THE STATE OF
THE RARITAN RIVER
A WORK IN PROGRESS
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TABLE OF CONTENTS</td>
<td>iv</td>
</tr>
<tr>
<td>FORWARD</td>
<td>vi</td>
</tr>
<tr>
<td>ORGANIZATION AND HOW TO USE THE REPORT</td>
<td>1</td>
</tr>
<tr>
<td>BACKGROUND</td>
<td>3</td>
</tr>
<tr>
<td>RARITAN BASIN WATERSHED MANAGEMENT PLAN</td>
<td>6</td>
</tr>
<tr>
<td>I. CURRENT RARITAN WATERSHED STATUS</td>
<td>9</td>
</tr>
<tr>
<td>UPPER &amp; LOWER RARITAN &amp; MILLSTONE WATERSHEDS</td>
<td>9</td>
</tr>
<tr>
<td>Surface Water</td>
<td>13</td>
</tr>
<tr>
<td>Water Quantity and Supply</td>
<td>17</td>
</tr>
<tr>
<td>Groundwater</td>
<td>18</td>
</tr>
<tr>
<td>Land-Use/Development</td>
<td>20</td>
</tr>
<tr>
<td>RARITAN ESTUARY &amp; RARITAN BAY</td>
<td>20</td>
</tr>
<tr>
<td>Water</td>
<td>23</td>
</tr>
<tr>
<td>Sediments</td>
<td>25</td>
</tr>
<tr>
<td>Shellfish Restoration</td>
<td>28</td>
</tr>
<tr>
<td>II. ENVIRONMENTAL ORGANIZATIONS</td>
<td>29</td>
</tr>
<tr>
<td>NATIONAL, STATE AND REGIONAL ORGANIZATIONS</td>
<td>29</td>
</tr>
<tr>
<td>RARITAN BASIN ORGANIZATIONS</td>
<td>38</td>
</tr>
<tr>
<td>III. COUNTY AND MUNICIPAL INITIATIVES ON THE LOWER RARITAN</td>
<td>48</td>
</tr>
<tr>
<td>IV. FEDERAL AND STATE INITIATIVES</td>
<td>60</td>
</tr>
<tr>
<td>THE FEDERAL AGENCIES</td>
<td>60</td>
</tr>
<tr>
<td>THE STATE OF NEW JERSEY</td>
<td>64</td>
</tr>
<tr>
<td>V. LOWER RARITAN CONTAMINATED SITES</td>
<td>71</td>
</tr>
<tr>
<td>OVERVIEW</td>
<td>71</td>
</tr>
<tr>
<td>RECENT ACTIONS</td>
<td>73</td>
</tr>
<tr>
<td>VI. REFERENCES CITED</td>
<td>75</td>
</tr>
<tr>
<td>VII. APPENDICES</td>
<td>79</td>
</tr>
<tr>
<td>APPENDIX 1: MUNICIPALITIES ALONG BRANCH OF LOWER RARITAN RIVER</td>
<td>80</td>
</tr>
<tr>
<td>APPENDIX 2: SUPERFUND SITES ON THE RARITAN</td>
<td>83</td>
</tr>
<tr>
<td>APPENDIX 3: NJDEP SITES WITHIN ONE MILE OF RARITAN RIVER</td>
<td>84</td>
</tr>
<tr>
<td>APPENDIX 4: NJDEP SITES FURTHER THAN ONE MILE FROM THE RARITAN RIVER</td>
<td>90</td>
</tr>
<tr>
<td>APPENDIX 5: CONTAMINANTS OF CONCERN</td>
<td>96</td>
</tr>
</tbody>
</table>

**MAPS**
- Map 1: Raritan Basin Watershed Management Areas, Municipalities and Roads ................................................. 4
- Map 2: WMA 8, Upper Raritan ............................................................................................................. 10
- Map 3: WMA 10, Millstone River ....................................................................................................... 11
- Map 4: WMA 9, Lower Raritan ............................................................................................................. 12
- Map 5: East Coast Greenways: NJ Greenways Plan .............................................................................. 32
ODE TO THE RARITAN RIVER

Lost in a pleasing wild surprise,
I mark the fountains round me rise
And in an artless current flow
Thro' dark and lofty woods below,
That from the world the soul confine
And raise the thoughts to things divine.

O sacred stream! a stranger, I
Would stay to see thee passing by,
And mark thee wandering thus alone,
With varied turns so like my own!
Wild, as a stranger led astray,
I see thee wind in woods away,
And hasting thro' the trees to glide,
As if thy gentle face to hide,
While oft in vain thou wouldst return
To visit here thy native urn;
But, like an exile doomed no more
To see the scenes he loved before,
You wander on, and wind in vain,
Dispersed amid the boundless main.

Here often, on thy borders green,
Perhaps thy native sons were seen,
Ere slaves were made, or gold was known,
Or children from another zone
Inglorious did with axes rude
Into thy noble groves intrude,
And forced thy naked son to flee
To woods where he might still be free.

And thou! that art my present theme,
0 gentle spirit of the stream!
Then too, perhaps, to thee was given
A name among the race of heaven;
And oft adored by Nature's child
Whene'er he wandered in the wild.

And oft perhaps, beside the flood,
In darkness of the grove he stood,
Invoking here thy friendly aid
To guide him thro' the doubtful shade;
Till overhead the moon in view
Thro' heaven's blue fields the chariot drew,
And showed him all thy wat'ry face,
Reflected with a purer grace,
Thy many turnings thro' the trees,
Thy bitter journey to the seas;
While oft thy murmurs loud and long
Awaked his melancholy song;
Which thus in simple strain began,
"Thou Queen of Rivers, Raritan."

John Davis, 1806

Forward

The only river exclusively within the boundaries of New Jersey, the Raritan River and its tributaries merits the highest and best protection possible. When poet John Davis pondered this “Queen of Rivers” in 1806, he saw a pristine river, replete with abundant wetlands and woodlands, and rich with indigenous flora and fauna. In the intervening years, the rich resources of the area fed industrial development and population growth. The absence of a coordinated approach to manage the effects of these activities on the environment has left a legacy of land uses that stress the River’s ecosystems and challenge communities along its length to become stewards to protect it as a viable resource for future generations.

This report begins a process to create a central repository of the research, management and advocacy efforts of organizations, communities, governments and academic institutions for their use to restore the Raritan to a higher quality.

We thank our many colleagues who dedicated their time and attention to creating this collaboration. It is with gratitude to them and to the generous Mushett Family Foundation that we offer this first report. Updates of this information (this is not a final product; it is a working document requiring everyone’s contributions) will be kept on the Raritan Collaborative website, under the auspices of Rutgers University, at www.raritan.rutgers.edu.

All of the contributing organizations have complementary roles to play. At Rutgers, our jobs are to help educate our students and the general public through student engagement, seminars and other outreach programs, to conduct good science in the pursuit of knowledge about the River, and then to foster participation in its restoration and preservation.

Judy Shaw, Ph.D., Project Director

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Josh Caldwell
This report provides a first attempt to describe and provide access to the many resources focused on the Raritan River within the core objective of ensuring the use of those assets in a concerted and constructive manner. This information forms the basis of a web-based clearinghouse, www.raritan.rutgers.edu, which we hope will illustrate the breadth of efforts currently underway in the Raritan Basin and provide readers with an overview from which to find effective models and to build future partnerships.

We have organized the report into five major sections. First, the report examines research efforts undertaken by Rutgers and other universities, and the New Jersey Department of Environmental Protection that deal directly with the Raritan.

Section 2 provides a list of the major organizations involved in the Raritan River. Many environmental groups have focused their efforts on improving the quality of the Raritan, including the branches and tributaries of the 1,100 square mile basin. This initial presentation will expand as the project continues.

Section 3 illustrates the in-depth work we will be doing to gather a comprehensive summary of county and municipal efforts. We start with the Lower Raritan and look at some of the many municipal and county efforts to protect the river. Local governments have created ordinances and launched initiatives to foster a healthier river, ranging from park development to stormwater controls. These county and municipal efforts are presented as models to be considered for adoption or adaptation in other areas of the watershed.

Section 4 highlights state and federal efforts, including those of the New Jersey Department of Environmental Protection (NJDEP), the United States Environmental Protection Agency (USEPA), the National Oceanographic and Atmospheric
Administration (NOAA), the United State Geological Survey (USGS) and the United States Army Corps of Engineers (USACE).

Section 5 examines contaminated waste sites in the Raritan River Basin. Historical industrial and related commercial uses along its banks have left a legacy that impacts the quality of the ecosystems both in the river and in the bay. Despite the efforts of the NJDEP, the sheer magnitude of this legacy exceeds the state’s current resources and calls for a more ambitious approach to clean up contaminated sites and river beds that are directly impacting the Raritan, and to restore resources damaged in their wake.

In short, our intention is to bring together the body of Raritan Basin-related work into a reference document for use by those interested in making a difference and ensuring that the work of those dedicated to the restoration of the natural beauty of this “Queen of Rivers” contributes to a renewed, protected resource into the future.
BACKGROUND

The Raritan Basin covers over 1,100 square miles of the state of New Jersey and is the largest river basin entirely within the state, supplying water, recreation, and transportation for more than one million residents in seven counties. The Raritan River itself is formed from the confluence of its North and South Branches in Branchburg, Somerset County. From there, it flows eastward past Manville where the Millstone River enters, then into Middlesex County past New Brunswick and Edison on its way to the Raritan Bay. Its major tributaries include the Green Brook, the Lawrence Brook, the Millstone River and the South River, with over fourteen smaller tributaries (see Map 1: the Raritan Basin).

The health of the river is central to quality of life in the region. Approximately 1.2 million people live in the Raritan River Basin. Over 600,000 people work here, and millions drink its waters or use it for recreation. It supports important biological diversity, and has acted as a trade route throughout its history. The impacts of industrial uses and urbanization must be managed while addressing the quantity and quality of water in times of drought and flood.

Today, the Raritan suffers from pollutants in stormwater runoff from farms and urban development; nitrogen, phosphorus and other discharges from wastewater treatment plants; and contamination from past and presently operating industrial facilities built along its shores. The U.S. Clean Water Act and NJDEP regulations have long sought to regulate or control the uses of the River and development along its shores, but their efforts have not been able to remedy the legacy of past transgressions. Developing a shared vision, commitment and agenda for the future is a high priority.
Ensuring that it is implemented and that the desired results are achieved within a reasonable time frame is a daunting challenge.

Map 1: Raritan Basin Watershed Management Areas, Municipalities and Roads
Source: Raritan Project GIS (reprinted with permission)
A comprehensive and strategic effort to improve the quality of the basin is a critical goal for the state. As the Raritan watershed encompasses the flagship Rutgers University campus in New Brunswick, the challenge to help lead an effort to address the myriad tangle of policy and science issues facing the “Queen of Rivers” represents an opportunity for the University to apply its policy and science-based expertise to the issues, as well as to address them on a wider scale involving its large student body.

The policy issues begin with the need to develop a shared vision and common commitment to the goal of a healthy and productive restoration of the Raritan that meets the needs of its diverse constituents. Accordingly, Rutgers University envisions the creation of an Institute that would serve as a clearinghouse for research and policy activities, foster implementation of the shared vision of its collaborators, and lead students to participate in the work of communities and organizations, in essence, to nurture their sense of scientific and civic responsibility for the future protection of the river. The Institute would be led by the Bloustein School and its partners at the Rutgers School of Environmental & Biological Sciences (SEBS).

This effort begins with the 1st Annual Call to Action Conference on a Sustainable Raritan River. Here we will share information, concerns and ideas and develop an action agenda. During the summer of 2009, we will work with key stakeholders and partnering organizations through a series of issue-specific workshops and discussions to produce white papers outlining the policy changes and scientific data needed to achieve those goals. This organizing effort will also articulate the structure of a university-wide initiative to focus our educational efforts on the Raritan in the form of course offerings, field studies, research and service-learning.

The Sustainable Raritan River Summit of May 15, 2009 will bring together approximately 150 representatives from regional communities, various environmental and planning organizations, county leaders, and state and federal agencies to develop a common understanding of the issues and needs of the Raritan River. Key constituents
of this meeting will include the NY/NJ BayKeeper, the Raritan Basin Alliance, Edison Wetlands Association, the Raritan Riverkeeper, the New Jersey Water Supply Authority (NJWSA) and various watershed associations and regional planning organizations.

RARITAN BASIN WATERSHED MANAGEMENT PLAN

Much is owed to a basin-wide planning project which was undertaken in 2001-2002. Stakeholders from state government and from local, county and nonprofit organizations in the Raritan Basin, led by the NJWSA, and jointly funded by NJDEP, developed The Raritan Basin Watershed Management Plan, published in 2002 (Raritan Plan). The goal of the planning effort was to develop a comprehensive regional plan to protect the water resources of the basin. The report was based on nine technical studies. The characterization and assessment report is found in “Portrait of a Watershed: the Raritan River Basin.” It is our intention to build from this foundation, not re-invent it, validate the issues identified and work to implement many of its strategies. Full details of the Plan are provided at www.raritanbasin.org/technical_reports.htm.

The plan identified six major issues (along with many other lower priority issues):

1. **Surface Water Pollution**: Concern with high levels of phosphorus and fecal coliform bacteria.
2. **Loss of Riparian Areas**: Heaviest losses are in the urban areas.
3. **Biological Impairment of Streams**: Number of severely and moderately impaired streams increased from 1993 to 1998 (NJDEP), though some streams improved.
5. **Water Supply Limitations**: Population density increases in rural and suburban areas are a concern, as these areas are usually dependent on ground water.
6. **Stormwater Impacts:** Some urban areas have no stormwater controls; systems need retrofit, maintenance, coordination and consideration of stormwater utilities funded by user fees.

The Plan also included a set of Goals, Objectives and Strategies Tables that list the implementation strategies necessary to achieve the priority objectives in each of the three Watershed Management Areas (WMAs) and basin-wide. Basin “transformational” strategies include land preservation for critical water resource areas, construction of a new water supply facility, institutional capacity to implement regional stormwater management, groundwater recharge pilot projects, and expanded environmental education and school involvement.

Some of the strategies specifically related to the Lower Raritan are:

- Provide assistance to municipalities and counties to develop and implement local and regional stormwater management plans.
- Adopt site plan provisions mandating minimum disturbance of lands that have attributes likely to exacerbate nonpoint source loadings if developed.
- Develop and implement an initiative for each subwatershed to maintain water quality from 2004 forward in water bodies that meet water quality standards.
- Develop and implement a citizen water quality monitoring network in each subwatershed to allow for reassessment every four years, at a minimum.

Raritan Plan participants envisioned that most of the implementation would occur through existing organizations and new partnerships, but recognized that successful implementation would require leadership and a coordinated effort. The Plan estimates the total cost of implementation to be in the hundreds of millions of dollars invested over two to three decades, with the largest unmet costs involving improved management of existing land uses. Today, more than five years after this plan was
published, many key issues remain. Indeed, the current economic stress on the United States and New Jersey economies substantially complicates efforts to obtain environmental management resources, although in the short run on likely to become available for cleanup of Superfund in Brownfield sites (see below).

The NJWSA continues to chair the Raritan Basin Watershed Alliance, a group that has been meeting regularly since early 2003. However, the majority of the focus of the Alliance has been on water supply and water supply protection efforts concentrated in the North and South Branch and the Millstone watersheds within the Basin. There is a need to base current actions on more recent data and current conditions – particularly in the Lower Raritan watershed, where both the largest data gaps and the least coordination and direction of activities exist. While the Upper (North Branch), South Branch and Stony Brook–Millstone have active watershed associations, no such organized watershed-wide effort exists for the Lower Raritan.
The Raritan Riv

er begins where the South Branch flows from Budd Lake in Morris County and it ends as it empties into the Raritan Bay at Perth Amboy and South Amboy, Middlesex County. The river’s major branches, the North and South, join at Branchburg in Somerset County to form the main stem of the Raritan River. The State of New Jersey established a Watershed Management Program in the early 1990s to guide the development, use and stewardship of water resources. The entire Raritan basin includes three Watershed Management Areas (WMAs).

The Upper Raritan Watershed, or WMA 8, consists of the North and South Branch of the Raritan above their confluence, the Neshanic River, Spruce Run, and the Lamington River. WMA 8 mostly encompasses headwater streams with low-flow conditions. The Upper Raritan is located within the Highlands province and is characterized by ridges of hard rock material and limestone or glacier aquifers. The area is primarily dominated by forest, urban and agricultural land uses.
Map 2: WMA 8, Upper Raritan (reprinted with permission)

The Millstone Watershed (WMA 10) encompasses the Millstone River, Stony Brook, Bedens Brook, Cranbury Brook, and Devil’s Brook within its 285 square mile area. This watershed is characterized by a range of land uses including urban (31%), forest (22%),
agriculture (24.5%), and wetlands (19.9%). The Millstone WMA had the largest increase in urban land use between 1986 and 1995, and as a result lost 2% of its wetland areas during this decade.

Map 3: WMA 10, Millstone River (reprinted with permission)

The Lower Raritan Watershed (WMA 9) covers 352 square miles and includes the main stem Raritan River, Green Brook, South River, Manalapan Brook, and Lawrence Brook as its major waterways. Characterized by extensive areas of development and industrial uses, this basin experiences high flows during prolonged periods of rainfall.
According to 1995 land use/cover data, over half of the Lower Raritan Watershed is urbanized while wetlands and forested areas cover about 40% of the basin.

Map 4: WMA 9, Lower Raritan (reprinted with permission)
The most recent assessment and characterization of the Raritan River Watershed was completed in 2002 by the Raritan Basin Watershed Alliance. Eight technical reports and two summary reports (New Jersey Water Supply 2002) were produced in support of the development of a Watershed Management Plan for the Raritan River Basin.

SURFACE WATER

Water Quality Data

A cooperative ambient surface water quality monitoring network has been established by the United States Geological Survey (USGS) and the New Jersey Department of Environmental Protection (NJDEP) to determine the status and trends of surface water in New Jersey. The data collected by USGS between 1991 and 1998 were used in several technical reports produced by the Raritan Basin Watershed Alliance during their characterization and assessment efforts. During a seven year time frame, 801 samples were collected from 21 sites in the Raritan River Basin. These samples were analyzed for 17 constituents, including: alkalinity as calcium carbonate (CaCO$_3$), ammonia plus organic nitrogen (TKN), biochemical oxygen demand (BOD), chloride, dissolved oxygen, fecal coliform, hardness, nitrate plus nitrite, pH, sodium, sulfate, total organic carbon, total phosphorus, total dissolved solids (TDS), total suspended solids (TSS), un-ionized ammonia and water temperature.

