



The Narrow River Handbook

**A Guide to Living in the Watershed
2008**

HELP AT YOUR FINGERTIPS

Household Hazardous Waste

R.I. DEM Eco-Depot 942-1430 x 241

Fertilizers, Pesticides, and Herbicides

URI Cooperative Extension Hotline (800) 448-1011

R.I. DEM Agriculture Section 222-2781

Poison Control Center (800) 222-1222

Recycling, Used Motor Oil, and Oil Filters

North Kingstown Curbside Recycling 268-1564

North Kingstown Transfer Station 295-4766

Narragansett and South Kingstown: Rose Hill Transfer Station 783-4554

R.I. DEM Eco-Depot 942-1430 ext. 241

R.I. Resource Recovery Corporation 942-1430

Sewage or Laundry Discharge

Building Inspector - North Kingstown 268-1581

Building Inspector - Narragansett 782-0619

Building Inspector - South Kingstown 789-9331

R.I. DEM Office of Compliance & Inspection 222-1360

R.I. Department of Health 222-2231

R.I. Coastal Resources Management Council 783-3370

Boating Safety

Harbormaster - North Kingstown 294-3316 x 255

Harbormaster - Narragansett 789-1091

Harbormaster - South Kingstown 783-3321

U.S. Coast Guard - Emergency 783-3021

R.I. DEM Boating Safety 222-2284

Wildlife

R.I. DEM Division of Fish & Wildlife 789-3094

U.S. Fish & Wildlife Service 364-9124

Mowing or Clearing Wetlands or Coastal Zones

R.I. Coastal Resources Management Council 783-3370

R.I. DEM Office of Compliance & Inspection 222-1360

R.I. DEM Office of Water Resources - Permitting 222-2306

Land Preservation

Narrow River Land Trust 783-6740

U.S. Fish & Wildlife Service 364-9124

The Nature Conservancy, R.I. Field Office 331-7110

Dumping and Nuisance Behavior

Police (non-emergency) - North Kingstown 294-3316

Police (non-emergency) - Narragansett 789-1091

Police (non-emergency) - South Kingstown 783-3321

Town Hall - North Kingstown 294-3331

Town Hall - Narragansett 789-1044

Town Hall - South Kingstown 789-9331

R.I. DEM 24-Hour Hotline (401) 222-3070

Narrow River Preservation Association (401) 783-6277



Have you ever looked out your window during a heavy rainstorm and wondered where the water goes? Have you ever watched as streams of water run down the street, picking up dirt and litter and maybe some of that oil off the driveway? After a storm, have you ever looked at the river—the Narrow River?

It's easy to look for sources of pollution from industry or sewage treatment plants, but here in the Narrow River watershed there are no such sources. Land use in the Watershed is almost exclusively devoted to residential housing, which means pollution in the Narrow River comes from us—our homes, our yards, and our boats.

Although the little things we do may seem negligible, they do add up—enough to impact the River. That leftover paint thinner poured onto the grass, or that little bit of fertilizer that landed on the driveway gets carried right down to the River after a storm in stormwater runoff, or more slowly through groundwater recharge. If you think of all the houses, lawns, driveways, and streets in each neighborhood, and you consider the kinds of products we use and how we use them, you can begin to imagine how we have affected the water quality of the River. But our good actions can add up, too, and can make a difference.

Estuaries like the Narrow River, also known as the Pettaquamscutt River, can recover from pollution if we control the sources. Imagine eating oysters collected from Middlebridge—a common treat in the past. Imagine swimming anywhere in the River with confidence. This can happen. We can make it happen. How? By 1) recognizing and eliminating the things that we do that pollute and 2) learning how to properly use and dispose of the products we buy that pollute.

The kind of pollution that comes from all of us is called nonpoint source pollution. Cleanup is difficult, if not prohibitively expensive. Containing the pollution at its source is much more effective and economical. Thus, the Narrow River Preservation Association (NRPA) has put together this handbook on household matters we can control that can reduce the pollution going into our River.

Here you will find environmental do's and don'ts that apply to every household. You will find suggested alternatives to many common household practices and products. You will also find phone numbers and lists of government agencies and other contact numbers in this area, so you can get more information when you need it.

We hope that you will keep this handbook and use it as a reference manual. If everyone in the more than 2,000 households and businesses in the Watershed make small, significant changes in their lives to prevent pollution, then we will again enjoy swimming and eating shellfish anywhere in the River, confident that it is clean.

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Osprey

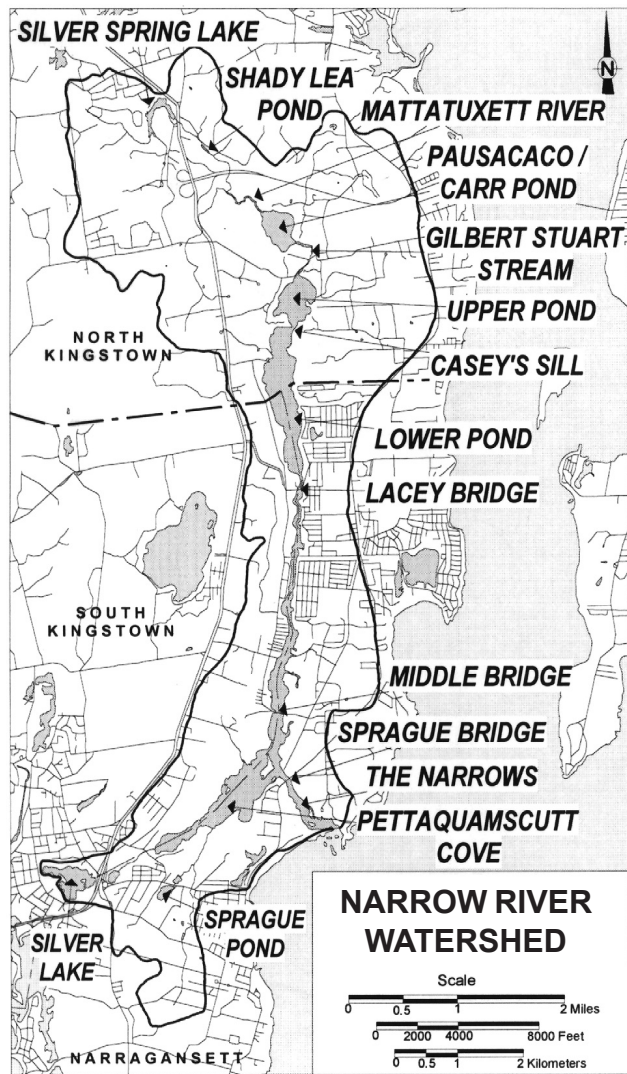
Introduction

An estuary is where the out flowing current of a river meets the incoming flow of the sea, resulting in an exceptionally diverse range of habitats, rich with wildlife and filled with beauty. Our estuary, the Narrow, or Pettaquamscutt, River, is no exception. From the depths of the upper ponds to the Narrows at Sprague Bridge, our River has tremendous biological resources and recreational opportunities. It is home to several rare species, and its deep northern basin is considered chemically unique. Throughout the state, Narrow River is highly regarded for its aesthetic value—especially by those of us who call it home.

