Car wash events are a popular fund-raising activity for youth clubs in New Jersey and all over the nation. Often the dirty car wash runoff is directed into the storm drain system where it discharges directly to local lakes and streams. A recent study conducted by Rutgers Cooperative Extension (RCE) and published in the *Journal of Environmental Engineering* showed that car wash runoff from these events has the potential to contribute significant quantities of pollutants to the receiving water bodies. The study also tested a potential solution to this problem: utilizing rain gardens to filter the polluted runoff before it reaches the

*New Study Shows Rain Gardens Can Effectively Treat Car Wash Pollution*

Michele Bakacs, Environmental and Resource Management Agent, Rutgers Cooperative Extension

Steve Yergeau, Program Associate, Rutgers Water Resources Program

Christopher C. Obropta, Extension Specialist, Rutgers Water Resources Program

(Continued on page 2)
The study was inspired by the Township of Clark’s “green” car wash, which was used for the first time this past May by Cub Scout Pack 145 of Clark to raise money for their scout activities. What makes this car wash “green” is that rainwater collected in a 5,000 gallon cistern is used to wash the cars. The soapy, dirty water is then filtered by a rain garden which acts like a sponge soaking up pollutants that would otherwise enter the local Robinson’s Branch stream. The research conducted by RCE helped to determine to what extent the rain garden was reducing these pollutants. This green car wash was designed by the RCE Water Resources Program and funded by a grant from the New Jersey Department of Environmental Protection. Funding for the research project was provided by the New Jersey Water Resources Research Institute.

Nancy Morris, Assistant Cub Scout Master said "We have never done so well! One man came back with 3 cars. People were very pleased to hear that it was an environmentally friendly car wash. The set up worked great. It is definitely nice to know we are helping the environment in addition to cleaning people’s cars and raising funds for our Cub Scout pack."

The car washing was mimicked on Cook campus in a controlled environment where samples of the dirty wash water could be collected and analyzed for total phosphorus (TP), total suspended solids (TSS), and surfactants, which are synthetic chemicals used in detergents and are toxic to aquatic life. The dirty runoff was also applied to miniature experimental rain gardens built in containers (known as mesocosms) to see how well the rain gardens removed the pollutants of concern. After 24 hours, samples were collected from the bottom of the mesocosms and sent to a laboratory to be compared to the pollutant levels in the dirty wash water.

Results showed that the rain gardens removed between 84 to 95% of the TSS and between 89 to 96% of the surfactants from the wash water. Although surfactant concentrations were significantly reduced, the final levels were not below what has been reported by other studies to be toxic to aquatic life. Surfactants are used around the world for household and industrial cleaning as well as textile manufacturing. Surfactants can damage the gills and mucus membranes of fish as well as impact larval growth and fertilization of many aquatic animals.

An additional research finding was that more phosphorus was coming out of the rain garden mesocosms than going into them. This is not the first study to show that rain gardens may leach phosphorus.

(Continued on page 3)
(Continued from page 2)

...rus. In this case, the excess phosphorus may have been from the soil media used during mesocosm construction. The rain garden mesocosms will be monitored long term to determine how long it takes for the phosphorus to be reduced.

This is the first study looking at the effectiveness of using rain gardens to treat car wash pollutants, specifically surfactants. Additional research is underway to further determine how well rain gardens remove pollutants associated with car wash runoff.

Rain gardens are often installed on school grounds to educate students and parents about the importance of watershed protection. Considering the popularity car wash fundraisers for student activity clubs an enormous potential exists to marry these two activities. Car wash events could become an education and outreach opportunity not just for students, but also for parents who help organize these activities and drivers who have their cars washed. Through this project, RCE is hoping to educate the public about the potential of rain gardens to help reduce the negative impacts of car wash runoff.

For further information on this project, or to help start a “green” car wash in your town, contact Michele Bakacs, Environmental and Resource Management Agent-Middlesex/Union Counties at bakacs@njaes.rutgers.edu, or (732) 398-5274.

