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# Citizen: What You Can Do to Help Improve Our Estuaries

Piscataqua Region Estuaries Partnership

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**CITIZEN**



**WHAT YOU CAN DO  
TO HELP IMPROVE  
OUR ESTUARIES**



**PREP**

Piscataqua Region Estuaries Partnership



# Take Your First Step Closer to Clean Water!

Summer Fun on Spruce Creek, Kittery, ME. Photo by Spruce Creek Association

## Why You Matter

Much of the pollution that is threatening our estuaries and Great Bay comes from things we all do every day without even realizing it. The **fertilizers we put on our lawns** can run off into our streams when it rains. That **mess our dog leaves behind** at the beach can get washed into ocean. That **dripping oil from our car** can wash off into a storm drain and into our rivers. The power to make a difference lies in every one of us changing small behaviors so that all of us can continue to enjoy this fantastic place we call home.

**PREP'S GOAL** To encourage all who live, work and play on the Seacoast to take actions to help protect and preserve the places we love.

## ABOUT THIS GUIDE

The need to keep our Seacoast rivers, lakes, marshes and Great Bay free of pollution is something we can all agree on. As the Community for Clean Water, PREP works to unite and encourage you, your friends and family to take simple steps to reduce water pollution caused by our every day actions.

This guide has some tips, stories of those who are working on solutions and ways you can get involved. We're not here to save the world, but together we're confident that we can all do our part to keep the places we love around the Seacoast healthy and clean.

"The Piscataqua River watershed is Smuttynose's exclusive water source, we need to preserve

and improve the health of this vital resource, not only for our products, but for everyone in our community..."

Peter Egleston, Smuttynose Brewing Company Founder and President





# Indicator Summary

There are 16 environmental indicators and 6 management indicators presented in this report:

**7 environmental indicators are negative**

**5 environmental indicators are cautionary**

**4 environmental indicators are positive**

## PREP's Clean Water Champion Advice

"There are so many things we can all do to protect our favorite places in the Seacoast. Simple things like using less or no lawn fertilizer and never pouring anything toxic down a storm drain are important to protect our water quality. We also need to tell our friends and neighbors how lucky we are to live in such a special place. Everyone goes about enjoying their lives but not enough of us take an active role in protecting what is so special and dear to us."

Peter Wellenberger  
Great Bay-Piscataqua Waterkeeper,  
Conservation Law Foundation

The *State of Our Estuaries Report* is published every three years by PREP as a way to monitor the health of our region's environment. For more information on the 2013 *State of Our Estuaries Report*, please contact us or find the full report online at [www.prep.unh.edu](http://www.prep.unh.edu).

## POSITIVE

**DISSOLVED OXYGEN (BAYS)** State standards for dissolved oxygen are nearly always met in the large bays and harbors.

**TOXIC CONTAMINANTS** The vast majority of shellfish tissue samples do not contain toxic contaminant concentrations greater than FDA guidance values. The concentrations of contaminants are mostly declining or not changing.

**MICROALGAE** Microalgae (phytoplankton) in the water, as measured by chlorophyll-a concentrations, has not shown a consistent positive or negative trend in Great Bay between 1975-2011.

**BEACH CLOSURES** Poor water quality prompted advisories extremely rarely in 2011. There are no apparent trends.

**POSITIVE** Demonstrates improving or generally good condition(s) or a positive trend.

**CAUTIONARY** Demonstrates possibly deteriorating condition(s) or indicates concern given a negative trend.

## NEGATIVE

**CLAMS** The number of clams in Hampton-Seabrook Harbor is 43% of the recent historical average.

**IMPERVIOUS SURFACE** In 2010, 9.6% of the land area of the Piscataqua Region watershed was covered by impervious surfaces. Since 1990, the amount of impervious surfaces has increased by 120% while population has grown by 19%.

**SHELLFISH HARVEST OPPORTUNITIES** Only 36% of estuarine waters are approved for shellfishing and, in these areas, periodic closures limited shellfish harvesting to only 42% of the possible acre-days in 2011. The harvest opportunities have not changed significantly in the last three years.