How Clean Is Our River?

Water quality in the Narrow River has been documented for the past 50 years through scientific studies, monitoring by RI Dept. of Environmental Management (RIDEM) and NRPA's participation in URI's Watershed Watch (WW) program since 1991. Since 1959, Narrow River has consistently failed State standards for total coliform (bacteria) levels. Increased algal growth stimulated by high levels of nitrogen and phosphorus have been observed since the early 1970's and since 1979, parts of the River have been closed to shell fishing. Under URI's WW program, measurements of water clarity, dissolved oxygen, temperature, salinity and chlorophyll have been made biweekly from May through September, while fecal coliform and nutrient levels have been measured monthly. Levels of all parameters generally either follow seasonal trends or are related to rainfall events. Surface oxygen levels in Narrow River have generally been at 5 ppm or greater, the concentration required to support all forms of life. Oxygen levels below this occasionally occur, but have typically been measured at 3 m depth. In 1994, the WW data supported the closure of the entire River to shellfishing due to high bacteria levels. Swimming and other water-contact activities are not regulated in Narrow River because there are no state-licensed beaches. However, bacteria levels in some areas have been found to exceed standards for swimming, particularly after storms.

According to Watershed Watch data from 1991 to 2007 and a 2001 RIDEM



study, the Narrow River has shown no clear trend in water quality improvement. For the past several years, low bacterial levels have only been observed during dry weather at Gilbert Stuart Stream and the three deep-water pond locations in the northern end of the River. High levels of fecal coliforms can occur throughout the river, but especially after rainfall. According to RIDEM, the following trends in fecal coliform levels have emerged from historical, RIDEM and Watershed Watch data: 1) the highest concentrations have consistently been found in the southern portion of Pettaquamscutt Cove; 2) concentrations in the middle sections of the river between Lacey Bridge and Middlebridge Bridge have consistently exceeded allowable limits in July/August; 3) concentrations peaked in the warmest summer months (July-September) and 4) concentrations also peaked for a 72-hour period following significant rainfall.

From these data sources, there are two kinds of pollution documented in the Narrow River: bacterial contamination from septic systems, stormwater runoff and animal wastes, and high levels of nitrogen from septic systems and fertilizers. Recorded numbers of finfish and shellfish have dramatically decreased over the years. It's clear to all who live here, as well as those who use the River, that the estuary has suffered serious degradation of its water quality, fisheries, and recreational value.

Construction of stormwater detention systems in Narragansett, completed sewer construction in South Kingstown and Narragansett, and new regulations on individual sewage disposal system (ISDS) maintenance should result in improvements in coliform and nitrogen contamination. However, it is important to remember that while coliform and nitrogen contamination have been the primary

contributors to pollution in the River, they are by no means the only source of pollution that must be addressed.

Other development-related pollutants that threaten the River include: sediment from soil erosion; chemicals from pesticides and herbicides; waste from pets and waterfowl; chemicals from commonly used household and marine products; salts, petroleum hydrocarbons, and trace metals from road surfaces, nutrients from fertilizers; and finally, household trash and litter. These are all kinds of pollution problems that will not be resolved by sewer installations. Fresh-water input from streams, groundwater seepage, and stormwater runoff will continue to carry these harmful contaminants into the River unless we do something to control them.

What is Nonpoint Source Pollution? Nonpoint source pollution occurs when: 1) the points of origin of pollutants are spread over a broad geographic area, and 2) the transport of pollutants to the receiving waters is also widespread.

Failing septic systems, leaking crankcase oil, pet waste—all contribute to nonpoint source pollution. Although not as visible or dramatic as an oil spill or toxic discharge, nonpoint source pollution can be just as detrimental to water quality, and sometimes more so, because it is persistent and often harder to control.

Two studies have been conducted focused on managing pollution from stormwater discharged into Narrow River. In 1992, the first phase of the tri-town (Narragansett, North Kingstown and South Kingstown) study confirmed that significant loads of nitrogen were coming into the River through stream flow and groundwater seepage in dry weather conditions, as well as from the expected stormwater flow during wet weather conditions. Stormwater runoff, routed to storm sewers, is the most significant wet weather source of bacteria to the Narrow River and its tributaries according to the 2001 RIDEM Narrow River study. Storm sewer outfalls, especially on the Narragansett side of the Narrow River, are the only point sources of fecal coliforms and supply the major fecal coliform load to the middle part of the river. Though other pollutants were

not measured in these stormwater studies, if nitrogen and bacteria are reaching River, this indicates that other kinds of nonpoint source pollution may be reaching the River, too.

What Can We Do?

There are two options for pollution control: treatment control and source control. For treatment control, the RIDEM study determined that stormwater outfalls in Narragansett would be targeted for Best Management Practices (BMPs) to significantly reduce coliform loadings during wet weather. Since 2000, stormwater treatment systems have been installed at the Wampum Road, Conanicus Road and Mettatuxet Road outfalls and the outfalls at Edgewater Road and Pettaquamscutt Terrace, among others, are targeted for future BMPs. In their evaluation of BMPs, both studies concluded that public education on source control was necessary to achieve long-term water quality improvements in the Narrow River Watershed.

Areas cited as needing critical attention included:

- 1) the proper use of household materials by homeowners, especially the use of fertilizers, herbicides, and pesticides;
- 2) the proper disposal of household

materials, especially used motor oil, anti-freeze, and paints;

3) the proper operation and maintenance of septic systems;

4) the control of runoff and erosion, especially at construction sites;

5) the proper disposal of trash and yard waste, particularly grass clippings and leaves; and

6) the control of animal waste from both domestic pets and waterfowl.

Helping homeowners in the Watershed understand how they contribute to pollution and what they can do about it is the objective of this handbook.

Did you ever think that walking your dog, or feeding the geese, or fertilizing your lawn could contribute to pollution in the River?