This July, I was delivering a presentation at a conference discussing water concerns for the nursery and greenhouse industries. I was presenting with a colleague from Riverside, California, and I had to joke that in the month of June some parts of New Jersey received as much rain in a month as Southern California typically does in a year!

Rainfall in June varied across locations in New Jersey, with locations in Salem County reporting over 12 inches (Table 1).

This is a lot of rain, especially when compared with the average monthly rainfall for this time of year, often 3 or 4 inches (Table 2).

High volumes of intense rainfall can be detrimental to local rivers and lakes, especially if that rain moves as runoff across the landscape or through stormwater infrastructure. Stormwater runoff moving quickly to a receiving stream can erode stream banks and create muddy water. Furthermore, stormwater can carry phosphorus with eroded soil from lawns or fields, which can cause blooms of algae and weeds in lakes and ponds.

Healthy soils in a watershed, however, can significantly reduce the volume and intensity of stormwater flowing to a local stream. Healthy soils are often uncompacted and have considerable pore spaces. This allows rain to percolate into the soil instead of moving off lawns and fields as runoff. This reduces runoff, supplies water for plant growth, and recharges groundwater.

For more information on soil quality and ways to improve soil health in your landscape, see Mangiafico (2011).

(Continued on page 5)
June rain ... continued

(Continued from page 4)

Table 1. Total rainfall for June for select locations in New Jersey. From CoCoRaHS.

<table>
<thead>
<tr>
<th>County</th>
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<th>Total Precip.</th>
<th>Latitude</th>
<th>Longitude</th>
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<td>39.392859</td>
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Table 2. Average monthly rainfall for select locations in New Jersey. From Mangiafico and others, 2012.

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References:
ViewData/TotalPrecipSummary.aspx.


A Look at Lake HO-PAT-CONG (It’s phonetic)

Jessica Murphy, Lake Hopatcong Foundation President

New Jersey may not be renowned for its lakes, but that doesn’t mean they aren’t something special. And the state’s largest, Lake Hopatcong, is 2,686 acres and 9.5 miles long and straddles the border of Morris and Sussex counties, spanning 44 miles of winding shoreline, with its waters lapping up along the shore in four towns: Hopatcong, Lake Hopatcong (part of Jefferson Township), Landing (part of Roxbury Township), and Mt. Arlington. The central basin has an average depth of 27 feet and a maximum depth of 58 feet (NJDEP 2008).

Through the late 1800s and early 1900s, Lake Hopatcong was a resort destination, and folks took trains from Manhattan and then boarded steam ships to visit vacation homes, grand hotels, and camp sites. Over the years, it has become mostly a year-round community, with thousands of residents and visitors using the lake for boating, fishing, sailing, swimming, kayaking, lakefront dining, and general enjoyment. Hopatcong State Park and Lee’s County Park offer public access to the water, and a collection of marina and restaurants also allow those who don’t live on one of the 2,000 or so lakefront properties to enjoy the view and get out on the water. The State Park totals 107 acres and receives 500,000 visits annually.

Lake Hopatcong has traditionally been managed by the State of New Jersey, manifested in the Lake Hopatcong Regional Planning Board, and over the last decade the Lake Hopatcong Commission. In recent years, the commission’s funding has been significantly reduced. Other than the annual summer aquatic weed harvest, which is now run by Hopatcong State Park through the N.J. Department of Environmental Protection, there are very few state resources dedicated to the lake’s well-being.

Because of concerns over the lack of attention to the health of this body of water, the Lake Hopatcong Foundation was established in 2012 with a mission “to improve Lake Hopatcong for all, now and in the years to come.” That mission covers a wide variety of initiatives, from conducting water quality monitoring of the lake to developing an app for boaters to use to find businesses and historical sites. A 501(c)(3) nonprofit organization, the Lake Hopatcong Foundation has been harnessing the enthusiasm from the local community and from those who come to visit. (For more information, go to LakeHopatcongFoundation.org.)