**EELGRASS** Data indicate a long-term decline in eelgrass since 1996 that is not related to wasting disease. Due to variability even recent gains of new eelgrass still indicate an overall declining trend.

**NUTRIENT CONCENTRATIONS** Between 1974 and 2011 data indicates a significant overall increasing trend for dissolved inorganic nitrogen (DIN) at Adams Point, which is of concern.

**DISSOLVED OXYGEN (RIVERS)** State standards for dissolved oxygen in the tidal rivers are not met for periods lasting as long as several weeks each summer.

**OYSTERS** The number of adult oysters decreased from over 25 million in 1993 to 1.2 million in 2000. The population has increased slowly since 2000 to 2.2 million adult oysters in 2011 (22% of goal).

**MANAGEMENT INDICATORS** These 6 indicators measure progress towards management goals, not environmental condition.

## CAUTIONARY

**SEDIMENT CONCENTRATIONS** Suspended sediment concentrations at Adams Point in the Great Bay Estuary have increased significantly between 1976 and 2011.

**NUTRIENT LOAD** Total nitrogen load to the Great Bay Estuary in 2009-2011 was 1,225 tons per year. There appears to be a relationship between total nitrogen load and rainfall. Although typical nutrient-related problems have been observed, additional research is needed to determine and optimize nitrogen load reduction actions to improve conditions in the estuary.

**BACTERIA** Between 1989 and 2011, dry weather bacteria concentrations in the Great Bay Estuary have typically fallen by 50 to 92% due to pollution control efforts in most, but not in all, areas.

**MACROALGAE** Macroalgae, or seaweed, populations have increased, particularly nuisance algae and invasives.

**MIGRATORY FISH** Migratory river herring returns to the Great Bay Estuary generally increased during the 1970-1992 period, remained relatively stable in 1993-2004, and then decreased in recent years.

**NEGATIVE** Demonstrates deteriorating condition(s) or generally poor conditions or indicates concern given a negative trend.

### CONSERVATION LANDS (GENERAL)

SALT MARSH RESTORATION

CONSERVATION LANDS (PRIORITY)

OYSTER RESTORATION

MIGRATORY FISH RESTORATION

EELGRASS RESTORATION



## Around your home

### Maintain Your Septic System

If you have a septic system, treat it with care. Chemicals dumped down the drain interfere with the septic system's ability to process waste. Also, septic systems must be pumped every 3-5 years. Failure to have a septic tank pumped can cause messy, stinky overflows that pollute water and threaten public health.

### Use Eco-Friendly Products Whenever Possible

Using "environmentally friendly" products, which are less resource-intensive to make and less harmful when used, is a great way to reduce the amount of contaminants that could potentially find their way into our rivers, lakes, marshes and bays.

### Dispose of Paint & Other

**Chemicals Carefully** If you have leftover paint, pesticides or other chemicals, dispose of them safely. Dumping chemicals down the drain is not a safe option. Contact your town to learn about hazardous collection events in your area.



## In your yard

### Start Composting and use less fertilizer

Use compost to augment your soil and fertilize your plants, rather than synthetic fertilizers.

**Install Rain Barrels** Installing rain barrels at the bottom of your house's gutters and downspouts helps reduce the amount of polluted water running off of your land & can be reused to water your garden.

**Let the Rain Soak In** Slow stormwater runoff by directing downspouts into lawns, beds or rain gardens.

**Mow High** Set the blade on your lawnmower to a 3" or higher setting and leave the clippings. This will reduce the need for water and synthetic fertilizers.

**Build Healthy Soil** Supplement your soil with mulch, compost and other all-natural soil amendments; you'll reduce the need for fertilizers, herbicides, and pesticides.

**Use Less Pavement** Instead of paving your patio try using pervious paving stones set into permeable stone dust. Try crushed stone driveways instead of asphalt. This will allow the rain to soak into the ground instead of running off.

### Plant Less Lawn & More Native

**Plants** Plant gardens allow for a lot more water to soak in than lawn does.



## With your car

### Dispose of Fluids Properly

Never pour anything down a storm drain, since most drains empty directly into streams or rivers. Recycle oil at registered collection centers throughout the region.

