drained with slope ranges from 0 to 50 percent. Depth to the bedrock is more than 4 feet. The soils formed in glacial till composed mostly of red to brown shale, sandstone, basalt, and some granitic gneiss. Many of these soils are located in areas that have become highly developed.

Dunellen

The Dunellen series are deep well drained soils in stratified materials, located primarily on outwash plains and stream terraces. Depth the bedrock is usually greater than 10 feet. Slope ranges from 0 to 35 percent. The underlying bedrock is a red soft shale or siltstone. Runoff is usually negligible to high in these soils.

Fluvaquents

This map unit is comprised of somewhat poorly drained to very poorly drained soils. Frequently found in floodplains or flood prone areas, these soils support reeds and herbaceous wetland plants. Slopes range from 0 to 3 percent and surface runoff is medium or slow. These soils provide potential habitat for wetland wildlife and pose limitations for development.

Haledon

The Haledon series consists of very deep somewhat poorly drained soils in depressions on uplands. The bedrock, typically more than 10 feet below the surface, is usually red shale,

sandstone, or basalt. The Haledon series soils formed from eroded and redeposited glacial materials overlaying till. Slope ranges from 0 to 8 percent.

Hasbrouck

The Hasbrouck series consists of very deep poorly drained soils. These soils typically formed redeposited and eroded glacial materials over till. Depth to bedrock of comprised of red shale, sandstone or basalt, is usually more than 10 feet. Slope ranges from 0 to 8 percent.

Otisville

The Otisville series includes very deep excessively drained soils. These soils formed in Wisconsinan age outwash and are on long narrow ridges, summits, shoulders and sideslopes on terraces, kames, eskers, and beaches. Slope ranges from 0 to 60 percent with a broad range of mean annual precipitation (29-50 inches). The potential for runoff runs from negligible to low.

Pasack

The Pasack series consists of very deep, moderately well drained and somewhat poorly drained soils. These soils are formed in glacial outwash, located in nearly level or slight depressions. The outwash formed from red shales, basalt, and granitic gneiss. Slope ranges from 0 to 8 percent.

Preakness

The Preakness series is comprised of very deep, poorly and very poorly drained soils. These soils are formed on broad, nearly level outwash plains or in narrow swales that

dissect outwash terraces. Slope ranges from 0 to 3 percent. Runoff is negligible or low on these soil series. Depth to bedrock is more than 6 feet.

Riverhead

The Riverhead series includes very deep well drained soils. These soils are formed in glacial outwash deposits derived mostly from granitic materials. Located in nearly level to steep soils on outwash plains, valley trains, beaches, and water-sorted moraines. Slope ranges from 0 to 50 percent with. The depth to bedrock is usually more than 60 inches.

Udorthents

This map unit occurs in low areas of marine and estuarine deposits. Not an official series description these soils have been filled, smoothed, or otherwise disturbed to a depth of 3 feet or more. In these mapped areas slope ranges 0 to 5 percent. The original soils are thought to be somewhat poorly drained to poorly drained soils.

Wethersfield

The Wethersfield series consists of very deep well drained soils. These loamy soils formed in dense glacial till. The glacial till formed from reddish sandstone, shale, and conglomerate with some basalt. The soils are found on till plains, low ridges, and drumlins with slope ranges from 0 to 35 percent. The depth to bedrock is typically greater than 6 feet.

SURFACE LANDSCAPE

Hydric soils

Approximately 9.35 percent of Ramsey's soil is considered hydric. The National Technical Committee of Hydric Soils defines hydric soils as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Consequently these soils support hydrophytic vegetation and are a key element of wetland areas. Soils classified as hydric may carry land use restrictions due to wetland regulations. For more information see the *Water Resources: Wetlands* section.

Erodible Soils

Erosion is defined as the natural process by which wind, moving water, ice, and gravitational forces displace the solid and particulate materials of the land. Erosion of exposed bedrock occurs on an extended geological time scale. Soil erodibility occurs on a much shorter time scale and with many more associated acute and chronic consequences.

The determination of soil erodibility is a complex process that requires the consideration of soil type, texture and topography. Clay and clayey soils are generally compacted, and do not degrade rapidly under duress of erosional factors. Loam soils consist of 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand in order of increasing grain sizes. Loamy soils are not as consistent due to the presence of larger particulate sand and silt. In addition to texture and type, slope and vegetative cover, stormwater runoff velocities,

and precipitation influences the potential for erosion.

Anthropogenic factors also influence erosion rates, chief among these being agriculture, construction and development, which can exacerbate erosion problems. Erosion problems include declines in agricultural productivity, channelized flow, streambank instability, waterway sedimentation buildup, and contaminant transport. The corresponding Erodible Soils map depicts the results of the NRCS Erodible Soils displayed in three potential categories: Highly Erodible Land (HEL), Potentially Highly Erodible (PHE), Not Highly Erodible (NHE) and Unclassified or Not Available (NA).

In general, the soils of Ramsey follow the topographic features of ridges and valleys. Highly erodible soils covering 29.66 percent of the land are located largely in areas that have significant slope changes. Potentially highly erodible soils cover 31.49 percent of the land within Ramsey. Unclassified soils are largely found in the heavily developed areas of Route 17 and the Main Street district.

In areas where soils are likely to erode, erosion can be minimized even by maintaining vegetative cover. When areas with highly erodible or potentially highly erodible soils are proposed for development, additional erosion control measures could be required of the developer and more frequent inspections be conducted of the installed erosion control provisions. Waterways can be protected from soil erosion impacts by restricting the disturbance of the riparian areas bordering streams and lakes.

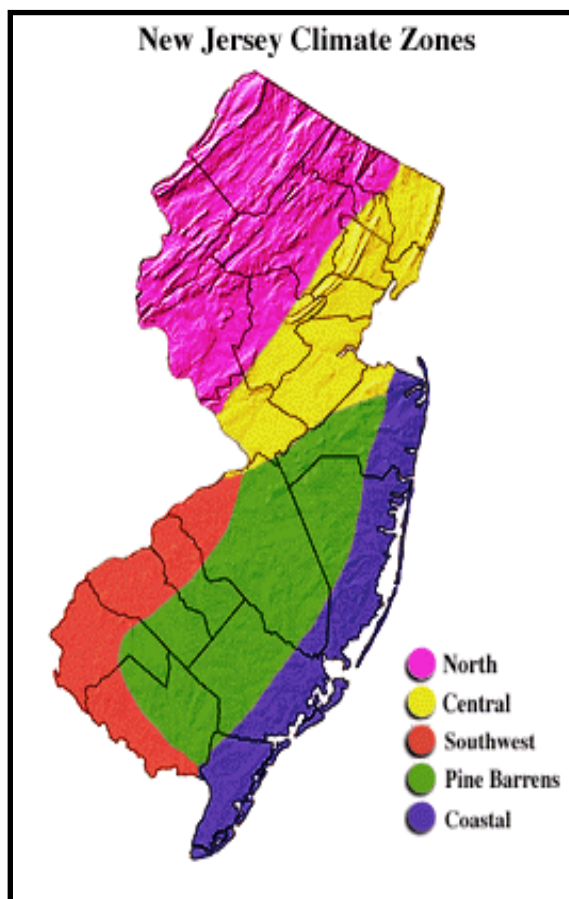
Climate

Climate directly affects all living organisms, as well as vegetative growth and habitat composition, and therefore has become an important component of an Environmental Resources Inventory. Growing evidence and support, including the New Jersey State Climatologist, Dr. David A. Robinson, Rutgers University, suggest that climate patterns are shifting, which may have implications for future planning, development, and the environment. Dr. Robinson explains that in New Jersey changes in our State's climate are likely to impact natural flora and fauna, human health and safety, agricultural productivity, fresh-water resources, tourism, transportation, and business and commerce. Awareness and readiness may help reduce vulnerabilities to such changes.

Halfway between the Equator and the North Pole, New Jersey experiences high variability in climate patterns as they traverse the continental U.S. and the Atlantic Ocean. New Jersey's climate is considered "continental" due to the significant difference in seasonal temperatures and fluctuation in daily temperatures. The constant circulation of airflow from west to east across the nation heavily influences the state's weather patterns. Even within the small state of New Jersey observations notice distinctions between climate patterns in the southern coast and the highlands regions.

New Jersey encompasses five distinct climate zones: the North, the Central, the Pine Barrens, the Southwest, and the Coastal zones. The Northern region includes approximately

one-quarter of the state. Influenced by the highlands and the mountains, this region often experiences colder weather compared to the rest of the state. The Central zone is characterized by its urban centers and paved infrastructure. This zone frequently witnesses a 'heat island' effect, a phenomenon that occurs when materials in the built environment trap heat and keep it from radiating back to the atmosphere at night. The consequence is a warming sensation within the urban area compared to rural areas.



SURFACE LANDSCAPE

Sandy soils and forests make up the Pine Barrens zone allowing for a wide range between daily minimum and maximum temperatures. The Southwest zone does not have the sandy soils of the Pine Barrens, but is subject to similarly high temperatures. The result is retention of heat. The location inland of the coast but below the elevations of the northern and central zones leaves the Southwest zone drier than other regions in the state. The fifth zone in New Jersey is the Coastal region. The Coastal zone experiences a daily battle for dominance from both continental and oceanic climate patterns resulting in mild wet weather with variability and affected by breezes.

Ramsey falls within the Central zone on the cusp with the Northern zone. This border is thought to be the freezing line across the state. On average the region containing Ramsey receives 3-5 inches of precipitation monthly and a yearly average just slightly higher than New Jersey as a whole. The New Jersey Weather and Climate Network has maintained a station in Ramsey since 2004. This station provides up-to-date forecasts, records precipitation and temperature data, and allows for visualization of trends in the region.

Air Quality

Air quality reflects land use, development, atmospheric, and climate patterns, but this correlation is far from direct. The regional and diffuse nature of air pollution makes documenting and assessing air quality as an environmental resource difficult. Air pollutants

include, but are not limited to, emissions from industry, motor vehicles, fires, and dust. These contaminants can travel far from the source, creating impacts across political lines.

To address the national concern for air quality, the EPA regulates air pollutants under the authority of the 1970 Clean Air Act (CAA). The CAA delineates six criteria pollutants, particulate matter, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead, which have common and potentially severe health and environmental implications.

Of the six pollutants, particulate matter and ground-level ozone are the most widespread health threats. The EPA uses human health and/or environmentally based criteria to determine acceptable levels for these pollutants. Primary standards address human health criteria, while the secondary standards seek to prevent environment and property damage. Areas that do not meet these primary health standards are referred to as non-attainment areas.

In New Jersey, the NJDEP performs the state air quality monitoring to satisfy the CAA. The Bureau of Air Monitoring utilizes a network of monitoring stations throughout the state. These stations monitor up to seven parameters – carbon monoxide, nitrogen oxides, ozone, sulfur dioxide, smoke shade, particulate matter, and meteorological data. Additionally, air toxins have become an increasing concern in New Jersey and across the country. The Air Monitoring network also monitors air toxins and includes this information with its annual Air Quality Report.

The CAA also limits the amount of emissions permitted from point sources such as factories or industrial plants. The NJDEP Air Quality Permitting Program requires emission reports from all stationary emission sources necessitating permits. There are 75 active permits in Bergen County, but none within the Borough of Ramsey.

Based upon nationwide comparisons New Jersey suffers from poor air quality; however, the NJDEP reports that over the years, the air quality in New Jersey has been improving significantly. The air quality in Bergen County is assessed based upon historical air quality monitoring data available from the NJDEP's air quality monitoring network. Bergen County has been designated by the USEPA as non-attainment area for ground-level ozone. Air quality degradation is due to the type and density of industry, the density of population, and the general reliance upon automobiles.

As part of an effort to increase uniformity in reporting and public awareness about air quality concerns, the EPA developed the Air Quality Index (AQI). The AQI is used throughout the nation for reporting and communicating a metropolitan area's air quality information. Carbon monoxide, nitrogen dioxide, ground-level ozone, particulates, and sulfur dioxide are monitored hourly at sites throughout the state. The levels of each contaminant are rated from 0-500, broken into six ranges to indicate the implications for human health. Each range is associated with a color to make the information accessible to a broad audience. The AQI is reported on statewide websites and often on local news broadcasts.