(Continued on page 7)
This year, the foundation took over the management of the Water Scouts program from the Knee Deep Club. This program organizes volunteer paddlers, who comb the shoreline looking for the invasive water chestnut species. The water chestnut has been found in lakes throughout the region, and its broad rosettes of leaves and stringy stems connecting to sharp, spiky seed pods can choke out entire ecosystems and recreational areas. The Knee Deep Club, a nonprofit that focuses on fishing and the lake environment, started the Water Scouts effort in 2010 based on information from the Water Chestnut Task Force, and that year a small colony of the plant was discovered in the southern section of the lake and removed. Since then, no occurrences of the plant have been found by the Water Scouts, who vigilantly cover every foot of shoreline, seeking any sign of the plant. The Water Scouts and the community need to be on constant alert because the seeds can easily be transported via boats, trailers, equipment, or water fowl.

As part of the effort to maintain the lake ecosystem health, the foundation is looking into commissioning long-term academic studies of the lake environment. It has also hosted several clean-up efforts, and is planning a major lake-wide clean-up event for the community this fall, to coincide with the 5-year, 60-inch drawdown. To learn about how to get involved in such clean-up efforts—and to get a view of the lake from the Lake Hopatcong Foundation offices—just go to ThisIsYourLake.org and enjoy the beautiful scene that so many people enjoy, and so many are also trying to protect.
Rutgers Master Gardeners of Cumberland County worked with Rutgers’ Sal Mangiafico to plan and build a rain barrel system to collect rainwater for a large community garden without water access in Millville’s Glasstown Arts District.

A local businesswoman gave permission for us to tap into her gutter. We planned six connected barrels, with the first barrel having one spigot to fill buckets of water, and a second spigot with for a hose connection at the base. We placed the connecting pipes at the bottom of the barrels, so all barrels would fill up and drain at the same time. This worked well when pumping water out of a barrel, and is also nice when letting the water drain with a hose since you don’t need to go to multiple barrels for water. Instead of a downspout to connect the gutter to the barrels, we used 1-¼” poly pipe. This same pipe was also used to connect the barrels to each other. Heating the pipe with a heat gun helped secure the pipe to the fittings on the barrels. Since the barrels were donated, the entire system cost less than $100, with pipe left over for future projects.

Garden volunteers are thrilled that the rain barrels have provided ample water, even through the recent blistering heat.

If you don’t have rain barrels for your garden, take one of the Rutgers Rain Barrel classes! You’ll love it.

(Continued on page 9)
Master Gardeners Install Rainwater Harvesting... continued

(Continued from page 8)

Using a heat gun to soften the poly pipe. Photo: Cheryl Loatman, Rutgers Master Gardener, Cumberland County.

Installing a downspout pipe to the roof gutter. Photo: Cheryl Loatman, Rutgers Master Gardener, Cumberland County.

Water from the rain barrel has helped the garden thrive in spite of poor soil. Photo: Kim Connor, Rutgers Master Gardener, Cumberland County.

This spicebush swallowtail caterpillar might not be in the community garden without water supplied by the rain barrels. Photo: Kim Connor, Rutgers Master Gardener, Cumberland County.
The National Stormwater Calculator is a desktop application that can calculate the amount of runoff for a given site based on its typical rainfall, soil properties, and green infrastructure practices. It operates on Windows-based computers, and requires an internet connection.

The user inputs a location in the U.S., and the program finds the relevant normal rainfall, local soils, and evapotranspiration. The user can further specify the location’s drainage, runoff potential, and slope.

Based on the green infrastructure the user wishes to model for the site—such as rain gardens, green roofs, or porous pavement—the program then calculates the expected amount of runoff. Several summary statistics and graphs are presented as results, including: the percent of rainfall retained; the frequency of runoff of a certain depth; and the percentage of time a certain depth of runoff is retained.