Well, it can, and it does. If you look through this handbook, you can find out why and what you can do.

How Much Improvement Can We Expect?

Several features that make the Narrow River unique also make it susceptible to pollution.

First, the Narrow River is not truly a river. It is more accurately described as a shallow lagoon connected by a narrow channel to a series of kettlehole ponds fed by a small, freshwater stream. Therefore, the Narrow River lacks the

IMPACTS OF POLLUTION

•**Fecal coliform bacteria** prompt the State's Department of Environmental Management (DEM) to restrict shellfishing and water-contact recreational activities for health reasons. The health threat arises not from the coliform bacteria themselves, but from the diseases associated with human septic waste, for which the bacteria are an indicator.

•**Nitrogen and phosphorus** are plant nutrients that act as fertilizers to aquatic plants in the River, just as they would on land. Excessive growth or algae "blooms" create a surface scum on the water that decreases water clarity and ends up as a black organic layer on the bottom. The decomposition of the plants puts an added demand on the oxygen dissolved in the water, thereby decreasing the oxygen available to fish and shellfish. The decomposition of leaves and grass clippings results in the same loss of dissolved oxygen. The scum and smell also detract from the aesthetic quality of the River.

•**Sediment** from the erosion of river banks, unstable slopes, and construction sites can decrease water clarity. The lack of light penetration can affect the growth and development of larval fish, shellfish, and aquatic vegetation. Sediment can suffocate bottom-dwelling organisms, ultimately disrupting the entire food web. Erosion and sediment deposition can permanently alter shorelines, marshlands, and the overall course and flow of the River.

•**Hazardous chemicals** can reach toxic levels in bottom sediments. They can also be taken up by aquatic organisms and passed along the food chain, where they can reach toxic levels in fish, birds, and humans. Chemical contaminants may cause reproductive problems and reduce resistance to disease.

•**Littered Styrofoam and plastic materials** can injure and block digestive tracts of fish, birds, turtles, and marine mammals. Wildlife can be strangled and entrapped by nets, fishing lines, and six-pack yokes.

usual freshwater flow by which a river system cleanses itself. Because the River is shallow with a slow flow, and tidal flushing of the basin is minimal, pollutants may accumulate to unsafe levels.

Second, the steep slopes and the permeable soils of flatter terrain nearer the River allow for rapid transport of pollutants into the River. Pollutants in

surface runoff may reach the River in a matter of hours or days, and pollutants in groundwater on the flatter terrain may take as little as a year to reach the River.

Relating these facts is not intended to discourage; it is intended as a call to action. The turnaround time to better water quality in Narrow River is as fast as we make it. The suggestions in this

booklet are simple things—things that may make your life easier, maybe even save you money. And they are things we can each start today. The sooner we control our pollution where it starts—with ourselves—the sooner we may reap the benefits of a cleaner, safer, healthier River.

Household Hazardous Material

Every household in the Watershed uses products that are hazardous. They are found in bathrooms, kitchens, garages, and hobby rooms. They may be flammable, explosive, corrosive, or—what is worst for the River—toxic. Toxic materials can be poisonous or carcinogenic, and may cause birth defects. The problem arises with how these materials are used and how they are thrown away. Pouring them down the drain or onto the lawn, or pouring them into a roadside ditch or storm drain is a sure way to contaminate drinking water and to pollute the River. Every hazardous material has a proper method and place for disposal.

Dispose of Hazardous Materials Properly

In 1995, the R.I. Department of Environmental Management (DEM) opened a permanent household hazardous waste facility called the Eco-Depot. You must call DEM to make an appointment to drop off material at the Eco-Depot. Be prepared to describe the type and amount of each material you are bringing. Only quantities appropriate for a single household will be accepted.

- Do take** these materials to the Eco-Depot: Pesticides, herbicides, gasoline, oil-based paints, household solvents, pool chemicals, photographic chemicals, and automotive fluids such as antifreeze, dry gas and transmission fluid. Some household, rechargeable batteries will be accepted, such as nickel/cadmium batteries, small lead/acid batteries such as those used in smoke alarms, and button batteries, but no car batteries. Regular alkaline and heavy duty batteries go in the trash.

- Do not take** these materials to the Eco-Depot: School or commercial waste, out-of-state waste, explosives or ammunition (call your local police or fire department), empty containers (even if they were used for hazardous materials), biological or radioactive materials, asbestos shingles or floor tiles, latex (water-based) paints, tires, automotive batteries. Used motor oil and oil filters may be recycled at the Rose Hill and North Kingstown transfer stations. (See Car or Recycling sections for more information.)

- Check under sinks**, in garages, and

in basements for hazardous materials, and dispose of them properly. Look for ingredients to avoid, listed in Appendix I.

- If you have a spill**, use kitty litter, sawdust, or newspaper to absorb the material. Allow absorbents to remain on the spill spot for several hours. Put the material in a plastic bag and triple-bag if the material is poisonous or corrosive. If less than a gallon, put in the trash. If more, take to the Eco-Depot. Protect your eyes and hands.

- If you have any questions** about any materials or proper disposal, call DEM at the number below.

Prevent Household Hazardous Waste

- Read the labels** on all products before you buy them. If they contain the words warning, dangerous, poisonous, or toxic, be especially careful. If possible,

substitute a nonhazardous or less hazardous alternative. See Appendix I for lists of ingredients to avoid and alternatives to commonly used products.

- Buy only the amount needed** to do a job. Use all the material before disposing of the container.

- Give away or donate** leftover materials. A friend or neighbor, a church, or a school may be happy to use leftover paint.

- Recycle materials** when you can. For example, paint thinner may be reused. Allow paint particles to settle, then pour off liquid for reuse. Wrap residue in newspaper and put in the trash.

- Store products** in their original containers. Keep them in a cool, dark place that is not accessible to children.

Who to Call

R.I. DEM Eco-Depot 942-1430 ext. 241
Poison Control Center(800) 222-1222

For more information, visit the web site
of the RI Resources Recovery Corporation

www.RIRRC.org

DID YOU KNOW?

Every year the average American family disposes of 21 pounds of household hazardous waste. As much as 50 percent of all household hazardous waste is liquid.

A single quart of motor oil or gasoline intentionally dumped or accidentally spilled onto the ground can pollute 250,000 gallons of groundwater and make it unsafe for drinking. Similarly, one gallon of gasoline spilled has the potential to contaminate 1 million gallons of drinking water.