New Jersey is broken into nine regions for monitoring the AQI. All of Bergen County is located within Region 1, labeled North Metropolitan. In 2007 the AQI ratings for New Jersey included 142 "Good" days, 183 were "Moderate", 33 were rated "Unhealthy for Sensitive Groups", 2 were considered "Unhealthy", and zero were rated "Very Unhealthy". This indicates that air quality in New Jersey is considered good or moderate most of the time, but pollution is still bad enough to adversely affect some people on about one day in thirteen. In 2007 Region 1 reported 207 "Good" days, 145 days as "Moderate", and 13 days rated "Unhealthy for Sensitive Groups".



Photo credit: Betsy Trum

Six Criteria Pollutants

Particulate matter

Particle pollution, more commonly known as particulate matter, comes in various shapes, sizes, and chemical combinations. Some such as dust, dirt, soot, or smoke can be seen with the naked eye; others require an electron microscope. The EPA regulates coarse particles (2.5 – 10 micrometers) and fine particles (smaller than 2.5 micrometers). Fine particles contribute to reduce visibility and haze, even in natural areas. Both inhalable particles can cause coughing, wheezing, and decreased lung function in healthy individuals. Long-term exposure has been linked with premature death in elder populations.

Ground-level ozone

Ozone (O_3) is a simple gas formed from the three oxygen atoms. It forms from a chemical reaction between NO_x and volatile organic compounds (VOC) in the presence of sunlight. As it is not directly emitted from any source, O_3 can only be traced to the sources of the contributing chemicals. Therefore sources of NO_x and VOCs such as motor vehicle exhaust and chemical solvents contribute to the formation of O_3 . Sunlight and hot air create an environment conducive to this chemical reaction. Therefore it is known as summer season pollutant. Health impacts from O_3 exposure include chest pain, coughing, throat irritation, and congestion. It inflames conditions such as asthma, bronchitis, and emphysema. Repeated exposure may permanently scar lung tissue.

Carbon monoxide

Carbon monoxide (CO) is a colorless odorless gas that occurs when the carbon in fuel is not burned completely. Motor vehicles contribute approximately 56 percent of the CO emissions in the US. In urban areas this percentage can increase to 95 percent of emissions. Forest fires, wood stoves, and industrial processes also contribute to CO in the air. CO can quickly and silently take a life. It is poisonous even to a healthy individual. Low exposure to CO can inflame cardiovascular effects in people who suffer from heart disease. Low levels of CO can also impact the central nervous system. In 2005 on road vehicles in Bergen County contributed over 140,000 tons of CO into the air. Non-road equipment in Bergen County added over 70,000 tons to the air.

Sulfur oxides

Sulfur dioxide (SO_2) is one element in a group of gasses known as sulfur oxides (SO_x). The largest contributors of SO_2 are from fossil fuel combustion at power plants and other industrial facilities. Health effects of SO_2 such as bronchoconstriction and increased asthma symptoms occur even with short-term exposure. These health impacts are escalated for asthmatics at elevated ventilation rates (e.g. while exercising). The EPA initiated the first regulations for SO_2 in 1971. Annual average ambient SO_2 concentrations have decreased by more than 70 percent since 1980.

Nitrogen dioxide

Nitrogen dioxide (NO₂) is part of a group of gasses known as nitrogen oxides (NO_x). While the EPA's air quality standard encompasses the entire group, NO₂ acts as the indicator for the larger group of pollutants. Primary sources of NO₂ pollution include emissions from cars, trucks, busses, and power plants. In Bergen County on-road vehicles contributed to over 14,000 tons of NO_x gasses in 2005. NO₂ contributes to the formation of ground-level ozone and particulate matter. Additionally research indicates exposure to NO₂ even in the short-term has respiratory impacts on healthy individuals and increased respiratory symptoms in people with asthma.

Lead

Exposure to lead presents a serious health risk for individuals, especially at-risk populations and children. After lead is internalized, through air, water, or food, the pollutant spreads through the body and accumulates in the bones. Depending on the severity lead exposure can affect the nervous system, cardiovascular system, reproductive and developmental systems, immune systems, and kidney function.

Children are especially vulnerable to exposure. Lead toxicity in children may contribute to behavioral problems, lowered IQ, and development difficulty. At one time the gasoline from automobiles contributed the most lead into the environment.

Since EPA passed higher standards this source of lead pollution has dropped significantly. Waste incinerators, utilities, aviation gasoline, and metals processing continue to contribute to lead in the air. Aside from its contribution to air quality the presence of lead in soils, paint, and dust continues to present a threat to environmental health and safety.

WATER RESOURCES

Streams and rivers traverse every community providing habitat, a vehicle for transportation, and a source of drinking water. Historically, towns and cities developed adjacent to watercourses to take advantage of the unique and powerful properties offered by surface water systems. Too often this development resulted in a variety of acute and chronic impairments that compromised water quality, altered hydrologic and hydraulic properties, destroying important wildlife habitat and ultimately damaged the ecosystem.

Federal, state, and local protections now seek to prevent or rectify these destructive practices through water quality standards, discharge permits, and restoration efforts. While these efforts have helped reduce impacts to surface water resources and have heightened awareness of the sensitivity of these resources, new challenges continue to emerge.

While focus was originally placed on the control of point source impacts (e.g. sewage plant and industrial waste discharges), we now recognize that non-point source pollution, largely in the form of stormwater runoff represents a significant set of threats to both surface and groundwater resources. Given the importance of water resource systems in sustaining all life an evolving, adaptive approach is needed to protect these resources against future impairment.

Surface water

Surface waters (streams, rivers, lakes, and ponds) provide numerous benefits to the

environment as well as surrounding communities. Waterbodies offer recreational opportunities for swimming, fishing, boating, as well as wildlife habitats for fish, turtles, raptors, and migratory waterfowl. Streams and lakes frequently offer scenic view sheds that can be easily enjoyed from local roadways and hiking paths.

Although the full benefits provided by surface water features in a community has yet to be quantified, studies have linked the proximity to a watercourse with a marked increase in property values. Arguably the preservation of water quality, aquatic habitats, and visual appeal provides extensive value to residents and tourists. Furthermore, the implications of water protections extend beyond a community's boundaries throughout the watershed.

Unfortunately, surface water features are often conveniently used as a means of "disposing" stormwater runoff. Historically, little attention was given to the management of runoff, thus resulting in measurable alterations to the hydrology, hydraulics, water quality, ecology and even the recreational and aesthetic attributes of the receiving surface water.

Watersheds

The USEPA defines a watershed or drainage basin, as the entire land area that drains into a body of water, such as a river, stream or lake. As previously discussed within *Topography Section*, the high points in the terrain, such as ridge tops, create the boundaries of each distinct watershed or catchment area. A

watershed includes both the waterway and the land that drains to it. Large watersheds are comprised of smaller sub-watershed, which in turn are comprised of ever smaller catchment areas down to the drainage area of a single site. For example, the Passaic River Basin is made up of several watersheds including the Ramapo and Saddle River Watersheds. The Ramapo and Saddle River Watersheds can then be broken down further into the drainage areas surrounding each smaller tributary that flows into the larger channel..

In order to identify each unique drainage system the US Geological Survey (USGS) developed a hierarchical system, the Hydrologic Unit Code (HUC). This system divides the US into 21 Regions, 222 Subregions, 352 Accounting Units, and 2,149 Cataloging Units. The Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service, expanded the classification to even smaller regions by adding a 3-digit extension to the 8-digit USGS code. This 11 digit code provides the basis for watershed planning in New Jersey. NJDEP used the HUC 11 scale to divide the state into 20 Watershed Management Areas (WMA). Each management area includes several sub-watersheds (HUC 14).

Ramsey is effectively divided from the southwest to the northeast by a subtle watershed ridgeline. Within Ramsey the streams and tributaries flow into five sub-watersheds contained within two major watersheds; the Ramapo River system and the Saddle River system. To the north, surface and groundwater within Ramsey feed the Masonicus Brook and Ramapo River subwatersheds, as part of

Ramapo Watershed

The Ramapo River Watershed originates in Orange County, New York. The total land area for the watershed is approximately 211 square miles in New York and covers approximately 48 square miles New Jersey. In New York the watershed extends from Orange County through Rockland County. In New Jersey it lies within both Bergen and Passaic Counties. Its waters traverse through 10 municipalities in both counties from Mahwah Township down to Wayne Township in the Central Passaic Basin where the Ramapo drains into the Passaic River. The Ramapo River Watershed feeds into the New Jersey Highlands.

Saddle Brook Watershed

The Saddle Brook Watershed encompasses approximately 51 square miles in northeastern New Jersey and southern New York. In New Jersey the watershed is contained within Bergen County. The waters of the Saddle River watershed cross 31 municipal boundaries in Bergen County from Mahwah Township in the northern reaches to East Rutherford Township before the Saddle River drains into the Passaic River. An estimated 3.5 square miles of this watershed fall within Ramsey's boundaries.

Major rivers in the Saddle River watershed include the Saddle River, the Allendale Brook, the Ramsey Brook, the Valentine Brook, the Pleasant Brook, and the Ho-Ho-Kus Brook. The southern portion of the watershed has become largely urbanized and is therefore vulnerable to industrial contamination and water quality concerns. In the northern section the aquatic ecosystems are subject to non-point pollution from stormwater runoff.

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the larger Ramapo River Watershed. Together with the Wanaque, Pequannock and Pompton Rivers, the Ramapo River is part of NJDEP's Watershed Management Area 3 (WMA 3).

The NJDEP has developed a Phosphorus Based Total Maximum Daily Load (TMDL) for the Ramapo River; meaning that there exists the need to control and reduce the amount of phosphorus discharged or otherwise released into the river. The Ramapo River also is recognized as impaired as per the New Jersey's 2008 Integrated Water Quality Monitoring and Assessment Report ("Integrated List"). This means that the river has water quality impairments that inhibit it from fully meeting its designated uses.

South of the ridgeline, streams flow into the Hohokus Brook subwatershed and the Saddle Brook subwatershed in the far eastern reaches of the borough. These subwatersheds make up a portion of the Saddle River Watershed.

The Saddle River watershed is part of NJDEP's Watershed Management Area 4 (WMA 4); the Upper Passaic/Saddle River watershed. The Saddle River also is recognized as impaired as per the New Jersey's 2008 Integrated Water Quality Monitoring and Assessment Report ("Integrated List"). This means that the river has water quality impairments that inhibit it from fully meeting its designated uses.

Streams

As noted above, each of the streams within Ramsey is a tributary of either the Ramapo River or the Saddle River. Both the Ramapo

River and the Saddle River eventually drain into the Passaic River, which drains to the Atlantic Ocean. The 1992 NRI lists the four major streams within Ramsey as Darlington Brook and tributaries, the Masonicus Brook and tributaries, the Valentine Brook and tributaries, and the Ramsey Brook and tributaries.

Two additional major streams are located, at least partially, within Ramsey. The Pleasant Brook nearly creates the border with Upper Saddle River Borough in the northeast corner. The Allendale Brook crosses through Ramsey as it stretches from Upper Saddle River Borough into Allendale Borough in the southeastern tip of the Borough. Although these streams are contained by different subwatersheds, both the Pleasant Brook and the Allendale Brook eventually drain to the Saddle River.

The streams within Ramsey are largely headwaters or source water for an arterial watercourse downstream. Headwater is a term used to describe the location where streams and rivers originate. The headwaters of a river or stream can be particularly sensitive to impairment. Frequently these areas contain lakes or wetlands that outlet into a stream channel. The Surface Waters map illustrates that the Valentine Brook originates within Ramsey before draining southward to Allendale Borough near Cobblestone Lane. In contrast the Ramsey Brook neither begins nor ends within the confines of Ramsey's boundaries, although a tributary does join the main stem of the stream near Spear Road north of Route 17.