The application may prove useful for determining the improvements a proposed green infrastructure project is likely to produce.

For more information, visit the website: http://www.epa.gov/nrmrl/wswrd/wq/models/swc/

(Continued on page 11)
EPA stormwater calculator... continued

Screenshot showing the summary of rainfall and runoff results.

Screenshot showing a plot of the percent of time that a certain amount of runoff will be retained.
On July 31st, EPA Region 2 and Rutgers Cooperative Extension hosted the New Jersey Green Infrastructure Forum.

Topics covered included planning and funding green infrastructure in New Jersey communities. Case studies from the City of Camden to Passaic County to Jersey City were highlighted and included green streets, rain gardens, permeable pavement, and rainwater harvesting.

The goal of the forum was to bring together experts with community representatives to demonstrate how green infrastructure can be utilized to reduce stormwater runoff, create open space, and improve community sustainability.

Over 150 community representatives, consultants, and government officials attended the first of what is expected to be an annual conference.

As part of a Rutgers Faculty Research Grant, three county extension agents conducted a municipal green infrastructure needs assessment survey for the state.

The preliminary results were presented at the forum and the data showed that of the 122 municipalities that responded to the survey, 72% have installed at least one green infrastructure practice in their town. Rain gardens were the most popular practice, followed close behind by vegetated swales. Funding was listed as the top barrier to green infrastructure installation, but many municipalities have not applied for funding. This may be due to rigorous application processes or that towns do not have the time or resources to spend writing grant applications.
MAC 2013 is coming!
Water Resources Adaptation & Advancement
Mid-Atlantic Conference of the American Water Resources Association
September 26-27, 2013
Kathy Hale, MAC 2013 Co-Chair

The Mid-Atlantic Sections of the American Water Resources Association (AWRA) – NJ, DE, PA, Philadelphia Metro and National Capital – will host the two-day Mid-Atlantic Conference (MAC) at the Conference Center at Mercer on September 26-27, 2013. The conference venue sits within Mercer County Community College, just a few minutes from Princeton and Trenton.

Water resource professionals throughout the region should not miss MAC 2013 – there are 14 concurrent sessions, keynote speakers, poster sessions and networking breaks. The conference committee has planned an agenda that explores a wide range of water resources research, policy, management and other technical topics to interest practitioners, researchers and students from a variety of disciplines. The planned sessions cover many topics, including:

- Water resources planning,
- Stormwater,
- Green infrastructure,
- Superstorm Sandy,
- Flood mitigation,
- Ecological restoration,
- And more!


The Conference Committee is working with professional accreditation organizations to secure certification for the sessions. An updated list of PDH/CEUs is available on the conference web site.

AWRA’s motto is “Community, Conversation, Connections” and MAC2013 will provide each of those. The conference will provide many informational sessions, plus time for connecting with old and new colleagues during networking breaks.

No MAC would be complete without the annual banquet. This year, the New Jersey Section is pleased to welcome conference attendees to their annual Water New Year’s Eve Celebration. The Water New Year’s Eve Celebration is a highlight of the NJ Section’s year, and in 2013 we expect it to be a wonderful time to meet new people and re-connect with old friends from throughout the region.

Join the five Mid-Atlantic Sections of AWRA for what promises to be an informative and exciting conference! Visit [www.mac2013.wildapricot.org](http://www.mac2013.wildapricot.org) for more information or email [mac2013questions@gmail.com](mailto:mac2013questions@gmail.com).
The Snyder Research and Extension Farm and The Melda C. Snyder Teaching Garden present the

Great Tomato Tasting

August 28, 2013
3:00 pm – Dusk

Please join us in this unique opportunity to taste over 60 tomato varieties (heirlooms and hybrids) along with apples, peaches, honey and more!