Construction Practices

Sediment from soil erosion is the number one cause of water contamination around the world. Sediment decreases water clarity and damages aquatic habitats. Often pollutants adhere to soil particles and are carried more quickly to receiving waters when erosion occurs.

Construction sites are particularly susceptible to erosion and sediment runoff. Construction sites can also contribute pollution from the miscellaneous chemicals and fuels lying around the work area. Poor construction quality, both in buildings and in sanitary systems, can lead to more pollution in the years to come.

What You Can Do

- Avoid the wet season** when bulldozing and undertaking outdoor construction. This will minimize soil exposure and erosion. In Rhode Island, the wet season runs generally from November through March.

- Limit soil disturbance**, keeping as much of the original vegetation as possible, and planting temporary cover as necessary. Replant slopes as soon as possible.

- Cover exposed soil immediately** with biodegradable erosion-control blankets to minimize erosion from stripped sites.

- Check your soil type** and build accordingly. Get a soil survey, and share it with your engineer, architect, and builder. Make sure to survey all pertinent factors, including permeability, water table level, soil texture, and steepness of slopes.

- Divert runoff** around excavations by using check dams and ditches, and filter structures made out of stone, gravel, or sandbags. Install gravel trenches along driveways or patios to collect water and allow it to filter into the soil.

- Do not flush** cement wash water or excess cement, or clean painting equipment in or near a gutter or storm drain.

- Keep sites clean** of loose dirt, litter, toxic chemicals, and other debris. Cover stockpiles and landscaping materials with tarps.



Snowy Egret

Protect Trees During Construction

Saving established, healthy, well-developed trees on construction sites will increase consumer demand for the property, lower energy consumption for heating and cooling, create quieter and more private living conditions, and improve the environmental quality of the area following construction. Once the decision has been made to save certain trees, they must be protected from one or more of the following: 1) Equipment and machinery may cause injuries to roots, trunks and low-hanging branches. A barrier around the tree's dripline will prevent this from happening. 2) Chemical poisoning can harm or kill trees and can be caused by: runoff from washing down equipment; petroleum products; lime and mortar; and misuse of fertilizers, insecticides, and herbicides. Avoid this by keeping the area within the dripline free of building materials and runoff. 3) Excavations, such as trenching for utility lines, etc., can remove vital tree roots and may change drainage patterns. Where possible, trenches should be routed away from trees and outside the dripline. If this is not possible, the next best approach is tunneling under roots, using

a power driven soil auger. This is a project that should be undertaken by a qualified arborist or landscape architect. 4) In preparing a building site, soil is often moved in order to level areas and make grade changes. If a tree is standing in this area, it may well have soil added, or the original soil level over the roots may be lowered. As a result, the tree may have difficulty obtaining its normal amount of air, water or minerals. Since most feeder roots are located in the top 6-8 inches of soil, these changes can cause significant damage and even eventual death. If a grade must be raised around a desired tree, it may be necessary to build a barrier around the tree's dripline. If a grade must be lowered, use the barrier around the tree as a guide and gently slope the soil away from the tree.

In conclusion, proper tree maintenance such as barriers around the dripline, watering, pruning to compensate for root injury, and fertilization, should help trees survive the activities of construction.

Who to Call

U.S.D.A. Natural Resources Conservation Service	828-1300
North Kingstown Tree Warden	268-1564
Narragansett	
South Kingstown Tree Warden	789-9331 x 250
Rhode Island Tree Council.....	861-1995
R.I. DEM/Division of Forest Environment.....	647-3367

DID YOU KNOW?

Almost fifty species of finfish have been found in the Narrow River at some point in their life histories. Many species are small, serving as a food source for larger, edible sport fish. Among the edible fish common in the lower estuarine reaches of the River are winter flounder, white perch, American eel, pollack,

Lawn and Garden Care

The care and feeding of lawns and gardens can be an environmentally harmful undertaking. Problems arise in how people choose and use lawn and garden products. The type of fertilizer, the choice of herbicide or pesticide, the amounts applied, and the timing of application can all make the difference between a landscape that is beneficial to the environment and one that contributes to pollution.

There are many effective ways gardeners can attack problems before reaching for chemical solutions. A chemical-free lawn and garden can be time-saving and less expensive, as well as kinder to the River.

Lawn Tips

•**Keep it small.** Allow parts of your lawn to revert to native growth. Consider seeding wildflowers, increasing your planting of native shrubs and trees, or using an alternative ground cover. (See Appendix II.)

•**Increase Stormwater Infiltration.** Homeowners can make a difference in the amount of stormwater runoff flowing to the river. Consider replacing paved driveways with more permeable surfaces such as crushed stone or turf pavers; redirecting rain spouts into dry wells or modifying landscaping to incorporate a 'rain garden' - a low area where rain water can collect.

•**Don't waste water.** A brown lawn in late summer is natural; it will turn green again with the cooler and wetter weather.

•**Choose drought- and disease-tolerant seed varieties.** Look for a seed mixture that has drought-tolerant red fescue and chewing fescue. Consider endophytic grasses, which contain fungi that repel insects such as webworms and chinch bugs, and that fight some diseases. Tall and fine fescues are varieties with a reduced need for nitrogen, which means less frequent feeding.

•**Adjust the mowing height of your lawn mower.** Grass kept at a height of 3 inches encourages deeper rooting, decreasing the need for water and fertilizer. It also enables grass to compete better against weeds and withstand heat stress.

•**Recycle lawn clippings by leaving them on the lawn.** Contrary to popular belief, clippings do not cause thatch buildup. As clippings decompose, they provide organic matter to the soil, improving water retention and returning nitrogen to the soil. Consider using a mulching lawn mower.

•**Add a thin topdressing of compost.** This can improve the structure and nutrient value of the soil. Apply compost in the fall instead of the usual application of fertilizer. Compost can be bought by the bag or by the truckload, or you can make it yourself using yard and kitchen waste (see Composting).

•**Use nitrogen-fixing plants** instead of fertilizer. Seeding with clover, for example, naturally pulls nitrogen from the air into the soil.

•**Develop a tolerance for weeds.** If it's green and attractive, it might not be all bad.

•**Take a physical approach** to controlling weeds. Pull weeds by hand, before they go to seed.

Fertilizer Tips

Fertilizer use on lawns and gardens is a major cause of pollution in the Narrow River and will become even more significant as development continues.

•**Avoid water-soluble nitrogen.** Most synthetic fertilizers are high in soluble nitrogen, which dissolves easily in water, resulting in a quick, but not necessarily healthy, greening of the lawn. More important, the dissolved nitrate moves quickly out of the soil (out of reach of your lawn), and can become a major contaminant of groundwater and runoff. Eventually, it can cause algal blooms in the River.

