

**Rain Garden**  
Water Quality and Natural  
Enhancement Project

This garden is designed to intercept, filter, and infiltrate stormwater at the source, before it becomes runoff. The plants are native to the region and help retain contaminants that could otherwise harm nearby waterways. Rain gardens are beautiful, low-maintenance, and inexpensive gardens that you can install at home.

<http://water.org/nj.edu>





# INTRODUCTION

## Key Points:

CHAPTER 1

- Impervious surfaces prevent groundwater infiltration and enable stormwater runoff and nonpoint source pollutants to enter waterways.
- A rain garden is a landscaped, shallow depression that captures, filters, and infiltrates stormwater at the source before it becomes runoff.
- A rain garden should reduce runoff, recharge groundwater, and use native plants.
- Native plants control erosion by stabilizing soils and increase infiltration, leading to an overall improvement of water quality.
- Installing a rain garden is a simple way to save money and energy, while also preserving New Jersey's natural resources.

**3 KEY POINTS:**

*A Rain Garden should:*

- *Reduce Runoff*
- *Recharge Groundwater*
- *Use Native Plants*

## Introduction

### Why a Rain Garden?

Rain that falls to the earth evaporates into the atmosphere, is used by plants, or infiltrates down through the soil into the groundwater. The remainder of the rainfall flows across the land surface into gutters, drains, streams, rivers, and lakes as stormwater runoff. As the rain moves over the land surface, it washes off pollutants and carries these contaminants to local waterways. The pollution that is carried by stormwater runoff to our waterways is called nonpoint source pollution (see “Nonpoint Source Pollution” information on page 10). Stormwater runoff that carries nonpoint source pollution to our waterways is the major reason many of our streams, rivers, estuaries, ponds and lakes are not meeting water quality standards and are considered impaired. In fact, nonpoint source pollution in stormwater runoff causes up to 60% of our existing water pollution problems, making it the largest source of pollution in our New Jersey waters (*NJDEP, Bureau of Nonpoint Pollution Control, Division of Water Quality*).

Rain gardens are a simple, cost-effective tool homeowners, municipalities, and schools can use to reduce stormwater runoff, improve groundwater recharge, and trap nonpoint source pollutants before they reach our waterways.



### CAPTURE

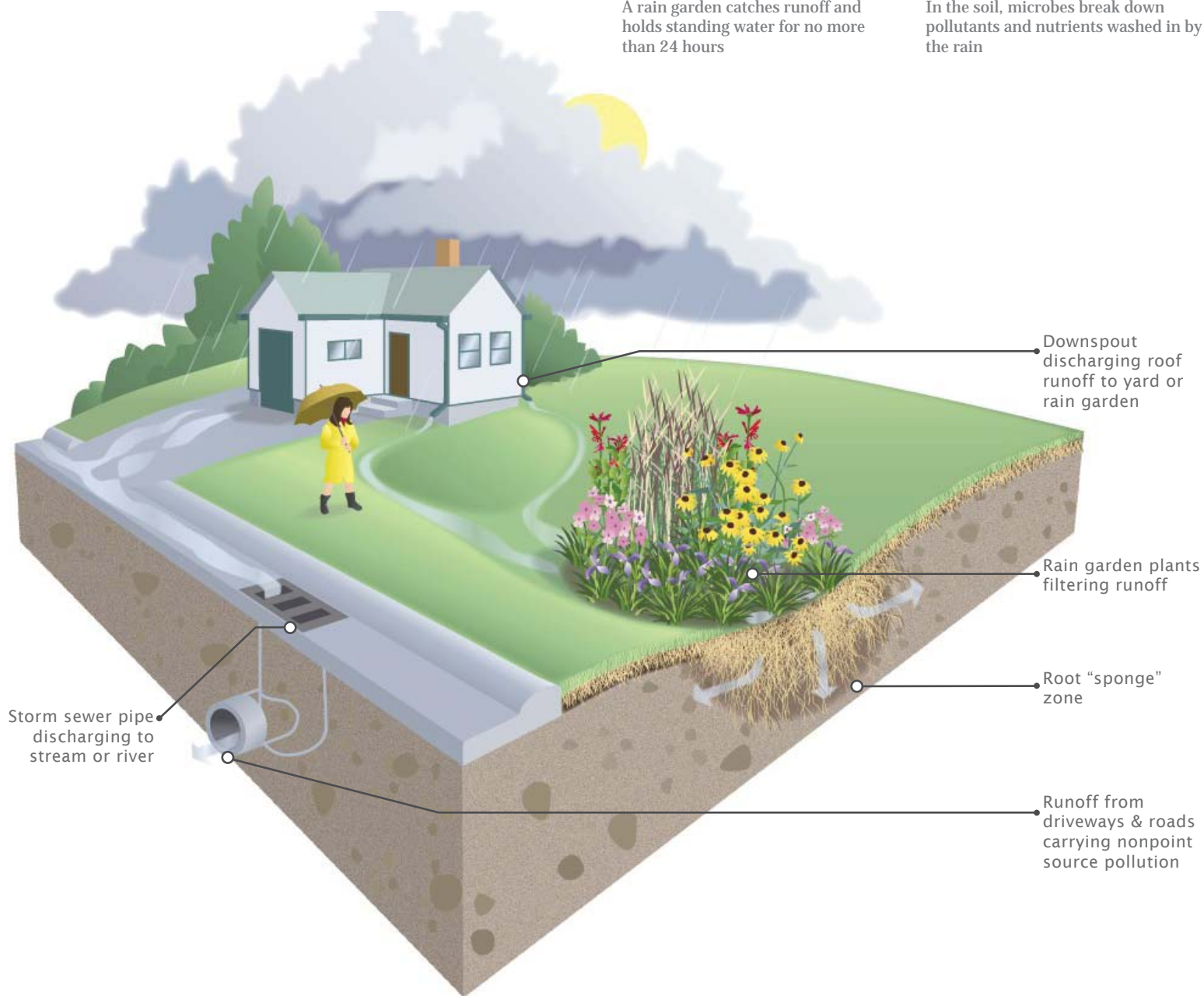
A rain garden catches runoff and holds standing water for no more than 24 hours