There are no special regulatory requirements associated with the headwaters of a stream. However, frequently headwaters contain untainted waters and often offer critical habitat and breeding ground for aquatic and avian life. Maintaining the water quality and integrity of headwaters has significant implications for all communities downstream.

Lakes and Ponds

Natural and artificial lakes and ponds provide critical function to water systems. These waterbodies provide habitat to aquatic wildlife, flood storage, and groundwater infiltration. Frequently lakes and ponds suffer eutrophication due to mismanagement and pollutant loading. These waterbodies do not flush out contamination as well as other moving waters. As a result sediment rests behind impoundments, the water temperature usually rises, and contamination builds in the stagnant water reducing habitat for aquatic life and reducing the water quality.

Unfortunately, due the shallow nature, limited hydrology and excessive nutrient loading characteristic of suburban man-made ponds and lakes, most of these waterbodies tend to be eutrophic, or over-productive. This often results in these waterbodies being prone to excessive algae and aquatic plant growth, both of which can decrease recreational use and aesthetic enjoyment. As a result, most eutrophic waterbodies require maintenance and management to stem or mitigate the negative effects of eutrophication. Ramsey contains seven named lakes. These identified waterbodies are Canns

Lake, Darlington Lake, Garrison Pond, Mirror Lake, Suraci Pond, Van Gelders Pond, and Wyckoff Lake. Collectively the lakes, both identified and unidentified, that are at least partially within Ramsey total 70 acres.

The largest of these waterbodies, Darlington Lake, encompasses approximately 18 acres. However, most of this surface area lies in Mahwah. Its size allows for numerous recreational opportunities. Among other activities, the NJDEP Division of Fish and Wildlife identifies Darlington Lake as a reputable location for fishing. Wyckoff Lake is the second largest waterbody and covers about 12 acres. Garrison Pond is the smallest named lake in the Borough at approximately 2 acres.

The 1992 NRI indicated that several of these lakes experience water quality impairment from siltation. Van Gelders Pond was noted as eutrophic in the 1992 NRI. No remediation has been documented for this pond since the NRI was published. Unnamed ponds at the end of Sauna Road, Garrison Pond, Crystal Spring Lake, Silver Lake, and Canns Lake were also identified as receiving considerable amounts of siltation from nearby development. There have been no reported efforts to remediate these waterbodies since the 1992 NRI.

Floodplains

A floodplain is the land immediately adjoining the channel of a stream that is routinely inundated during storm events. There are two integrated elements of the floodplain; the floodway (the inner part of the floodplain that carries flood flows including those generated by the 100-year storm, and the flood fringe (the outer part of the floodplain that at times is inundated but does not carry flood flows).

The floodplains is an integral hydrologic elements of a stream or river. Although its primary role is to temporarily store floodwaters during intense precipitation events, the floodplain plays a complex in defining the overall quality and condition of a stream or river ecosystem. The slow release of captured runoff helps abate damaging flood flows. Additionally, the retained runoff that seeps into the soils recharges surficial water supplies, groundwater reserves, and provides base flow for streams.

As stormwater runoff traverses the floodplain, established vegetation improves the water quality of the runoff by trapping filtering and biologically assimilating a wide array of pollutants including sediments, heavy metals, and nutrients. Vegetation along the stream bank also anchors and stabilizes the soils, effectively reducing erosion and providing shade to maintain water temperatures. Floodplains generally include the riparian zone adjacent to the stream, and provide wildlife habitat for many rare species.

The floodplain's propensity to settle and filter out sediments during flooding events leads

to the deposition of nutrient rich sediments. As a result these areas have historically been drained and subsequently farmed. In turn, lands within the floodplain have been developed. Such disturbances negate the services and functions provided by the floodplain and result in the exacerbation of local and regional flooding problems and associated property damage.

Common terminology describing flood events, such as the 100-year or 500-year floodplain, is often misleading because these flood zones are based on probabilities not periodicity. The 100-year floodplain is land with a 1% annual chance of inundation. The 500-year floodplain has a .2% chance of inundation annually. Therefore, 100-year flood events may occur several times within any given year and then again the following year. It is a measure of probability alone. For this reason the Floodplain map contained within this ERI does not label flood areas in terms of the 100-year and 500-year. The FEMA Flood Zones map denotes the location of the floodplains that have 1% chance and a .2% percent chance of inundation on an annual basis.

Federal Emergency Management Agency (FEMA) uses the 1% floodplain (100-year), .2% floodplain (500-year), and BFE to determine flood risk. The Base Flood Elevation (BFE) is the height of the 1% flood, or base flood, referenced to a controlled, vertical scale. The 1% flood zone can be calculated using the BFE obtained from detailed area-specific hydraulic analyses. These areas have been labeled by FEMA as Zone 'AE'. Conversely, the 100-year flood zone can be established without a BFE

in less well-studied areas through approximations modeled on area topography. The approximated zones are noted on the map as Zone 'A'. Both carry requirements for flood insurance as both zones estimate a 1% percent annual chance of inundation.

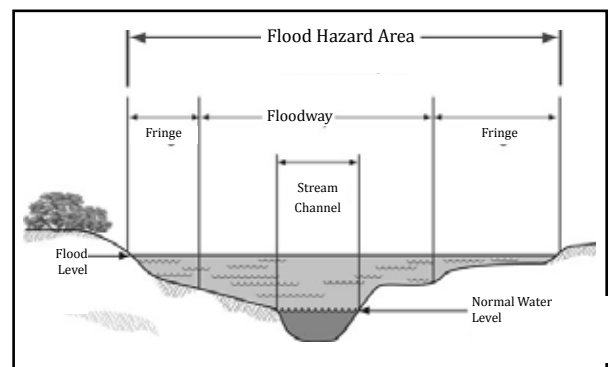
The State of New Jersey created an additional designation called the 'New Jersey flood hazard design flood' that spans the 1% floodplain plus land allowing for an additional 25 percent of flow. The NJ flood hazard design flood (NJFHA) is the basis for state regulations on development within the floodplain.

Currently, the NJ state flood maps are not available in digital form. The map included in this ERI uses floodplains as mapped by FEMA. The State of New Jersey and FEMA are working on updating the digital flood hazard mapping, ideally allowing for future maps to include the 1%, .2%, and the NJFHA. While the map allows for a delineation of the floodplains per FEMA's flood insurance requirements, any development application in proximity to these areas would need additional surveying to determine the exact location of the NJFHA.

Less than 10 percent, or 328 acres (9.2%) of Ramsey falls within the 1% (100-year) flood hazard area as delineated by FEMA. The flood prone areas surround Ramsey Brook and its tributary, the Valentine Brook and its unnamed tributaries, and the Darlington Brook and its tributaries. Much of the floodplain remains undeveloped. Lots adjacent to Masonicus Brook in the Highway Commercial District may be in the floodplain, as are the residential lots in proximity to the Valentine

Brook west of the NJ Transit rail line and north of the Central Business District. Additional development of floodplains has occurred along certain areas of the Ramsey Brook in the eastern section of the Borough. The Borough proactively purchased land within the floodplain to minimize future flooding damages. As a result of these actions much of the floodplain areas within the Borough remain forested and contain existing wetlands.

While floodplains may be aesthetically pleasing because of the proximity to water, these areas are not recommended for development. Development within floodplains alters storage capacity and flow characteristics elsewhere in the drainage system. In order to protect property, lives, the environment, and the integrity of the flooding system the State of New Jersey regulates development within the floodplain. The current Flood Hazard Area Control Regulations (N.J.A.C. 7:13) restrict new development and disturbances, and clearing of woodlands within riparian zones of floodplains. For more information on the Flood Hazard Area Control Regulations see Section I: FHCA



Source: <http://www.nhflooded.org>

Wetlands

Wetlands are defined by the presence of hydric soils, hydrophytic vegetation that is typically adapted for life in saturated conditions, and area hydrology that is inundated or saturated by surface or groundwater at a frequency and duration to support hydrophytic vegetation. All three parameters must be met to qualify as a wetland. Wetlands provide a unique function in an ecosystem as floodwater storage, water filtration areas, and specialized habitat.

For years these moist areas had been undervalued in terms of their ecological function, and frequently filled in or dredged. EPA estimates that the United States has already lost over 50 percent of its wetland acreage, and continues to lose thousands of acres annually. Wetland protections have been passed as part of the Clean Water Act Section 404, as well as the New Jersey Freshwater Wetlands Protection Act (*for more information on wetlands see Section 1: Freshwater Wetlands*).

The Borough of Ramsey contains just over 266 acres of freshwater wetlands, according to the NJDEP 2007 Land Use / Land Cover data. The primary type of wetland, as classified by NJDEP, in the community is a deciduous wooded wetland. The NJDEP characterizes this wetland type as a 'closed canopy swamp dominated by deciduous trees'. Important canopy species in these areas can include red maple, American sycamore, black gum, black willow, swamp white oak, and American sweetgum as delineated by the NJDEP.

Approximately 3 percent of the wetlands, concentrated mostly in the southwest corner, consist of deciduous scrub/shrub wetlands. A category by NJDEP that denotes wetlands containing samplings of trees such as those listed above as well as woody shrubs including southern arrowwood, swamp azalea, buttonbush, sweet gale, and highbush blueberry, among others.

Less than 5 acres of Ramsey contain modified wetlands. Modified wetlands have been affected by natural or human activity and cease to support hydrophytic vegetation, but continue to retain moisture. Wetlands that have been fully filled or altered and converted to other land uses are not included in this category.

Most municipalities in New Jersey require proposed development projects that encroach near wetland areas to apply for a Letter of Interpretation (LOI). The LOI is a legal instrument used by the NJDEP to delineate the extent of the wetland area and determine its value as a resource. The New Jersey Freshwater Wetlands Protection Act rules dictate that wetlands can be of Exceptional Value, Ordinary Value, or Intermediate Value.

Wetlands of exceptional resource value include areas that discharge into FW-1 or FW-2 trout production waters and their tributaries, contain present habitat or documented habitat for threatened or endangered species that remains suitable for these species. The NJDEP Wetlands map shows the wetlands of differing resource value within Ramsey.

The map contained within this ERI applies the criteria for the wetland resource classification per N.J.A.C 7:7a-2.4. However, this map does not replace an LOI and has not been field verified. Only NJDEP can issue a formal assessment of resource value for freshwater wetlands.

Surface water quality

The quality and vitality of fresh and saline waters affects the health of all life within the watershed. Historically, surface water quality suffered from point source discharges emitted from industrial plants. Currently, the EPA estimates that non-point sources cause the majority of degradation in the nation's waters. Sediment, nutrients, and toxins heavily impact the safety of the water for drinking, fishing, swimming, and aquatic habitat. The federal Clean Water Act mandates water quality standards, where possible, to ensure the protection of viable water sources for such uses. Water quality standards are created and enforced by both state and federal agencies.

Stream Classification

The NJDEP classifies waterbodies in the state as freshwater (FW), pinelands water (PL), saline estuarine water (SE), or saline coastal water (SC). Freshwaters are further delineated as either FW1 or FW2. Again, N.J.A.C 7:9B can be referenced for the official classification of the State's major waterbodies, and their unnamed or minor tributaries. FW1 classification correlates with the water's origination within preserved parks, and wildlife lands.

Waters receiving FW1 classification have been deemed unsuitable for manmade wastewater discharges due to their unique ecological or recreation value. FW2 includes all other freshwaters in the state, excluding those located in the Pinelands. The NJDEP also classifies freshwater streams based on trout production (TP), trout maintenance (TM), or as non-trout waters (NT). These classifications may carry differing restrictions and water quality standards.

Most of the surface waters in Ramsey are FW2-NT waters. A small, less than half a mile, section of the Pleasant Brook along the northeastern border with Upper Saddle River Borough is deemed Trout-Maintaining. According to NJ law, N.J.A.C. 7:9B, the designated uses of all FW2 waters (trout maintaining and non-trout) include: the maintenance, migration and propagation of the natural and established biota, primary contact recreation, industrial and agricultural water supply, public potable water supply, and other reasonable uses. The classification of trout maintenance in FW2 waters indicates that the waterbody has the characteristics necessary to support trout populations. Beyond the standards mandated for FW2-NT, these waters are subject to certain standards to maintain the temperature, clarity, and chemical load necessary for trout habitat.