•**Use a slow-release fertilizer,** one that contains 50 percent or more water-insoluble nitrogen (read the back of the bag). Water-insoluble nitrogen breaks down slowly, making it available for plant uptake over a longer period of time. This reduces the amount subject to leaching and runoff and results in a more controlled rate of growth. Also, because you apply it less frequently, it saves you time and money.

•**Consider using organic forms of fertilizers,** such as cottonseed, bone or blood meals, fish emulsion, compost, or manures. Organic fertilizers are generally high in water-insoluble nitrogen and release nitrogen slowly. Although they may contain relatively low concentrations of nutrients, they perform other important functions—such as increasing the organic content of the soil and providing micronutrients—which synthetic formulations do not.

•**Have your soil tested for pH,** then add lime accordingly. The acidity of the soil is crucial to the effectiveness of any fertilizer. For a nominal fee, the University of Rhode Island Cooperative Extension Service will test your soil and make recommendations.

•**Don't overfertilize.** Fertilization schedules should not be dictated by fertilizer companies. Advertisers will have you believe that a lawn needs a full application of fertilizer three times a year. However, a half-application of slow-release fertilizer put down in late April and a full application put down in September or October should be plenty for the average lawn. URI Cooperative Extension recommends 0.5 pounds of nitrogen per 1,000 square feet as the half-application in the spring, and 1 pound per 1,000 square feet as the full application in the fall. Order their fact sheet "Lawn Care Simplified" (listed in Appendix III).

•**Apply fertilizer in clear weather.** Do not fertilize if rain is predicted. Sweep, don't wash, fertilizer off walks and driveways. This is a major pathway for nitrogen to reach the River.

•**Do not over water.** Over watering can leach fertilizers out of the soil and into groundwater and runoff. Use a rain gauge to determine rainfall. If less than an inch of water has fallen in a week, add just enough to make an inch.

•**Water in the morning.** Less water is lost to evaporation in the cool of the morning than in the heat of the day. Watering at night is better than midday, but can cause fungal growth in grass plants. Use a drip or trickle irrigation system to cut water use and control weeds.

Herbicides and Pesticides

•**Identify your lawn problem** before reaching for a pesticide or herbicide. This can ensure effective treatment. Contact URI Cooperative Extension for problem identification and information on choosing control options.

•**Mow high** (around 3 inches) so that good grass will shade out the crabgrass. As a last resort against crabgrass, apply a pre-emergent seed killer in the early spring (before the forsythia blossoms drop). It is a more benign chemical than a crabgrass killer.

•**Be cautious of weed and feed products.** Ask yourself if you need all the products that are in the mixture. Unnecessary ingredients increase the cost of fertilizing and can harm beneficial lawn insects.

•**Avoid broad-spectrum herbicides.** Look for the least toxic product. Use only the bare minimum necessary to accomplish your goal. Limit your approach to spot treatment.

•**Explore your pest management alternatives.** Choose a method that is compatible with improving water quality. Whenever you apply a chemical, you pose the risk of contaminating runoff. Near streams and wetlands, use only chemicals approved for aquatic use. Consult a gardening expert for the most benign solution to your problem before buying any

pesticide.

•**Use the least toxic measures** first when dealing with pests. Below is a partial list of some lower toxicity options.

•**More is not better.** Follow directions when using any chemical pesticide, herbicide, or fertilizer.

Garden Tips

•**Improve your soil** with soil amendments such as compost, aged cow manure, and leaf mold. In addition to improving the soil texture, these will provide a natural nutrient base for your plants. Strong plants can better resist disease and compete with weeds.

•**Keep it weeded, watered, and mulched.** Mulching around plants reduces the amount of water lost to evaporation. It insulates roots against extreme heat and cold, keeps down the weeds, and attracts earthworms, which aerate the soil.

•**Do not over water.** Over watering can leach pesticides, herbicides, and fertilizers out of the soil, and into groundwater and runoff. Use a rain gauge to determine rainfall. If less than an inch of water has fallen in a week, add just enough to make an inch.

•**Water in the morning** or late in the day to reduce evaporation. Use a drip or trickle irrigation system rather than a sprinkler.

•**Take a physical approach** to controlling pests. Put out traps for slugs and Japanese beetles, or pluck them by hand and throw in a bucket of sudsy water. Place cardboard collars around seedlings to discourage cutworms.

•**Take a physical approach** to controlling weeds. Pull weeds by hand. Use hand-held or long-handled hoes. An hour of weeding in June can save several hours in August.

•**Allow room for plants to grow.** Crowding results in competition, which weakens all plants, making them more susceptible to disease and pests.

•**Put plants in the right place.** If a plant requires rich, moist soil and shade, don't put it in full sun and sandy, well-drained soil.

•**Choose native plants.** Native plants preserve the local ecosystem by providing food and shelter for indigenous wildlife and, once established, will require less maintenance. Non-native plants can become invasive, taking over the habitat of native plants. (See Appendix II for species lists.)

•**Avoid fertilizers high in soluble nitrogen.** They encourage plenty of tender, green growth, but at the expense of sturdiness and strength. Water-soluble nitrogen often leaches out of the soil before it is used by plants. Buy fertilizers that are high in water-insoluble nitrogen. Organic forms of fertilizer such as cottonseed, bone or blood meals, fish emulsion, compost, and manures are generally high in water-insoluble nitrogen.

Who to Call

URI Cooperative Extension Hotline	(800) 448-1011
R.I. Wild Plant Society	783-5895
Northeast Organic Farming Association, R.I. Chapter	364-1699

DID YOU KNOW?

Of the dozen or so over-the-counter pesticides, nearly all are suspected of causing serious long-term health problems. Many are carcinogenic.

Approximately 90 percent of the

insects in your lawn are not harmful. In fact, earthworms are extremely beneficial to lawns and gardens. They aerate the soil and their castings are a natural fertilizer. However, weed killers and pesticides such as diazanon may harm earthworms.

Many gardeners use pesticides at 20 times the rate farmers do. Sixty percent of pesticides are used to keep plants pretty and free of blemishes, rather than to ensure plant survival.