**Fix Leaks** Chemicals leaking from cars are a major source of pollution, as they get washed into the nearest stream.

**Skip Driving Alone** Carpool or use public transit to reduce air and water pollution and save money.



## With your pets

### Pick Up the Poop!

Dog waste contains fecal coliform bacteria and other disease-causing organisms such as salmonella, roundworms and giardia. If you own a dog, please remember to always pick up after your four legged friend so that pollution doesn't get washed into our rivers, lakes, marshes and Great Bay.

### Bathe Pets the Green Way

Wash your pets indoors or have your pet professionally groomed. If your dog or animal is so big that he has to be washed outdoors, make sure to do it on the lawn or another permeable surface to keep the soapy water from running into a storm drain.

### Try a Do-It-Yourself Grooming

**Shop** There are many shops in the Seacoast region where you can bathe your pet yourself. Best of all: no after-bath clean up!



## Get involved

There are many local and regional organizations that need volunteers. Whether you like to get knee deep in mud counting bugs or teaching children about pollution or stuffing envelopes our community of non-profit organizations NEED YOU!

Visit [www.cleanwatermusic.com/get-involved](http://www.cleanwatermusic.com/get-involved) to find out who you can help in your neighborhood.



## Support businesses

If you own a business think about how you can help protect the waters around you. Can you reduce the parking lot size? Plant a rain garden to catch rain runoff? Donate to a local conservation organization?

As a customer visit the local businesses you know support clean water. Visit The Green Alliance ([www.greenalliance.biz](http://www.greenalliance.biz)) for over 100 businesses who are "Clean Water Champions."

## PREP's Clean Water Champion Advice

"Do less for Great Bay. The less we do to change the landscape, the better off the Great Bay Ecosystem will be."

Paul Stacey,  
Great Bay National Estuarine Research Reserve



## THE SCIENCE OF INDICATORS

The State of Our Estuaries Report features 22 indicators that have been color coded and explained. But, what exactly is an indicator and how does PREP come up with these 22?

Probably, without even realizing it, we all track indicators every single day. We get on the scale in the morning to see how we're doing on our diet. We hear about unemployment rates and the stock market indexes and gauge how the national economy is doing. We watch the weather to decide if we'll bring our raincoat. All of these things – the weight of our bodies, the unemployment rate, and



**How we get our fish return data: Mike Dionne and Becky Heuss, from the NH Fish & Game Dept., prepare to tag a net full of herring below the fish ladder in Exeter, NH.**

the chance of precipitation are all numeric representations of highly complex, intricate, dynamic systems. These things represent a much larger, more involved story that has multiple factors, inputs and variations and the science of simplifying it down to representative indicators is not simple at all.

PREP staff and our Technical Advisory Committee made up researchers, scientists, engineers and water and land managers are responsible for analyzing detailed scientific

**One way we get our water quality data: Scientist Adam Baumann from UNH uses a syringe to collect a “grab sample.” This sample of water is then brought back to the lab to determine the amount of nitrogen in the water and other properties.**

data and translating it into indicators that reflect the health of our region's environment. The four key criteria that they look for in an indicator are based upon US EPA guidance, these are: relevance to a management question, feasibility, sensitivity, and clear interpretation. A key factor is the indicator's relevance to answering important management questions that we have like, “how many acres of eelgrass exist on the floor of Great Bay? Is it decreasing or increasing?” or “How many fish swim upriver each spring to lay their eggs?”

Effective translation of data into indicators can help tell the story of how the Piscataqua Region watershed is doing overall in terms recognizable to us all. The 22 indicators covered in this 2013 report capture many sides of the complex story of the current state of our estuary – they provide a ‘snapshot’ in time of the condition of our waters and our environment.



When interpreting indicators, it is also extremely helpful to have measurements that have been collected over a long time. Research has been done in Great Bay for many years thanks to the scientists at UNH. We have some data from the 1970's on water quality in the Great Bay which is useful for knowing long-term trends. It's not the only thing to look at to determine decisions and management actions but it helps.