The most commonly occurring constituents measured that were above regulatory standards in all samples were phosphorus; fecal coliform; hardness; pH; and water temperature in designated trout waters. Chloride, TDS, nitrate, and sulfate did not exceed the standard in any samples. The online technical reports provide descriptive statistics of concentrations, analysis of data in relation to water quality standards, comparisons between sites, analysis of changes in concentrations by season and flow condition, and a summary of water quality trends over time.
Additional provisions for updates to the report are identified and include the compilation of NJDEP and USGS water quality data through the most current water year, sediment quality data, and water quality data from other monitoring sources (New Jersey Water Supply 2002).

In a project completed by NJDEP prior to 1991, it was found that among the 152 Ambient Biomonitoring Network (AMNET) sites managed by the NJDEP, the most frequently occurring exceedances of water quality standards were for biological impairment, followed by fecal coliform and total phosphorus. Exceedances occurred on Beden Brook, Tera Lake, Lamington River, Millstone River, Manalapan Brook, Matchaponix Brook, Mulhockaway Creek, Neshanic River, North Branch Raritan River, Raritan River (main stem), Rockaway Creek, South Branch Raritan River, Spruce Run, and Stony Brook.

The AMNET employs sampling and taxonomic analysis of in-stream macroinvertebrate communities to assess the ecological conditions and gauge long-term trends in freshwater systems throughout the state of New Jersey. The diversity and relative abundance of particular macroinvertebrate species provide insight into the overall health of a given stream. There are 165 monitoring stations within the Raritan Water Region, which encompasses four Watershed Management Areas (WMAs 7, 8, 9, and 10), according to the AMNET sampling region delineation.

The most current assessments available are from monitoring data collected between April and October in 2004. Nearly 34% of the stations monitored during this study period were rated as “non-impaired” and 63.7% were rated as “moderately impaired”. 2.5% were considered “severely impaired”, reflecting the poor biological and habitat conditions within the waterways. All severely impaired sites are located within WMAs 9 and 10. The number of moderately impaired sites within the Raritan region increased between 1999 and 2004, while the number of non-impaired and severely impaired sites decreased within the same time frame (Mauriello et al. 2008). Pollution in the Raritan
River ecosystem increases downstream, reaching a maximum before New Brunswick (Dean & Haskin 1964).

**Modeling Data and Water Quality**

Excessive loading of nutrients and organic matter to waterways increases biological oxygen demand and threatens the integrity of stream ecosystems. Spectro-flourescence signatures (SFS) of water samples contain information that can be used to quantify dissolved organic carbon (DOC), an indicator of organic matter loading to streams. The SFSs of 219 samples from the Upper Raritan River and the corresponding DOC concentrations were used to build a water quality model. When linked to a partial least-squared regression (PLS), SFS can be a reliable and cost effective method to perform DOC measurements. The SFS-PLS correlation methodology can also be adapted to other parameters linked to the organic content in water such as di-n-butyl phthalate (DBPs), chlorophyll-a, and chlorine demand, all of which impact water quality and contribute to the overall degradation of stream health (Marhaba et al., 2003). This kind of statistical model has been used elsewhere and is less expensive to develop and use than deterministic predictor models, especially if stochastic elements are added to the predictor models.

**Total Maximum Daily Load (TMDL) Development**

States have been mandated by the Clean Water Act to identify all impaired rivers that do not meet federal water quality standards under the federal total maximum daily load (TMDL) rules. Fewer than 25% of water bodies have been assessed since the 1985 rule implementation, and over 40% of those waters still do not meet the water quality standards set for them. These impaired waters include approximately 300,000 miles of rivers and shorelines polluted mostly by sediments, excess nutrients, and harmful microorganisms (Money et al., 2009).
Several locations within the Raritan River Basin are included in the draft version of New Jersey’s 2008 303(d) List of Impaired Waters. Refer to Appendix B of the 2008 Draft Integrated Water Quality Monitoring and Assessment Report provided by NJDEP for detailed locations and corresponding impairment parameters.² As a result of the confirmation of these impairments within the watershed, TMDLs must be developed to specify the amount of a pollutant that the water body can receive while still meeting surface water quality standards.

Many current papers have been published highlighting methods to develop, achieve, and enforce TMDLs in the Raritan River Basin. Omni Environmental LLC developed a hydrologic model entitled HydroWAMIT. The model provides surface runoff, baseflow and associated non-point source loads as outputs, and the model can be applied to large-scale TMDL conditions. The statistical tests used to measure model predictability suggest that the HydroWAMIT flow simulations are valid for the North and South Branch Raritan River (Cerucci & Jaligama 2008).

The University of North Carolina at Chapel Hill, in conjunction with the NJDEP, developed a statistical method for estimating water quality along the length of a river. The Raritan River Basin was used as a case study in this method development. It was shown that it is possible to improve the accuracy of water quality assessments using a Bayesian Maximum Entropy geostatistical estimation method and limited data sources to increase the total number of river miles accurately assessed for future TMDL allocation and development (Money et al., 2009).

Water quality trading is a voluntary economic process that provides an opportunity for dischargers to reduce the costs associated with meeting a discharge limitation. Trading can provide a cost effective solution for point sources (i.e., wastewater treatment plants) to meet strict effluent limitations set in response to TMDLs. Trading

also provides a means of implementing controls on non-point source pollution (Obropta & Rusciano 2006). Rutgers Cooperative Extension Water Resources Program has developed a water quality trading program to address phosphorus impairments in the Raritan River Basin.

**WATER QUANTITY AND SUPPLY**

**Water Budget**

Water budgets represent storage and fluxes of water in a defined system. An understanding of a given area’s water budget provides insight into the hydrologic regimes and establishes a baseline to identify water surplus or deficit. On average, the Raritan Basin receives 2,500 million gallons per day (MGD) of water from precipitation. The three Raritan Basin WMA’s differ in the importance of each water budget component. The Upper Raritan has the lowest runoff rate and the highest recharge rate, due primarily to lower impervious cover and the presence of limestone and glacial aquifers. The Millstone WMA has the lowest percentage of recharge and the highest percentage of runoff. The Lower Raritan has the highest evapotranspiration rate, which is nearly 55% of the annual water budget (New Jersey Water Supply 2000).

Surpluses of water associated with large storm events (such as hurricanes) can significantly affect the annual water budget and cause flooding in areas on or near the river’s floodplain. Documentation of flood events is important for implementing correct flood control measures and for developing appropriate stormwater management practices in specific flood-prone areas. For example, Hurricane Floyd dropped heavy rainfall on New Jersey in September of 1999, causing record flooding through state. The storm dropped 7.8 to 9.8 inches in the Raritan Basin, and at some locations in the Basin, as much as 11 inches in a 24 hour interval. The Raritan River crested at 4.3 m above flood stage. This amounted to nearly 20% of the mean annual
precipitation in some areas. Reservoir levels rose from 11% below seasonal average to 11% above the seasonal average (Robinson 2000).

**Water Supply**

The ratio of ground water versus surface water withdrawals is highly variable among the three WMAs because of differences in geology, topography, population density, land use and proximity to major water bodies. WMA 8 contributes to 6.5% of the total water withdrawal within the entire Raritan Basin, with an average withdrawal rate of 13 million gallons per day. Groundwater sources provide nearly 92% of the total water supply in the Upper Raritan Watershed. Of the 4,790 million gallons per year allocated to the Upper Raritan WMA, 3,355 million gallons are distributed to public water supply systems.

The Lower Raritan basin generates the largest demand for water, withdrawing nearly 65,000 million gallons per year. This accounts for nearly 88% of the total annual water supply in the entire Raritan Watershed. Surface water sources contribute to over half of the total demand from WMA 9. The Millstone Watershed withdraws the least amount of water on an annual basis - only 5.9% of the total annual water supply in the basin. Groundwater sources supply most of the Millstone, and provide the public water supply system entirely (New Jersey Water Supply Authority 2000).

**GROUNDWATER**

**Recharge**

Ground water recharge is a function of geology, soil depth and characteristics (well-drained, permeable soils), depth of plant roots, and existing land uses. Recharge in the Upper Raritan Basin ranges between 8.3 and 16.8 inches per year, with the highest infiltration rates occurring in the South Branch Raritan River watershed (above Spruce Run and Three Bridges to Spruce Run) and in the Lamington River watershed. The
Upper Raritan’s average rate of recharge for 1995 was 12.15 inches per year as compared with 12.91 inches per year in 1986, an overall loss of nearly 6 percent. In the Lower Raritan WMA, recharge ranges between 2.5 and 10.6 inches per year. The 1995 average rate of recharge of 6.68 inches represents a nearly 5% decrease in recharge as compared to the 1986 average. Recharge ranges between 5.4 and 11.7 inches per year in the Millstone River Watershed. This basin also experienced a 5% loss in recharge between 1986 and 1995. Conversion of agricultural and forested land to residential, commercial and industrial land uses has contributed to these recharge losses (New Jersey Water Supply Authority 2002).

**Wellhead Protection Areas**

A wellhead protection area (WHPA) delineates, at the ground surface, the section of an aquifer that provides water to a well within a given time frame. The Upper Raritan Watershed contains 65.7 square miles of WHPAs, which comprise 14% of the total watershed management area. The Lower Raritan and Millstone contain 44.9 and 27.5 square miles of WHPAs, respectively. In total, the Raritan River basin contains 138.1 square miles of WHPAs, which constitute 12% of the entire watershed area (New Jersey Water Supply Authority 2002).

**Contamination**

The Upper Raritan Watershed is primarily dependent on aquifers for potable water supply, but in its 2002 report, the NJWSA reported 205 sites with known contaminated groundwater and the highest percentage (31%) of contaminated wells within WHPAs, thus increasing the chance of human exposure to contamination via supply wells. The Lower Raritan WMA has 14% of its known contaminated groundwater sites within its WHPAs. This lower proportion is due to the fact that many contaminated public supply wells have been closed. The Millstone basin has 151 known contaminated
groundwater sites. These contaminated sites comprise 20% of the Millstone WHPAs (New Jersey Water Supply Authority 2002).

**LAND-USE/DEVELOPMENT**

Urban development and changing land use has damaged the Raritan Watershed and its natural resource value. A study conducted in the New York-New Jersey Highlands (NY-NJ Highlands), which dominate the Upper Raritan Watershed, demonstrates the necessity to analyze the consequences of future land use change. The study also emphasizes the importance of regional planning and policies and the need for regulation of future development. The primary land cover in the NY-NJ Highlands remains largely forested area and, to a lesser extent, wetlands. Spatial planning, land cover change analysis, and build-out modeling showed a generally increasing trend toward altered land cover and thus a higher percentage of impervious surface cover. This has severe implications for both the forest and the Upper Raritan Watershed integrity (Lathrop et al., 2007).

According to the 2008 New Jersey Integrated Water Quality Monitoring and Assessment Report, 515 acres of wetlands areas were lost between 1995 and 2002 in the Upper Raritan Watershed (New Jersey Department of Environmental Protection 2008). Net wetland loss in the Lower Raritan totaled 2,081 acres between 1995–2002; net freshwater wetland loss in WMA 8 totaled 515 acres over the same time period (NJDEP 2008).

**RARITAN ESTUARY & RARITAN BAY**

The Raritan River mixes with waters of the Atlantic Ocean within the Raritan River estuary. The Raritan coastal plain estuary includes tidal straits, an open Bay, tidal mud flats, and beaches. Tidal effects are seen as far as 20 miles above the mouth of the river, where the Head of Tide is located at Bound Brook; saline water extends almost 12 miles
above the river’s mouth, even under drought conditions (Dean & Haskins 1964). The Raritan Bay itself is approximately 25 miles in length in the east-west direction, is relatively shallow near shore, sloping to 22 feet in depth (Jeffries 1962), and triangular in shape. The mixing of salt water from the ocean and freshwaters from the Raritan River produces a counterclockwise gyre that results in a series of physio-chemical gradients driven by the circulation patterns (Jeffries 1962, Bagher et al., 2005). The movement of freshwater seaward is accelerated along the southern shoreline of Raritan Bay. Water temperatures in Raritan Bay range from summer highs of 24 °C to winter lows of 2 °C (Jeffries 1962, Adams et al., 1998). Raritan Bay salinity ranges from 11.8 to 27 ppt, and dissolved oxygen ranges from a summer low of 4 mg/L (the lower limit capable of supporting oxygen breathing marine species) to 9 mg/L (Jeffries 1962, Adams et al., 1998, Paulson 2005). Nutrients are elevated in the spring season, with inorganic nitrogen concentrations as high as 96 mg/L and ortho phosphate over 4 mg/L (Jeffries 1962). Nitrogen concentrations on the south shore have been observed to be higher than on the New York northern shore by a factor of 1.5 (Jeffries 1962).

Historically, Raritan Bay was a highly productive fishery within the Hudson-Raritan Estuary (HRE), and prior to World War I supported profitable oyster and fish stocks (Jeffries 1962). However, industrialization, urbanization, and dredging have resulted in the decline, and in the case of some species, the loss of the Bay’s fishery resources. Today toxic and nutrient pollutants are present in Raritan Bay and the Raritan River estuary as a result of human activities within the watershed (Ayers & Rob 1986, Adams et al., 1998, CARP 2007, Rodriguez et al. 2007, NJDEP 2008).

The contamination of the Raritan River estuary and Raritan Bay has been occurring over more than a century, and dissolved oxygen concentrations of less than 40% of maximum were recorded in the 1930s (Ayres & Rod 1986). This implies substantial difficulty for many species, including trout. There are three major categories of

1. Heavy metals (arsenic, cadmium, chromium, copper, mercury, lead, silver, zinc)
2. Pesticides and herbicides (DDT, TDE, aldrin, lindane, chlordane, dieldrin, endosulfan, endrin, heptachlor, methoxychlor, toxaphene), and
3. Other critical pollutants (PCBs, PAHs, oil, nitrogen, phosphorus, total organic carbon).

Although the origin of these pollutants varies, runoff, historic sediment contamination, leachate, and the legacy of industrial discharge are thought to be the main sources of the Raritan Bay contamination. The extensive urbanization within the Raritan River watershed has been positively associated with the low dissolved oxygen concentrations in Raritan Bay (Rodriguez et al., 2007). Waters of western Raritan Bay are classified as “Prohibited” for shellfish harvest (NJDEP 2008), and are monitored by the NJDEP for total coliform bacteria counts. Middlesex County Utilities Authority (MCUA) is permitted to discharge 160 million gallons/day (MGD) through an outfall located within western Raritan Bay; a supplemental outfall adjacent to the MCUA facility is utilized during peak flows, and this outfall is capable of discharging 150 MGD directly into the Raritan River (Zimmer 2004). Flows in excess of 200 MGD have been reported, and it is likely that flows during wet weather may result in inadequate treatment (Zimmer 2004).

The U.S. Congress (1999) directed the US Army Corp of Engineers (USACE) to develop a long-term comprehensive restoration plan (CRP) for the Hudson-Raritan Estuary (HRE). The CRP (HRE 2009) will be the driving force for most, if not all, of the major restoration activities conducted within the HRE. The Master Plan has identified and characterized eleven Target Ecosystem Characteristics (TECs) that clearly outline specific restoration projects and approaches (Bain et al., 2007) for the HRE.
WATER

Raritan estuarine waters are spatially and temporally heterogeneous, changing daily due to tidal circulation and the various freshwater inputs that affect the Bay’s physical, chemical, and biological properties (Bagher et al. 2005). The estimated flushing time for the Bay is 16-21 days, or 32-42 tidal cycles (Jeffries 1962, Bagher et al., 2005). The overall circulation within Raritan Bay is the result of a combination of factors, including freshwater discharges, winds, and tides (Oey et al. 1985a, b). The Raritan River and the Arthur Kill are the dominant sources of brackish water to Raritan Bay (Paulson 2005).

Pollutants accumulate in the Bay, arriving via municipal and industrial wastewater discharges, land runoff, leachate and combined sewer overflows (CSOs). These pollutants contribute to low dissolved oxygen levels in the bottom waters. The NY/NJ Harbor Estuary Program (HEP) determined that in general, the most degraded waters in the harbor estuary included Raritan River and Raritan Bay (HEP 2008). Since 2005, NJDEP has been participating in the harbor-wide Water Quality Monitoring Program (NJDEP 2008). As part of this initiative, NJDEP monitors 33 sites weekly from May through September, and twice-monthly from October through April. Water quality data collected includes dissolved oxygen (D/O) concentrations, pH, total suspended solids (TSS), fecal coliform and Enterococcus counts, Secchi depth (turbidity), salinity, temperature, total nitrogen (TKN), ammonia, nitrate-nitrite, total phosphorus, ortho-phosphorus, chemical oxygen demand (COD), chlorophyll a, and dissolved organic carbon (DOC).

Dissolved oxygen concentrations in portions of Raritan Bay may be too low to support benthic populations. Twenty-five percent of Raritan Bay bottom waters sampled exhibited D/O concentrations of less than 5 mg/L, and this low D/O was inversely correlated with cadmium and mercury concentrations (Rodriguez et al., 2007). Dissolved cadmium concentrations suggest an input from direct discharges, contaminated runoff, or release from the Raritan River or Arthur Kill sediments.
(Paulson 2005). Fifty-five percent of the bottom waters have total suspended solids (TSS) of less than the 15 mg/L, and thirty-eight percent of the estuarine area has total organic carbon (TOC) above 2 μg/g (Rodriguez et al., 2007). Historically, nitrogen concentrations on the south shore of Raritan Bay in the path of the ebb tidal flow were higher than the opposite New York northern side of the bay by a factor of 150 percent (Jeffries 1962).

The non-tidal total maximum daily load (TMDL) for phosphorous impairment of the Raritan River is now drafted, and NJDEP is currently reviewing the draft documents (K. Cenno, NJDEP, personal communication). Based on unique geochemical particle signatures, it appears that the influence of the Raritan River is limited to the inner western portion of Raritan Bay (Paulson 2005). TMDLs for pathogens are in the process of being developed for the eastern coast of Raritan Bay where shellfish waters are impaired; however, at this point in spring of 2009, pathogen TMDLs are not being developed for the western portion of Raritan Bay or for WMA 8 (NJDEP 2008). NJDEP staff anticipates further water quality improvements in the eastern portion of Raritan Bay will result in the opening of additional shellfish beds for harvest in the near future (R. Connell, NJDEP, personal communication).