TO CONTROL USE

Chewing or sucking insects (aphids, spider mites, scales, whitefly)	insecticidal soap
Caterpillars	Bacillus thuringiensis
Slugs	diatomaceous earth
Insects in soil	beneficial nematodes
Flying insects (fleas, beetles, leaf miners)	pyrethrum-based products
Fungus problems (powdery mildew, black spot, scab)	sulfur

Composting

The dumping of lawn clippings and leaves into the Narrow River is a significant source of pollution, according to the tri-town stormwater study. Decomposition of organic matter by microorganisms depletes dissolved oxygen, which is critical to maintaining water quality and aquatic life. At the same time, almost 30 percent of the waste stream flowing into our landfills is lawn and garden waste. With very little effort, homeowners can compost that yard waste into rich humus to be used as a soil conditioner for lawns and gardens.

A backyard composting operation can be as simple as a pile where leaves, grass clippings, garden waste, and kitchen vegetable scraps are deposited. Organisms in the soil decompose the dead plant matter, transforming it into a dark, rich soil amendment. Compost makes a clay soil more granular and permeable, and a sandy soil more able to hold water and nutrients. It also provides a slow-release source of nutrients, cutting down the need for chemical fertilizers. Compost bins, either commercial or of your own design, can improve the appearance of your pile, but are not necessary for a successful system.

Who to Call

R.I. Resource Recovery Corporation	942-1430
URI Cooperative Extension Hotline	(800) 448-1011
Northeast Organic Farming Association, R.I. Chapter	364-7557

Recycling

Litter and debris not only reduce the aesthetic and recreational value of surface waters, they also impair water quality. Recycling can protect our river by keeping detrimental, nuisance materials out of the water and drainways. Recycling also helps to conserve our dwindling natural resources. It saves us money and helps control pollution by reducing the waste at landfills and by cutting short the expensive and pollution-causing process of turning raw materials into consumer products.

Remember that, in order to work, recycling programs are run as businesses. Collection centers sell recycled items back to industry. It is imperative that separate recycling streams be kept as pure as possible. An entire bin of ledger paper contaminated with glossy paper or envelopes with plastic windows could be unmarketable.

Who to Call

North Kingstown Transfer Station.....	295-4776
North Kingstown Curbside Recycling	268-1564
Rose Hill Transfer Station.....	783-4554
R.I. Resource Recovery Corporation	942-1430

Recycling Tips

- Keep the recycling stream pure.**

Follow the guidelines set by the collection centers.

- Rinse your containers** to reduce problems with pests.

- Recycle clothing, toys, and appliances.** Contact R.I. Resource Recovery Corporation for a list of organizations that accept reusable items.

- Recycle these things** through your local facility:

Residents of Narragansett and South Kingstown recycle at the Rose Hill Transfer Station. There is no charge for

recycling newspapers, ledger paper, junk mail, glass, aluminum, steel and tin cans, HDPE (1) and PETE (2) plastics, waste motor oil and filters, corrugated cardboard, paperboard, textiles, magazines, and books. For a fee, you may recycle tires, yard waste, furniture, appliances, construction material, and other bulky items.

Narragansett and South Kingstown do not participate in the State's curbside recycling program, but recycling is available through private companies. Consult the Yellow Pages under "Rubbish Removal."

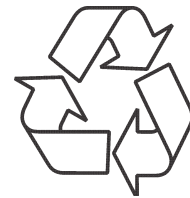
Composting Tips

•**Make your own pile,** keeping these principles in mind. Layer your pile with leaves, clippings, weeds, soil, and kitchen waste. Alternate green (fresh) layers with brown, always leaving brown on top. Air and moisture are critical to decomposition. You can turn the pile every few months to speed up the process. Be careful not to locate your pile next to streams, roadways, or wetland areas, where leached nutrients could be carried to the river. Where nuisance animals are a problem, use non-aromatic vegetable scraps—no sweet fruit or meat scraps.

•**Call the R.I. Resource Recovery Corp.** for the following materials on home composting:

- composting design sheets, *free of charge*
- home composting manual, *free of charge*
- commercial compost bins at *discounted prices.*

•**Recycle your yard waste.** Those who are not interested in home composting, but wish to keep leaves and grass clippings out of the landfill, may recycle them at the transfer stations. Rose Hill Transfer Station in South Kingstown sells bags or charges per pound with a minimum for truckloads. There is no charge for residents of North Kingstown at the town transfer station.



Residents of North Kingstown may participate in the state's curbside recycling program. The following items can be recycled in the blue bin: glass, aluminum, steel and tin cans, plastic HDPE (1) milk jugs, PETE (2) beverage bottles, milk and juice cartons. Additionally, a green bin is available for disposal of: mixed paper, newspaper and thin cardboard. Corrugated cardboard can also be recycled. It must be flattened and prepared in 3 x 3 bundles. North Kingstown residents may also recycle newspaper, magazines, leaves, and grass clippings at the North Kingstown Transfer Station at no charge.



Precycling

Precycling, like recycling, is aimed at keeping litter and unwanted debris out of the River and its drainways. Precycling, however, aims to reduce waste at the store, before you take it home. Precycling means choosing products with the least amount of packaging, avoiding single-use, disposable products, and looking for durability in products so they can be used again. By cutting down on potential trash before you bring it home, less will find its way into the River and into the landfill.

Precycling Tips

- Avoid wasteful packaging.** Buy food in bulk or large-size packages. Avoid single-serving food and beverage items.

- Choose reusable containers** for packing lunches and beverages, and for storing leftovers. Invest in well-made containers that won't break and require replacement.

- Clean and reuse durable containers** including items such as plastic bags and yogurt containers.

- Take reusable cups, plates, and utensils** on picnics and boat rides.

- Take a reusable mug** to the office or coffee shop.

- Use sponges and cloth** towels and napkins that can be washed and reused, rather than single-use, throwaway paper towels and napkins.

- Avoid single-use, disposable products** like diapers, batteries, razors, and Styrofoam cups.

- Buy recycled products or products in recycled packaging.** Check for a high level of post-consumer waste content.

- Use aluminum foil**, which can be recycled, instead of plastic film, which cannot.

- Recycle electronics** at the R.I. Resource Recovery Corporation (RIRRC). RIRRC offers free recycling of residential computers and cellular phones. This includes all hardware. A low per pound fee is charged for a small amount of computer equipment recycled by a business. Televisions are accepted for only \$5.00. Detailed information is available on the RIRRC web site (See Appendix V).

- Recycle reusable items** by using the ResourceXchange and The Free Market, free services provided by RIRRC to give away or find reusable goods that might otherwise be thrown away. The services are designed to assist businesses, non-profits, educational institutions and residents to save resources and money. By registering at a web site, you, a business or institution can either give away or find reusable free goods to use in your business, institution, home or garden.

