

10 Key Indicators of Watershed Health in the Raritan



Ten key concerns have emerged from analysis of recent reports on indicators of water quality and watershed health for the Raritan Basin. These concerns are not exhaustive but point to current demanding issues that can be used to facilitate discussion on development of basin-wide planning measures to address these concerns. As our conversations continue, we will pull in other indicators of quality of life in the Raritan including: status of dams, bridges, culverts and outfall infrastructure; access to boat launches, trails and other recreation; strategic restoration projects; and assessment of stream quality through biotic integrity of macroinvertebrates and fish species.

1. Impervious surface cover is increasing due to changes in urban development trends.

With rising pressures on urban land use, pervious land cover increasingly gives way to impervious surfaces. Without proper management, urban land use intensifies the potential for contaminated runoff into streams. Although urban development seems to have slowed in recent years, population trends throughout the Raritan are still rising, increasing advancements associated with urban land uses such as: housing units, transportation use, and commercial use.

| Impervious Surface | 1995 Percent IS | 2012 Percent IS |
|--------------------|-----------------|-----------------|
| Raritan Basin-wide | 11.2% | 12.9% |
| Upper Raritan | 5.7% | 6.6% |
| Lower Raritan | 19.9% | 22.4% |
| Millstone | 9.4% | 11.5% |

2. Emerging contaminants are an increasing concern in the Raritan.

The source of the pollutants, the extent of contamination, and the potential risk to human health and aquatic life is not well understood and requires investigation and, potentially, regulation. Emerging contaminants include pharmaceuticals and personal care products, persistent organic pollutants, pesticides and herbicides, microplastics, endocrine disrupting chemicals and nanomaterials. They enter our streams, lakes and groundwater through point- and non-point sources such as household septic systems; wastewater treatment plants; accidental introduction during manufacture, handling or storage; and through purposeful discharge. Emerging contaminants have been detected in the Raritan system and the public is beginning to be aware of them.

3. Raritan wetlands continue to decline.

Overall, the Raritan Basin has suffered a loss of 12,500 acres (more than 13 percent) of wetlands since 1986. Wetlands provide numerous benefits including water filtration, shoreline stabilization, floodwater storage, groundwater recharge, and habitat.

The wetland type experiencing the highest acreage conversion to other land uses was emergent wetlands, followed closely by agricultural wetlands and forested wetlands. A decline in wetland acreage has a negative impact on water quality.



4. A large portion of the Raritan's designated open space is not accessible.

The Raritan has 147,142 acres (20.8 percent of the total basin) held in fee or easement, but less than half of all open space is actually open access. The remainder is classified as restricted access, closed, unknown, or preserved farmland.

Lands designated as open space are owned or held by the State of New Jersey, local governments, non-governmental organizations, private ownership, regional agencies, Rutgers University, or are State preserved farmland.

5. Flooding in the Raritan is complex, and mitigation has been reactionary.

As the Raritan's riparian areas are converted to other land uses (both urban and agricultural), and as other pervious surfaces are converted to more impervious surfaces, the Raritan region has become more vulnerable to flooding and its impacts. Total combined National Flood Insurance Program payouts in Raritan basin communities for Floyd, Irene and Sandy exceeded \$203.78 million dollars.

Transitional areas between terrestrial and aquatic ecosystems are vital to watershed health. Riparian areas and natural floodplains protect streambanks and remove sediments and nutrients from runoff, reduce flooding, protect aquatic ecosystems, and provide habitat for terrestrial and aquatic organisms.

Hard infrastructure can increase the speed and volume of runoff into streams that can exacerbate the effects of precipitation events and further degrade riparian zones as streams cut into banks and become disconnected from their floodplains.

6. Prime agricultural lands are decreasing.

The Raritan had over 44,500 acres of prime agricultural lands converted to other land uses, representing a 44.3 percent change in land use. Prime agricultural lands overall have better soil quality, climate and soil moisture conducive to crop production, greater water permeability, and gentler slopes that are less prone to erosion. These qualities can filter and absorb runoff and increase recharge of groundwater supplies.

7. Consistent protections for at-risk species are deficient.

New Jersey's Landscape Project, founded in 1994, documents habitat and serves as a tool for conservation of threatened and endangered species. Landscape Project data layers are classified in five ranks that are linked to species-specific habitat patches. Ranks 3 through 5 support at-risk species, but also provide habitat that provides services critical to clean and resilient water resources. The total amount of Landscape Project area in the Raritan Basin is 634.6 square miles, or approximately 57 percent of the total area. Of that, 237.4 square miles (approximately 21%) include the more critical habitat ranks of 3, 4 and 5.

8. Groundwater recharge is declining.

Intricately tied to infiltration rates of different land covers, the loss of primary recharge zones such as wetlands, upland forest and prime agricultural lands coupled with increases in impervious surfaces negatively impact groundwater recharge in the Raritan basin. Groundwater is an important drinking and irrigation water source and also supplies water uniformly to ecologically sensitive areas for plant and animal survival. Further, there are over 5,100 acres of contaminated groundwater in the Raritan basin. Groundwater can become contaminated through point- and non-point sources of pollution. Point sources include landfills, illegal dumping, accidental spills and leaks from gasoline storage tanks or faulty septic systems. Non-point sources include improper pesticide and fertilizer applications.

9. Upland forests and canopy cover are on a general decline.

The Raritan has experienced a net loss of upland forest of over 8,300 acres with mixed results for overall canopy cover, with some areas losing as much as 12.6 percent cover and others gaining 10.3 percent.

Studied as a subset of canopy cover, upland forests reduce soil erosion, filter runoff and increase groundwater recharge, and therefore elevate and protect water quality. Overall, trees add property value, filter the air, provide oxygen, cool our homes and neighborhoods in the summer, block the wind to reduce our heating costs in the winter, capture and filter runoff to protect our streams, provide wildlife habitat, provide recreational opportunities, as well as enhance our mental and physical health and sense of well-being.

10. Cleanup of contaminated sites seems slow and is difficult for Raritan stakeholders to track.

Both the status and pace of contaminated site cleanup in the Raritan is difficult to track. Pollutants from contaminated sites can seep into groundwater or run off into adjacent surface waters where they can negatively impact water supplies and cause ecological damage to wildlife and fisheries, as well as pose a hazard to public health. The Raritan basin contains twenty Superfund sites and 1,703 other known contaminated sites. Only eight of the Superfund sites and 469 of the other sites have been closed with institutional controls in place. Nearly sixty of the non-Superfund sites have unknown sources of contamination (as defined by the NJDEP Site Remediation Program). Raritan stakeholders have expressed a need for a more easily accessible system for tracking the status of cleanups in the basin and monitoring the integrity of previously remediated sites to ensure stability.

Data sources: State of the Raritan Report Volume 1 (2016) and Volume 2 (pending publication).

Image credits: Edison Landfill along the Raritan River by Michael Catania; Albany Street Bridge by Mario Burger.

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