**Modeling Data and Water Movement**

Raritan Bay is a drowned river partially mixed estuary. An important factor governing water circulation in the Bay includes surface wind stress. There is density advection instability during times of slack water and during tidal flood stage, when intense mixing last for a 1-2 hour period (Oey et al., 1985a). Instability is also produced by “up-estuary” (westward) wind events, when winds can be strong enough to destabilize the water column (Oey et al., 1085a). Tidal currents in Raritan Bay are weak, and so the effects of the winds are more pronounced (Oey et al., 1985b).
Remote sensing has been employed to determine hydrology on both local and regional scales. The relationship between reflectance, absorption, and backscatter can be used to link water quality parameters to inherent optical properties (Bagher et al., 200%). These properties are then linked to sub-surface irradiance reflectance.

**SEDIMENTS**

Baseline data for use in evaluating progress in cleaning up the NY/NJ harbor system was collected by USEPA in 1993-1994 (Adams et al., 1998). The Lower Harbor sub-basin encompassed 11% of the study area (318 km²), and included Raritan and Sandy Hook Bays, where data was collected from 14 sampling sites. Surficial sediment contaminant concentrations were analyzed, sediment toxicity tests were performed, and the benthic macrofaunal community structure was described. Contamination was found to be widespread, with 91% of the samples containing at least one chemical that exceeded the Effects Range-Low (ERL) concentrations, and 50% of the samples exhibiting chemical concentrations that exceeded the Effects Range-Medium (ERM) limits. Mercury concentrations were elevated in Raritan Bay sediments, as were total PCBs, PAHs, and the most toxic dioxin congener (2,3,7,8-TCDD). However, the Lower Harbor (Raritan and Sandy Hook Bays) had the highest mean Microtox™ bioluminescence inhibition and survival readings, suggesting survival of sediment communities.

An extensive study of sediment contaminants in Raritan Bay was conducted by a public private collaboration between the USEPA, USACE, NJDEP, NYSDEC, Empire State Development Corporation, the Port Authority of NY & NJ, Environmental Defense, and the Hudson River Foundation (CARP 2007). Objectives of the Contaminant Assessment and Reduction Program (CARP) included:

1. Identification and quantification of the sources of Contaminants of Concern (COCs) in dredge materials,
2. Establishment of ‘baseline’ levels of COCs in the waters, sediments, and biota,
3. Determination of the relative significance of current contaminant inputs in controlling contaminant levels in water, sediment, and biota,
4. Modeling the future under various contaminant reduction scenarios, and
5. Taking action to reduce COCs in water, sediment, and fish.

Based on data collected through the Mussel Watch Program (MWP) over the last 19 years, it appears that sediment contaminant concentrations are at or below previous values (Kimbrough et al., 2008). However, Raritan concentrations for total PAHs and PCBs are near or above the 75 percentile for the national MWP data (Lauenstein & Kimbrough 2007).

**Modeling Data and Contaminant Movement**

As part of the CARP (2007) study, HydroQual, Inc. mathematically modeled the fate and transport of sixty-three hydrophobic organic and metal Contaminants of Concern (COCs) that are found in the Raritan Bay estuary (10 PCB homologs, 17 dioxin/furan congeners, 22 polyaromatic hydrocarbons (PAHs), 6 DDT-related compounds, 5 chlordane-related compounds, cadmium, mercury, and methyl mercury). Source locations included tributary heads of tides, CSOs, sewage treatment plants, stormwater, atmospheric deposition, leachate, and sediments. The study concluded that historical contaminant sources were much larger than current sources for most COCs. It was not clear whether the elevated dioxin concentrations around the edges of Raritan Bay are due to Passaic River contaminant transport, or to historic Raritan Bay shoreline sources.

**Benthic & Fin Fish Community**

Sediment contaminants negatively affect benthic populations. Benthic samples collected in the lower 20 km of the Raritan River in the late 1950s indicated that estuarine pollution had dramatically reduced the size and diversity of the Raritan
benthic community (Dean & Haskins 1964). During the 1957-1959 sampling rounds, 20-30 pollution tolerant marine species were found. After MCUA installation of a trunk sewer system in 1958, the benthic organism density increased to 7,102 organisms/m$^2$ by 1960 (Dean & Haskins 1964).

Crab samples collected from Raritan Bay in the 1990s showed polychlorodibenzo-p-dioxin and dibenzofuran contamination in hepatopancreas and mussel tissues (Cai et al., 1994). Because the Raritan Bay crab dioxin concentrations were five-to-ten-fold lower than the Newark Bay crab samples, Cai et al. hypothesized that the source of the Raritan dioxin contamination was via the food chain rather than through the water column. However, 14 sites in Raritan and Sandy Hook Bays sampled for sediment toxicity and benthic macrofaunal community structure showed contamination in the Bays to be widespread (Adams et al., 1998). Benthic species diversity was 166 species, and pollution sensitive species were more abundant in the lower harbor (Raritan and Sandy Hook Bays) than the upper harbor.

Although the lower harbor was judged to be less degraded than the upper portion of the NY/NJ harbor, the biological effects observed were associated with chemical contamination, which appeared to be the result of both point and non-point pollution sources (Adams et al., 1998). The most toxic dioxin congener (2, 3, 7, 8-TCDD) found by Adams et al. was highest in the lower harbor (7.5 ± 3.4 ng/kg dry wt). The majority of toxic Microtox™ results clustered in sampling sites on the southern shore of the lower harbor (Adams et al., 1998). The presence of Clostridium perfringens spores, which are indicative of sewage contamination, were found to be significantly above background concentrations (935 ± 355 versus 10-20 spores/g dry wt, respectively).

As of 2006, mercury concentrations in Raritan Bay largemouth bass ranged between 0.37 and 0.41 g/g. A recent integrated assessment (2006) has been completed for the Raritan Bay Estuary by the NJDEP, and this assessment includes an ecological assessment of the benthic community (NJDEP 2008).
Recent restoration projects in the lower Raritan River and Raritan Bay include a number of activities instituted by both government and non-governmental organizations (NGOs) to address historic impairments of the estuary.

**SHELLFISH RESTORATION**

NY/NJ Baykeeper is undertaking oyster restoration in the Keyport Harbor section of Raritan Bay, with the support of Rutgers Environmental Research Clinic (RERC). The NJDEP has permitted a ¼ acre restoration site (2009) in Keyport Harbor, and has expressed a willingness to consider additional sites for oyster restoration activities in the eastern portion of Raritan Bay (B. Connell, J. Josephs, NJDEP, *personal communication*). NJDEP water quality data and RERC experimental data (Ravit et al., 2008) indicate that the far western section of Raritan Bay is not yet able to sustain shellfish populations.
II. ENVIRONMENTAL ORGANIZATIONS

As of this publication date, we have identified over forty different organizations working in the Raritan Basin. Below is an initial list with limited information on their efforts. These entries will continue to be updated once the information is posted on www.raritan.rutgers.edu.

NATIONAL, STATE AND REGIONAL ORGANIZATIONS

American Littoral Society
http://www.littoralsociety.org/
Tim Dillingham, Executive Director
732-291-0055

The American Littoral Society has a number of programs and initiatives that impact the Raritan River and Raritan Bay.

- Advocacy: ALS advocates at the state level (at the agencies and in front of the Legislature) for strong coastal protection policies and regulations focused on land use, growth management, open space protection and acquisition, habitat protection, adaptation to sea level rise impacts on coastal habitat, public access, shellfish and habitat restoration, horseshoe crab and migratory bird protection, water quality improvements; these policies and regulations directly affect activities along the Raritan and the Bay.

- Planning: ALS has focused for several years on supporting the State Development and Redevelopment Plan, and the implementation programs under the State Planning Commission (particularly the Plan Endorsement process), to integrate coastal resource protection policies into local and regional planning, as well as recognize and address current and emergent issues such as public access, habitat protection, sea level rise adaptation.

- Financial Support: ALS directly funds (and has funded for many years) the Baykeeper Oyster restoration program in Raritan Bay through their national partnership with Restore America’s Estuaries and NOAA Restoration Center. They also funded other habitat restoration projects on Sandy Hook and in the Navesink River.

- Land Acquisition: ALS has funded land acquisition projects (through the Baykeeper) along the River and Bay.
- Education: ALS runs educational programs in area schools under their “Sea Quest” program, which brings marine science curriculum into middle schools, with an emphasis on getting kids out into the field to learn about the coast and Raritan Bay.
- Enforcement: ALS has brought public interest litigation cases throughout the years to address Clean Water Act violations, some of which have direct impact on the Raritan River and Bay.
- Publications: Through their publications, they promote education about estuaries.

**American Rivers**  
[www.americanrivers.org](http://www.americanrivers.org)  
Liz Garland, Associate Director: Clean Water Program  
717.763.0742

American Rivers strives to protect rivers throughout the country. The organization works in five different programming areas - Rivers and Global Warming; River Restoration; River Protection; Clean Water; and Water Supply, in order to cultivate healthy rivers for present and future communities. American Rivers works with local watershed organizations to remove dams and promote innovative flood control. In March 2009, American Rivers, with NOAA, awarded a grant to Stony Brook-Millstone Watershed Association to conduct a feasibility study on the removal of two dams on the Lower Millstone River, a tributary to the Raritan River.

**Association for NJ Environmental Commissions**  
[www.anjec.org](http://www.anjec.org)  
Sandy Batty, Executive Director  
973.539.7547

ANJEC serves the collective efforts of New Jersey’s municipal and county environmental committees and commissions, to preserve natural resources and promote sustainable communities. Established through regulations of the New Jersey Municipal Land Use Law, this organization provides workshops and resource materials to encourage public participation through local environmental and open space committees. Their research group maintains records of innovative ordinances and programs across the state, and their library contains most of the states Natural Resource Inventories.
Clean Ocean Action  
[www.cleanoceanaction.org](http://www.cleanoceanaction.org)  
Cindy Zipf, Executive Director  
732.872.0111

Clean Ocean Action (COA) is a broad-based coalition of 125 active boating, business, community, conservation, diving, environmental, fishing, religious, service, student, surfing, and women's groups. These "Ocean Wavemakers" work to clean up and protect the waters of the New York Bight. The groups came together in 1984 to investigate sources, effects, and solutions of ocean pollution. What follows is a description of the network.

Clean Water Fund  
[www.cleanwaterfund.org](http://www.cleanwaterfund.org)  
Kim Gaddy, New Jersey Coordinator  
973.704.4312

Clean Water Fund's mission is to develop strong grassroots environmental leadership and to bring together diverse constituencies to work cooperatively for changes that improve their lives, focused on health, consumer, environmental and community problems.

Conserve Wildlife Foundation  
[www.conservewildlifenj.org](http://www.conservewildlifenj.org)  
Margaret O'Gorman, Executive Director  
609.292.1276

The Conserve Wildlife Foundation is dedicated to the restoration and protection of habitat for endangered and threatened species in New Jersey. They have an active education and outreach program and are central to research efforts to map habitat and track species populations.

Conservation Resources, Inc.  
[www.conservationresourcesinc.org](http://www.conservationresourcesinc.org)  
Michael Catania, President  
908.879.7942

Conservation Resources, Inc. (CSI) provides assistance to ensure preservation of open space and farmland in New Jersey. They offer private and public conservation
organizations assistance in capacity building, to increase their expertise, financial and technical resources.

East Coast Greenway
http://www.greenway.org/nj1.php
Mike Kruimer, NJ Committee Chair

The New Jersey Committee of the East Coast Greenway maintains an active effort to preserve the greenways along the Raritan River. Their New Jersey Blueprint for Action outlines their preservation goals. The New Jersey Benchmark Assessment details the progress of their efforts, including locations, contacts, amount of trail created, and other key data. Their Trail Builder’s Toolbox provides materials and direction for residents to use to help secure additional ECG trail building, routing, signing, and designation materials and they also provide an Advocacy Toolkit of advice and graphics to support outreach and advocacy efforts.

Map 5: East Coast Greenways: NJ Greenways Plan (reprinted with permission)
GreenFaith
www.greenfaith.org
Fletcher Harper, Executive Director
732.565.7740

GreenFaith has long advocated for sustainable living, helping religious organizations adopt energy conservation measures. They partner with many environmental organizations.

League of Women Voters
www.lwv.org
Ms. Anne Maiese, President
LWV of New Jersey
609.394.3303

The League of Women Voters, a nonpartisan political organization, has fought since 1920 to improve our systems of government and impact public policies through citizen education and advocacy.

New Jersey Audubon Society
http://www.njaudubon.org/
Troy Ettel, Director of Conservation
908.204.8998

The New Jersey Audubon Society has several projects in the region of the Raritan River. Among these are the avian research conducted in conjunction with Edison Wetlands Association assessing habitat along the Raritan and in the Raritan Bay Estuary. Their current work includes stewardship efforts in the Upper Raritan Basin and an avian assessment in the lower Raritan bay complex. Their work on contaminants in the Meadowlands is a model for future research on the Raritan River (http://merilibrary.njmeadowlands.gov/dbtw-wpd/FullText/ML-07-26.pdf).

The Audubon Society is currently partnering with Franklin Township, Somerset County, to lead birdwatching walks in the area.
http://www.njaudubon.org/Conservation/Franklin.html#Walks.
New Jersey Community Water Watch  
[www.njwaterwatch.org](http://www.njwaterwatch.org)  
Liz Glynn, Program Director  
732.249.4108

NJ Community Water Watch is a cooperative effort between NJPIRG Law and Policy Center and AmeriCorps. This program strives to increase community awareness of issues relating to water quality. Local efforts include stream monitoring and river cleanups including the Raritan Wide Earth Day cleanup. The program has three Rutgers-based groups: Cook/Douglass group focuses on Lawrence Brook and works on the Lawrence Brook monitoring sites where they have found fecal coli-form contamination. The Rutgers group focuses on Mile Run and the Rhodia site. The Livingston group focuses on Johnson Park.

New Jersey Conservation Foundation  
Michele S. Byers, Executive Director  
908.234.1225

The mission of New Jersey Conservation Foundation is to preserve New Jersey’s land and natural resources for the benefit of all.

Through acquisition and stewardship NJCF protects strategic lands, promotes strong land use policies, and forges partnerships to achieve conservation goals. Since 1960, NJCF has protected over 100,000 acres of natural areas and farmland in New Jersey – from the Highlands to the Pine Barrens to the Delaware Bay, from farms to forests to urban and suburban parks.

New Jersey Environmental Federation  
David Pringle, Campaign Director  
609.530.1515

The New Jersey Environmental Federation (NJEF), the state chapter of Clean Water Action, is a non-profit, action-oriented organization developing a growing coalition of community, environmental, student and labor organizations able to act on a broad range of environmental issues.
New Jersey Work Environment Council
http://www.njwec.org/
Valerie Caffee, Director of Organizing
609.695.7100

The New Jersey Work Environment Coalition (WEC) is a membership alliance of labor, environmental, and community organizations working for safe, secure jobs and a healthy, sustainable environment.

No Water, No Life
Alison M. Jones, Founder, Director
212.861.6961

No Water, No Life is a world-wide water protection advocacy organization using the power of film to highlight and educate on the critical need to sustain the world’s sources of fresh water and to secure the protection of watershed lands. They focus on emerging scientific research to spread their educational message across all nations. In 2008, they selected the Raritan River as one of their six major points of focus. They are currently in production of a documentary on the Raritan River.

Regional Plan Association
http://www.rpa.org/new_jersey.html
Carlos Rodrigues, NJ Director
609.228.7080

RPA/NJ’s mission is to research issues of regional and statewide significance, to promote proposals and advocate solutions to these issues, and to implement action projects and policy initiatives across political boundaries that will lead to positive change within New Jersey and throughout the tri-state region.

Rutgers University - Bloustein
http://policy.rutgers.edu/
Judy Shaw, Project Director
732-932-5475 ext. 720

The Bloustein School of Planning and Public Policy has 30 faculty, two undergraduate and four graduate programs in planning, public policy and public health. The School has more than fifteen research centers focusing on brownfields, neighborhood redevelopment, transportation, green building and sustainability.
Sustainable Raritan River Initiative: the Sustainable Raritan River Initiative, coordinated by the Bloustein School in partnership with the Rutgers School of Environmental and Biological Sciences (SEBS), brings together the varied stakeholders of the Raritan Basin to focus on the needs and issues of the Lower Raritan in an effort to develop a strategic partnership to remediate and restore the Raritan River and ensure its protection into the future.

Another Center is the New Jersey Sustainable State Institute (NJSSI). A major project was created in 2007 for Highland Park. The Highland Park Green Community Plan, http://www.njssi.org/uploaded_documents/HighlandParkGreenCommunityPlan121707.pdf, outlines efforts in Highland Park to reduce energy costs, save water and preserve land. NJSSI is currently developing a sustainability plan for Middlesex County. They have a set of ten goals related to natural resource preservation, energy efficiency, public health, pollution prevention, the economy, waste reduction, and recycling and developed a variety of indicators (e.g. impervious surfaces, contaminated sites) to illustrate current conditions and track progress toward these goals. The plan also includes action plans for county departments to implement in order to progress towards their vision of a sustainable county.

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**Rutgers University - School of Environmental and Biological Sciences (SEBS)**

http://sebs.rutgers.edu/

Chris Obropta
Beth Ravit

The Rutgers-SEBS is housed on Cook Campus and hosts several key research institutions: Rutgers Cooperative Extension (http://njaes.rutgers.edu/extension/), the Water Resources Institute (http://njwrri.rutgers.edu/) and the Rutgers Environmental Research Clinic (http://rerc.rutgers.edu/). Two major current initiatives involve stormwater management and oyster habitat restoration in the Raritan Bay.

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**Trust for Public Land**

www.tpl.org

Anthony Cucchi

The Trust for Public Land (TPL) is a national, nonprofit, land conservation organization that conserves land for people to enjoy as parks, community gardens, historic sites, rural lands, and other natural places, ensuring livable communities for generations to come.
Wild New Jersey  
http://www.WildNewJersey.tv  
David Wheeler, Founder  
WildNewJersey@edisonwetlands.org

In fall 2008, Edison Wetlands Association launched www.WildNewJersey.tv, the only daily wildlife and conservation news blog in New Jersey. Wild New Jersey serves as a one-stop source for everything you need on wildlife and conservation in the Garden State, spotlighting the unique places, habitats, species, and events that only New Jersey can offer.