Stream Quality Monitoring

The NJDEP has adopted a multi-faceted approach to ensure surface water in the state maintains a quality that meets federal and state standards and minimizes public health

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risks. The Ambient Surface Water Quality Monitoring Network (ASWMN) is a cooperative program between NJDEP and USGS that includes 215 stations that tests routinely for metals, pathogenic indicators, suspended solids, and oxygen.

Through the Biological Monitoring network (AMNET) the NJDEP uses benthic macroinvertebrate species to identify areas of impaired waterbodies. This network of stations throughout the state tests surface waters in lakes and streams for attainment of designated uses and minimum quality standards. The AMNET network testing allows for information regarding the short-term impacts of contamination and impairment on stream and

lake waters. Additionally, the NJDEP uses the Fish Index of Biotic Integrity (IBI) to assess long-term conditions occurring within the surface waters. These monitoring programs inform remediation efforts, public awareness, and the drinking water quality reports submitted by both local water agencies and the state.

AMNET Network

The NJDEP reactivated its Ambient Biomonitoring Network (AMNET) in 1992 to evaluate surface water in each of the 20 freshwater Watershed Management Areas in New Jersey. The AMNET program uses EPA protocols to determine water quality based on the biological communities of benthic macroinvertebrates. These stations capture data on a

Table 3a: 2010 Designated Use by subwatershed

HUC 14 ID	Subwatershed Name	Ag. Water Supply	Aquatic Life	Fish Consumption	Industrial Water Supply	Primary Contact Recreation	Public Water Supply
NJ02030103100030-01	Ramapo River	IS	NS 4	IS	IS	IS	IS
NJ02030103100020-01	Masonicus Brook	IS	NS 4	IS	IS	NS 3	IS
NJ02030103140010-01	Hohokus Brook (above Godwin Ave)	NS 1	NS 4	IS	FS	NS 3	NS 1
NJ02030103140020-01	Hohokus Brook (Pennington Ave to Godwin Ave)	NS 1	NS 2	IS	FS	NS 3	NS 1
NJ02030103140040-01	Saddle River	FS	NS 2,5	IS	FS	NS 3	FS

Designated use key
 IS - Insufficient Information
 NS - Not attaining
 FS - Fully supporting

Attributed cause of unattainment
 1- Total dissolved solids
 2 - Cause unknown
 3 - Fecal coliform
 4 - Phosphorus
 5 - Temperature

rotational basis once every five years. There are no AMNET stations within the confines of Ramsey’s boundaries.

The Surface Waters map shows the location of two stations in proximity to the Borough. Station AN0286 is located upstream of the Borough on the Ramsey Brook. The results of this testing have been recorded in 1998, 2003, and 2008. A comparable station was tested in 1990. Within the ten years of testing the Ramsey Brook has improved in quality from a designation of “Severely Impaired/Poor” to “Moderately Impaired/Fair”. Downstream of Ramsey, station AN0284 records data on the Valentine Brook in Allendale Borough. This station has maintained a status of “Moderately Impaired/Fair” for the same ten-year period.

Integrated Water Quality report

The AMNET data provides substantial information for compiling the state Integrated Water Quality Report. The Federal Clean Water Act (CWA) (33 U.S.C. 1315(B)), requires the State of New Jersey to prepare and submit to the USEPA a biennial report addressing the overall water quality of the State’s waters. This report is referred to as the New Jersey Integrated List of Waterbodies.

The Integrated Report identifies water quality in accordance with N.J.A.C. 7:15-6 and the Surface Water Quality Standards. It is then determined if the water has attained the standards necessary for each designated use: Agricultural water supply, aquatic life, fish consumption, industrial water supply, primary contact recreation, public water supply, and secondary contact recreation.

Starting in 2006 the NJDEP shifted its approach to a subwatershed (HUC-14) basis. The results from one or more monitoring site(s) within the subwatershed are extrapolated to all of the watersheds within the HUC-14. This approach does not mean that all regulatory or remediation efforts will be applied on a HUC-14 level. Any remediation or regulation will demand further investigation as to the source and extent of impairment within the waterbody. This technique recognizes the interconnectedness of surface water systems, but does not overburden communities with unnecessary restrictions, if not applicable.

Table 3a provides the Draft 2010 Integrated Water Quality Report Data on the HUC-14s within Ramsey as it relates to the designated uses. The table details if the waters within the

Table 3b: 2010 Water Quality Limited Waters

HUC 14 ID	Subwatershed Name	Source	TMDL Priority	TMDL Schedule
NJ02030103140020	Hohokus Brook (Pennington Ave to Godwin Ave)	Cause unknown	Medium	Beyond 2012
NJ02030103140020	Hohokus Brook (Pennington Ave to Godwin Ave)	Total Dissolved Solids	Medium	Beyond 2012
NJ02030103140040	Saddle River	Cause unknown	Medium	Beyond 2012
NJ02030103140040	Saddle River	Temperature, water	Medium	Beyond 2012

HUC-14 attain the designated standard, the cause, and the source. Some of these waters have not been fully classified in the report due to insufficient information. Despite the efforts to expand the monitoring networks, the NJDEP does not have the resources to maintain water monitoring on every stream and waterbody in the state routinely. Volunteer organizations, students, and organizations provide a critical function to minimize data gaps and enhance the data collected in subwatersheds across the state. Currently, Ramsey does not have a program that supports volunteer monitoring.

Table 3b includes the List of Water Quality Limited Waters from the Draft 2010 Integrated Water Quality Report. Also known as the 303(d) list, the Limited Waters list encompasses waterbodies that did not attain designated use standards due to a pollutant and require regulatory intervention.

TMDL

Often the NJDEP will implement a Total Maximum Daily Load (TMDL) as the means to achieve regulatory intervention. The USEPA mandates the creation of TMDLs for all waters that fail to meet federal water quality standards. TMDLs may also be created as a protective measure in waters that have not been impaired. TMDLs reflect the recognized carrying capacity of a waterbody to absorb pollutants without impairment greater than specified by water quality standards. The measurement accounts for the sources of the pollutant, the natural background of the receiving water, and surface water withdrawals from the waterbody. TMDLs operate as an enforcement

mechanism to address source and non-point source water quality impairments and satisfy water quality standards.

In the Borough of Ramsey, nearly 5.5 miles of streams require a TMDL for fecal coliform. These streams are indicated on the Surface Waters map with either a red or orange colored line. The entirety of Ramsey Brook within the Borough and its unidentified tributary, the small section of Pleasant Brook, the Masonicus Brook in the northern section of the Borough, and its unidentified tributary on the border with Mahwah all require a TMDL for pathogens. Garrison Pond, Wyckoff Lake, Mirror Lake, and Canns Lake are also subject to a TMDL for coliform.

The primary contributors for fecal coliform loading are non-point sources and stormwater point sources. Stormwater carries the bacteria from sources such as farms, geese, and pet waste into the streams through runoff and storm drains. Failing or inappropriately sited septic systems and failing sewage conveyance systems also contribute to pathogen loading in waterbodies. NJDEP determined that point source contributions from Publicly-Owned Treatment Works (POTWs) are insignificant, and therefore exempt from changes to effluent limits imposed by a TMDL.

Implementation of a TMDL requires coordination between the NJDEP, local and county government, and watershed community. Addressing pathogen concerns can be done through enforcement of state mandated pet waste ordinances, implementation of geese management activities, and maintenance of

sewer and septic infrastructure. Furthermore, local officials should implement stormwater regulations to address non-point and runoff sources of contamination.

Protective Buffers

Buffers along wetlands and riparian corridors is another regulatory technique to address water quality concerns caused by human related activities. The Protective Buffers map illustrates the differing buffer widths along stream corridors and wetlands within Ramsey.

Regulatory wetland buffers vary based on the determined resource value of the wetland. Exceptional value wetlands receive a 150 foot buffer. In Ramsey there may be wetlands of Exceptional Value due to the presence of Endangered Species Habitat. The actual value

and the consequential buffer can only be officially determined by an LOI by the NJDEP.

Wetlands of ordinary value carry no buffer requirements, while wetlands of an intermediate value have a 50 foot buffer. The wetlands in Ramsey that have not been identified as critical habitat have been mapped with a 50 foot buffer for the purposes of this ERI.

All open waters in the state receive a regulated buffer of 50 feet automatically. If a riparian corridor contains identified habitat of a water-dependent threatened or endangered species, the buffer is increased to 150 feet. Additionally, Category 1 waters receive a 300 foot buffer. Ramsey does not have any Category 1 waters and is not subject to this buffer requirement. The riparian areas in Ramsey have been mapped based on the identified



Photo credit: Princeton Hydro, LLC

habitat of water dependent species such as the Wood frog or Timber rattlesnake from the Landscape Project 3.0.

Water Quality Impairments

Point Source

Discharges to streams and rivers are the most visible and widely regulated threat to the surface water systems in the US. The Federal Clean Water Act made clear strides in addressing unmitigated dumping of toxins and pollutants into waterways across the country. The National Pollution Discharge Elimination System permits point source contamination into waterbodies in the US. While the threat these contaminants pose remains, the federal and state regulatory frameworks have reduced the health and environmental impacts of point source pollution across the country.

Non-point source

Non-point source pollution, described as contamination that cannot be directly attributed to a single point, presents a more difficult regulatory challenge. Without a specific source federal and state agencies have had to make broad regulations and programs to address this form of contamination. Non-point source pollution comes largely from the runoff that occurs during and after a storm event.

Rainfall collects toxins, pesticides, pathogens, sediment, and other chemicals from grasses, driveways, roofs, and roads, and then runs into the storm sewer which discharges into a nearby waterbody without treatment. At

times the runoff does not even collect in the storm pipes, but runs directly downhill and into the streambed. A number of programs and efforts have been focused on implementing Best Management Practices and Low Impact Development approaches to reduce the volume of stormwater runoff that reaches streams and rivers untreated, as well as reducing the chemical compounds that can be carried into the waterways during storms. For more information on New Jersey's regulations see Section 1:Stormwater Regulations.

Riparian disturbance

The transportation of sediment and silt into surface water systems is one of the most widespread contaminants in waterways. Development along stream banks can increase erosion and the transfer of sediment into the streams and rivers. The riparian corridors offer fragile and unique habitat for threatened and endangered species such as the Black-crowned Night Heron. Encroachment on these areas creates challenges beyond surface water quality.

Dams

Dams provide a utility for recreation, hydropower, surface water intakes, and flood control. It is estimated that in the US there are over 75,000 dams blocking hundreds of thousands of miles of waterways. Manipulation of the surface water system in any form changes the hydrology, may increase flooding, and can disconnect wetland systems.

The ponding that occurs behind dams can increase the water temperature, thus decreasing

the oxygen content, and trap sediment and contamination. Additionally dams can prevent fish passage. For species that swim up or downstream in order to breed, dams prevent the proliferation of certain species upon which aquatic food chains depend. There are currently efforts throughout the US to remove obsolete dams to allow restoration of floodways, fish passage, and natural surface water systems.

There are at least three impoundments on Ramsey streams and open waters. Two of these are regulated dams under the purview NJDEP Bureau of Dam Safety and Flood Control. The known dam that is less than 5 feet is in proximity to the Regency Apartment. The regulated dams, both greater than 5 feet, are the impoundment for Garrison Pond and Lakeside Drive. These are the dams that have been recorded by the municipal government. Additional unregulated impoundments may impede water flow on other surface waters in Ramsey.



Photo credit: Ashley Sicard

Groundwater

Ramsey relies heavily on groundwater sources for its drinking water. As groundwater is susceptible to both natural and man-made contamination, as well as over-extraction, its protection is critical for the interests of the Borough.

Groundwater passes beneath the earth's surface at various depths and patterns. The water table refers to the depth at which groundwater saturates the soils. Water tables vary by geology, climate conditions, and seasonal variability. Below the water table, ground water passes through geological formations, and is often retained in aquifers. The USGS defines an aquifer as a geological formation, group of formations, or part of a formation that contains sufficient saturated, permeable material to yield significant quantities of water.