Indicators help to inform us of patterns or trends by distilling lots of data down to simple metrics. However, they cannot make management decisions for us. Often, more focused research and monitoring is needed, along with innovations in management techniques. Our estuaries and our environment are massively complex and so intertwined with our society and our economy – that is why they are infinitely fascinating to study, explore and enjoy.

**Another way we get our water quality data: This is a datasonde buoy in Great Bay. Scientists deploy this buoy and instruments that are underneath it take measurements of the water around it on a consistent schedule. For example dissolved oxygen content is measured every 15 minutes, 24 hours a day, 365 days a year.**



A residential rain garden

## RESTORING A WATERSHED IN PORTSMOUTH NEIGHBORHOOD-TO-NEIGHBORHOOD

Rain gardens are just one technique in the Low Impact Development (LID) playbook and they're pretty much just what they sound like — a slight depression containing plants that can tolerate both wet and dry conditions and soils that allow water to infiltrate back into the ground instead of running off into a storm drain on the street. The water running off impervious surfaces (like the roof of a house, or a parking lot) is directed into the garden where it nourishes the plants and can pool long enough to seep back into the groundwater supply. Each garden may seem

Great Bay in Summer



small, but a single garden can soak up the water from impervious surfaces of an average single family home.

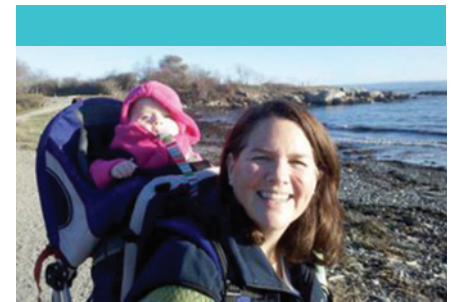
For 6 years Candace Dolan, Director of the Hodgson Brook Restoration Project in Portsmouth, with funding from NH Department of Environmental Services 319 Program, has dedicated her abundant enthusiasm and energy to engaging residents throughout the Hodgson Brook watershed in conversations about the poor health of their local stream, and the small ways they can together make a big impact in restoring the clean water, plants and wildlife that make up their neighboring natural areas.

A recent effort in September 2012 was in the Pan-naway neighborhood by Portsmouth Regional Hospital. Plenty of strong hands made quick work of three gardens and a fourth, impromptu garden was installed for a resident who caught wind of the project while work was underway.

Installations like these are part of an ongoing effort throughout the Hodgson Brook watershed that includes small projects like the residential rain gardens and larger projects at Portsmouth High School and The Port Inn, as well as systems installed in the City of Portsmouth's right of way with the help of the Public Works Department. Work in Hodgson Brook started with simple rain barrels, and now includes 7 residential rain gardens, 2 Tree box filters, 2 engineered rain gardens with 2 more coming in Fall 2012.

## CITIZEN SCIENCE AND OYSTER NANNIES

Homeowners are helping Ray Konisky of the Nature Conservancy rebuild oyster reefs at the mouths of the tributary rivers of Great Bay. Through the Oyster Conservationist program, people with waterfront property can take care of baby oysters until they are ready to join the big oysters at the restoration sites around the Bay. Not only does this help to restore lost oyster reefs that could once filter the entire contents of Great Bay in three or four days, caring for oysters and contributing to their restoration also connects people to the environment in an intimate way and helps citizens understand the issues facing Great Bay. The program has



### PREP's Clean Water Champion Advice

"Do your part with whatever land you own or manage. Even if you're not on the shoreline, water from your property always eventually makes its way to the ocean - along with everything it's picked up. Make sure you're doing the best you can to keep it clean, slow it down or even stop it. Sometimes it's the littlest (and cheapest) things that can make the biggest difference."

Phyllis Ford, Spruce Creek Association, Kittery, Maine

expanded every year since it started in 2006. In the 2011 season, 39 families helped grow oysters for restoration. The oysters they raised will be added to reef restoration projects at the mouths of the Lamprey and Squamscott Rivers. In addition to filtering vast quantities of water, oyster reefs provide a nursery for recreational and commercial fish, and protective habitat for a huge range of other estuarine critters. To become an oyster nanny contact Kara Mcketon at [kara.mcketon@tnc.org](mailto:kara.mcketon@tnc.org).