Wild New Jersey Exclusives, our weekly feature, offers inside looks into wildlife news through vivid photos, detailed tour summaries, and entertaining videos. The exclusives often capture state conservation leaders in the field interacting with the wildlife they know best. Wild New Jersey Exclusives have a special focus on Central New Jersey, providing a direct forum for exciting Raritan River conservation updates, such as video interviews, live ecotours, and vibrant photography about the Raritan Watershed.
RARITAN BASIN ORGANIZATIONS

The Corporate Wetlands Restoration Partnership
http://www.cwrp.org/
Russ Furnari
973.430.8848

The CWRP was created by a group of major corporations in cooperation with Coastal America to preserve, restore, enhance and protect coastal and inland aquatic habitat. They organized in 1999 and since then have restored more than 20,000 acres nationally. The New Jersey Chapter interests include oyster habitat restoration, dam removal and general restoration and habitat creation projects.

D & R Greenway Land Trust
www.drgreenway.org
Linda Mead, Executive Director
609.924.4646


D&R Canal Commission
www.dandrcanal.com
Ernest P. Hahn, Executive Director
609.397.2000

The Delaware and Raritan Canal Commission was established in October, 1974, when Governor Brendan Byrne signed the D&R Canal State Park Law. The Commission was created to accomplish three main tasks:

- To review and approve, reject or modify any action by the State in the Canal Park, or any permit for action in the park
- To undertake planning for the development of the Canal Park
- To prepare and administer a land use regulatory program that will protect the Canal Park from the harmful impacts of new development in central New Jersey
Duke Farms Foundation
www.dukefarms.org
Timothy M. Taylor, Executive Director
908.772.3700

The Duke Farms in Hillsborough is a 1700 acre property on the Raritan River. The property serves as a model for environmental stewardship and has a strong commitment to public education and environmental sustainability research.

East Brunswick Nature Notes
http://www.njnaturenotes.com/
Rich Wolfert

Rich Wolfert hosts a community website on matters of importance to nature lovers from the East Brunswick area. The site tracks emerging news issues, and is a central repository for raptor and other bird sightings in the area.

Eastern Environmental Law Center
www.easternenvironmental.org
Richard Webster
973.424.1166

The Eastern Environmental Law Center is the only law firm in New Jersey dedicated solely to public interest environmental cases. They actively support Natural Resource Damage cases for regional organizations (see New York New Jersey Baykeeper and Edison Wetlands Association).

Eastern Villages Association of South Brunswick
http://sbeva.blogspot.com/

The Eastern Villages Association of South Brunswick is a volunteer community organization in South Brunswick. This organization strives to preserve lands in the northeastern portion of the township. In 2008, they set their sights on preserving the Van Dyke Farm on Davidson's Mill Road, which is directly adjacent to Pigeon Swamp State Park, which has the only Category 1 quality water in the county.
Edison Greenways Group, Inc
www.edisongreenways.org
Robert E. Takash, President
Walter Stochel, Jr., Vice President
732.985.7071

The Edison Greenways Group is a land trust organization, actively involved in preserving open space and advocating for environmental protection in Edison. In addition, they advocate for improvements for pedestrian and bicycle routes in the township. They sponsor events and are actively involved with other recreational groups.

Edison Wetlands Association
http://www.edisonwetlands.org
Robert Spiegel, Executive Director
732.321.1300

Since 1989, the independent nonprofit Edison Wetlands Association (EWA) has led the effort to clean up, preserve, and restore the Raritan Estuary. Dedicated to preserving the environment and protecting public health, EWA focuses on the Lower Raritan Watershed, but is active in ensuring timely and thorough cleanups of toxic sites across the state as well as federal issues such as Superfund.

- **Cleanup of Hazardous Sites**: The major focus of EWA is serving as the state leader in ensuring the thorough and timely cleanups of New Jersey’s most dangerous toxic sites. Since their incredible decade-long successful fight to clean up the Chemical Insecticide Corporation “green rabbits” site in Edison, EWA has continued to advocate on behalf of the Raritan River Watershed as a treasured natural resource.

- **Federal Superfund Reinstatement**: EWA has long served as the national grassroots leader in the effort to reauthorize the federal Superfund “Polluter Pays” Tax, a federal program designed to fund the remediation of sites that pose an imminent threat to human health and the environment.

- **EWA Executive Director Robert Spiegel** has testified three times before the U.S. Senate on the federal Superfund issue.

- **Environmental Justice**: EWA provides technical and strategic assistance to underprivileged community organizations across New Jersey through its Community Assistance Remediation Program.

- **Brownfields-to-Greenfields/Open Space Preservation**: EWA advocates for the balanced redevelopment of Brownfield sites to create open space and recreational
lands, enhance public access to our natural resources, and restore wildlife habitat, while also providing economic incentives from balanced redevelopment.

- **Conservation:** EWA led the protection of the Dismal Swamp Conservation Area, a 1,200-acre at-risk wildlife refuge that stands as the only significant natural area left in the Lower Raritan Watershed. Known as the “Everglades of Central Jersey,” the Diz serves as a key source of clean water for the Lower Raritan. EWA has also created the *Birds of Middlesex County* report and is developing a *Guide to the Wildlife of Middlesex County*. EWA Director of Operations David Wheeler founded [WildNewJersey.tv](http://WildNewJersey.tv), the only daily nature and wildlife blog in New Jersey.

- **Environmental Education:** Through their headquarters at the Triple C Ranch, the last farm in Edison and the gateway to the Dismal Swamp Conservation Area, and an ambitious outreach and education schedule, EWA provides programs to educate children and families on the importance of protecting our natural resources. EWA also brings programs to other organizations to further encourage all New Jerseyans to join the cause for environmental restoration and protection.

- **Enforcement:** EWA challenges actions that have potentially harmed the environment and uses legal action to ensure enforcement of environmental regulations. EWA advocates with municipalities, regulators, and federal officials to improve their local ordinances to enforce environmental protection laws.

- **National Lead pollution lawsuit, April 2009:**
  A notice to file a lawsuit has been announced by NY/NJ Baykeeper and Edison Wetlands Association (April 16, 2009). The two groups plan to sue eight public and private entities over pollution discharging into the Raritan River (NL Industries Inc., NL Environmental Management Services Inc, Sayreville Economic and Redevelopment Agency, O’Neill Properties Group, Sayreville Seaport Associates, Middlesex County, the Turnpike Authority, and the New Jersey Department of Transportation). The NGOs contend that the contamination comes from National Lead, a manufacturing facility operated in Sayreville (1935-1982), and from inefficient storm water management programs run by the named transportation authorities. The lawsuit seeks to stop discharge of hazardous substances and to remediate the contaminated sediments.

- **Environmental Education:** Through their headquarters at the Triple C Ranch, and an ambitious outreach and education schedule, the staff of EWA provide programs to educate children and families on the importance of protecting our natural resources. They also bring programs to other organizations to further encourage all New Jerseyans to join the cause of restoring, protecting and preserving our natural treasures.
Green Brook Flood Control Commission
http://gbfcc.org
Theodore Bassman, Chairman

Authorized by NJ around goal of comprehensive flood control solution for Green Brook basin. Hold open meetings and publish a newsletter. Members are Middlesex, Somerset and Union counties, plus 12 flood-affected municipalities.

Heritage Trail Association
www.heritagetrail.org
732.356.8856

The goal of the organization is to offer area residents and visitors alike an opportunity to learn about the rich history of greater Somerset County while celebrating our unique place in our nation's history.

Lawrence Brook Watershed Partnership
www.lbwp.org
Alan Godber, President
732.846.4476

The highly effective educational mission of the Lawrence Brook Watershed Partnership attracts hundreds of people to events organized throughout the year to promote the protection and stewardship of the Brook. Their events, workshops and local tours engage residents from across the region.

Milltowners for a Sensible Ford Avenue Redevelopment
Charlie Jegou, Founder

A citizen organization to encourage and promote more public engagement in the future plans for the Ford Avenue redevelopment project, focusing on remediation issues.

New York/New Jersey Baykeeper
http://www.nynjbaykeeper.org/
Debbie Mans, Executive Director
732.888.9870

Recently celebrating twenty years of advocacy and stewardship, the New York/New Jersey Baykeeper is among the leading organizations in the region in the fight to restore waterways damaged by years of neglect and pollutants from the areas heavy industrial
base. They advocate for protection of habitat and the fisheries in the Hudson-Raritan complex. Their prime objectives are:

- Preservation of the habitat and ecosystems of the Hackensack Meadowlands
- Restoration of oyster habitat and the oyster industry
- Remediation of contamination and public access to its 650 mile shoreline
- Pursue polluters and secure damage funds to restore the habitat for animals and people
- Greenways and waterfront parks
- Revitalized communities through restored ecosystems
- Stewardship for the future

North Jersey Resource Conservation and Development Council
www.northjerseyrcd.org
Grace Messinger, Watershed Specialist
908.735.0733

This consortium is sponsored by freeholders and soil conservation districts of six counties. Its main mission is to facilitate the wise use and protection of the regions human and natural resources. This is accomplished by working with communities and regional partnerships to: address issues related to water quality and water resource protection, sustainable farming and farm communities, building local community capacity and managing natural hazards that impact community planning are among some of our council’s focus areas.

Raritan Basin Watershed Alliance
http://www.raritanbasin.org/

The Alliance is an unincorporated coalition of interests that play major roles in water resources management in the region. It seeks to foster implementation of the Raritan Basin Watershed Management Plan, completed in early 2003 as a comprehensive approach affecting the 1100 square mile Raritan River Basin (see enclosed summary). The Raritan Plan identified six key issues that must be addressed if the region’s water resources are to be restored and protected:

- surface water pollution,
- stormwater management,
- ground water recharge losses,
- riparian area (stream corridor) losses,
- biological impairment of streams, and
- water supply limitations.
Formed in late 2003, the Alliance’s major functions are:

- Create public and official support for Plan implementation
- Create coalitions/partnerships for Plan implementation and assist with acquisition of financial and other resources where requested
- Encourage and support implementation efforts and assist with project planning
- Keep the Raritan Plan current and continually improving
- Maintain and enhance technical knowledge and capabilities of the Basin and ensure dissemination to those who need it

In the near term, the Alliance has two principal responsibilities: attracting resources to implement the Raritan Plan; and fostering partnerships to use those funds effectively. Most project funds will go directly to the partnerships involved in each project, rather than to the Alliance itself. The Alliance has selected three major initiatives for its initial efforts:

**Program Coordination** – Workshops for governmental and nongovernmental entities engaged in major water resources management work, to increase the potential for cooperative projects and new initiatives.

**Nonpoint Source Pollution Cause Identification** – “Demonstration project” of nonpoint source pollution cause analysis in three to five watersheds or subwatershed of the Raritan River Basin, including innovative techniques.

**Raritan Basin Stream Corridors Project and Riparian Restoration** – Campaign for the creation of a linked network of vegetated stream corridors, using both parks and private lands, and comprehensive stream and riparian corridor habitat restorations as appropriate.

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**Raritan Highlands Compact**


John Malay
908.879.5520

The Raritan Highlands Compact is a cooperative organization of nine member municipalities in southwest Morris County (Chester Borough, Chester Township, Mendham Borough, Mendham Township, Mt. Arlington Borough, Mt. Olive Township, Randolph Township, Roxbury Township, Washington Township) and the County of Morris.

Associate members include the Upper Raritan Watershed Association, South Branch Watershed Association, New Jersey Water Supply Authority, the Regional Plan Association, and Morris Tomorrow. The central purpose of the Compact is to establish a common and comprehensive watershed model, and a set of model regulations and
operating practices, in order to protect and improve water quality in the Raritan River and its aquifers.

In addition, members will work together to meet the new storm water regulations and to help each of the member towns carry out the water preservation purposes of the Highlands Preservation Act.

Raritan-Piedmont Wildlife Habitat Partnership (RPWHP)
http://www.conservationresourcesinc.org/rpwhp.htm

Created in 2006, the Partnership is a group of organizations dedicated to implementing NJ Wildlife Action Plan in Piedmont plains. They have worked with NJ Audubon on grassland habitat study, project funded by Doris Duke Charitable Foundation to benefit grassland birds.

Raritan Riverkeeper
Bill Schultz
732.442.6313

The Raritan Riverkeeper's mission is to protect, preserve, and restore the ecological integrity and productivity of the Raritan River, its tributaries, and watershed. As the citizen conservation advocate for the River and its shores, the Riverkeeper stops polluters, champions public access, and influences land use decisions.

South Branch Watershed Association
http://www.sbwa.org/
Bill KiblerExecutive Director
908.782.0422, Ext. 11

The South Branch Watershed Association (SBWA) is a not-for-profit organization dedicated to protecting the environment in the watershed of the South Branch Raritan River. Since 1959, SBWA has been assisting municipalities, schools, community groups, and citizens with protecting natural resources through education and outreach. Programs offered by SBWA include a volunteer stream monitoring program, biannual stream clean-ups, informational workshops, community well testing programs, and in-school in-field environmental education programs. SBWA also serves as a clearinghouse for public information regarding local environmental issues.
EPA Targeted Watersheds Grant Project -- This $2.1M project was an exciting effort to improve surface water quality using a three-prong effort of restoration, protection, and pollution prevention.

Raritan Basin Watershed Management Project – The Raritan Basin Project is a cooperative effort coordinated by the New Jersey Water Supply Authority with the ultimate goal to develop a Plan to assure that the water quality in the Basin meets or exceeds federal standards.

DEP Grants
Open Space Acquisition and Land Management Projects
Programs
Well Testing

Environmental Education – The Waterways Stewardship Project consists of two program components: an in-school 90-minute session and an in-field 2.5-hour session.

River Monitoring – Volunteer Biological Monitoring Program's mission is to promote the conservation of water quality in the South Branch of the Raritan River watershed. The program gathers baseline benthic macro-invertebrate data to use as an indicator of water quality in the South Branch Raritan River using a core group of volunteers.

Stream Cleanup

Fundraisers – Events to raise money for the organization’s projects

Stony Brook-Millstone Watershed Association
http://www.thewatershed.org/
Jim Waltman, Executive Director
609. 737.3735, ext 22

The Stony Brook-Millstone Watershed Association is a member supported non-profit organization dedicated to enhancing the quality of the natural environment in the 265-square mile region drained by Stony Brook and the Millstone River through intelligent and informed land use decision making, the protection of water quality and supply, and the improvement of the community's awareness of environmental issues. They offer education programs and workshops for the community and operate an 860 acre nature reserve. They organize volunteer stream clean ups. They also monitor local water quality through StreamWatch, in which volunteers collect information on biological, chemical and physical stream features. The Association’s River-Friendly Certification Program promotes environmental stewardship and provides education and information on nonpoint source (NPS) pollution reduction and best management practices focused on the landscape. The program aims to work cooperatively with residents, businesses, and golf courses to protect our local environment and reduce the amount of chemicals entering water bodies. They sponsor restoration and reforestation projects. They are attempting to restore shad and other fish in the Millstone by
researching the safety of removing or breaching dams, such as the Weston Causeway and Blackwell Mills Dams, and improving water quality. Other Raritan related projects: The Raritan Basin Watershed Management Project, EPA Targeted Watershed Initiative Grant for the Raritan Basin

Upper Raritan Watershed Association
www.urwa.org
Cindy Ehrenclou
908.234.1852

URWA's mission is to ensure the protection of the natural resources of the Upper Raritan Watershed through education, advocacy, land preservation and stewardship. One of their main goals is to encourage more protective municipal policies. With 194 square miles in their watershed area, they have developed an extensive GIS inventory with ranging from sewer service areas and contaminated sites to historic area maps.

URWA hosts a regular informational breakfast known as the “Wake Up Call” series. This brief morning meeting gives them an opportunity to share information with municipal leaders and promote participation and support of their programs. They also sponsor various environmental education programs including the “Take a Walk” series designed for individual communities. The Association hosts an annual Water Summit for high school students, and their newsletter provides informative articles and to encourage participation in watershed activities.

A major focus of their efforts is preserving land as a tool to protect water supplies. They have a very successful easement program. Water monitoring activities include an adopt-a-stream program, where students learn and where teachers come for training. It is lab certified for use by the NJDEP quality assurance program, so the data can be used for land use decisions.

Habitat protection includes an aggressive approach to dealing with invasive species. They work closely with the Friends of Hopewell Valley in the “Central Jersey Invasive Species Strike Team.”

Woodbridge River Watch
www.woodbridgeriverwatch.org

This is a volunteer organization with the mission of cleanup and restoration of all the waterways of Woodbridge.
III. COUNTY AND MUNICIPAL INITIATIVES ON THE LOWER RARITAN

The Raritan basin covers parts of seven counties and includes one hundred municipalities in Hunterdon, Mercer, Middlesex, Monmouth, Morris, Somerset and Union counties. Significant variation exists in the socioeconomic status, development density and landscape of the Upper and Millstone watershed management areas versus the Lower basin area. The Lower Raritan area, from roughly the towns of Raritan and Hillsborough in Somerset County and downriver toward the Bay, has lower socioeconomic status, and a denser residential, commercial and industrial development pattern. The Upper and Millstone regions have active well-established watershed associations that have worked with municipalities on environmental aspects of land use plans and local ordinances, run numerous public education activities, and developed citizen monitoring networks. There is no comparable umbrella organization that devotes its sole attention to the water issues of the Lower Raritan area, although there are many organizations active in the region and many municipalities are starting to look at the matters of more protective measures (see Appendix 1).

Despite the variations in policies and practices, there is a unifying theme among these counties and municipalities, which is their dedication to open space protection. While the Upper Raritan receives support for land preservation from the ratepayers of the region, other private and public efforts have contributed dramatically to the protection of natural areas in the region. In 2008, the seven counties collected over $139 million in open space funds, lead by Morris and Middlesex counties (NJDCA, Division of Local Government Services, 2008). Fifty-seven municipalities in the watershed raised an additional $40 million.
It is clear from this level of voluntary tax levies, that the residents of the region prize their resources and wish to see them preserved, but that is only one aspect of the future security of the Raritan River and its environs.