Aquifers vary drastically in size and composition. In New Jersey the USGS divides the aquifers into two groups. North of the Fall Line (the division line between the Coastal Plain from the northern physiographic provinces) lie the non-Coastal Plain aquifers, while the Coastal Plain aquifers remain south of the Fall Line. The provinces and their related surficial geology heavily influence how groundwater is contained, extracted, and recharged.

Ramsey sits entirely atop the Passaic Formation. A bedrock formation comprised of sandstone and conglomerate beds, the Passaic Formation was at one time known as the Brunswick Formation. This bedrock is part of the Piedmont province and consequently

houses non-Coastal Plain aquifers. The non-Coastal Plain aquifers consist of glacial valley-fill deposits, fractured shales, limestones, sandstones, conglomerate, and crystalline rocks. Ramsey sits above aquifers within the Newark Group. These aquifers are primarily shale and sandstone. Studies have found water to be present in the upper 200 or 300 feet of the bedrock. Beneath 500 feet water availability may be reduced, depending on the rock type as the fractures become smaller.

Groundwater Recharge

Groundwater recharge is a critical consideration for all planning and land use decisions, especially for a community heavily reliant on groundwater sources for drinking water. The Aquifer Recharge map shows estimated recharge rates for the groundwater beneath Ramsey. These estimates gage potential recharge based on geology and land use. An in-depth study should be performed at the site level to determine the actual recharge potential of any parcel.

This map provides a foundation for understanding trends within the community. If the soils and geology are held equal, wooded areas and heavily vegetated lands allow for more recharge than mowed grass due to a decrease in runoff rates. In Ramsey the map indicates that the highest potential for recharge occurs in the areas with lower density and remaining woodlands. Open waters, wetlands and hydric soils are listed separately because they constantly remain saturated, these areas are not considered successful recharge areas.

The Aquifer Recharge map overlays the boundaries of the surficial and bedrock aquifers beneath the surface of Ramsey. The dotted red lines divide the community into three known groundwater sources. Region A covers a surficial sand and gravel aquifer that allows for the greatest yield at 250-500 gallons per minute (gpm). The lowest yield occurs in the areas labeled “C” on the map. This surficial aquifer in till materials yields only 25-100 gpm. The Wellhead map indicates that thus far Ramsey has effectively guided its community wells towards the more productive groundwater sources.

Groundwater Quality

Groundwater is susceptible to both natural and man-made contamination. Shallow aquifers such as those found in the Piedmont province are susceptible to sources of contamination that occur at the surface such as spills and unregulated discharges. Aquifers that are overdrawn can be affected by saltwater intrusion. Additionally, the bedrock and surficial geology can leach elements and compounds, such as arsenic, into the groundwater. Aquifers that are unconstrained and porous such as those underlying the Ramapo River Basin allow contamination to spread quickly.

The NJDEP monitors groundwater quality through the Ambient Groundwater Monitoring Network. Formed in 1983 as a cooperative program between USGS and the NJDEP, the network operates to protect groundwater sources within key identified Watershed Management Areas. The USGS posts the data on the National Water Information System website.

The USGS monitors the level of groundwater while the NJDEP qualifies groundwater based on standards.

The Groundwater Quality Standards (GWQS), N.J.A.C 7:9C classify waters by designated use and set quality minimums for those waters to reach attainment. Groundwater quality links heavily with the NJDEP efforts to remediate contaminated and brownfield sites. For more information on groundwater quality in Ramsey, see the *Contaminated Sites* section.

Wellhead Protection

The 1986 Federal Safe Drinking Water Act amendments (Section 1428, P.L. 93-523) direct all States to develop a Wellhead Protection

Program (WHPP) for both public community wells and non-community public wells, such as those that service a homeowners association, school, church or business. The NJDEP Guidelines for the Delineation of Wellhead Protection Areas explain that a goal of this plan is to protect water supplies and prevent the contamination of ground water resources and drinking water supplies.

A Wellhead Protection Area is a mapped area around a public well that delineates the horizontal extent of groundwater travel.

Tier 1 Time Of Travel = 2 years

Tier 2 Time Of Travel = 5 years

Tier 3 Time Of Travel = 12 years

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Groundwater is vulnerable to the risk of contamination from varied sources including underground storage tanks of gasoline, heating fuel, and septic systems. It is difficult and costly to cleanup or treat polluted groundwater, and these wells are often abandoned. Therefore, preventing groundwater pollution through a Well Head Protection Program is the most cost-effective approach.

The NJDEP cataloged and mapped these public wells and delineated the Wellhead Protection Areas (WHPA). The WHPA includes the area of land from which a well draws its water, or the horizontal extent of ground water captured by a well pumping at a specific rate over a two-, five-, and twelve-year period of time. The WPHA also depicts three sequential tiers that identify the time of travel (TOT) it takes water to flow to a well and the relative risk of contamination. Each WHPA is dependent on the pumping rate of the well and the local geology.

The WHPA delineations are the first step in defining the sources of water to a public supply well. Within these areas, potential contamination can be assessed and appropriate monitoring undertaken. The delineation of wellhead protection areas can also help communities to better understand the nature of their groundwater supplies and the importance of protecting these resources. In New Jersey zoning is the authority of each municipality, and communities are adopting ordinances that restrict future development of certain high-risk industries and services, such as gasoline stations, from locating near public wellhead protection areas.

The Wellhead Protection Area mapping for the Borough identifies twelve public community wells and one non-public community well within the Borough. Future development or growth near these wellhead protection areas should be carefully evaluated to ensure that the water quality and groundwater recharge of these community wells are not degraded.

Water Supply

Ramsey receives its drinking water from a combination of surface and groundwater sources. The Borough of Ramsey Water Department is responsible for the delivery of water to all residents within the community. In addition to maintaining the infrastructure for the water delivery and sanitary sewers, the Ramsey Water Department owns and operates ten groundwater wells as of 2009.

Approximately 60 percent of the water delivered to Ramsey comes from these wells, eight of which are within Ramsey and two are within Mahwah. The remainder of the water is purchased from United Water. This water is blended with the groundwater obtained by the wells in the distribution system. At present the Borough does not purchase water from any other municipality or jurisdiction.

As Ramsey's water comes from both surface and groundwater sources it is vulnerable to the risks laid out above. The water delivered to Borough residents is subject to stringent testing and reporting to meet state and federal standards. The 2009 Water Quality Report for Ramsey is available on the municipal website.

The Water Quality Report only reports on the susceptibility for water sources owned by the Ramsey Water Department. Information on the risks of water purchased from United Water must be obtained from their report.

The 2009 Water Quality Report for Ramsey indicated that the water did not violate any minimums or standards required by the state or federal government. This does not preclude certain populations from facing consequences from contamination in the water. Certain individuals and groups may be more vulnerable to the impacts of contaminants than are accounted for in the broad standards. More information on these susceptible populations can be obtained from the Water Quality Report.

Arsenic

Arsenic naturally occurs in groundwater, but may have serious health consequences for consumers. To reduce the probability of these health impacts, the NJDEP lowered the state standard from 50 parts per billion (ppb) to 5 ppb effective in January 2006. The Ramsey Water Department installed facilities to remove arsenic from the water in order to meet this standard requirement.

A number of communities in New Jersey faced a similar problem with arsenic in groundwater. If ingested above the standard for an extended period of time, arsenic may damage the skin and/or circulatory system, and may increase risk of cancer. In 2009 the Water Quality Report provided a quarterly average of arsenic at 1.2 ppb. The efforts of the Ramsey Water Department have been successful in reducing the presence of arsenic in the drinking water.

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A community's biodiversity is a reflection of the overall health of the natural environment. The capacity of the waterbodies, wetland areas, and vegetated land to support wildlife and habitat hinges on the quality of the air, soil, and water in the region. The biological resources in a community offer aesthetic benefits, recreation activities, as well as ecological function. Both plants and wildlife struggle in developing and developed landscapes as toxins taint the environment, competitive uses limit habitat, and invasive species compete for vital resources.

The Federal and New Jersey governments have passed legislation appropriating funds to restoring and protecting biodiversity. Local governments have the opportunity to heighten these protections by using zoning, land use planning, and municipal ordinances to reduce the impact of development on habitat, sensitive vegetation, and wildlife populations. Additionally, governments frequently sponsor efforts to reduce individual's inclination to harbor exotic, injured, or abandoned wildlife. Maintaining these animals as domestic pets may result in harm or death, and may cause damage to the local ecosystem after an inappropriate release of the animal.

Wildlife

Although no comprehensive database of wildlife populations exists for Ramsey, Bergen County, or New Jersey, it is possible to infer possible animal populations based on sightings, known extents, and information on habitat. According to the New Jersey Department of

Fish and Wildlife, over 450 species of vertebrate wildlife have been documented or seen throughout the state. Often non-profits, volunteers, and state agencies collect information on the presence of animal populations. The extent of the data on biodiversity within a community depends of these field visits to document and verify sightings. Currently, there are no organizations focused on monitoring animal and rare plant populations specifically for Ramsey. Information on the common animals potentially existing within Ramsey comes from the 1992 NRI, the NJDEP, and the Bergen County Audubon Society.

The 1992 NRI for Ramsey includes a list of common mammals found in and around Ramsey. According to the NRI, chipmunks, deer, fox, mole, mice, muskrat, bat, opossum, rabbit, raccoon, shrew, skunk, squirrel, vole, and woodchucks may utilize the hundreds of acres of conserved land within Ramsey as habitat. Additional species that may be seen in and around Ramsey include Canada Goose, Black Bear and Coyotes. Black Bear, Canada Goose, and Coyotes have increased in population in New Jersey in recent years and have implications for the health and safety of residents.

Reptiles and amphibians

New Jersey is home to 71 species of reptiles and amphibians. Common reptiles and amphibians in the region may be American Bullfrog, American Toad, Milk Snake, Rat Snake, Red Spotted Newt, Garter Snake Northern Water Snake, Racer, Spring Peeper, Slider, Pickerel Frog, Green Frog, Wood Frog, Gray Tree

Frog, Box Turtles, Spotted Turtles, Snapping Turtles, and Painted Turtles and several types of salamanders. Salamanders reported by the Tenafly Nature Center as local to Bergen County are Northern Dusky Salamander, Northern Slimy Salamander, Northern Two-lined Salamander, and the Eastern Red-backed Salamander. These species are reported to have stable populations in the state at this time.

Invertebrates

Invertebrates are the most common type of animal. As such they are present in a variety of habitats and regions, are an integral part of every food chain, used to diagnose environmental health, and provide key ecological services to every community. The broad category encompasses all animals without a spinal column and covers insects (butterflies, moths, ants, dragonflies, bees, flies), arachnids (spiders, ticks and mites), crustaceans, mollusks (mussels, snails and slugs), and worms.

Invertebrates play a key role within terrestrial, wetland and aquatic ecosystems. In addition to providing food for predators, insects also pollinate and enable plant reproduction. Some mollusks have been created with water quality treatment and filtration. Worms are noted for digesting and breaking down soil. The invertebrate assemblage is often very indicative of an ecosystem's overall status and environmental health.

Tiny invertebrates, smaller than 50 millimeters, that live on the bottom of watercourses are called benthic macro-invertebrates. In

Black Bear

The Black Bear is the largest mammal resident to New Jersey. Recently, Black Bear populations have grown increasingly visible to New Jersey residents. For years Black Bears suffered extensively at the loss of habitat, but status as a game animal and the proliferation of mature forests in isolated tracts has allowed the Black Bear to proliferate across the state.

According to the NJDEP Black Bears have been sighted in all 21 counties. In 1995 only the northwestern region reported sightings. The NJDEP reports that the most common reported problem with bears is the rummaging through trash. However, at times these interactions result in physical harm to the person or animal. Often these occurrences result from a lack of awareness of how to safely manage the presence of a bear. More information regarding bears can be found on the NJ Division of Fish and Wildlife website.