### FILTER

In the soil, microbes break down pollutants and nutrients washed in by the rain

### INFILTRATE

Deep-rooted plants loosen the soil, creating a sponge zone. Water soaks in and groundwater aquifers are recharged





## Stormwater and You

Development activities throughout New Jersey are rapidly covering the land with impervious surfaces like roadways, driveways, and rooftops. These impervious surfaces increase the amount of stormwater runoff and nonpoint source pollutants carried to nearby waterways. These areas also prevent water from infiltrating into the ground, thereby depriving groundwater aquifers of the water they need to remain stable. Approximately half of the water we use in New Jersey comes from groundwater aquifers. Additionally, groundwater provides many of New Jersey's streams with "baseflow". During the long periods between rainfall, groundwater seeps into our streams, keeping them flowing and sustaining aquatic life. This baseflow provided by the groundwater to the stream is critical in keeping streams healthy and viable.

In addition to the impervious surfaces associated with developed communities, many of the soils in these areas are disturbed and compacted during the development process. Even though turf grass is often covering these compacted soils, the infiltration capacity of these areas is greatly decreased. Compaction reduces the amount of rain that can infiltrate through soils and increases stormwater runoff by two to ten times from that of natural (undeveloped) landscapes.



Natural landscapes, including wetlands, meadows, and forests, consist of native plant communities adapted to specific climate, soil, and hydrologic conditions. The roots of these plants help to make the land very porous so that the soil quickly infiltrates rain that falls to the land surface.

## What is a rain garden?

A rain garden is a landscaped, shallow depression that captures, filters, and infiltrates stormwater runoff. The rain garden removes nonpoint source pollutants from stormwater runoff while recharging groundwater. A rain garden has two main goals. The first goal is to serve as a functional system to capture, filter, and infiltrate stormwater runoff at the source, and the second goal is to be an aesthetically pleasing garden. Rain gardens are an important tool for communities and neighborhoods to create diverse, attractive landscapes while protecting the health of the natural environment.

### NONPOINT SOURCE POLLUTION:

"Nonpoint source pollution" is also called "people pollution." It is the pollution that comes from our everyday lives. It is the fertilizers that wash off our farms and lawns. It is the pet waste that washes into our streams. It is the sediment (or soil) that erodes from our lands into our local waterways. It is the oil and grease that comes from our parking lots. Finally, it is the pollutants such as nitrogen, phosphorus, and heavy metals that settle out of our atmosphere onto our roads and rooftops. When it rains, the stormwater runoff carries nonpoint source pollution and may ultimately wash it to our waterways.