In this section, we examine in more detail the portion of the river in Middlesex, Somerset and Union Counties that faces the most threats, is of lowest quality, has minimal public awareness, and no single over-arching organization to advocate for its restoration. Our intent is to provide a snapshot of the perspective of riverfront towns along the main stem of the Raritan, plus a few others that are particularly involved in a water resource issue because of impacts to a tributary. In keeping with the nature of this report as a “work in progress,” this is not intended to be a complete and comprehensive compendium of all local plans and activities that affect the river. Rather, it is based on interviews and meetings with most of the towns to elicit both their concerns and their plans and activities, plus research into planning documents and ordinances available online. Future iterations of this report will expand and fill in more detail about local initiatives, as these communities also become more engaged and begin to address river issues to a greater extent.

MIDDLESEX COUNTY:

Generally, the areas directly adjacent to the river in the portion of the River from New Brunswick to the Bay have a concentration of wetlands, landfills, industrial sites and some public recreation. Access to the waterfront varies, but it is notable that the Raritan River is often not visible from major roadways. Much of the region has very little “river orientation,” with the exception of some parts of Highland Park, New Brunswick, Perth Amboy and South Amboy. Other areas of the waterfront in the Middlesex County portion of the river are largely underdeveloped, non-residential or in wetlands.

Some of the county-driven plans and activities that affect the river are noted below.
Middlesex County Planning Department

Middlesex County Water Resources Association (WRA).

This is the body that reviews applications to add new waste water generators. The WRA is also involved with stream restoration projects and implementing the NJDEP stormwater management regulations.

Raritan Riverfront Strategy Plan, 2003

This plan, produced by consultant HDR, Inc., was developed for the county planning department and the Middlesex County Improvement Authority (MCIA) to respond to the concern that Raritan waterfront locations are not maximized. The goal of the document is to promote environmental education, historical and cultural assets for tourism, specifically boat-related activities, by creating a series of complementary venues to attract recreational boaters upriver. The plan identifies and compiles redevelopment areas and plans from the waterfront towns from New Brunswick/Highland Park to the Amboys. Some of the primary conclusions of the plan are:

- The River should have both natural and urban edges.
- Landfill closures offer open space/pedestrian opportunities.
- Middlesex county and municipalities must partner in marketing the River and public education/awareness of river.
- There is a need to increase physical and visual access from roadways.
- There is a need for more channel marking beyond the Route 1 bridge.

Middlesex County Parks

Currently, county recreational parks along the Lower Raritan exist at Raritan Bay Waterfront Park (Sayreville), Donaldson Park (90 acres, Highland Park) and Johnson Park (473 acres, Piscataway and Highland Park). In addition, there is undeveloped
county land at Reds Marina (Highland Park) and Raritan River Conservation Area (New Brunswick). The only municipally-owned open space directly on the waterfront is found at one local park in Sayreville, one in Highland Park and two in New Brunswick. The primary water-related issue at the parks is the flooding that occurs regularly with heavy rains. The debris that washes on the banks can be a deterrent to recreational use of the River.

According to the *Open Space and Recreation Plan (2003)*, the county’s vision is for greenway linkage along both sides of Raritan from the Amboys all the way to the beginning of the Delaware and Raritan Canal in New Brunswick. This greenway would link existing greenway sites along the River, such as a walkway in South Amboy, county parks and newly developed trails in Edison, with new greenway and trail development. To this end, the county has identified “potential open space acquisition areas” at four locations along the River – Sayreville Dredge Spoils Area (669 acres), Raritan River Tidal Wetlands (2,094 acres), Rutgers Village Area (129), and Rutgers Ecological Preserve (465 acres).

**Middlesex County Improvement Authority (MCIA)**

The MCIA’s Raritan Redevelopment Program involves working with the U.S. Army Corp of Engineers (USACE) in an effort to restore the Raritan estuary, and includes parks, boat ramps, a fishing pier in South Amboy, and multi-use redevelopment in Sayreville. Implementation of this program will require dredging for improved navigation. MCIA contracted with HDR, Inc. to test sediments near New Brunswick. The sediments exceeded standards for cadmium. Other samples taken near Sayreville by a private consultant on behalf of an area non-profit in 2000 exceeded in multiple parameters.
Middlesex County Utilities Authority (MCUA):

The MCUA has easements along the south side of the river in East Brunswick Twp. and operates Edgeboro landfill. With a footprint of 315 acres, Edgeboro is the only active landfill along the Lower Raritan. It is surrounded by wetlands with limited access.

Middlesex County Municipalities:

There are twenty-four Middlesex County municipalities in the Raritan Basin. We highlight those along the main stem of the river, plus Milltown, and describe some of the river-related priorities and plans in these communities.

East Brunswick

The township has Raritan River frontage, as well as parts of three Raritan tributaries. However, the Edgeboro Landfill, operated by the County Utilities Authority, occupies most of the waterfront land, and NJDEP regulates the water body issues, so the River itself is not a prominent presence or issue at the municipal level. The township supports the greenways concept and is looking at possible development in the area where the Raritan meets Lawrence Brook.

Edison

The riverfront area, planning district 5 in the township, is dominated by the Akzo Nobel / Basell, U.S.A chemical plant, the Kin-Buc Landfill Superfund Site, ILR Landfill and Edison Landfill, and undeveloped wetlands. The Township has designated the Edison Landfill riverfront for open space and recreation, with a walkway, native butterfly gardens, gazebos, and a kayak launch planned. The Township will re-evaluate the plan that was proposed almost a decade ago and ensure that the vision for the land is comprehensive, holistic and supports the ecology of the area once it has been
restored. The current plan for the river walkway, as part of Raritan Riverfront Restoration and Park conceived by the Edison Wetlands Association in 2002, is moving forward with the first phase out to bid. The area around the chemical company is in a redevelopment study. The goals for the area are to increase public access, develop trails, preserve open space and restore the marshes with possible education centers. The township has an Open Space Trust fund and hopes to access Green Acres funding. Also, the township passed a new stormwater management ordinance in 2008 (O.1634-2008).

**Highland Park**

A majority of Highland Park’s riverfront is in either parkland or preserved open space, including Donaldson County Park, 16-acre Highland Meadows (just downstream of Donaldson), Red’s Marina and the 3-acre Native Plant Reserve. A main concern of the township is stormwater and the need for larger buffer areas around streams and restoration of streambanks. Town Master Plan goals are to achieve a Raritan River Greenway that incorporates riverfront areas and connects and extends in both directions into Edison and Piscataway. A non-motorized boat landing at the Raritan River Environmental Education Center (located at the Native Plant Reserve) is also under consideration.

**New Brunswick**

The City’s Master Plan conservation plan element includes a goal to create continuous conservation/park/environmental uses along the waterfront resource areas, including municipal parks (Boyd and 78-acre Buccleuch) and the 100-acre Raritan River conservation area at the city’s southeastern end. At Boyd Park, renovation involves boat slips and a boat ramp. Dredging has occurred in the river to facilitate the Raritan Landing project. There is currently limited access for canoes and kayaks along
the New Brunswick waterfront. Along a 1.8 mile under-utilized bike path, the Mayor’s office has partnered with Rutgers and with a consultant to create the Raritan River Art Walk that includes a concrete wall with space for murals. Another site, a former police station, is an area to be redeveloped for mixed use.

New Brunswick currently obtains drinking water from Weston’s Mill Pond (fed by Lawrence Brook) and from the Delaware and Raritan Canal near the Lynch Bridge. The city is constructing state-of-the-art membrane filtration.

**Milltown**

The Ford Ave. Michelin Site is a concern, along with the need for better characterization of the Lawrence Brook and understanding the legacy of industrial impacts. There has been some problem with turbidity, and the Environmental Commission would like to get C-1 status for the Lawrence Brook.

**Piscataway**

Nearly all of the waterfront area in the township is located within Johnson Park, which has both developed and undeveloped portions (stretching north). Therefore, there is little attention to the River itself at the municipal level.

**South Plainfield**

A main concern is the cleanup of sites and protection of water resources, including the Dismal Swamp Conservation Area. The township experiences floatable trash flows into water bodies in storm events. The Woodbrook Road and Cornell-Dubilier Superfund Sites both impact waterways.
**Perth Amboy**

Perth Amboy’s plans for being a premier riverfront destination include a vision for moving more goods up and down the river, expanded kayaking and recreational boating opportunities and a ferry service that could operate from New Brunswick to Manhattan. Along the riverfront, the town would like to improve aesthetics, access, walkability and use of the River, including extension of the current “promenade” that runs along the Bayfront in Perth Amboy. Two active industrial sites, the New Jersey Steel facility and the Hess Oil facility, are located along the riverfront, but town officials are confident that a walkway could work around them.

A major obstacle to achieving any of these objectives is the presence of a very low railroad bridge owned by NJ transit that crosses the mouth of the Raritan. The only way for a watercraft to get past the bridge is with a turnstile system that will only work at certain times and not under high wind or storm conditions. If the bridge is not either elevated or removed, it poses an almost insurmountable limitation to any proposals involving increased boat or ship traffic between the Bay and the River.

From Perth Amboy’s perspective, however, water quality has improved over the past decade. Fisheries have come back and other than overflows during storm events, water quality has not been a major public issue.

**Sayreville**

Sayreville has long sought to redevelop around the National Lead site, adjacent to the Garden State Parkway and Routes 9 and 35. The objectives of redevelopment are to capitalize on the waterfront location with remediation of properties and opportunities for recreation, office, commercial, marina and other water-related uses. The recent discovery of slag with significant lead and arsenic levels in the sediments around the site and extending to Old Bridge on the bayside, have prompted NJDEP and USEPA to consider the area for the Superfund designation.
South Amboy

Along the South Amboy river waterfront, the town operates a boat ramp and Middlesex County has a walkway, with plans to extend it further upriver. A Waterfront Master Plan developed in the early 2000’s includes plans for an intermodal center, ferry terminal and marina. South Amboy recently opened a ferry terminal at the entrance to the Bay. The only industry located along the River in South Amboy is Amboy Aggregates. One of the primary issues of importance is the need for dredging to allow barges.

Woodbridge

The township is applying for a Brownfields Development Area designation from NJDEP covering portions of 5 industrial properties and township owned parcels, totaling over 350 acres in Keasbey section of Woodbridge, the area along the waterfront. They have declared a Redevelopment Area in this part of the township, stressing the ultimate vision to convert existing industrial and vacant properties to either eco-industrial parks or resource recovery parks creating a balanced redevelopment. Most of the property in the proposed BDA is privately owned and operated. A new truck terminal is planned for a property adjacent to the contaminated Tenneco site.

Somerset County:

Somerset County Parks:

The County’s Parks, Recreation and Open Space Master Plan, published in 2000, describes a Raritan River Greenway initiative, including goals to expand existing parks and to create a corridor of protected lands along the Raritan. They have worked with
the NJ Department of Transportation (NJDOT) to institute an extensive bike path system.

They face numerous issues from flooding and there are several older industrial properties, both active and closed, along the river which interrupt the completion of the corridor. Conversations with those organizations are ongoing. The Green Brook Flood Control Project has been underway for several years by the US Army Corps of Engineers (USACE). The USACE has also worked with the county on wetland mitigation projects. They have several successful mitigations, particularly the one at Black Point Road.

The Somerset County Parks Department was merged with the Engineering Office in 2008. They work closely with the managers of the park system, the Somerset County Park Commission. Raritan-Piedmont Wildlife Habitat Partnership is focusing on Somerset Parks and Duke Farms.

**Somerset County Municipalities:**

**Franklin Township**

The township’s frontage on the Raritan has very limited public access, but the Millstone River forms the western boundary of the township, and its frequent flooding issues and visible presence has brought water issues to the fore. The township has a number of projects with NJWSA. The Environmental Commission received a grant from NJDEP to do baseline water quality sampling of most streams in the township. All streams exceeded SWQS for fecal coliform, and most exceeded for phosphorus. The Commission is actively engaged in education and outreach, including a partnership with the NJ Audubon Society to lead a series of bird watching hikes through the community (see [http://www.njaudubon.org/Conservation/Franklin.html](http://www.njaudubon.org/Conservation/Franklin.html)). The New Jersey Water Supply Authority (NJWSA) helped to secure NJDEP 319(h) non-point source funds for various water quality improvement projects in Franklin Township and
South Bound Brook Borough. This model stormwater management project began in 2001 and continues to provide wet ponds and manufactured treatment devices (MTDs) in the area.

http://www.conservationresourcesinc.org/FeaturedProjects/NJWaterSupplyAuthority/DelawareRaritanCanalRestoration.htm

**UNION COUNTY:**

**Union County Department of Parks and Community Renewal**

The County has two parks in the Raritan Watershed. Both Cedar Brook Park and Green Brook Park are in Plainfield, New Jersey.

**Union County Municipalities**

**Plainfield**

At Cedar Brook Park, Union County recently completed a shoreline restoration and dredging of Cedar Brook Lake. The lake has recently been restocked by NJ Division of Fish & Wildlife. Shoreline grading was done and boulders and an aerator installed. Native vegetation including trees, shrubs, perennials and aquatic plants were planted. A neighborhood Adopt-A-Park group has adopted the lake area and adjacent brook and holds annual cleanups.

In the Green Brook Park, Plainfield Youth Corps has partnered for the last four years with Union County and through Recreational Trails Act funding has restored the original footbridges, reset bluestone steps, removed invasive vegetation and installed native plants in a section of the park across from the brook. Motorola, a Union County Adopt-a-Park group, recently held a cleanup in the park, removing over 120 bags of litter, debris and invasive vegetation.
Plainfield/North Plainfield Partnership

The North Plainfield Shade Tree Advisory Board has become an Adopt-a-Park group, helping to maintain the area within the park located in that city. The group underwent training by Adopt-a-Park steward, Larry Murrell and injected knotweed located at this site and at the project site overseen by Plainfield Youth Corps, an Adopt-a-Park group. The group recently applied the same technique to bamboo that was also growing at the project area.
IV. FEDERAL AND STATE INITIATIVES

THE FEDERAL AGENCIES

There are five major federal agencies with a presence in the Raritan River Basin. These are: the United States Environmental Protection Agency (USEPA), the National Oceanic and Atmospheric Administration (NOAA), the US Geological Survey (USGS), the United States Army Corps of Engineers (USACE) and the United States Department of Agriculture (USDA), including the Natural Resource Conservation Service (NRCS) and the Conservation Security Program (CSP).

U.S. Environmental Protection Agency (EPA)

The USEPA administers the Clean Water Act, which provides various programs and resources to prevent point and non-point sources of water pollution, and protect the resource from further degradation. These funds, the 319(h) and 308, respectively, fund two major initiatives in the state.

Non-point Source Pollution

These funds, known by their section of the Clean Water Act, 319(h), fund various programs, the following being prime examples:

- **Manalapan Brook Watershed Restoration Plan** – stream restoration projects and best management practice to comply with Phosphorus reduction goals.

- **Delaware and Raritan Canal Tributary Assessment and Nonpoint Source Management Program** (New Jersey Water Supply Authority). This Watershed Restoration Plan was approved by NJDEP in 2006, which yielded Best Management Practices (BMP) recommendations for priority drainage areas.
Funding for implementation of selected drainage area BMPs is currently being considered.

- **Streambanks Stabilization and Riparian Buffer Restoration of Cedar Brook**, City of Plainfield, Union County (Rahway River Association). This project will restore approximately 2,000 linear feet of eroded stream banks and degraded riparian buffer of Cedar Brook in Cedar Brook Park, which is an Olmsted Park and of historical significance.

- **Stormwater Management Plan for the Cedar Grove Brook Watershed**
  New Jersey Water Supply Authority (NJWSA). This project will build on the Raritan Basin Watershed Management Project by developing a stormwater quality and quantity model, a management plan and implementation recommendations for use by various stakeholders. The project goals are to ensure long-term stability, to mitigate current pollutant loadings and prevent future degradation to the Canal and to identify opportunities to reduce pollutant loadings to the stream and Canal, so that the stream no longer degrades the Canal.

**Targeted Watershed Initiatives**

In 2003, the USEPA granted $1 million to the NJWSA, the Stony Brook-Millstone Watershed Association and the South Branch Watershed Association. The project produced three programs, including the “River Friendly” programs, a study of stormwater improvements and a non-point-source (NPS) management project in the Somerville/Manville area.

The three-pronged approach of this project addresses stream restoration, watershed protection and preservation through the Municipal Assessment process and pollution prevention for municipalities, businesses, golf courses, farms and residents through a
River Friendly program. The million dollar federal grant will be matched by funds from the New Jersey Water Supply Authority (NJWSA), Stony Brook-Millstone Watershed Association and South Branch Watershed Association.

A second Watershed Management program for the Raritan River Basin was the Phase II Management Plan & Interim Protection/Restoration Projects, which funded the work through the New Jersey Water Supply Authority (NJWSA). This project includes the development of the Manalapan Lake Watershed Restoration/Implementation Plan, an Open Space and Redevelopment study of the Lower Raritan Watershed and Fecal Coliform TMDL Support.

The USEPA Science to Achieve Results (STAR) program, funded the Rockaway Creek Watershed Project. This project will determine land areas within the Rockaway Creek watershed that are most likely to contribute pollutant loadings to the stream through use of the Variable Source Area modeling concept. Partial funding came from the New Jersey Institute of Technology (NJIT) who partnered with the NJRC&DC and the NJWSA on the project.

**U.S. Army Corps of Engineers**

In 2005, the US Army Corps of Engineers (USACE) proposed a maintenance dredging between miles 2–4 of the Raritan River. Concerns were expressed by Clean Ocean Action and NY/NJ Baykeeper about the disposal site and method of dredging to reduce re-suspension of PCB’s and dioxin. Contamination from National Lead has not been fully delineated. One of the USACE main projects in the Raritan Basin is the Green Brook Flood Control Project. In conjunction with this, the USACE has funded a number of habitat restoration projects in the area.

A second major USACE initiative is the Comprehensive Restoration Plan for the Hudson-Raritan Estuary which was released on May 1, 2009. The plan can be found at: [http://www.nan.usace.army.mil/harbor/crp/](http://www.nan.usace.army.mil/harbor/crp/).
The USDA Conservation Security Program (CSP) is a voluntary program that provides financial and technical assistance to promote the conservation and improvement of soil, water, air, energy, plant and animal life, and other conservation purposes on Tribal and private working lands. The CSP awarded $200,000 to sixteen applicants in the Upper Raritan River Watershed in fiscal year 2006. In addition, a Conservation Innovation Grant for $75,000 was awarded to North Jersey Resource Conservation and Development (RC&D) Council to implement ‘River Friendly Farms’ in the Neshanic River Sub-Watershed. The North Jersey RC&D was also awarded $84,715 in Cooperative Conservation Partnership Initiative (CCPI) grants to restore stream banks and riparian zones, as well as wetlands on farmland in the Raritan Basin (NJDEP 2008).