Deer

Suburban and rural residents, especially those with gardens, are all too familiar with white-tailed deer. Damage to gardens, agricultural crops, and over-harvesting of forests are some of the challenges presented by an unchecked white-tailed deer population in an increasing urbanizing state. Additionally, vehicular accidents involving deer present a serious safety concern. The urbanization of New Jersey, limiting options for hunting, coupled with decreases in national hunting trends results in a highly visible deer population. The NJDEP encourages hunting where appropriate as a means to manage resident deer populations.

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watersheds across the US this unique creatures are used to assess water quality. For more information regarding the use of invertebrates in water quality testing, see the section *Surface Water Quality* for more information.

While invertebrates are common and important to the vitality of the ecosystem, not all of these animals belong in every ecosystem. When a foreign invertebrate is introduced to an environment it can severely disrupt the balance. Plant communities may severely decline, which could result in a ripple effect throughout the ecosystem. This has been seen with the Asian Longhorned Beetle, the Gypsy Moth, and the Pineshoot Beetle. The USDA and other agencies warn individuals against moving wood, especially firewood, between locations as this may spread the presence of foreign invertebrates.

Avifauna

As of October 2010, New Jersey has had 465 birds of natural origin documented including extinct species. Many of these birds reside within the Garden State throughout the year, while certain bird species choose to spend only the winter in New Jersey. Some of the documented birds use New Jersey's natural and urban areas to breed, while others only rest here during migrations.

Of the documented species found within the state NJDEP lists 17 bird species as endangered, including eight in which the breeding population is endangered. Of these the Piping Plover and Roseate Tern are also listed on the Federal endangered species list. The state

Canada Goose

The Canada goose is one of the most commonly seen and recognized birds in the state of New Jersey. In 2002 resident geese numbered nearly 100,000 State-wide. These birds feed on grass and prefer wide-open spaces where it is easy for them to observe predators or threats. As a result it is not uncommon for them to be present in large numbers on golf courses, playing fields and the sculpted lawns of corporate parks.

Geese can cause a large amount of damage. Their grazing activity degrades vegetative cover and their feces is responsible for water quality impacts owing to the associated nutrients and pathogens. The concentration of fecal matter is recognized to be a principal source of water quality degradation in suburban and urban areas.

The USDA has also expressed concern that these birds damage agricultural crops and wetland areas. Management practices for geese include aversion statues, landscaping adjacent to water bodies with appropriate vegetation, fencing, and other active and passive control techniques designed to make areas less hospitable for nesting, feeding and roosting..

lists an additional 16 species as Threatened, six of which are breeding populations.

Birding provides a great form of recreation and engagement with the natural environment. Opportunities for viewing are spread across all 21 counties as New Jersey's diverse landscape provides varied habitat for many bird species. The New Jersey Audubon Society lists 123 sites as important birding areas throughout the state. Near Ramsey, in the Piedmont Plains Region, the Celery Farm Natural Area, Lake Tappan, and Oradell Reservoir and Woods are listed among these unique birding locations.

Within the Celery Farm Natural Area over 240 bird species have been sighted including the Red-Shouldered Hawk, American Bitterns, Pied-billed Grebes, Long-eared Owls, Cooper's Hawk, Sharp-shinned Hawks, and American Black Ducks. Other possible birds common in the Ramsey area are Common Merganser, Ring-billed Gulls, Bald Eagle, Double-crested Cormorants, Grackles, American Kestrel, Great Blue Heron, Mallard, Ruddy Duck, Rock Dove, Mourning Dove, Red-bellied Woodpecker, Downy Woodpecker, Blue Jay, White-breasted Nuthatch, European Starling, Cardinal, Robin, Mockingbird, American Goldfinch, and the Red-winged Blackbird. This list is not exhaustive as birds within Bergen County are prominent due to the heavily vegetated areas to the north and west, and migration patterns.

Eastern Coyotes

Eastern Coyotes have recently established themselves in New Jersey. These members of the wild dog family prey are known for being widely adaptable, allowing them to prosper in the densest state. A 2006 report indicated that over 3,000 coyotes live in New Jersey. Coyotes are not known to attack humans, although the possibility exists as it does with any predatory animal. According to the NJDEP there have been reports of coyotes attacking small pets on occasion within developed areas.

These resourceful creatures provide an important function in maintaining rodent population and do not currently pose a critical threat to humans. Many of the reports and complaints for coyotes involve only a perceived concern for what the animal might do, not what the animal has done. Precautionary information regarding coyotes can be found on the NJDEP Division of Fish and Wildlife website.



Eastern Coyote

Fish

There are an estimated 85 species of freshwater fish found within New Jersey waters. An additional 336 marine finfish pass through the bays, estuaries, and marine waters at some point during the year. The Division of Fish and Wildlife's Bureau of Freshwater Fisheries is responsible for the protection and management of freshwater fisheries throughout the state. The Bureau collects research and surveys on fish populations in streams, rivers, and lakes. The Bureau also raises and stocks 19 species of fish in over 200 waterbodies each year. State fishing reports Darlington Park Pond hold populations of largemouth Bass, catfish, carp, and sunfish.

Fish populations continue to face threats from impoundments and water quality contaminants from point and non-point sources. As freshwater fish provide food for animals in river and ocean systems, these impediments to breeding have potentially devastating effects on marine ecosystems. Fish also provide a recognized form of recreation and income throughout the nation. Recreational fishing in New Jersey is supported through the Division of Fish and Wildlife. However, due to impairment in water quality many streams have not satisfied the requirements to meet safety standards for fish consumption. See the section *Surface Water Quality* for more information.

Threatened and Endangered

One indicator of stress on the state's ecosystems is the growing number of species that are designated as rare, threatened or endangered species. As of 2005, nearly one third of the vertebrate animal species found in New Jersey are classified as rare or endangered (NJ Trends, 2005).

The NJ Department of Environmental Protection, Division of Fish and Wildlife (NJDEP-DFW) defines Endangered Species as those species whose prospects for survival in New Jersey are in immediate danger because of a loss or change in habitat, over-exploitation, predation, competition, disease, disturbance or contamination. NJDEP defines Threatened Species as those who may become endangered if conditions surrounding them begin to or continue to deteriorate. These threatened and endangered species are identified and protected in accordance with the Nongame Species Conservation Act. (N.J.S.A. 23:2A-1 et seq.)

New Jersey uses two programs to identify and monitor endangered, threatened, and/or rare ecological communities. The New Jersey Natural Heritage Program uses GIS mapping to identify rare plant and animal species and create a comprehensive inventory. The Landscape Project was developed initially by New Jersey Division of Fish and Wildlife's Endangered and Nongame Species Program (ENSP) in 1994, and was adopted to utilize a landscape level approach to imperiled species protection. Both programs offer a method for indentifying and monitoring critical biological resources.

The Natural Heritage Program

Established in 1984 the Natural Heritage Program compiles information from a broad range of resources including museum and herbarium collection records, fieldwork, publications, and expert identifications. In partnering with other state and non-public agencies the Natural Heritage Program centralizes data, providing a single comprehensive resource to identify valuable ecological resources in the state.

Through the efforts of the Natural Heritage Program and its partners the database is continually updated to maintain a current inventory. Not all of the areas in the state have been field verified, as creating this inventory is an intensive and evolving process. With caution this information can be used to prepare environmental impact assessments, identify priority areas for conservation and protection, and aid in land use planning.

For the purposes of this ERI a request for information was submitted to the Natural Heritage Program. As of November 2010 the Natural Heritage Database does not contain any records for rare plant species or ecological communities within Ramsey.

There are a number of rare plant species that have been documented in Bergen County that may be present within Ramsey, but have not been identified and documented by the Natural Heritage Program.

The request for data from the Natural Heritage Program also includes information regarding rare animal populations. The Endangered and

Non-game Species Program provides this information from the Landscape Project to the Natural Heritage Program and is detailed in the subsequent section of this document.

Landscape Project

The Landscape Project started in 1994 in response to a need for information regarding critical and suitable habitat in New Jersey. As residents of a dense and continually urbanizing state, New Jersey wildlife populations face intense pressure and threats. The Landscape Projects offers a vehicle to lessen these pressures and ensure the vitality of suitable and critical habitat for animal communities.

The landscape approach focuses on large tracts of land, called landscape regions, which are ecologically similar in regards to their plant and animal communities composed of critical wildlife areas. In 2002, utilizing a combination of land cover data and an extensive database of rare species locations, the Landscape Project published GIS mapped areas of critical importance for imperiled species within five distinct landscape region or habitat type including: grassland, forest, forested wetland, emergent wetland and beach/dune. Grasslands must meet a minimum size of 18 hectares (44.46 acres) to be recognized by the Landscape Project. Forests must meet a minimum core size of 10 hectares (24.7 acres).

The Landscape Project delineates critical habitat patches based on the species present and their conservation status, which are ranked from common to most rare. Areas with federally threatened or endangered species

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receive the highest ranking (5), followed by state endangered (4), state threatened (3), state species of priority concern (2), and finally suitable habitat for threatened or endangered species in which no observation has been documented (1). Ultimately, this information can assist state, local and private agencies in prioritizing areas that could be preserved to protect habitat for rare species. This information also serves to alert officials to ensure that any future development minimizes disturbances to these critical habitat areas.

The NJ Landscape Project 3.0 classifies approximately 24% of Ramsey (841 acres) as either suitable or critical habitat for state threatened or endangered species. Preservation of both

levels of habitat is imperative to maintaining biodiversity within the region. Although not currently supporting an observed population, suitable habitat is important to potentially future growth and establishment of populations. Within Ramsey the documented state threatened and endangered species observed are Black-crowned Night-heron, Cooper's Hawk, Long-eared Owl, Red-headed Woodpecker, Red-shouldered Hawk, Timber Rattlesnake, Wood Turtle, and Yellow-crowned Night heron.

Nearly 54% of the 841 acres provides critical habitat for State Endangered Species (R4) such as the Timber Rattlesnake and breeding populations of the Red-shouldered Hawk.

Table 4: Landscape Project Wildlife by Habitat Type in Ramsey

Wetlands	Urban
Black-crowned night-heron forage (T)	Red-headed woodpecker (T)
Cooper's hawk (T)	Cooper's hawk (T)
Long-eared owl (T)	Black-crowned night-heron forage (T)
Red-headed woodpecker (T)	Timber rattlesnake (E)
Red-shouldered hawk (E)	
Timber rattlesnake (E)	Forest
Wood turtle (T)	Cooper's Hawk (T)
Yellow-crowned night-heron forage (T)	Red-headed woodpecker (T)
	Red-shouldered hawk (E)
Water	Timber rattlesnake (E)
Black-crowned night-heron forage (T)	

(T) = Listed as Threatened in New Jersey
 (E) = Listed as Endangered in New Jersey

Concentrated in the western section of Ramsey, critical habitat for endangered species include wetlands, forests, as well as some urban areas. In addition breeding populations of the Red-shouldered Hawk have been observed in the forested area between the railroad line and Central Ave (Route 85) south of Main Street. Habitat ranked as R4 also contains populations of threatened species including the Long-eared Owl and Wood Turtle.

Threatened species including Cooper's Hawk and the Red-headed Woodpecker find additional habitat in the northeastern and central forested areas of Ramsey as indicated by the R3 Forest Habitat between Airmont Ave (Route 83) and Franklin Turnpike (Route 507), as well as north of Darlington Ave and west of the train tracks on the Threatened and Endangered Species Habitat map. Wetland areas and lakes that surround the Valentine Brook in the central section of Ramsey and those adjacent to the Ramsey Brook to the east provide critical foraging habitat to the Yellow-crowned Night-heron and the Black-crowned Night-heron.

Scattered throughout Ramsey wetlands provide suitable emergent and forested habitat for these rare species. Although no documented observations of threatened or endangered species exists for these areas marked by R1 on the map, protection of these areas may ensure the vitality of future habitat and aid in the stabilization of these fragile populations. These areas possess the characteristics sought by animal communities as habitat and may become critical habitat in the future, if they remain intact.