As the image on the left illustrates, stormwater runoff picks up oil and grease from the parking lot, flows through a curb cut, and into a rain garden. The rain garden acts as a sponge to trap the nonpoint source pollutants, preventing them from reaching the nearby lake.

Rain gardens can be readily implemented throughout our communities to begin the process of re-establishing the natural processes of the land. Rain gardens:

- capture stormwater runoff reducing erosion and sedimentation and the amount of water that flows to our streams and waterways during rain storms,
- protect water quality by filtering out and breaking down pollutants,
- infiltrate runoff and thereby recharge groundwater supplies and provide baseflow to nearby streams and waterways,
- provide the opportunity to establish native plant communities to promote biodiversity and habitat for beneficial wildlife, and
- integrate necessary soil improvements and native plants adapted to periodic wet and dry periods mimicking our New Jersey natural landscape.

While the Environmental Protection Agency (EPA) defines stormwater runoff as the number one threat to water quality in our lakes and streams, rain gardens are one of the quickest and easiest methods everyone can use to reduce runoff and help protect our water resources. Beyond the aesthetic and ecological benefits, rain gardens encourage environmental stewardship and community pride. In addition, using native plant materials in rain gardens is an important way to promote biodiversity and preserve native species in our developed communities. When used throughout a community, rain gardens can also provide significant economic benefits by lowering costs for local government and businesses to maintain and upgrade traditional stormwater infrastructure pipes and management basins.

### How does a rain garden differ from any other garden?

To a certain extent, a traditional landscaped bed or flower garden can provide functions similar to a rain garden. But, to provide all the benefits of a rain garden including capturing,

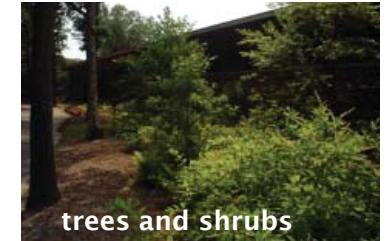
### A Rain Garden can be...



a butterfly habitat



along a sidewalk



trees and shrubs



a parking island



a wet meadow



a perennial garden

Photo courtesy of Bill Young

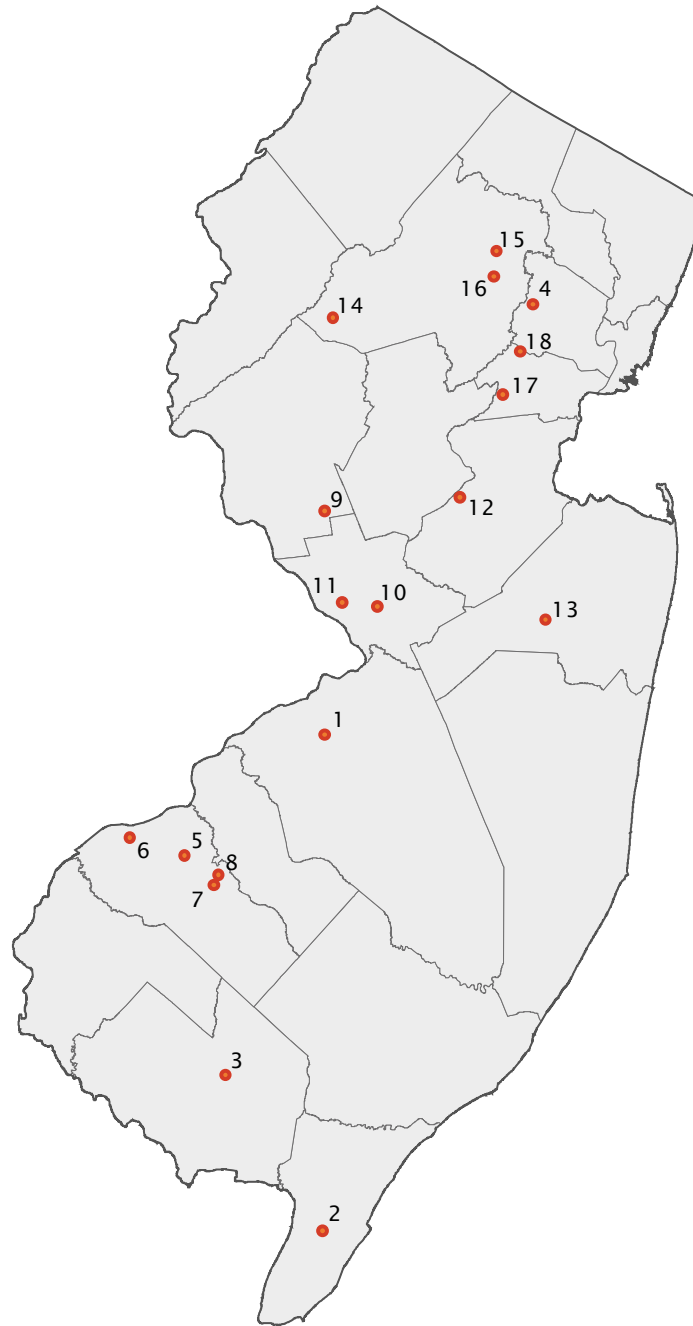
filtering, and infiltrating stormwater runoff, a shallow basin must be dug and planted slightly below-grade to store water.