The Raritan Agricultural Buffers Planning Project was funded by the NRCS, the NJWSA and the NJ Raritan and Delaware Canal (NJR&DC) in 2007. This project identified agricultural lands in the Raritan River Basin where the creation and maintenance of stream buffers would significantly reduce pollutant loadings, improve stream stability, and enhance ecological integrity. The project partners were the NJWSA and the NJRC&DC.

The River Friendly program, including outreach to golf courses, businesses, residents and farms, was funded by the NJWSA and the NRCS.

For over a hundred years, the United States Geological Survey has operated surface and groundwater monitoring networks in the Raritan basin. The data collected on the quantity and quality of the water resources in this watershed has been used to: document existing conditions and changes to the watershed's hydrology from both
anthropogenic and natural causes; develop ground water flow models for the coastal plain aquifer systems of the lower basin; and assess water availability (safe yield) of the surface water of the Raritan and Millstone Rivers.

**THE STATE OF NEW JERSEY**

Various programs have been initiated by the departments of state government, most notably the NJ Department of Environmental Protection (NJDEP). There are three other key players in the New Jersey state system. The first is the New Jersey Water Supply Authority (NJWSA), which supports the Raritan Basin Alliance and the second is the New Jersey Highlands Commission. The third is Rutgers, the State University of New Jersey.

**New Jersey Department of Environmental Protection (NJDEP)**

Within the NJDEP, there are five major elements to handle regulatory and policy programs. They are: Compliance and Enforcement; Environmental Regulation; Land Use Management; Natural and Historic Resources; the Office of Policy, Planning and Science; and the Site Remediation Program. Each has activities of importance to the Raritan Basin.

The Green Acres Program has partnered on many projects in the region, at the municipal and county level, to protect open space and develop programs. The Compliance and Enforcement program activities of the NJDEP at this time are significantly focused on contaminated properties and the securing of Natural Resource Damages from companies with histories of polluting the River. They also have the authority to channel penalties for violations into Special Environmental Programs (SEPs), which are designed to enhance the resource and provide programs designed with the input of the community in which the violations occurred.
Also active are the water quality monitoring efforts and the programs working in the watersheds. The NJDEP receives federal pass-through funding for various Clean Water Act programs, including the Watershed Protection Programs. A number of these programs are jointly funded with other federal and state agencies, as noted, most notably with the New Jersey Water Supply Authority (NJWSA).

**New Jersey Water Supply Authority**

Probably one of the most far-reaching efforts in the state to ensure protection of its drinking water supplies was the creation in the early 1980s of the NJWSA. Charged with the oversight of two of the state’s major reservoirs and the Delaware and Raritan Canal (in conjunction with the NJDEP), the NJWSA has reinvested funds from their rate-payers to conserve and protect the resource and much of the preserved land in the region. To date, they have preserved over 2700 acres of land. They serve as a model for stewardship in the region and partner with NJDEP and numerous other agencies to foster the protection of the water supply for the vast majority of the region in the Upper Raritan, and through contracts with other water purveyors, much of the Lower Raritan as well.

The projects below represent the partnership of NJDEP and NJWSA and others:

**Cedar Groove Brook Stormwater Management Plan**

Development of a regional stormwater plan for use in addressing new development and identifying potential remedial projects to control pollutant loadings to the Canal.

**Funding:** NJDEP and NJWSA

**Project partners:** Franklin Township, NJWSA

**Raritan Highlands Wastewater Management Planning Grant**

Project to help Highlands' municipalities better plan for and protect Highlands water resources through their Wastewater Management Plans and other tools.

**Funding:** NJDEP

**Project Partners:** County Planning Departments of Hunterdon, Morris, and Somerset Counties, SBWA, URWA, NJWSA
Lockatong and Wickecheoke Creeks Watershed Restoration and Protection Plan
This project will result in a technical report and management plan for the largest area draining into the Delaware and Raritan Canal.
Funding: NJDEP, NJWSA, NRCS
Project partners: NJWSA, NRCS

Delaware and Raritan Canal Nonpoint Source Control Plan Implementation
This project implements the plan for the top 15 drainage areas contributing nonpoint source pollution to the Canal in the project area.
Funding: NJDEP, NJWSA
Project Partners: Rutgers Preparatory School, NJ Department of Transportation, Borough of South Bound Brook, Township of Franklin, NJWSA

Neshanic Watershed Restoration Plan
Development of a watershed restoration plan in the Neshanic River watershed
Funding: NJDEP, NJIT, NJWSA, NJRC&DC
Project Partners: NJIT, NJRC&DC, SBWS, Rutgers Cooperative Research and Extension, Hunterdon Soil Conservation District, NJWSA

Manalapan Watershed Restoration Plan Project
Development of a watershed restoration plan for the entire Manalapan watershed with detailed project identification
Funding: NJDEP
Project Partners: Middlesex County, NJWSA

Sidney Brook Watershed Protection Plan
Development of a watershed plan for Sidney Brook, a Category 1 tributary of the South Branch Raritan River
Funding: NJDEP
Project partners: Union Township, Franklin Township, NJWSA, SBWA

Action Plan Presentation to Communities to Address Nonpoint Source Pollution
Funding: NJDEP
Partners: South Branch Watershed Association

A Regional Stormwater Management Plan for the Pleasant Run Watershed
Funding: NJDEP
Partners: Readington Township
Budd Lake Watershed Restoration, Protection, and Regional Stormwater Management Plan
Funding: NJDEP
Partners: Mount Olive Township

Restoration of Victor Cromwell Park
Funding: NJDEP
Partners: Borough of Middlesex

Restoring Our Rivers
Funding: NJDEP
Partners: Chapter of Trout Unlimited

Streambank Restoration of the Millstone River and Stony Brook River
Funding: NJDEP
Partners: Stony Brook-Millstone Watershed Association

Riparian Buffer Restoration of Pond
Funding: NJDEP
Partners: Somerset County Park Commission

Regional Stormwater Management Plan for the Sourland Mountain Watershed
Funding: NJDEP
Partners: East Amwell Township

Regional Stormwater Management Plan for the Devils, Shallow, Cedar, and Cranbury Brooks Watershed, Millstone Watershed Management Area, Raritan River Basin
Funding: NJDEP
Partners: Middlesex County Planning Department

Partnerships

The following projects were funded from various partners, in most cases, including NJDEP.

Black River Watershed Restoration Plan
Watershed plan developed by the Raritan Highlands Compact for the Black River.
Funding: ANJEC, NJWSA, Morris County Planning Department, Raritan Highlands Compact, Upper Raritan Watershed Association, Rutgers Cooperative Extension
Project Partners: NJWSA, Morris County Planning Department, Raritan Highlands Compact, Upper Raritan Watershed Association, Rutgers Cooperative Extension

Open Space Acquisition
NJWSA is using Source Water Protection funds from dedicated portions of its water rate to partner with the State, counties, and municipalities in the purchase of open space identified in the Spruce Run Initiative.
Funding: NJWSA, Green Acres, NJ Farmland Preservation Program, Environmental Infrastructure Financing Program, counties, municipalities, and land trusts

Mulhockaway Creek Watershed Restoration Plan Implementation
Implementation of the two highest priority projects from the Mulhockaway Creek Watershed Restoration Plan
Funding: NJDEP, NJWSA
Project partners: Hunterdon County Soil Conservation District, NJWSA

Agricultural Cost-Share Programs
Cost-share will be provided to producers to facilitate conservation practice implementation
Funding: NJDEP
Partners: NJWSA, HCSCD, NRCS, North Jersey RC&D

Peters Brook Rain Gardens Initiative
Outreach to landowners in the form of assistance and guidance using rain barrels and rain gardens to reduce the quantity of water and improve the quality of water entering Raritan River.
Funding: TBD
Partners: TBD, but including Rutgers Cooperative Extension and municipalities

Spruce Run Initiative
Preserve and protect the watersheds that drain to Spruce Run Reservoir.
Funding: Project-based
Partners: NJWSA, Bethlehem Township, Glen Gardner Borough, High Bridge Borough, Lebanon Township, Union Township

Assess Causes of the Current Quality of the Peapack Brook in Chester Borough, Chester Township, Borough of Peapack-Gladstone, and Bedminster Township
Develop management strategies to restore and protect these waterways
Funding: NJDEP
Partners: Upper Raritan Watershed Association
In addition to the above initiatives, the Upper Raritan Watershed Association, the South Branch Watershed Association, the Stony Brook-Millstone Watershed Association, and North Jersey Resource Conservation and Development Council actively conduct and participate in conservation, monitoring, educational, and stewardship activities relating to the Raritan River Watershed. Refer to their websites for further information and upcoming events. The Raritan Basin Alliance supports all of the aforementioned activities and functions to fulfill two main responsibilities: attracting resources to implement Raritan Basin projects and coordinating efforts to use those resources effectively. The Alliance is comprised of a variety of governmental, nongovernmental, and private sector interests who dedicate their efforts toward three initiatives, identified as program coordination, nonpoint source identification, and stream corridor restoration.

**The New Jersey Highlands Council**

The New Jersey Highlands Council was formed by the New Jersey Legislature in 2000. It is charged with developing a conservation master plan to protect the drinking water resources and diverse natural communities in this 1343 square mile area of 88 towns in parts of seven counties. The challenge facing the council is managing to both protect the natural resources and handle growth and economic development.

**Rutgers University River-Related Plans**

With portions of its campus situated on both sides of the river as it flows through New Brunswick, Rutgers University is naturally poised to consider plans and activities that utilize, impact or affect the river in some way. Three possible Rutgers-initiated projects are linked to the river, but many more could be developed. Rutgers and the City of New Brunswick are currently investigating an alternate site or renovation for
the Rutgers Crew Team boathouse, currently located near New Brunswick’s Boyd Park. There is also a proposal to re-institute the Rutgers Sailing Club, bringing sailboats back to the river corridor. The University has also visited the idea of linking campuses via a water taxi service.

Work on the part of the Bloustein School of Planning and Public Policy supports efforts to plan for resource protection in local development, and encourages public engagement in neighborhood redevelopment, sustainability and green buildings.

The School of Environmental and Biological Sciences conducts research ranging from oyster bed restoration to stormwater management strategies to incorporate simple yet effective management tools such as rain gardens. The Cooperative Extension Program is active throughout the region and has developed an ever-increasing role in educating communities and government officials on the benefits of more protective practices.
V. LOWER RARITAN CONTAMINATED SITES

OVERVIEW

The majority of New Jersey's industries came into existence when the river was a main source of transportation and power, so many of the relics of their past activities, contaminated sites among them, dot the shores of these waterways, or exist in close proximity to them. The NJDEP Site Remediation Program and the USEPA are responsible for overseeing the remediation of contaminated sites in the state. NJDEP handles all of the smaller contamination projects and a considerable number of larger more complex sites. In situations where the exposure potential and the complexity of the case exceeds the capacity of the state, the federal government takes over the management through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), more commonly known as Superfund.

In the past ten years, NJDEP has embarked on several efforts particular to the Raritan. In 2004, a concerted effort was introduced to address contamination at the Edison Township Landfill and the Edgeboro Landfill in East Brunswick; the ILR Landfill in Edison; the PCB cleanup at the Hatco site in Woodbridge; and the Rhône-Poulenc/Bayer CropScience site in Middlesex Borough. These sites, along with the Rhodia site, El Paso Energy in Woodbridge, the Global Sanitary Landfill Superfund Site, and the Chemsol Superfund Site continue to be of high public interest and have remained the focus of the local community. This initiative occurred at a time when NJDEP was working to provide better public access to their information, which has resulted in several new and improved systems, including Data Miner and iMap.

Data Miner (http://www.nj.gov/dep/opra) responds to state law requiring public access through the Open Public Records Act (OPRA). The Data Miner shows current information on cases and you can now search by location of sites or addresses. Viewers
can select layers of interest to map their communities using the iMap function
(http://njgin.state.nj.us/dep/DEP_iMapNJDEP/viewer.htm).

Our research used these resources along with individual case file reviews (available
upon request through OPRA) and sought answers to the following three major
questions: Where are these facilities? Who is responsible for the oversight of their
cleanup and what is the status of those remediations? We wanted to know about the
timelines for remediation, the contaminants of concern, and the impediments to
eventual restoration of the sites. What we found is presented in brief summaries and
then fully referenced in four tables.

First, we tracked the federal Superfund sites (see Appendix 2). These are
predominantly handled by USEPA Region 2. Second, we tracked NJDEP sites
according to their proximity to the waterfronts of the various elements of the Raritan
system, and limited our inquiry to those within one mile (See Appendix 3). We sorted
those under the oversight of the state by level of complexity of contamination, and
selected those that are considered "C" or "D" cases. The “C2” sites are defined as a
Formal Design with known source or release with groundwater contamination. Sites in
the “C3” category include a Multi-Phased RA - unknown or uncontrolled discharge to
soil or groundwater. The “D” sites are defined as a Multi-Phased RA - multiple
Source/release to multi-media including groundwater.

A second set of data for sites further than one mile from the river is also listed (see
Appendix 4).

A final area of interest was the sources of contamination identified at these sites, as
any effort to recover natural resource damages needs to start with a presumption of
responsibility; finding contaminants on the site that match those in the river would
merit further investigation of possible damages. We were able to get 90 cases identified
through OPRA reviews (see Appendix 5).
In addition to this information, a comprehensive list of all the sites and the contact information at NJDEP or Superfund, are listed in a table on the website, www.raritan.rutgers.edu.

RECENT ACTIONS

Several sites are the focus of current actions; Raritan Bay Slag, Cornell- Dubilier Electronics and Horseshoe Road. High levels of lead and arsenic were found in the slag and sediment along the Raritan Bayfront near Cheesequake Creek, Laurence Harbor in Old Bridge, and Sayreville, causing action by NJDEP to refer the site to the USEPA. In response, the USEPA has proposed that Raritan Bay beachfront areas contaminated with high levels of lead (500 times the residential limit of 400 parts per million) be added to the Superfund National Priorities List (NPL). A sixty-day comment period began on April 8, 2009. The decision to add the site to the NPL could be made by fall 2009.3

After a site is listed on the NPL, the USEPA can conduct an investigation into the extent of the environmental damage and take measures to remediate the damage, including identification of the parties responsible for the contamination. USEPA is closing 1.3 square miles of beachfront property, and is testing biota including shellfish such as clams and mussels, collected from the closed areas. The area was used during the 1970s as a disposal site for acid/lead batteries.

The Cornell Dubilier Electronics Superfund Site located along the Bound Brook in South Plainfield will receive more than $25 million in stimulus money to demolish

buildings and remove more than 26,000 tons of polluted debris from the 26-acre industrial site. The Borough of South Plainfield would like to redevelop the site with retail and storage space.

Up to $5 million of new stimulus funding will also be allocated to the third and final phase of the cleanup of 12-acres comprised of two Superfund sites in Sayreville. The USEPA has been working for over two decades to clean up the Horseshoe Road site (placed on the National Priorities List (NPL) in 1995) and the adjoining Atlantic Resources Corporation (ARC) site (NPL 2002), located on the south shore of the Raritan River in Sayreville. The Horseshoe Road site contained a former pesticide and chemical drum dump and the Atlantic Development Corp. site, home to a precious metals recovery facility. The sites are contaminated with a variety of chemicals that run off through drainage channels into an 8-acre marsh adjacent to the Raritan River. The USEPA plan recommends dredging and excavating contaminated marsh and Raritan River sediments.
VI. REFERENCES CITED

Background


Current Watershed Status


OTHER SOURCES OF INFORMATION:

Information from the following sources was not included in the research overview section of this report. In most cases, this was due to an inability to acquire the documents through the Rutgers digital system.