Vernal Pool Habitat

Vernal pool habitats are narrowly defined as ephemeral wetlands that have temporary ponding water during the year and provide habitat for obligate or facultative breeders. Vernal pools have only recently been widely recognized for their important ecological function as wetlands. Statewide, the number of vernal pool habitats declined drastically due to development and limited regulatory protection. However, with the approval of the Freshwater Wetlands Protection Act Rules in 2001, vernal habitats became specifically protected. Filling, altering, draining or otherwise compromising the hydrological or ecological function of vernal habitats should be avoided and these activities are subject to NJDEP review and approval.

To be classified by the NJDEP as a vernal habitat, standing water must be present in the pool for at least two continuous months between March and September in a year of normal rainfall. Ecologically, vernal pools harbor documented obligate or facultative vernal habitat species such as frogs and salamanders as listed by NJDEP, and be free of fish populations.

Characteristic obligate species include amphibians such as the mole salamanders, and wood frog, but are equally important to facultative wildlife such as state threatened Wood turtle. Obligate species may be defined as those species that are dependent on vernal habitats at some stage of the life cycle, while facultative species are those species that frequently utilize vernal pool habitats but are capable of reproducing outside of vernal habitats.

The NJDEP's Endangered and Nongame Species Program established the Vernal Pool Habitat Project, which is a dedicated effort to map and survey vernal habitats throughout the state. Much of the NJDEP's mapping efforts have been completed through trained volunteer surveys and a partnership with Rutgers University's Center for Remote Sensing and Spatial Analysis. For the Highlands surrounding region, the Landscape Project 3.0 includes vernal pool habitat. As indicated on the subsequent map Ramsey has one vernal pool that has been documented and certified by the NJDEP. The pool is located in the vicinity of the Ramsey Brook Tributary in the northeastern section of the Borough near Airmount Ave.

For the purposes of mapping, the Landscape Project adds a 300-meter buffer around the center of the vernal pool. This buffer has no regulatory implications, but encompasses land in the surrounding areas that may also provide habitat. It is provided for information purposes only and does not delineate the boundary of the pool or transition area.

Vernal pools receive the same regulatory buffers as other delineated freshwater wetlands, depending on the determined resource value. The NJDEP Division of Land Use Regulation (LUR) extends an effort to verify that freshwater wetlands permit applications do not infringe on certified vernal pool habitat areas. When a permit application comes in, the LUR will check the location against the list of certified pools. The New Jersey Freshwater Wetlands Protection rules restrict the activities allowed in vernal pools and their regulated transition areas.

Threats to Wildlife and Plants

Pollution

People often relate the impacts of pollution on wildlife and wildlife with major environmental catastrophes such as the 2010 Gulf Coast Oil Spill or toxic Superfund sites. The general public also typically point to discharges from factories or wastewater treatment plants being the primary cause of impact to wildlife or the degradation of surface water ground water, wetland and terrestrial ecosystems. While such point-source risks can be significant and continue to threaten wildlife communities and habitat, there is increasing awareness about the impacts of pollution from non-point sources.

As previously mentioned, non-point source pollution is a leading threat to the quality of our natural resources. In particular, stormwater runoff mobilizes and transports a variety of pollutants including oil, grease, fertilizer, salt, bacteria and pathogens, toxins, insecticides, and sediment into wetlands, streams and rivers. These diffuse and varied compounds directly affect aquatic life and wetland dependent species.

The impacts on these species and habitats trickles effects through food systems to affect broad ecosystems. Stormwater runoff can also compromise groundwater resources, including potable water supplies. Thus the impacts of non-point source pollution can be far reaching, but difficult to combat and control given the ubiquitous nature and diffuse origins of this form of pollution.

Habitat removal

The Landscape Project strives to address one of the most direct threats to wildlife populations. Development across the country has removed vast amounts of preferred habitat for wildlife. The forests and wetlands that remain are often divided and isolated, reducing their value to large animals as well as migratory species.

The development and land use patterns have not allowed for safe corridors to allow for migration of species like Black bear, deer, and coyotes. In addition to the impacts on fragile species that are listed as threatened or endangered, habitat removal forces unnecessary and potentially inflammatory interactions between humans and other animals such as Black bear.

Invasive Species

The interconnectedness of human transport systems has magnified the capacity of animals and plants to migrate to new land. Where butterflies, insects, wind, and birds provide a vehicle to transport seeds and pollen, humans use cars and planes to transplant species for the aesthetic, medicinal, or personal value they might provide. An invasive species is one that takes advantage of this unnatural dispersal and threatens the stability of the ecosystem to which it is transferred.

The Asian Long-Horned Beetle, Asian Carp, Chinese Tallow are examples of non-native species that may have implications for native ecosystems. To reduce the unnatural transfer of these species the public must be aware of

the dangers of transferring firewood and other plants from one region to another. Exotic plants and animals purchased at stores may still have devastating impacts on local plants and animal communities, especially if they are released into the wild. Jurisdictions can work within their regulatory capacity to advise and limit the direct transfer of invasive species into the community.

Climate change

The Polar bear has become an icon for the potential effects of rapid changes in the global climate system. Any form of climate change will inevitably result in shifts within local and regional ecosystems. Scientists are predicting shifts in climate change may increase the intensity and periodicity of storm events.

These episodes will impact vegetation root structures, wetland areas, and the animals that depend on these areas. The fluctuation in temperatures and the propensity towards extremes may challenge animal and plant communities that have adapted to the routine climate patterns of a given region. The inability of these communities to readily adapt to anticipated fluctuations makes them vulnerable.

Garlic Mustard



BUILT ENVIRONMENT

In many ways the design of the built environment guides a community's relationship with its natural resources. The urban and suburban landscape parcels off natural lands, breaking and creating wildlife corridors and habitat. Political lines cut across ecological communities and disconnect watershed systems, neglecting the interconnectedness of the natural world.

Automobiles, air conditioners, waste removal systems, and water purifiers disassociate individuals from the land, air, and water upon which they depend. Transportation infrastructure, advancement in utilities, and improvements in technology continue to shape the interaction between people and the natural environment. For these reasons, characterizing the built environment is a critical component to assessing and understanding the existing natural resources in a region.

Zoning

Zoning and planning processes play a pivotal role in ensuring protections for resources and reducing development pressure on environmentally sensitive areas. Zoning aids in the formulation of a community's development, character. The impervious surface coverage, building specifications, and parking requirements have direct implications for water quality, flooding, and habitat concerns.

In Ramsey, the current zoning ordinance perpetuates the municipality's character as a low-density residential community. Approximately 82 percent of the Borough is zoned

as residential, with the commercial and the business districts concentrated around major roadways. The following Zoning map depicts the current zoning ordinance by district.

Of the residential areas 93 percent are zoned for single-family lots. The western section of the Borough maintains the lowest density. Primarily zoned R-1, these single-family lots have a minimum lot size of 40,250 square feet, nearly an acre. Lower density potentially minimizes environmental impacts by reducing the concentrated impact of development. Large lots that remain vegetated allow for more stormwater infiltration and existence of habitat than smaller lots consumed by the building footprint.

The R-1 zone allows for a maximum building coverage of 12 percent and a maximum impervious surface coverage of 30 percent. Both of these ratios are smaller than or equal to their counterparts in other residential districts. For example, the R-3 zone, the most common residential district in Ramsey, allows for a single-family dwelling on a minimum lot size of 14,000 square feet with building coverage no greater than 20 percent.

The remaining areas of Ramsey zoned for business and commercial uses line major roads and thoroughfare. The Central Business District and adjacent Business District maintain the Main Street identity associated with Ramsey's origination. Route 17 provides a corridor for Highway Commercial uses and divides the industrial uses and office parks from the rest of the community. Additional residential units have been zoned adjacent to

these industrial and office districts north of Route 17. However, the majority of residential dwellings are buffered from intensive uses.

In addition to protecting resources through traditional zoning districts, communities can design overlay zones. Overlay zones are regulatory tools that specialize zoning standards in addition to those of the base zone. These unique districts seek to protect a specific resource or guide development within a special area. Communities will use overlay zones to protect aquifers, well-head supply areas, historic districts, arts and cultural communities, and wetlands, among other resources. Currently, Ramsey does not have any provisions for overlay districts in its zoning.



Open Space

The term 'open space' is widely used and loosely defined. The classification of open space does not necessarily denote preservation or public access; it may simply mean the land has yet to be developed. Open space includes both private and public lands. Each type of land use under the umbrella of 'open space' offers a different function for the environment and the community. Park and recreation fields offer a space of congregation and community, while forests allow for habitat preservation and provide key environmental benefits. For the purpose of this ERI, open space is further broken down into the categories of preserved land and recreation/park land.

Preserved land

Ramsey's open space inventory includes approximately 214 acres of preserved land. These parcels vary in size and are located throughout the municipality. The smallest tract is less than an acre, while the largest covers approximately 33 acres. These tracts provide opportunity for recreation, habitat, and groundwater recharge. Some of the lands have been purchased through the Green Acres program, a program that provides funding to secure lands for conservation and recreation within the state. Such lands carry deed restrictions that limit potential future development. The Green Acres program has helped preserve over 80,000 acres in the state for conservation and recreation purposes. Not all of the open space in Ramsey carries this legal restriction. The Preserved Land map illustrates the location of the preserved land throughout the

Borough. The total preserved land sums to an estimated 376 acres. This total includes both the private and public lands within Ramsey.

Parks and Recreation

Ramsey offers a wide range of opportunities and facilities for active and passive recreation. Table 5 lists the park facilities within the municipality. An Olympic-sized municipal pool, tennis courts, a bocci court, athletic fields, and lakes provide recreation opportunities to local residents and tourists. In total the municipal park and recreation facilities encompass over 120 acres, approximately 3 percent of the Borough. The Board of Education owns and maintains approximately one-third of this land for athletic fields and playgrounds. The Borough of Ramsey owns and maintains the remaining two-thirds of the recreation lands. Table 5 lists the park facilities, which are also illustrated on the Community Facilities Map.

In addition to the municipal land Ramsey contains several acres of county parkland. Darlington County Park, which straddles the municipal border with Mahwah, adds 77.5 acres to Ramsey's total park and recreation lands. This expansive park totals 182 acres and includes facilities for swimming, fishing, hiking, boating, golf, tennis courts, and a large playing field. Although closed through the winter months, Darlington Park offers recreation opportunities through the spring, summer, and fall.

Community Facilities

In addition to the abundance of parks and recreation land, Ramsey contains several public and semi-public facilities for residents. The *Community Facilities* map depicts the numerous community facilities within the Borough. The Borough continues to review and upgrade the facilities as needed to ensure health, safety, and quality of life for residents. The Borough Hall has been located on North Central Avenue in the heart of the Borough since 1939. The building was originally as school constructed in 1892. Efforts have been made by the Ramsey

government to ensure the building is accessible to all residents. Adjacent to the municipal building is the Borough police headquarters. The Ramsey Public Library is located west of Main Street on Wyckoff Avenue. As part of the Bergen County Cooperative Library System, the public library allows access to all the collections within the system. Ramsey is home to three public elementary schools, which feed into one middle school. The local high school is located off Main Street just outside the downtown area as found on the Community Facilities Map.

Table 5: Community Facilities

EXISTING PUBLIC RECREATION FACILITIES	AREA IN ACRES
Conklin Park	27.1
Finch Park	18.4
Suraci's Pond	17.8
Van Gelder's Pond	6.7
Bonnieview Park	0.8
MacFarran Field Park	7.64
North Central Avenue Soccer Field	8.2
Board of Education facilities, portions developed as playgrounds and fields:	
Ramsey High School	17.1
Eric S. Smith Middle School	5.6
Tisdale Elementary School	8.5
Mary A. Hubbard Elementary School	4.0
Dater Elementary School	2.0
Subtotal:	123.84
Darlington Park (County)	77.5
Green Acres Conservation Areas	214.7
Total:	416.04

Historic sites

The rich history of Ramsey is evident in the linear Main Street layout, mixed housing stock, and preserved buildings throughout the Borough. Although the Main Street area does not currently possess historic district status, the 2005 Master Plan indicates intent to pursue historic designation for appropriate sections of the downtown.

