Source Water Protection: Protecting Water Quality in the Raritan Basin

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Sustainable Raritan River Conference
Economy, Ecology and the Future of the Raritan River Region
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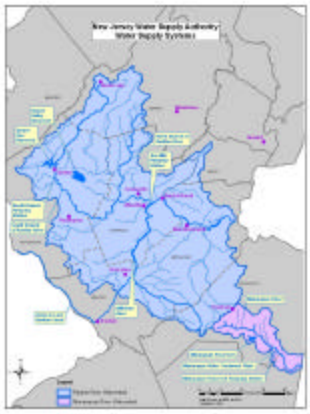
NJ Water Supply Authority

- Manage Spruce Run, Round Valley & Manasquan Reservoirs, D&R Canal as water supply sources
- Raritan System provides water supply to public & private water utilities serving 1.5+ million people in Central NJ
- Management of water supply infrastructure
- Watershed management planning & implementation projects
- River-Friendly programs
- Open space preservation & management
- Stream assessment & restoration
- Stormwater management



Delaware & Raritan System

Spruce Run = 11 billion gallons

Round Valley = 55 billion gallons

Safe yield: 241mgd

Source water area: ~850 square miles

Why Source Water Protection?

- Spruce Run and Round Valley Reservoirs provide 160 MGD to Central New Jersey (part of 241 MGD system)
  - Round Valley – pumped storage
  - Spruce Run – natural stream flow
- Spruce Run Reservoir showing impacts of excessive nutrients and sediments
- Tributary streams showing impacts of land use change
- Projects to reduce pollutant loads to streams & reservoirs

Protecting Water Resources

What to Do?
Assess current and future problems
Protect critical areas
Prevent increased pollutant loads & flows
Fix existing problems

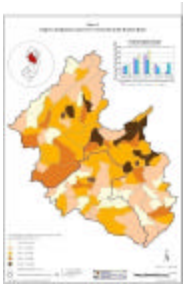
How to do it?
- Comprehensive Source Water Protection Program
- Watershed Restoration & Protection Plans

Assess Current & Future Problems

- Characterization & Assessment
- Basin-wide Management Plan
- Wate
  Plans

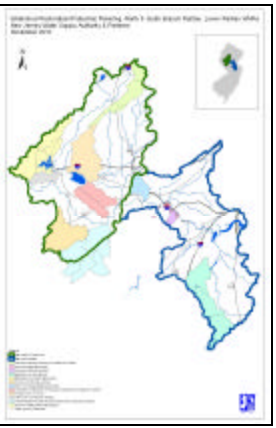
Raritan Basin
Watershed Management Plan

- 2002, www.raritanbasin.org
- 6 critical issues:
  - Surface Water Pollution
  - Loss of Riparian Areas
  - Biological Impairment of Streams
  - Loss of Ground Water Recharge
  - Water Supply Limitations
  - Stormwater Impacts
- 30% of historic riparian areas converted to urban and agricultural uses
- Nonpoint sources provide majority of pollutants



Watershed Restoration & Protection Plans

- D&R Canal Tributary Assessment & NPS Management Plan
- Cedar Grove Brook WRP
- Mulhockaway Creek Stormwater Management Plan
- Lock/Wick WRP
- Neshanic River WRP
- Sidney Brook WRP
- Manalapan Brook WRP
- Sourland Mountain WPP



WRP Elements

Characterization & Assessment	**Stream Visual Assessment**	**Infrastructure Inventory**	**Municipal Assessment**
Geology Land use Existing water quality Pollutant sources	USDA-NRCS Protocol (SVAP) Physical and biological indicators Assess overall stream health	Stormwater	Ordinances, master plans, zoning, NRIs

Implementation Projects

Implementation

Prevent Increased Pollutant Loads & Flows
Fix Existing Problems

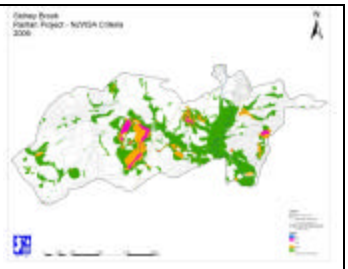
- Municipal ordinance improvements
- Protect critical areas
- Stream restoration
- Riparian buffer improvements
- Stormwater improvements
- River-Friendly programs
- Rain barrels
- Rain gardens
- Stewardship/Land management

Municipal Implementation

Municipal planning
- Master plans
- Conservation elements
- Ordinances
- Stormwater management
- Better site design

Recommendations to strengthen local efforts

Protect Critical Areas

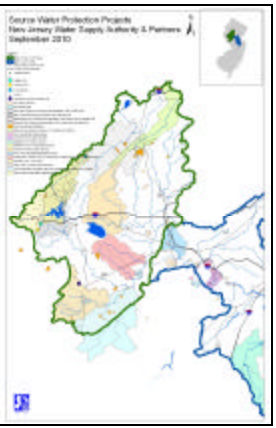


Raritan Basin Water Resources Protection Open Space Criteria (2002, updated 2009) & NJWSA Criteria (2009)

Goal: Identify areas for protection that are critical to water resources

Parameters:
- Riparian Area
- Groundwater & Aquifer Recharge
- Wellhead Protection Area
- Critical Habitats
- Highly erodible soils