Who to Call

R.I. Resource Recovery Corporation	942-1430
R.I. DEM Environmental Protection Bureau	222-4700



DID YOU KNOW?

One cubic yard (3' x 3' x 3') of yard waste will produce 8 cubic feet (2' x 2' x 2') of compost in less than one year without an ounce of effort.

Containers and packaging waste account for almost half of all

garbage. The production of packaging and decoration of consumer products exhausts 50 percent of the nation's paper, 8 percent of its steel, 75 percent of its glass, 40 percent of its aluminum, and 30 percent of its plastic.

Americans throw away 18 billion disposable diapers a year—enough to stretch to the moon and back seven times. Our landfills are not designed to receive or treat human waste.

Septic System Maintenance

Failing septic systems have long been identified as the major source of pollution to Narrow River. Components of the system crack and leak, or the soils in the leach field become clogged, resulting in discharges of untreated waste to the yard, to surface runoff, or into the ground and groundwater, and ultimately the River. Contamination from septic systems has contributed to the ban on shellfishing in the River; it has also contaminated drinking water supplies and caused excessive growth of aquatic plants in the River, resulting in decreased water quality. Septic systems are like furnaces, cars, or any other appliance. They need regular maintenance to function properly. Repair or replacement of a system can be much more costly than regular maintenance.

What You Can Do

•Pump your tank regularly. DEM recommends pumping at least once every three years. The town of Narragansett requires pumping once every four years. Some systems will need to be pumped more frequently. It is best to have your system inspected regularly and pumped accordingly.

•Inspect your system regularly. Having your tank pumped may not reveal or resolve other problems in your system that could become costly if not addressed. You can do this yourself (see below), or hire a professional.

•Get more information and training. Take a workshop at URI's On-site Wastewater Training Center or call for the Cooperative Extension fact sheet on septic system maintenance (see Appendix III). These are helpful if you want to do your own maintenance, or if you have a problem with your system.

•Address problems immediately. Septic systems fail when they are not kept

in good working order.

•Do not dispose of hazardous materials in the sink or toilet. Toxic materials can kill the bacteria in your septic tank, causing the system to malfunction. Nonbiodegradable chemicals can flow out of the tank and into the River still in their toxic state! See Household Hazardous Materials for proper disposal and Appendix I for a list of toxic materials and some safe alternatives.

•Do not use chemical treatments for your system. Acids and organic chemical solvents are prohibited for use in septic systems by state and local laws. Bacteria and enzyme treatments are unnecessary and should never be used, especially in place of pumping. Pour a pot of boiling water down the drain once a week to unclog.

•Conserve water. Too much water passing through the system can wash solids out of the tank into the drain field, causing it to malfunction. Drain appliances one at a time. Spread clothes

washing over the entire week. Fix leaks, replace worn-out faucet washers, and use water-saving devices (see Water Conservation, page 11).

•Use garbage disposals sparingly, if at all. Extra fibrous waste breaks down slowly, causing the solid matter in your tank to build up more quickly. Recycle vegetable waste in a compost pile (see Composting).

•Never flush slow-to-decompose materials down the toilet. Facial tissue, paper towels, baby wipes, sanitary napkins, tampons, disposable diapers, and cigarettes all decompose slowly (if at all), clogging the system and calling for remedial pumping.

•Protect your leach field. Don't compact the soil by driving heavy vehicles on it. Keep trees and shrubs 10 feet away so their roots won't clog the pipes. Don't overload it with water; make sure roof gutters and downspouts drain away from the leach field. Don't connect a basement sump pump to the household drain. Never cover the leach field with asphalt, concrete, or other impervious surfaces. Dense grass and shallow-rooted plants are good coverage for the leach field.

•Use phosphate-free detergents. Dish washing, as well as laundry detergents, may contain phosphates, which can act as a plant fertilizer, stimulating algae growth.

Who to Call

NE Onsite Wastewater Training Program	874-5950
URI Cooperative Extension Hotline	(800) 448-1011
R.I. DEM Water Resources - Permitting	222-2306, 222-6820
R.I. DEM Compliance & Inspection	222-1360
R.I. Department of Health	222-2231
North Kingstown Building Inspector.....	294-3331 x301
Narragansett Building Inspector	782-0619
South Kingstown Building Inspector	789-9331

DID YOU KNOW?

An enormous effort has been made to install sewers in the most densely developed areas of the Watershed. It is hoped that reducing the number of septic systems will result in an improvement in

water quality. Keep in mind that many of the tips on septic system maintenance can and should be used by sewer owners.

Although sewage may be pumped out of our Watershed, the same principles of water conservation and what should and shouldn't

go into the waste stream apply.

Remember, properly functioning waste systems can save you money. In fact, a managed on-site program of septic system maintenance could have avoided the huge expense of sewerage. Managed septic systems do not fail.

Water Conservation

Water conservation can produce many benefits. Conserving water not only reduces the use of a limited resource, it also saves money. As water consumption is reduced, so are energy, water, and sewer bills. The less water used by properties on septic systems, the lower the amount of pollutants that are made available to enter the Watershed. The less water used on a lawn, the lower the amount of fertilizers and/or pesticides that seep into groundwater or wash into surface water runoff. In order to conserve water, we must start thinking of it as a limited, precious, and expensive resource.

In the House

•**Turn off the tap** as much as possible. A gallon of water can run out of the faucet in less than 60 seconds.

•**Install an aerator** in every faucet. These devices are inexpensive and available at local hardware stores and from your local water company. See Who to Call section below.

•**Install a low-flow shower head** to reduce flow 50 to 75 percent. These can be purchased for about \$10.

•**Check for leaks** in faucets, toilets, hoses, and pipes. A steady drip can waste up to 20 gallons a day, amounting to over 7,000 gallons per year. A leaking toilet can waste up to 200 gallons per day.

•**Take short showers** (10 gallons), instead of a bath (30 to 50 gallons). Fill the sink to shave. Turn off the tap when brushing your teeth. The greatest water

use in the house is in the bathroom.

•**Use a bowl** when washing fruits and vegetables. Use basins for washing and rinsing dishes by hand.

•**Run only full loads** in dishwashers and washing machines.

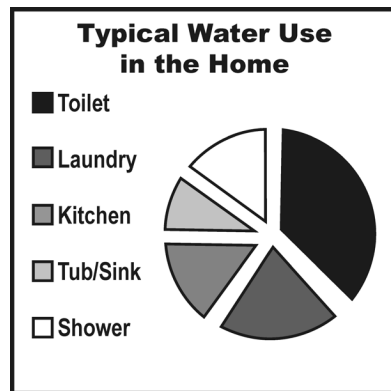
•**Insert toilet dams**, which displace or hold back water. The height from which the water falls, not the volume, controls the flushing action.