### TALKING FACE-TO-FACE WITH LAMPREY RIVER RESIDENTS

A unique approach recently taken by Bambi Miller of the Strafford County Conservation District (SCCD) helped to show people how their lives and their private lands are connected to their neighbors and the watershed.

Bambi and the SCCD engaged with residents along the Lamprey River face-to-face about their private septic systems. They started by inviting residents of Durham and Lee to a presentation in each town about private septic systems, and extending the offer of free, professional inspections and recommendations for maintenance. The goal was to help citizens make wise land use decisions that would protect their health and water quality, and help to start building a network with other private landowners to continue the project. Personal contact was important to achieve the project's goals, but even more critical was ensuring the confidentiality of respondents and assuring them that regulatory consequences would not result from their participation. Because the SCCD is a volunteer service they could approach residents about the project without strings attached. Homeowners got to go over their property's site plans with engineers and other professionals who could provide recommendations for each unique situation. It came as a surprise just how many people were unaware about proper care of septic systems, or even that they had a septic system at all! Once people had information, that increased their awareness about the connection



### PREP's Clean Water Champion Advice

*"Speak up. I think people are more likely to protect something when they have a personal connection to it... so if you love a place speak from your heart and tell others why it's special."*

Sally Soule, NH Dept. of Environmental Services

between their septic system and the rest of the watershed, they took initiative in taking care of their septic systems and property. Following initial presentations, workshops, and home visits, SCCD distributed an informational booklet on private septic system care to further engage Lamprey River residents about the reasons for proper septic care.

### FURRY SCIENCE: POOP-SNIFFING DOGS HELP LOCATE AND ELIMINATE SOURCES OF HARMFUL BACTERIA ENTERING RIVERS AND BEACHES.

FB Environmental Associates recently hired Environmental Canine Services LLC to help identify human sources of bacteria in Kittery, ME. Hailing from Michigan, Environmental Canine Service (ECS) is a "K-9 illicit discharge detection unit" made up of animal handlers, scientists and

two furry data collectors, Sable and Logan. Dog's noses are amazing detection tools. By sniffing outflow pipes and areas where stormwater or wastewater discharges into rivers, estuaries, and beaches, they can tell if it's contaminated with harmful bacteria. More importantly — and most incredibly — they can distinguish whether the bacteria are from humans. Using the dogs' detection powers in conjunction with other scientific instruments is a cost-effective and highly accurate method of rapidly identifying sources of bacteria from sewage. Recently, an area of beach and tide pools near Fort Foster in Kittery was found to have levels of bacteria above the safe levels set by state water quality standards. It was unclear what kind of bacteria was present or where they were coming from. Sable and Logan were able to confirm that the bacteria were from human waste, and the source was tracked to an abandoned outhouse back in the woods that was leaking into the wetland above the beach. Since this discovery, the Town of Kittery has pumped out and sealed the outhouse to prevent further contamination and the bacteria levels have dropped a lot. Logan and Sable aren't just excellent scientists with their own built-in sensor equipment; they're a furrier, friendlier connection between science and the people who stand to benefit from a better understanding of impacts to the local waterways and beaches.



Sable meeting with some young fans in Kittery on Aug. 7th



## JOIN THE CONVERSATION

What are you doing to help protect the places we love? Tell us about your favorite outdoor escapes, share photos and connect with others by liking us on Facebook or following us on Twitter. Sign up for our Newsletter at: [www.prep.unh.edu](http://www.prep.unh.edu)

[www.prep.unh.edu](http://www.prep.unh.edu)  [Twitter.com/PREPCommunity](https://twitter.com/PREPCommunity)  [Facebook.com/PREPCommunity](https://Facebook.com/PREPCommunity)

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The full 48-page Environmental Indicators and Conditions Report that has deeper explanations, tables, graphs & future priorities.



A short guide for municipal leaders and legislators that provides a short list of priority policy options for consideration and model efforts from our own communities.



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