Implementation Projects



Stream restoration

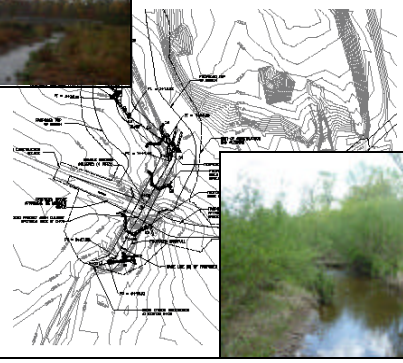
Riparian buffer improvement

Crystal Springs

Hoffman Park Pre-Construction Conditions

- Eroded/failing banks
- Stream lacked access to floodplain
- Deeply incised channel
- Deteriorated culvert system

Hoffman Park



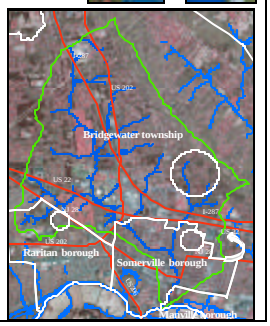
Stormwater Improvements

- Retrofit existing facilities
- Disconnect impervious surfaces
- Rain barrels
- Rain gardens

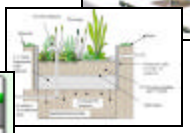
Peters Brook Stormwater Mitigation Project

2010 Rain Barrel Workshops

- Four targeted workshops
- Partners: RCE, NJWSA, and Municipal Environmental Commissions
- 128 attendees and 98 rain barrels constructed
- Monitoring to compare sub-watersheds with & w/o rain barrels



D&R Canal NPS Implementation Infall 21



Install 5 vegetated inlets & nutrient separating baffle box

D&R Canal - Infall 38

Convert basin to wet basin

Ag Mini-Grants Program

- Cost-share program for practice implementation
- Mulhockaway ICM & NMP program
- Manure management
- Riparian buffer restoration projects
- River-Friendly Farm
- Monitoring and evaluation

Priority Watersheds:

- Mulhockaway Creek
- Spruce Run
- Neshanic River
- South Branch/Long Valley

Ag Mini-Grants Program

To date:
- 8 nutrient management plans completed
- 22 fields / 1,208 acres enrolled in ICM (208 soil samples)
- Riparian buffer improvement sites identified in Mulhockaway
- River-Friendly Farm outreach to producers in all watersheds

Complementary funding: Agricultural Water Enhancement Program (AWEP) $ through NRCS

River Friendly Programs

- Golf Course
- Business
- Farm
- Resident
- Schools

Golf Courses: 1,406 ac
Businesses: 3,400 ac
Schools: 60 ac
Farms: 3,700 ac
Total: 8600 acres
600+ residents

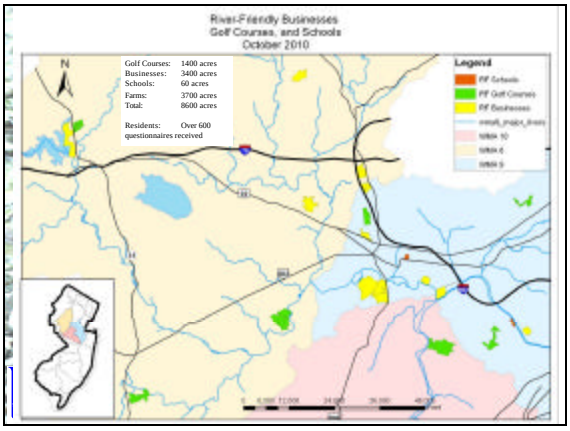
River-Friendly Golf Course, Business & School Certification Programs

- **Partnership** to reduce nonpoint source pollution
- Actions are tailored to each facility to achieve increment of improvement
- Specific, attainable, measurable actions:
  - Water Quality Management
  - Water Conservation Techniques
  - Wildlife and Habitat Enhancement
  - Education & Outreach

Participants

(NJWSA program areas)

- NJ American Water Company – **certified 2009**
- Sanofi-Aventis Research & Development – **certified 2009**
- Sanofi-Aventis Corporate – **certified 2010**
- NJ Water Supply Administration Facility – **certified 2009**
- Raritan Valley Community College
- Ethicon
- Duke Farms
- Colgate-Palmolive GTC
- Upper Raritan Watershed Association
- Quail Brook Golf Course – **certified 2007, recertified 2011**
- Neshanic Valley Golf Course – **certified 2008**
- Heron Glen Golf Course – **certified 2011**
- Green Knoll Golf Course
- Spooky Brook Golf Course
- Warrenbrook Golf Course
- High Bridge Hills Golf Course
- Van Derveer School
- Rutgers Preparatory School



River-Friendly By The Numbers

- sanofi-aventis research facility reduced irrigation by 33%
- RVCC reduced mowed lawn area by 24%
- NJWSA Spruce Run Administrative Facility established 12 acres of native warm season grasses

before

after

Better management of existing land uses

Monitoring & Evaluation

aka how do we know if it's working (or not)

- Define indicators / criteria
- Define "success"
- Link physical restoration to water quality restoration goals
- Set measurable goals & objectives
- Identify when modification / adaptive management is necessary

Stream Restoration Project
- Photo-monitoring
- Visual observation
- Macroinvertebrate sampling
- Fish sampling
- Habitat sampling
- Vegetation surveys
- Geomorphology surveys

Stormwater Improvement Project
- Photo-monitoring & visual observation
- Water quality monitoring

Native grass restoration area, NJWSA Administration Facility – Spruce Run Reservoir