Stroll through our teaching garden, corn maze and take a wagon tour highlighting today’s Rutgers / NJAES agricultural and horticulture research.

Support Rutgers against Hunger! Please donate a non-perishable food item

Visit our website for additional information and to RSVP online:

http://snyderfarm.rutgers.edu/snyder-events.html

Or RSVP by phone at 908-730-9419 X 3501

$7 admission (cash or check only please)

Children under 10 free
********** NEWS AND UPCOMING EVENTS **********

Mercer County 4-H Fair
Howell Living History Farm 2013
Saturday, August 3, 10 a.m.-8 p.m.  Sunday, August 4, 10 a.m.-4 p.m.

Livestock Shows and Judging • 4-H Exhibits • Food • Hayrides • Farm Tours and Demonstrations
Jugtown Mountain String Band • The American Centenary Band • Pony Rides • Magic Shows • Archery Range
Homemade Ice Cream • Free Parking and Admission with a suggested donation of a canned food item
for RAH! (Rutgers Against Hunger: http://rah.rutgers.edu)

4-H

Youth at Work: Leading Us into the Future

For more information, including a schedule of activities, or to learn how you can exhibit projects at the fair, visit: http://mace.njias.njagg.org

Rutgers
New Jersey Agricultural Experiment Station
www.howellfarm.org

Howell Farm is a Facility of the Mercer County Park Commission
The farm is located 2 miles east on Valley Road, off Rt. 29
two miles south of Lambertville, NJ.

Brian M. Hughes, County Executive  Kevin B. Bamora, Executive Director
14th ANNUAL
HUNTERDON COUNTY
4-H & AGRICULTURAL FAIR
AUGUST 21 - 25, 2013

WEDNESDAY - SATURDAY
10:00 a.m. - 10:00 p.m.
SUNDAY
10:00 a.m. - 5:00 p.m.
SOUTH COUNTY PARK
(location of county fairgrounds)
1207 Route 179, Ringoes, NJ

The non-profit fair is supported in part by the Hunterdon County Freeholders, county Department of Parks & Recreation, Rutgers Cooperative Extension of Hunterdon County, county Board of Agriculture, county Municipal Alliance, the New Jersey State Council of the Arts/Department of State, through funds administered by the Hunterdon County Cultural & Heritage Commission, as well as by many businesses and organizations.
**** NEWS AND UPCOMING EVENTS ****

**SOMERSET COUNTY 4-H FAIR**

**What's Not to Love?**

August 7-8-9, 2013
10:00 am - 10:00 pm

- 4-H Exhibits
- Animals
- Great Food
- Entertainment
- Fun & Games for Kids

Free Park and Ride Shuttle Buses
9:30 am - 10:30 pm daily from Raritan Valley College

**Free Family Fun!**

For more information, call (908) 526-6644
Somerset Co. 4-H Fairgrounds at North Branch Park
Milltown Road, Bridgewater
Southwest of Somerville, Off Rt. 202 or Rt. 22
www.4HisTops.org

Rutgers Cooperative Extension (RCE) is an equal opportunity program provider and employer. Contact your local Extension Office for information regarding special needs or accommodations. Contact the State Extension Director’s Office if you have concerns related to discrimination, 848-932-3583.

Cooperating Agencies: Rutgers, The State University of New Jersey, U.S. Department of Agriculture, and County Boards of Chosen Freeholders.

Rutgers Cooperative Extension, a unit of the Rutgers New Jersey Agricultural Experiment Station, is an equal opportunity program provider and employer.
Annual Purple Martin Spectacular (Maurice River Twp, August 2 and 3)

See thousands of purple martins as they gather for migration!!

- Free viewing platforms
- Evening boat cruises
- Kayak rentals
- Lodging specials

View the complete flyer:

Meghan Wren’s swim across Delaware Bay to raise awareness for bay.