Ideally, a rain garden is planted with a variety of grasses, wildflowers, and woody plants that are adapted to the soil, precipitation, climate, and other specific site conditions. Using native plants with deeper root systems facilitates infiltration and also sustains the landscape through periods of drought that sometimes occur in our New Jersey summers.

Native plants provide a multitude of benefits to both the local ecosystem and the homeowner. For local wildlife, native plants supply food and habitat. In addition, most native plant species produce long root systems. For example, a non-native turf grass, such as Kentucky bluegrass, has roots that typically reach only six to eight inches in depth, while the roots of a native grass like big bluestem will extend to nine feet deep. Not only do these longer root systems help stabilize soils by controlling erosion, they also increase infiltration to lessen the impacts of floods and droughts, leading to an overall improvement in water quality. Once established, native plants require very little maintenance, as they typically do not require irrigation or the application of pesticides or fertilizers.

## Where can you see a rain garden in New Jersey?

Many rain gardens have been installed throughout New Jersey. Below are several locations where great examples of rain gardens can be found. Before beginning the process of planning and installing your rain garden, visit one located near you.



For more information on demonstration rain gardens near you, visit [www.water.rutgers.edu](http://www.water.rutgers.edu)

### Burlington County

1. Rutgers Cooperative Extension of Burlington County

### Cape May County

2. Rutgers Cooperative Extension of Cape May County

### Cumberland County

3. Wheaton Arts and Cultural Center

### Essex County

4. Essex County Environmental Center

### Gloucester County

5. Holy Nativity Lutheran Church
6. Greenwich Township Library
7. Atkinson Park
8. Hurffville Elementary School

### Hunterdon County

9. Marion F. Clawson Memorial Park

### Mercer County

10. Mercer County Community College
11. Delaware River Basin Commission

### Middlesex County

12. Rutgers Cooperative Extension of Middlesex County (EARTH Center)

### Monmouth County

13. Rutgers Cooperative Extension of Monmouth County (Agriculture Building)

### Morris County

14. Washington Township Library
15. Leonard Park
16. Parsippany-Troy Hills Town Hall

### Union County

17. Fanwood Memorial Library
18. Hanson House/ Hanson Park Conservancy Reeves-Reed Arboretum



### SAVE MONEY + SAVE ENERGY:

Planting a rain garden can save you money on your energy bill:

- Carefully situated plants, particularly deciduous trees located on the southern and western sides of your house, can reduce your energy bill by up to 25% for a typical household.
- Planting deciduous trees along the southern and western sides of your house contributes to a cooler house in the summer, while still allowing for the sun to shine in the windows in the winter.
- Trees, shrubs, or vines provide shade and act as windbreaks.
- Summer air temperatures can be three to six degrees cooler in tree-shaded neighborhoods.

### How do you build a rain garden?

The design of a rain garden involves understanding several interrelated principles including:

- the hydrologic cycle or water cycle,
- nonpoint source pollution,
- natural resource conservation,
- wildlife habitat,
- nutrient cycles,
- soil chemistry,
- horticulture,
- landscape architecture,
- design,
- ecology, and more.

While these many principles may sound complicated, this manual provides the information you need and the simple step-by-step instructions that will allow you to enjoy creating your own rain garden to protect the water resources of New Jersey and enhance your landscape.



Sumner Elementary School  
Camden, NJ