Surface Water Quality


Water Quantity and Supply

Groundwater

Land Use and Development
VII. APPENDICES

Appendix 1: Municipalities Along Main Branches in Lower Raritan Watershed
Appendix 2: Superfund Sites on the Raritan River
Appendix 3: NJDEP Sites Within One Mile of the Raritan River
Appendix 4: NJDEP Sites Further than One Mile from the Raritan River
Appendix 5: Sites by Complexity of Contaminants
**APPENDIX 1: MUNICIPALITIES ALONG MAIN BRANCH OF LOWER RARITAN RIVER**

**South Branch Raritan River**
- Bridgewater Twp
- Califon Boro
- Clinton town
- Clinton Twp
- Franklin Twp (Hunt)
- High Bridge Boro
- Lebanon Twp
- Mount Olive Twp
- Readington Twp
- Tewksbury Twp
- Washington Twp (Morris)

**North Branch Raritan River**
- Bedminster Twp
- Bernardsville Boro
- Branchburg Twp
- Bridgewater Twp
- Far Hills Boro
- Hillsborough Twp
- Mendham Boro
- Mendham Twp
- Peapack and Gladstone Boro

**Millstone River**
- Bridgewater Twp
- Cranbury Twp
- East Windsor Twp
- Franklin Twp (Som)
- Hillsborough Twp
- Manville Boro
- Millstone Boro
- Millstone Twp
- Monroe Twp (Msx)
- Montgomery Twp
- Plainsboro Twp
- Princeton Twp
- Rocky Hill Boro
- South Brunswick Twp
- West Windsor Twp

**Stony Brook**
- East Amwell Twp
- Hopewell Twp (Mercer)
- Lawrence Twp (Mercer)
- Pennington Boro
- Plainsboro Twp
- Princeton Twp

**Main Waterways in Lower Raritan**

**Lawrence Brook**
- New Brunswick City
- East Brunswick Twp
- North Brunswick Twp
- Milltown Boro
- South Brunswick Twp
<table>
<thead>
<tr>
<th><strong>Green Brook</strong></th>
<th><strong>North Plainfield Boro</strong></th>
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<tbody>
<tr>
<td>Berkeley Heights Twp</td>
<td>Plainfield City</td>
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<tr>
<td>Bound Brook Boro</td>
<td>Scotch Plains Twp</td>
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<td>Bridgewater Twp</td>
<td>South Bound Brook Boro</td>
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<td>Dunellen Boro</td>
<td>Watchung Boro</td>
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<tr>
<td>Green Brook Twp</td>
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<td>Middlesex Boro</td>
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<tr>
<td>East Brunswick Twp</td>
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<td>Old Bridge Twp</td>
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<tr>
<td>Jamesburg Boro</td>
<td>Sayreville Boro</td>
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<td>Manalapan Twp</td>
<td>South River Boro</td>
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<tr>
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<td>Branchburg Twp</td>
<td>Piscataway Twp</td>
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<tr>
<td>East Brunswick Twp</td>
<td>Raritan Boro</td>
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<tr>
<td>Edison Twp</td>
<td>Raritan Twp</td>
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<tr>
<td>Franklin Twp (Som)</td>
<td>Sayreville Boro</td>
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<tr>
<td>Highland Park Boro</td>
<td>Somerville Boro</td>
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<tr>
<td>Hillsborough Twp</td>
<td>South Amboy City</td>
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<tr>
<td>Manville Boro</td>
<td>South Bound Brook Boro</td>
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<tr>
<td>Middlesex Boro</td>
<td>Woodbridge Twp</td>
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<tr>
<td>New Brunswick City</td>
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APPENDIX 2: SUPERFUND SITES ON THE RARITAN RIVER

These sites are listed with links to the USEPA summaries:

**Middlesex County**

Atlantic Resources (Within 250 yards of the Raritan River): 
http://www.epa.gov/Region2/superfund/npl/0201116c.pdf

CPS/Madison Industries (Approx. 1 Mile from South River, a tributary of the RR): 
http://www.epa.gov/Region2/superfund/npl/0200109c.pdf

Chemical Insecticide Corp. (Approx 1 Mile from Mill Brook, a tributary of the RR): 
http://www.epa.gov/Region2/superfund/npl/0200517c.pdf

Chemsol, Inc. (A little over 1 Mile South of Bound Brook and just under 1 Mile North of Dotys Brook, a tributary of Ambrose Brook, which is a tributary of Green Brook, which flows into the Raritan River): 
http://www.epa.gov/Region2/superfund/npl/0200607c.pdf

Cornell Dubilier Electronics (Within 1,000 Ft. of the Bound Brook): 
http://www.epa.gov/Region2/superfund/npl/0201112c.pdf

Evor Phillips Leasing (Approx. 1 Mile from South River, a tributary of the RR): 
http://www.epa.gov/Region2/superfund/npl/0200776c.pdf

Fried Industries (Within 2,000 Ft. of Lawrence Brook, a tributary of the Raritan River): 
http://www.epa.gov/Region2/superfund/npl/0200303c.pdf

Global Sanitary Landfill (Approx. 2.5 miles from the Raritan River): 
http://www.epa.gov/Region2/superfund/npl/0200398c.pdf

Horseshoe Road (Within 250 yards of the Raritan River): 
http://www.epa.gov/Region2/superfund/npl/0200781c.pdf

JIS Landfill (Approx. 2 miles from both Lawrence Brook and Devils Brook, both lead into tributaries of the Raritan River): 
http://www.epa.gov/Region2/superfund/npl/0200499c.pdf

Kin-Buc Landfill (Within 500 yards of the Raritan River): 
http://www.epa.gov/Region2/superfund/npl/0200346c.pdf
Middlesex Sampling Plant (Approx. 2,000 Ft. South of Bound Brook, a tributary of the RR): http://www.epa.gov/Region2/superfund/npl/0202755c.pdf

Sayreville Landfill (Within 2 miles from the Raritan River. Within 1,000 Ft. of the South River, a tributary): http://www.epa.gov/Region2/superfund/npl/0200572c.pdf

Woodbrook Road Dump (Within 2,000 Ft. of Bound Brook, a tributary of the RR): http://www.epa.gov/Region2/superfund/npl/0204260c.pdf

**Monmouth County**

Burnt Fly Bog (Within 2,000 Ft. of Deep Run, a tributary of the South River, which is a tributary of the RR): http://www.epa.gov/Region2/superfund/npl/0200528c.pdf

Imperial Oil (Approx. 2 miles from Deep Run, a tributary of the South River, which is a tributary of the RR): http://www.epa.gov/Region2/superfund/npl/0200764c.pdf

**Somerset County**

American Cyanamid Co. (Within 1 Mile of Raritan River): http://www.epa.gov/Region2/superfund/npl/0200144c.pdf


Higgins Disposal (Within 1 Mile of the Millstone River, a tributary of the RR): http://www.epa.gov/Region2/superfund/npl/0200359c.pdf

Higgins Farm (Within 1 Mile of the Millstone River, a tributary of the RR): http://www.epa.gov/Region2/superfund/npl/0201094c.pdf

Montgomery Twp Housing Development (Within 1 Mile of the Millstone River, a tributary of the RR): http://www.epa.gov/Region2/superfund/npl/0200771c.pdf

Rocky Hill Municipal Well (Within 1 Mile of the Millstone River, a tributary of the RR): http://www.epa.gov/Region2/superfund/npl/0200770c.pdf
APPENDIX 3: NJDEP SITES WITHIN ONE MILE OF RARITAN RIVER

The following sites are within one mile of the Raritan, and with approximate distances as noted. We have listed first those for which we were able to gather additional information. For these sites, more information was available through various searches, gained from general internet sources and from the use of the Open Public Records Act review of records at the NDEP in the spring of 2009.

Summaries will continue to be developed, as illustrated in a few cases below. Those cases for which we are still gathering data are listed second.

Edison and Edgeboro Landfills (Both located on the Raritan River. Edgeboro Landfill also within a mile of the South River, a tributary of the Raritan River)

At Edison Township Landfill and Edgeboro Landfill in East Brunswick, recent NJDEP site visits identified areas where floatable material and debris were going directly into the river. NJDEP directed both parties to remove all waste along the riverbank to construct a shoreline stabilization system and to provide a schedule for taking these actions. The facilities are currently developing landfill closure plans for NJDEP approval. Edison Township Landfill is comprised of a 35-acre main site, as well as an adjacent older landfill about 20 acres in size. NJDEP registered Edison Landfill in 1978 to accept municipal, bulky and non-chemical industrial waste. The landfill ceased operating in 1990 and is covered with soil and dense vegetation. The Edgeboro Disposal, Inc. Landfill (EDI) site in East Brunswick operated from 1954 to 1987 and is now closed. EDI consists of two designated areas: the first, approximately 213 acres contained within an impermeable cut-off wall; and, the second, approximately 155 acres, designated as Areas 1 through 7, located out-side the wall. EDI's area inside the cut-off wall is shared with the presently operating Middlesex County Landfill (MCLF) that purchased portions of the site from EDI in 1988. Of the 155 acres outside the cut-off wall, EDI previously remediated areas 5 and 6 that consist of 47 acres. (Source http://www.state.nj.us/dep/newsrel/2004/04_0101.htm)

Fisher Scientific Company (Within One Mile of Raritan River)

Hatco Chemical Corp./W. R. Grace & Co. (Approx. one mile from the Raritan River and within 1,000 ft. of Crows Mill Creek, a tributary of the Raritan River)

W. R. Grace (Grace) owned and operated the site from 1959 to 1978 as the Hatco Chemical Division. On August 21, 1978, Grace sold the assets of the Hatco Chemical Division to an entity that became known as Hatco Chemical Corporation. Hatco Chemical Corporation changed its name to Hatco Corporation (Hatco) in 1986. Since the late 1980s and pursuant to a 1992 administrative consent order between NJDEP and
Hatco, the site has undergone significant investigation and interim emergency cleanups to address environmental contamination. (Source http://www.state.nj.us/dep/newsrel/2004/04_0101.htm)

Marisol Inc. (Within 1,000 ft. of the Raritan River) http://www.epa.gov/region02/waste/fsmarisol.htm

National Metal Finishing Corp. (Within 1,000 ft. of Raritan River)  
The company, which operated in the Brook Industrial Park, was cited for discharging metal plating wastes to the groundwater without a permit from 1976-1986. (Source response.restoration.noaa.gov/book_shelf/335_Brook.pdf)

National Starch & Chemical Corp (Within 1,000 ft. of the Raritan River)  
National Starch and Chemical Company develops, produces, and sells industrial adhesives, specialty starches, electronic materials, and specialty polymer products. The site is still operating.

NL Industries (Within 1 Mile of Raritan River)  

Prospect Industries (Within 1 Mile of the Raritan River)  
Site on 37 acre, steel drum & container manufacturing facility. All equipment removed and inactive. Used solvents & based paints with organic compounds. Sampled by NJDEP show wells contain compounds. Ordered to remove contaminated soil & institute ground water monitor. Pot. (source CERCLIS)

Raritan Bay Slag (Proposed Superfund) (Within 1 Mile of Raritan River)  
A sea wall in Old Bridge, and a jetty in Sayreville were constructed using lead and arsenic contaminated material. Sediment samples indicate that the lead and arsenic is migrating into the environment from the sea wall. (Source CERCLIS) http://www.epa.gov/region2/superfund/npl/raritanbayslag/ Additional Summary.
Rhône Poulenc/Rhodia (Slightly over 1 Mile from the Raritan River and the tributary of Mile Run Brook, which discharges into the Raritan, runs directly through the site)
The Rhodia Inc. site was a chemical manufacturing facility located at 298 Jersey Avenue, New Brunswick, Middlesex County, New Jersey. The 15 acre property is situated in a light industrial zoned area. Rhodia Inc. manufactured a number of specialty chemicals for use in the formulation of fragrances, cosmetics, and pharmaceuticals. Four chemicals that were site specific to Rhodia Inc. operations included camphor, camphene, coumarin, and cumene. The Rhodia Inc. site is traversed by the Mile Run Brook, which is about 10 to 15 feet wide and divides the property roughly in half. The Mile Run Brook runs approximately 1,700 feet within the Rhodia Inc. property boundary and flows in a northerly direction, ultimately discharging into the Raritan River. Over the years a number of environmental problems (e.g., chemical spills and discharges to the soil and/or groundwater) were documented at the Rhodia Inc. site. Other incidents included odor problems (described as chemical, sewer, and a vanilla-like smell) and the improper handling and storage of chemicals. In May 1986, Rhodia Inc. entered into an agreement to sell approximately five acres of its property. This triggered an investigation of the site in accordance with the Environmental Cleanup Responsibility Act (ECRA) legislation in effect at that time, and subsequently in accordance with the Industrial Site Remediation Act (ISRA) established in 1993. Since that time, the Rhodia Inc. site has remained under investigation by the NJDEP and a number of administrative consent orders have been issued. Results of environmental monitoring of the site identified a number of areas of concern including underground storage tank areas, various spill areas, the storm sewer system, drum storage areas, and deep groundwater. On April 15, 2002 Rhodia Inc. ceased production activities and on May 31, 2002, it closed the facility. Several on-site buildings have been demolished down to the slab. Remedial efforts of the site are ongoing. (Source ATSDR)

Rhône Poulenc/Bayer CropScience (Within 1 Mile of the Raritan River)
Rhône-Poulenc was a pesticide manufacturing facility. Arsenic is the predominant contaminant of concern. Rhône-Poulenc entered into an Administrative Consent Order May 1986 to remediate the extensive arsenic and pesticide contamination of the main site and neighboring properties. The contamination covers about 50 acres of light industrial and business park property. The present day responsible party is Bayer CropScience. (Source http://www.state.nj.us/dep/newsrel/2004/04_0101.htm)

Sherwin Williams – Main St. (Within 1 mile of the Raritan River and Cuckels Brook)
Removal assessment was done in 2000. The site is an hrs candidate, we were going to assign the site for an HRS package when the state decided to take over the lead; they signed an agreement for cleanup w/PRP. (Source CERCLIS)
Union Carbide Chemical and Landfill Site (Within 1,000 ft. of the Raritan River)
This is a major chemical plant and a landfill site, both owned by Dow Chemical (formerly Union Carbide Corporation). These properties have undergone extensive environmental investigations, during which chemical contamination similar to that at the Marisol site close by (i.e., volatile organic compounds) was identified. Dow currently operates a series of wells, which extract contaminated groundwater from the bedrock aquifer. The groundwater is treated onsite prior to discharge to the Middlesex County Utilities Authority (MCUA). (Source: http://www.epa.gov/region02/waste/maris750.pdf)

The following sites are still being researched.

Acme Tube Inc. (Within 2,000 ft. of the Raritan River and Randolph Brook, a tributary of the Raritan River)
Akzo Nobel Chemicals Inc. (Within 1,000 ft. of the Raritan River and Mill Brook, a tributary of the Raritan River)
Akzo Nobel Coatings Inc. (Within 1 mile of the Raritan River and Randolph Brook, a tributary of the Raritan River)
Ashland Chemical Company (Within 1 mile of the Raritan River and Crows Mill Creek, a tributary of the Raritan River)
BOC Gases (Approx. 1 mile from the Raritan River)
Carborundum Co. (Within 2,000 Ft. of the Raritan River and Crows Mill Creek, a tributary of the Raritan River)
Cary Chemicals Inc. @ Raritan Center (Approx. 1 mile from the Raritan River and .5 miles from the Red Root Creek, a tributary of the Raritan River)
Cell Products Inc. (Within 1 Mile of the Raritan River and within 1 mile west of Mile Run Brook, a tributary of the Raritan River)
Center Realty Inc. (Approx. 1 mile from the Raritan River and .5 miles away from the Red Root Creek, a tributary of the Raritan River)
Central Gas Plant (Within 300 Ft. or 100 yards of the Raritan River)
Chemray Coatings Co. (Within 2,000 Ft. of the Raritan River and Green Brook, a tributary of the Raritan River)
CO Steel Raritan (Within .5 miles of the Raritan River)
Continental Color Inc. (Approx. 1 mile from the Raritan River and directly adjacent to the Mile Run Brook, a tributary of the Raritan River)

Dartco Manufacturing Inc. (Within 2,000 Ft. of the Raritan River)

Egan Machinery Division Plant 2 (Approx. .5 miles from the Raritan River and within 1 mile of Dukes Brook and Peters Brook, both tributaries of the Raritan River)

E H Werner Generating Station (Within 750 Ft. or 250 yards from the Raritan River)

E R Squibb and Sons Inc. (Approx. 1 mile from the Raritan River and within 1,000 Ft. of Mile Run Brook, a tributary of the Raritan River)

Ethyl Corp. (Within 1 mile of the Raritan River)

Gerdau Ameristeel (Approx. .5 miles from the Raritan River)

Gibson Tube Inc. (Approx. 1 mile from the Raritan River and within 1,000 Ft. of Cuckels Brook, a tributary of the Raritan River)

Halcyon Essences Limited (Approx. 1 mile from the Raritan River and within 1,000 Ft. of the Mile Run Brook, a tributary of the Raritan River)

40 Haynes Street Groundwater Contamination (Within 1 mile of the Raritan River)

Hockenbury Electrical Co Inc. (Within 2,000 Ft. of the Raritan River and within 1,000 Ft. of Peters Brook, a tributary of the Raritan River)

Huls America Inc. (Approx. 1 mile from the Raritan River and .5 miles from Mill Brook, a tributary of the Raritan River)

Longwood Avenue Groundwater Contamination (Within 1 mile of the Raritan River and within 2,000 Ft. of Middle Brook, a tributary of the Raritan River)

Middlesex Chemicals Inc. (Within 2,000 Ft. of the Raritan River)

Midland Ross Corp. (Within 2,000 Ft. of the Raritan River)

Mortell Company (Within 1,000 Ft. of the Raritan River)

New Brunswick Coal Gas (PSE&G) (Within 750 feet or 250 yards of the Raritan River)

Nuodex Inc. (Approx .5 miles from the Raritan River)
Ortho Diagnostic Systems Inc. (Approx. 1 mile from the Raritan River)

Perth Amboy City Coal Gas (ETG) (Within 300 feet or 100 yards of the Raritan River)

Petroleum Specialties International Inc. (Approx. 1,000 Ft. from the Raritan River)

Pier 7 Development Group (Within 750 Ft. or 250 yards from the Raritan River)

PMC Specialties (Within 1 mile of the Raritan River and within 2,000 ft. of Crows Mill Creek, a tributary of the Raritan River)

Polize Inc. (Within 1,000 Ft. of the Raritan River)

Possumtown Groundwater Contamination (Approx. 1 mile from the Raritan River and right on the Ambrose Brook, a tributary of Green Brook, which is a tributary of the Raritan River)

180 Raritan Center Parkway (Within 1 mile of the Raritan River)

Raritan Township Sanitary Landfill II (Approx. 1,000 Ft. from the Raritan River)

RBH Dispersions Inc. (Approx. .5 miles from the Raritan River and approx. 2,000 ft. from the Ambrose Brook, a tributary of Green Brook, which is a tributary of the Raritan River)

RCA Corp. Solid State Division (Approx. 1 mile from the Raritan River)

Sayreville Generating Station (Within 300 Ft. or 100 yards of the Raritan River)

Sherwin Williams – Industrial Ave. (Within 1 mile of the Raritan River and within 2,000 ft. of Crows Mill Creek, a tributary of the Raritan River)

Towne Laboratories Inc. (Within 1 mile of the Raritan River and Peters Brook, a tributary of the Raritan River)
APPENDIX 4: NJDEP SITES FURTHER THAN ONE MILE FROM THE RARITAN RIVER

The following sites are outside one mile of the Raritan, and with approximate distances as noted. We have listed first those for which we were able to gather additional information. For these sites, more information was available through various searches, gained from general internet sources and from the use of the Open Public Records Act (OPRA) review of records at the NJDEP in the spring of 2009.

Summaries will continue to be developed, as illustrated in a few cases below. Those cases for which we are still gathering data are listed second.