At present, 3 houses within the Borough have been listed on the New Jersey State Registry of Historic Places. These buildings are listed in Table 6. Both the David Van Gelder House and the Westervelt-Ackerson House are also listed on the National Registry of History Places. These buildings were submitted to the state as a thematic nomination of 'Early Stone Houses of Bergen County'. The Westervelt-Ackerson House commonly referred to as the Stone House, offers tours and open houses to the public to increase awareness and appreciation of this history. Interpretative signs placed at the Ramsey Train Station downtown also highlight the evolution of the community through time. The Ramsey Historical Association maintains an active collection of resources capturing these historic resources.

Ramsey also contains a section of the Erie Railroad Main Line Historic District. The Main Line District extends westward from Jersey City in Hudson County, to an undetermined extent. The State Historic Preservation Officer issued an opinion on the designation, but the district is not currently on either the state or national historic registries.

Table 6: Historic Properties

Historic Properties in the Borough of Ramsey

Erie Railroad Main Line Historic District (ID#218)
Erie Railroad Right-of-Way westward from Hudson, Jersey City at Coles Street to undetermined extent.

SHPO Opinion: 2/20/2003

(Previous Opinion: 3/10/1999; Opinion of 3/6/2006 expands boundaries to include NJT Bergen County Line.)

Post House (ID#634)

245 Shadyside Road

SR: 10/3/1980

(#224 - Thematic Nomination of Early Stone Houses of Bergen County)

David Van Gelder House (ID#635)

37 West Crescent Avenue

SR: 10/3/1980

NR: 1/10/1983 (NR Reference #: 83001570)

(#131 - Thematic Nomination of Early Stone Houses of Bergen County)

Westervelt-Ackerson House (ID#636)

538 Island Road

SR: 6/18/1976

NR: 7/20/1977 (NR Reference #: 77000846)

(#130 - Thematic Nomination of Early Stone Houses of Bergen County)

Municipal Utilities

Water and Sewer

The municipal government, via the Borough of Ramsey Water Department, delivers water to its residents. The local water supply includes both groundwater and surface water sources. Groundwater comes from municipal wells owned and operated by the Water Department. Additional water supply is purchased from United Water. For more information on Water Supply, see the *Water Resources* section.

Ramsey has sewer service extended to the entire community. The Northwest Bergen County Utility Authority handles wastewater and sewer treatment for the municipality. The Authority pipes and collects wastewater at the treatment plant in Waldwick. This plant has capacity to handle 16.8 million gallons a day. The current annual average flow is 10.3 million gallons a day. The discharge point for the treated wastewater is into the Ho-Ho-Kus Brook downstream of Ramsey in Ho-Ho-Kus Borough.



Contaminated sites

A contaminated site potentially threatens the health and vitality of the community. In order to foster awareness and effective remediation the NJDEP maintains a database of known contaminated sites throughout the state. The list includes landfills, underground storage tanks, former industrial sites, and sites that experienced either routine or accidental chemical or waste discharge. Contaminated sites may have toxins remaining in the soil, groundwater, and/or surface water. These chemicals contribute to health issues and environmental degradation. To minimize the impacts of contaminated sites, NJDEP publishes information on the status, remediation process, and extent of groundwater contamination.

The Known Contaminated Sites map reports the location of contaminated sites listed in NJDEP GIS layer for Known Contaminated Sites. The map depicts 19 sites located within Ramsey proper. The map also includes sites in proximity to Ramsey's borders as contamination may leach across political boundaries. In the region the active known contaminated sites cluster around the commercial and industrial districts, largely down the Route 17 corridor. The map also shows delineation of groundwater contamination. For more information regarding groundwater contamination see *the Groundwater Quality Section*.

Each of the known contaminated sites on the map is detailed in the following table. The classification of each site specifies the extent of contamination and its mandated clean up. Sites with a C-1 classification do not require

remedial action of formal design and have a known or identified source of contamination. C-2 classifications denote a formal engineered remediation in response to a known source. Often this classification results when groundwater contamination is confirmed or known. C-3 classifications require a multi-phase remediation as the source is unknown or uncontrolled.

The D classification includes a multi-phase remedial action in response to multiple, unknown, and/or uncontrolled sources. The C3 and D sites face complex contamination that may include both soil and groundwater contamination. These sites are deemed potentially dangerous for direct contact with the contaminated soil. D level classification within New Jersey frequently means that a Superfund designation has been made.

As the map illustrates 3 sites have a remediation level of C3, and 1 site is classified as D. The C3 sites are located adjacent to Ramsey's boundaries. 2 of these sites are in Upper Saddle River Borough (#1, #23) and the third (site #7) is located in Allendale Borough. The LEEM Filtration Products site on Arrow Rd within Ramsey has a D classification. However, the LEEM Filtration Products site is not listed in the Superfund program (CERCLIS). Also known as the New York Twist Drill site this location has ongoing remediation efforts. Information regarding the status and relevant remediation of these sites can be accessed through the NJDEP website.

A primary concern with the presence of contaminated sites is the potential for

groundwater contamination. The Known Contaminated Sites map shows sites that have known contamination of the groundwater supplies as indicated by the shaded areas. The Groundwater Contamination Classification Exception Area (CEA) east of Route 17, south of Brookside Dr, and west of the border with Upper Saddle River is located in proximity to sites 3, 20, and 26 on the known contaminated sites list. Another small area of Ramsey west of Route 17 in proximity to sites 11 and 18 on the known contaminated sites list has also been listed as a CEA. A CEA is designated by the NJDEP when groundwater exceeds specific groundwater quality standards. Use of wells in the delineated area is suspended for the length of the CEA designation.

The other designation of groundwater quality mapped by NJDEP is Currently Known Extent (CKE) of groundwater contamination. These areas are known to have impaired water quality resources based on the failure of the water to satisfy mandates for specific contaminants. NJDEP, local officials, and decision-makers use CKE designations to determine proper remediation of the groundwater. CKE does not carry restrict or limit well usage in the affected area. Information on both designations is made public to inform communities, businesses, and individuals of groundwater quality concerns.

Superfund sites

In 1980 the Federal Government passed the Comprehensive Environmental Response, Compensation and Liability Act, which authorizes and funds the national Superfund

Program through the EPA. A Superfund Site is defined by EPA as land containing an uncontrolled or abandoned source of hazardous waste that may affect the health of people or local ecosystems. The program further delineates levels of concern by placing certain sites, deemed a critical level of risk, on the National Priorities List (NPL).

Bergen County contains 15 sites that have been identified by the EPA Superfund program. 10 of these sites are listed on the NPL, 3 sites have been listed under the Corrective Action program, and the EPA is currently assessing 2 additional sites for designation. None of these sites are located within Ramsey or its neighboring municipalities.

BUILT ENVIRONMENT

Table 7: Contaminated Sites

ID	Municipality	Name	Address	Lead Agency	Remedial Level
1	Upper Saddle River	ADPP ENTERPRISES	142 RT 17	BFO-N	C3
2	Ramsey	LEEM FILTRATION PRODUCTS INC	25 ARROW RD	BISR	D
3	Ramsey	HESS STATION 30322	456 RTE 17 N	BOMM	C2
4	Ramsey	RESTAURANTS R US INC T/A EMERALD	900 RTE 17 N	BFO-N	C2
5	Upper Saddle River	UPPER SADDLE RIVER EXXON	PLEASANT AVE & RTE 17	BOMM	C2
6	Mahwah Twp	ALLENDALE PARK (HETRE BLDG)	1 PEARL CT	BFO-N	C2
7	Allendale	ALLENDALE PARK(VERDANT BLDG)	RT 17 & PEARL CT	BFO-N	C3
8	Ramsey	AERO TEC LABORATORIES INC	45 SPEAR RD	RPIU	C2
9	Ramsey	SOUND EFFECTS	1015 RT 17 S	BOMM	C2
10	Ramsey	T&C AUTOMOTIVE INC DBA RAMSEY TEXACO	104 W MAIN ST	BUST	C2
11	Ramsey	EXXON R/S 32236	75 RTE 17 S	BUST	C2
12	Mahwah Twp	CELCO INC	70 CONSTANTINE DR	BISR	C2
13	Ramsey	RAMSEY AUTO SERVICE	67 MAIN ST E	BUST	C2
14	Ramsey	RAMSEY CITGO	1275 RT 17 S	BUST	C1
15	Ramsey	GOLDSEAL TRANSMISSION	35 GRANT ST	BUST	C2
16	Upper Saddle River	TEXACO	RT 17 S & PLEASANT AVE	BOMM	C2
17	Ramsey	SUNOCO 0011-7770	681 RTE 17 & LAKE ST	BOMM	C2
18	Ramsey	RAMSEY AUTO MALL INC	65 RT 17 S	RPIU	C1
19	Ramsey	RAMSEY CITGO SERVICE INC	116 NORTH CENTRAL AVE	BUST	C2
20	Ramsey	FASIO MOVERS	416 N RT 17	BUST	C1
21	Ramsey	EXXON 3-5641	842 N RT 17	BUST	C2
22	Ramsey	SIMBA LLC	36 RT 17 N	BUST	C2
23	Upper Saddle River	ROUTE 17 & PLEASANT ROAD GROUND WATER CONTAM	RT 17 PLEASANT RD & LENAPE TRAIL	OWR	C3
24	Upper Saddle River	FUEL MAX	254 RT 17 N	BIDC	C2
25	Ramsey	JOE HEIDT MOTOR CORP	515 RTE 17	BUST	C2
26	Ramsey	J&K CONTRACTORS	259 FRANKLIN TPKE N	BFO-N	C2
27	Ramsey	DERCOLE SALES INC	995 RTE 17 S	BFO-N	C2
28	Mahwah Twp	DARLINGTON COUNTY PARK	DARLINGTON AVE	BOMM	C2
29	Upper Saddle River	KAL-GIL II LIMITED PARTNERS	120 PLEASANT AVE	UNK SO	S
30	Ramsey	846 NORTH ROUTE 17	846 N RT 17	BUST	C2
31	Ramsey	LUKOIL #57314	1065 RTE 17 S	BUST	C2
32	Ramsey	MODEL ELECTRONICS	615 CRESCENT WAY	BOMM	C1

Source: NJDEP Contaminated Sites GIS Layer dated 08/2009.

Remedial Level	Description
C1	Remedial levels are associated with simple sites one or two contaminants localized to soil and the immediate spill or discharge area.
C2	Remedial levels are associated with more complicated contaminant discharges, multiple site spills and discharges, more than one contaminant, with both soil and GW impacted or threatened.
C3	Remedial levels are associated with high complexity and threatening sites. Multiple contaminants some at high concentrations with unknown sources continuing to impact soils, GW and possibly surface waters and potable water resources. Dangerous for direct contact with contaminated soils.
D	Same conditions as C3 except that D levels are also usually designated Federal "Superfund Sites".
S	Should Have Remedial Level but is either blank or N/A in Pre-NJEMS Data.

ENDNOTE:

As part of the effort to identify and index the resources in the community, the Environmental Commission identified specific actions that can be taken to further environmental resource management in the community. These recommendations can be found in the Environmental Resource Management Recommendations document for the Borough of Ramsey. This document uses the information collected through the ERI process to establish potential action items to maintain the character of the community, and enhance and protect the vitality of its natural resources. For more information on these recommendations, please contact the Ramsey Environmental Commission.

APPENDIX A: Resources

Surface Landscapes

From the EPA website <http://www.epa.gov/oaqps001/urbanair/>– Accessed January 27, 2011

Bergen County Databook <http://www.co.bergen.nj.us/planning/data/databook.pdf>

Water Resources

NJDEP Fecal Coliform TMDL factsheet

NJDEP Environmental Trends Update 2005, Fresh Water Pollution: Streams: Ambient Biomonitoring Network & Fish Index of Biotic Integrity Network.

<http://www.nj.gov/dep/dsr/trends2005/pdfs/freshwater-pollution.pdf>

<http://www.state.nj.us/dep/njgs/whpaguide.pdf>

http://www.state.nj.us/dep/wms/bwqsa/docs/0608_SWQS.pdf

Biological Resources

<http://www.aphis.usda.gov/ws/statereports/NJ/cagonj021303.pdf>

Built Environment

<http://www.state.nj.us/dep/hpo/1identify/lists/bergen.pdf>