August 3, Fortescue, NJ

On August 3, 2013 – conditions permitting – Meghan Wren will enter the waters of the Delaware Bay from the banks on the Delaware side, at Port Mahon, swim across the channel and the shoals over New Jersey’s oysterbeds, and land on the beach of Fortescue, NJ some eight – ten hours later.

Though several others have crossed the Delaware Bay from Cape May to Lewes (12 miles as the crow flies); no one has yet attempted to cross from Delaware to New Jersey – at the chosen route – 13.1 miles.

The SWIM is an effort to call attention to the importance of the Delaware Bay in our lives – and to raise funds for its protection. Please help Meghan’s SWIM be a success!

For more information:
Cohansey RiverFest and CrabFest, August 24, Bridgeton, NJ

More information:

http://www.cohanseyriverfest.org/Cohansey_Riverfest/WELCOME.html
********** NEWS AND UPCOMING EVENTS **********

Presented by the Washington Township Green Team & Recreation Committee

Green Festival & Family Fun Day

Free Exhibits Music Vendors
Old Fashioned Baseball Game-11am Food* Kid’s Activities

Date: August 17, 2013 Time: Noon – 4pm Place: Rock Spring Park

Apply by June 15th to bring your cool exhibit!
For more information visit our website www.wtmorris.org or email recreation@wtmorris.net

*Free hot dogs donated by Chester Meat Market
DRAGONFLY POND WATCH

Become a Pond Watch monitor!

**Dragonfly Pond Watch** is a volunteer-based program of the **Migratory Dragonfly Partnership** (MDP), an international partnership chaired and coordinated by the Xerces Society. Pond Watch investigates the annual movements of two major migratory dragonfly species in North America: **common green darner** (*Anax junius*) and **black saddlebags** (*Tramea lacerata*). No prior experience with dragonflies is needed to participate!

By visiting the same wetland or pond site on a regular basis, participants will be able to note the arrival of migrant dragonflies moving south in the fall or north in the spring, as well as to record when the first resident adults of these species emerge in the spring.

**Why monitor ponds?**
Collecting seasonal information at local ponds will increase our knowledge of the timing and location of dragonfly migration across North America, and expand our understanding of the relationship between migrant and resident populations within the same species.

**Who can participate?**
Anyone with regular access to a large pond or wetland who has an interest in dragonflies and would like to contribute to our growing knowledge about dragonfly migration in North America.

For those new to citizen monitoring, recognizing these two species is easy to learn! Visit the photo gallery at **OdonataCentral** to see an array of photos of **common green darner** and **black saddlebags**.

**How can I get involved?**
Please visit the **Pond Watch homepage** for information on how to register a pond of your choice and for detailed monitoring protocol instructions.

We will provide regular feedback and reports to participants, so you can see how you are making a difference!

To learn more about Xerces' other citizen science opportunities, visit our **citizen science webpage**.
Stretch along Maurice River in Cumberland becomes a living shoreline
(from pressofAtlanticCity.com)


Communities and homeowners can use living shorelines to stabilize many types of waterfronts, with the design costing similar to that of a regular bulkhead, Bushek said. But unlike bulkheads and other hard structures, the living shoreline creates wildlife habitat, helps improve water quality and makes the shoreline boundary more resistant to erosion from waves.
Record rainfall floods South Jersey, caused traffic, water damage (NJ.com)

http://www.nj.com/gloucester-county/index.ssf/2013/07/record_rainfall_floods_south_jersey_caused_traffic_water_damage.html

Thunderstorms and rain came fast across New Jersey’s southern counties, and in just a few hours dropped between two and seven inches of water, flooding roads, stranding motorists and causing traffic delays that lasted for hours.

Pennsville Chief of Police Allen J. Cummings literally had to dive in to rescue motorists stranded by floodwaters at the height of the storm. The chief rescued two women Sunday afternoon as the more than 4 inches of rain that inundated the riverfront town caused water to quickly rise on roadways often not prone to flooding.