Chevron Chemical Company Ortho Div. (Approx. 4 miles from the Raritan River, but directly on a tributary of Bound Brook)
http://www.epa.gov/region02/waste/fschevsp.htm

Ethicon Inc. (Approx 2 miles from the Raritan River. Bordered on the East by Peter’s Brook, a tributary of the Raritan River)
http://www.epa.gov/region2/waste/fsethicon.htm

Green Tree Chemical Tech Inc/Hercules (A little over 1 mile from the Raritan River and about 1.5 Miles from the South River and just over 1,000 feet from Pond Creek a tributary of South River)
http://www.epa.gov/region02/waste/fshercpa.htm

ILR Landfill (Approx. 2 miles from the Raritan River. Within 1 mile of the Mill Brook, a tributary of the Raritan River)
At the ILR Landfill in Edison, the facility operators have complied with all closure requirements except for leachate management at the site. NJDEP has instructed ILR to construct a leachate management system and submit the necessary progress reports for this work. The ILR Sanitary Landfill is a privately owned sanitary landfill covering 145 acres, of which approximately 131 acres comprise the landfill. The facility began accepting waste in 1964 and ceased operations in April 1985. Municipal, construction and demolition, vegetative and dry non-hazardous industrial wastes were disposed of at this landfill. Landfill gas is collected at ILR, Edgeboro and Edison Township landfills for use at an electric generation station on the other side of the Raritan River. (Source http://www.state.nj.us/dep/newsrel/2004/04_0101.htm)
Michelin Powerhouse (Approx. 2 miles from the Raritan River. Bounded by Lawrence Brook, a tributary of the Raritan, and Mill Pond)

Former powerhouse containing large amounts of degrading friable asbestos. The building is in very poor condition and asbestos may be escaping to the outside environment. An assessment will be performed to determine removal eligibility. (Source CERCLIS)

Middlesex Industrial Center (Approx. 2 miles from the Raritan River and within .5 mile of the Bound Brook, a tributary of Green Brook, which is a tributary of the Raritan River)

GATX, former owner of the site is putting together a sampling plan to collect all the HRS samples necessary to determine further action at the site. NJDEP referred the site to us because they wanted the RP to sign an agreement to cleanup the whole site, during that meeting the RP's representative, Mr. Richard Dahl, Environmental Director for GATX did not have the power to sign the agreement. So NJDEP decided to refer GATX to CERCLIS. GATX is willing to sample the site. They are in the process of putting a sampling plan together. (Source CERCLIS)

Monroe Township Landfill (Approx. 5 miles from the Raritan River and within 1 mile of Matchaponix and Manalapan Brook, tributaries of South River)
http://www.epa.gov/Region2/superfund/npl/0200570c.pdf

National Diagnostics (Within 1 mile of Dukes Brook, a tributary of the Raritan River)

SIP start needed. SEVERAL Types of petroleum based chemicals, xylem, toluene and anthem. TCE AND Trans-1,2 trichloroethylene have been found in the drinking water. at least 20 private water supply wells have been contaminated by trichloroethylene and trans. (Source CERCLIS)

Raritan Arsenal (Within 1,000 Ft. of Mill Brook, a tributary of the Raritan River)

Revlon Consumer Products Corp. (Approx. 2 miles from the Raritan River. Just over 1 Mile away from the Mill Brook, a tributary of the Raritan River. Also, within 2,000 ft. of the Ambrose Brook, a tributary of Green Brook, which is a tributary of the Raritan River.
http://www.epa.gov/region02/waste/fsrevlon.htm

South Brunswick Landfill (Approx. 1 mile West of Lawrence Brook and Approx. 2 miles East of Millstone River, both tributaries of the Raritan River)
http://www.epa.gov/Region2/superfund/npl/0200724c.pdf
The following sites are still being researched.

American National Can Company (Approx. 6 miles from the Raritan River, but within 1,000 Ft. of Lawrence Brook, Davidsons Mill Pond)

Asarco Inc. (About 5-6 miles from the Raritan River. Approx. 1 mile from Cedar Brook, a tributary of the Bound Brook, which is a tributary of Green Brook, which is a tributary of the Raritan River)

Berger Industries Inc. (Approx. 2.5 miles from the Raritan River. Approx. 2,000 Ft. North of Mill Brook, a tributary of the Raritan River)

Borden Chemical A & G Div. (Approx. 2 miles from the Raritan River and within 1,000 Ft. of the Bound Brook, a tributary of Green Brook, which is a tributary of the Raritan River)

Camp Kilmer (Within 2 miles of the Raritan River and about 2,000 Ft. South of the Ambrose Brook, a tributary of Green Brook, which is a tributary of the Raritan River)

Carter Wallace Inc. (Approx. 2,000 Ft. North of Cranbury Brook, a tributary of Millstone River, which is a tributary of the Raritan River)

Columbian Chemicals Co. (Approx. 2 miles from the Millstone River, a tributary of the Raritan River)

Con-lux Coatings Inc. (Just over 2 miles from the Raritan River, Approx. 1 mile from the Ambrose Brook and Bound Brook, which both eventually lead into Green Brook, then the Raritan River)

Continental Can Company (Approx. 2 miles from the Raritan River and about 2,000 Ft. South of the Ambrose Brook, a tributary of Green Brook, which is a tributary of the Raritan River)

Courier News (Within 2 miles of the Raritan River and within 1,000 Ft. of Peters Brook, a tributary of the Raritan River)

DLA Defense Stockpile (Within 1,000 Ft. of Royces Brooke, a tributary of the Millstone River, which empties into the Raritan River.)

Dynamit Nobel Harte Inc.

Eco Pump Corp. (Within 2,000 Ft. of the Bound Brook, tributary of Green Brook, which is a tributary of the Raritan River)
Erda New Brunswick Laboratory (Within 2,000 Ft. of Mile Run Brook, a tributary of the Raritan River)

Federal International Chemicals (Within 1 mile of the Bound Brook, a tributary of Green Brook, which is a tributary of the Raritan River)

Ford Motor Company Edison Assembly Plant (Approx. 2,000 Ft. from Mill Brook, a tributary of the Raritan River)

Garry Manufacturing (Approx. 2,000 Ft. South of Mile Run Brook, a tributary of the Raritan River)

Gulton Industries (Approx. 1 mile from the Bound Brook, a tributary of Green Brook, which is a tributary of the Raritan River)

Hemminger Company (Just over 1,000 Ft. North of Bound Brook, a tributary of Green Brook, which is a tributary of the Raritan River)

Kupper Airport (Approx. 2,000 Ft. from Royce Brook and the Millstone River, a tributary of the Raritan River)

L & R Metal Treating Company (Approx. 1 mile from the Bound Brook, a tributary of Green Brook, which is a tributary of the Raritan River)

Lebanon Agricorp (Approx. .5 miles North of Cranbury Brook, a tributary of Millstone River, which is a tributary of the Raritan River)

Leggett & Platt Inc. (Approx. 1 mile from Lawrence Brook/Davidsons Pond, a tributary of the Raritan River)

Livingston Avenue Citgo

Lockheed Electronics Co. Inc. (Within 1,000 Ft. of Green Brook, a tributary of the Raritan River)

Nichols Engineering and Research Corp. (Approx. .5 miles from Royce Brook, a tributary of Millstone River, which is a tributary of the Raritan River)

North Brunswick Coatings & Chemicals (Within 1 mile of both Six Mile Run, a tributary of Millstone River and Mile Run Brook, a tributary of the Raritan River)
Oakite Products (Approx. 1 mile East of the Bound Brook, a tributary of Green Brook, which is a tributary of the Raritan River)

Oxy USA Inc. (Approx. 2 miles East of the Millstone River, a tributary of the Raritan)

Parker Hannifin Corp. (Approx 1 mile from Lawrence Brook, a tributary of the Raritan)
Parker Seals Inc. (Within 2,000 Ft. of Mile Brooke Run, a tributary of the Raritan River)
Permacel (Within 2 miles of the Raritan River. Approx. .5 miles to Lawrence Brook, a tributary of the Raritan River)
Personal Products Co. (Within 2 miles of the Raritan River. Approx. 1 mile from Lawrence Brook, a tributary of the Raritan River)
Polyone Corp. (Just over 1 mile from the Raritan River. Approx 1 mile from Randolph Brook, a tributary of the Raritan River)
Pressman Toy Corp. (Just over 1 mile from the Raritan River. Within 1,000 Ft. from Mile Brook Run, a tributary of the Raritan River)
Princeton University Forrestal Campus (Within 1 mile of the Millstone River, a tributary of the Raritan River)

SS White Industrial Products (Approx. 1 mile South of the Bound Brook, and within 1 mile North of the Ambrose Brook, both are tributaries of Green Brook, which is a tributary of the Raritan River)

S Second St. Redevelopment 5 (Within 2,000 Ft. of Green Brook, a tributary of the Raritan River)

SmithKline Beecham Pharmaceuticals (Just over 1 mile from the Raritan River. Within 1,000 Ft. of the Ambrose Brook, a tributary of Green Brook, which is a tributary of the Raritan River)

South Brunswick Asphalt Co. (Within 2,000 Ft. of Lawrence Brook)

Stauffer Chemical (Within 1 mile of Devils Brook, a tributary of the Millstone River. Within 2 miles of Lawrence Brook, a tributary of the Raritan River)

Taylor Forge Stainless Inc. (Just over 1 mile from the Raritan River, North Branch. Within 2,000 Ft. of Chambers Brook, a tributary of the North Branch Raritan River)

Textile Chemical Inc. (Within 1,000 Ft. of the Bound Brook, a tributary of Green Brook, which is a tributary of the Raritan River)
Union Steel Corp. Piscataway Plant (Approx. 1 mile south of Bound Brook. Within 1 mile north of the Ambrose Brook, both tributaries of Green Brook, which is a tributary of the Raritan River)

USA Detergents Inc. (Within 2.5 miles of the Raritan River, Close to Mile Run Brook, a tributary of the Raritan River)

V A Supply Depot (Just outside of 1 mile from the Raritan River. Less than 1 mile South of Dukes Brook, a tributary of the Raritan River, and less than 1 mile North of Royce Brook.

Vornado EB Warehouse (Approx. 1 mile from South river, a tributary of the Raritan River. Within .5 miles of Sawmill Brook, a tributary of Lawrence Brook, which is a tributary of the Raritan River)

WA Cleary (Within 2 miles of the Raritan River. Within 1,000 Ft. of Mile Run Brook, a tributary of the Raritan River)
APPENDIX 5: CONTAMINANTS OF CONCERN

The Following sites are listed with the major contaminants of concern (Mostly GW):

Akzo Nobel/ Basell, U.S.A Chemicals on Meadow Rd. – VOCs, Benzene, Benzoic Acid, Chlorobenzene, naphthalene, toluene, xylenes

BOC Gases – VOCs (BTEX, Acetone)

Camp Kilmer – VOCs, SVOCs, PAHs, PCBs, asbestos, heavy metals

Carter Wallace Inc. – hydrocarbons, tetrachloroethylene, trichloroethylene

Chem Ray Coating - Arsenic, Lead

Chevron Chemical Company, Ortho Div. – VOCs (BTEX, Chlorobenzene), OCP’s (pesticides such as aldrin, alpha-benzene hexachloride (alpha-BHC), beta-BHC, gamma-BHC, chlordane, 4,4’-dichlorodiphenyldichloroethylene (4,4’-DDD), 4,4’-dichlorodiphenyltrichloroethylene (4,4’-DDE), 4,4’-dichlorodiphenyltrichloroethane (4,4’-DDT), dieldrin, endosulfan I, endosulfan sulfate, endrin, and heptachlor), and METALS (arsenic).

CO Steel Raritan – VOCs, Heavy Metals, Lead, Chromium, Nickel, Mercury, Manganese, Zinc

Columbian Chemical - Arsenic, Beryllium, cadmium, nickel

Con-lux Coatings Inc. - Arsenic, VOCs, Benzene, ethylbenzene, toluene, xylenes

Continental Can - ethylidene dichloride, tetrachloroethylene, trichloroethane (1,1,1), Trichloroethylene, Vinylidene chloride, Xylenes, Possible Asbestos

Courier News - Methyl tert-butyl ether, Tert-butyl alcohol

Dartco - dichloroethan (1,2-), ethylidene dichloride, trichloroethan (1,1,1), vinyl chloride

Eco Pump - dichloroethan (1,2-)(trans), ethylidene dichloride, methyl chloride, tetrachloroethane (1,1,1,2-), trichloroethane(1,1,1), trichloroethylene, vinyl chloride, vinylidene chloride
E R Squibb and Sons Inc. - Arsenic, VOCs, benzene, chloroform, dichloroethan (1,2-), dichloroethylene (cis-1,2-), dichloroethylene (trans-1,2-), Ethylidene dichloride, Methylene chloride, tetrachloroethane (1,1,1,2-), tetrachloroethylene, trichloroethane (1,1,1), trichloroethylene, Vinyl chloride, Vinylidene chloride

Ethicon Inc. - PCE (Tetrachloroethylene), chlorinated hydrocarbons

Ethyl Corp. - VOCs, Benzene, chlorobenzene

Fisher Scientific – VOCs, benzene, Bromoform, Carbon tetrachloride, chlorobenzene, chloroform, dichloroethane (1,2-), ethylbenzene, methylene chloride, trichloroethylene, toluene, trichloroethane (1,1,1), trichloroethylene, vinylidene chloride, xylenes

Ford Motor Co. Edison Assembly Plant - Lead, Arsenic and PAHs, low levels (But above standards) of PCBs and VOCs

Garry Manufacturing – VOCs, 1,1,1 Trichloroethane, methylene chloride, tetrachloroethylene, 1,1 dichloroethane, 1,1 dichloroethylene, heavy metals, copper, copper compounds, Lead, Nitrate compounds, nitric acid, cyanide compounds

Gerdau Ameristeel – Heavy Metals, Aluminum, Lead, Mercury, Manganese, Zinc, Polycyclic aromatic compounds, Dioxin/Diozon Like Compounds

Green Tree Chemical (Hercules) - VOCs (carbon tetrachloride and chloroform), tertiary-butyl alcohol, DDT contamination

Hatco Chemical Corp. – Mainly PCBs, VOCs

Lockheed Electronic Co. – hydrocarbons, Trichloroethylene

Marisol (Veolia) – VOCs, benzene, toluene, methylene chloride, tetrachloroethene, trichloroethene and chlorobenzene

Michelin Powerhouse (Ex Michelin Facility) - Asbestos

Monroe Township Landfill – VOCs, benzene, cadmium, lead, nickel, ethylidene dichloride, phenols
National Diagnostics Inc. – VOCs, xylene, toluene, napthene, TCE (Trichloroethylene) and Trans-1,2 Dichloroethylene

National Metal Finishing – VOCs, Semi-VOCS, Inorganics, Toulene, Xylene, p-bromofluorobenzene, total chromium, hexavalent chromium

NL Industries – Arsenic, VOCs, Bis (2 Ethylhexyl) Phthalate, Heavy Metals, Lead, Cadmium, Mercury, Copper, Iron, Zinc, Beryllium

Nichols Engineering and Research Corp. - Carbon tetrachloride, chloroform, tetrachloroethylene, trichloroethylene

Ortho-Diagnostic Systems – PCBs, PAHs, Heavy Metals (Nickel, Lead, Beryllium), VOCs (benzene, Vinyl chloride), TCE

Permacel - Dichloroethylene (cis-1,2 ), Nickel, Tetrachloroethylene, Toluene, Trichloroethylene, Vinyl Chloride

Personal Products Co. – VOCs, benzene, ethylbenzene, xylenes, trimethlybenzene (1,2,4), trimethylbenzene (1,3,5)

Petroleum Specialties International Inc. - #6 Fuel Oil, PAHs, VOCs

Prospect Industries Corp. – VOCs, Dichloroethane (1,1-), Dichloroethene (1,1-), Dichloroethene (cis-1,2-), Tetrachloroethylene, Trichloroethane (1,1,1), Trichloroethylene, Vinyl chloride

RCA Corporate Solid State Div. - dichloroethene (1, 1-), dichloroethene (cis-1,2-), tetrachloroethylene, trichloroethylene

Revlon Consumer Products Corp. – VOCs, vinyl chloride, trichloroethylene, trichloroethane, acetone and 1,2-dichloroethene, Arsenic in Subsurface soil

Rhône Poulenc / Bayer CropScience – VOCs, Arsenic, Pesticides

Rhône Poulenc Chemical Company (Rhodia) – VOCs, Heavy metals including mercury, SVOCs, PAHs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, dibenz[a,h]anthracene and indeno[1,2,3-c,d]anthracene), and PCBs (Aroclor 1248), Camphor, Camphene, Coumarin, Cumene.
Stauffer Chemical/Fedex Ground – VOCs (Xylene), Pesticides (Captan)

Taylor Forge Stainless - dichloroethylene (cis -1,2), tetrachloroethylene, trichloroethylene

Union Carbide Corp. Chemical & Plastics – VOCs, Benzene, methylene chloride, phenol, tetrachloroethylene, toluene, trichloroethylene, vinylidene chloride

Union Carbide River Road Landfill – Mainly VOCs (Similar to Marisol Inc. Contaminants)

Vornado EB Warehouse – VOCs, BTEX

The following files also will be added in future:
[W A Cleary, Lebanon Agricorp, and American National Can Company]

Superfund Sites: All have NPL fact sheets with this data. Most of these sites also have full contaminant of concern reports associated with their sites listed at [http://www.epa.gov/superfund/sites/npl/nj.htm#Pepe_Field](http://www.epa.gov/superfund/sites/npl/nj.htm#Pepe_Field)

- American Cyanamid Co.
- Atlantic Resources/Development
- Brook Industrial Park
- Burnt Fly Bog
- Chemical Insecticide Corp.
- Chemsol Inc.
- Cornell Dubilier Electronics
- CPS/Madison Industries
- Evor Phillips Leasing
- Federal Creosote
- Fried Industries
- Global Sanitary Landfill
- Higgins Disposal
- Higgins Farm
- Horseshoe Road
- Imperial Oil Company
- JJS Landfill
- Kin-Buc Landfill
- Middlesex Sampling Plant
- Montgomery Township Housing
- Development
- Rocky Hill Municipal Well
- Sayreville Landfill
- Woodbrook Road Dump
The following 19 sites have full information from NJDEP reviews conducted through OPRA and are stored on CD which can be accessed from our website at www.raritan.rutgers.edu.

- Ashland Chemical Company
- Cell Products Inc.
- Central Gas Plant
- Continental Color Inc.
- E H Werner generating Station
- Gibson Tube Inc.
- Halcyon Essence Limited
- Hockenbury Electrical Co.
- Huls America Inc.
- Longwood Avenue Groundwater Contamination
- Middlesex Chemicals Inc.
- Midland Ross Corp.
- Mortell Company
- National Starch & Chemical Corp.
- New Brunswick Coal Gas (PSE&G)
- Nuodex Inc.
- Parker Seals Inc.
- Perth Amboy City Coal Gas (ETG)
- Pier 7 Development Group