•**Install a low-flush toilet** during renovations. Some use as little as 1.6 gallons per flush, while conventional toilets use 5 to 7 gallons per flush.

In the Yard

•**Wash your car from a bucket** and drain water into the lawn, or use a pistol-grip nozzle that shuts off.

•**Water your garden** with low-flow, perforated hoses. Water your yard early or late in the day to reduce evaporation. Watering at night, though better than at midday, may encourage the growth of fungus. Native plant species often require less water (see list of recommended plants in Appendix II).



URI Fact Sheet 91-2



Plankton sampling

DID YOU KNOW?

On average, each Rhode Islander uses 50 to 75 gallons of water a day. The majority—75 percent—is used in the bathroom, 20 percent in the kitchen, and 5 percent for cooking and drinking.

Leaving a hose running for one hour uses 375 gallons of water. Trickle or drip irrigation can cut water use by up to 60 percent and slow the growth of weeds.

Who to Call

URI Cooperative Extension Hotline (800) 448-1011

FREE water-saving kits, including faucet aerators, a shower head, dye tablets (for detecting toilet leaks), and a toilet insert, are available to customers of:

United Water Rhode Island 789-0271
 North Kingstown Water Department 268-1521
 Narragansett Water Division, Engineering 782-0639
 South Kingstown Public Services Dept. 789-9331, x250

Car Care

Cars and their everyday maintenance can contribute dangerous pollutants to the River. Improper disposal of used motor oil or a battery can pose a significant threat to an ecosystem. Car pollutants are most likely to enter the River in surface runoff, but can also seep into the ground, contaminating drinking water and eventually reaching and contaminating the River.

What You Can Do

- Never dump** gasoline, used oil, or other automotive products on the ground, in the driveway, or in the toilet, sink, curbside storm drain, or street gutter.

- Recycle used motor oil and oil filters** by placing them in strong plastic containers and taking them to your town transfer station.

- Don't mix waste oil** with gasoline, solvents, or other liquids before recycling.

- Take antifreeze, gasoline, dry gas, and transmission fluid** to the Eco-Depot, the state's hazardous waste facility at Field's Point (see Household Hazardous Materials).

- Recycle car batteries.** Retailers are required to accept your old battery when you buy a new one. It is likely they will take your old battery even if you are not buying, but call ahead to make sure.

- Wash your car** with biodegradable, phosphate-free detergent, using as little soap as possible. Use a pistol-grip hose nozzle to conserve water. Dump buckets of soapy water in the toilet or sink, not the storm drain. Rinse soap suds onto grass or gravel, where they can filter through vegetation and soil before entering a waterway. Better yet, park your car on grass or gravel before washing. Or go to a commercial car wash where waste-

water is treated properly.

- Pump gas and change fluids carefully** to avoid spills on the ground. Place a drip pan under your work area. Pour kitty litter, sawdust, or cornmeal on spills. Allow the absorbents to remain on the spill spot for several hours. If it's only a small spill, place the used absorbents in a strong plastic bag in the trash. If it's a large spill (over one gallon of absorbent), take the material to the Eco-Depot. Be especially careful with spilled antifreeze; it has a sweet smell that can attract pets, who may be killed if they ingest the liquid.

- Store car wax and unused automotive fluids** in airtight containers in a cool, dry, dark place. These items have a long shelf life and are better used than discarded or recycled.

- Read product labels** and choose those with the least toxic ingredients (see Appendix I). For example, less toxic brands of antifreeze are now available.

Who to Call Oil and Oil Filter Recycling/Disposal

North Kingstown Transfer Station	295-4766
Hours: Mon – Fri 7 a.m. – 3:15 p.m., Sat 7 a.m. – 4 p.m.	
Rose Hill Transfer Station	783-4554
Hours: Mon – Sat 7 a.m. – 3 p.m.	
R.I. DEM Eco-Depot	942-1430 x 241
Old Batteries	Call new battery retailer or garage
Poison Control Center	(800) 222-1222

DID YOU KNOW?

Half of all Americans change their own motor oil. Every year, Americans illegally dump 120 million gallons of used oil—11 times the amount of the Exxon Valdez

spill—on the ground, down storm drains, and in the trash. One quart of oil can contaminate up to 250,000 gallons of water. The oil from one engine (four to six quarts) can produce an eight-acre oil slick.

Approximately 42 gallons of

crude oil are needed to refine 2 1/2 quarts of lubricating oil. Yet it takes only one gallon of recycled oil—and about half as much energy—to produce the same 2 1/2 quarts.

Recycle your used motor oil!

Boat Care

Taking care of your boat, like taking care of your car, can present a number of environmental hazards to the River. Disposing of oily bilge water, or painting, or cleaning a boat can pollute the very waters that make boating so enjoyable. For example, an anti-fouling agent in older marine paints, tributyl tin (TBT), is extremely toxic to freshwater plants and animals.

What You Can Do

- Place drip pans under engine and fuel lines** to minimize oil and fuel spills. Remove oil from bilge water using an oil-absorbing bilge pillow.

- Use nontoxic detergents** and a scrub brush to clean your boat. Products that remove stains and make your boat

shine are often extremely toxic.

- Don't use TBT-based paints.** They are already prohibited on boats under 65 feet. Copper-based anti-fouling paints are less toxic, but still pollute the water. Not using these products and regularly cleaning the bottom of your boat may be the best solution.

- Scrape your boat bottom over a drop cloth.** Vacuum up TBT contaminated wastes and take them to the Eco-Depot (see page 4).

- Dispose of refuse properly.** Contain your trash and dispose of it onshore. Use reusable plates, cups, and utensils. *next page*

•**For your next outboard motor**, consider buying one with less horsepower and a four-cycle engine. Four-cycle engines recirculate the oil in the same way a car engine does, instead of releasing the oil to the environment, as two-cycle engines do.

•**Get more information** by ordering R.I. Sea Grant fact sheets on preventing pollution from boats (see Appendix III).

Boat Handling

The Narrow River attracts a large number of boaters. The way people handle their boats can make a huge difference in protecting the physical shoreline from disturbance and erosion, and also in protecting the recreational value of the River by keeping it a safe and pleasant place for people to enjoy.

The shoreline of the River is a delicate region—home to a variety of specialized saltmarsh plants, whose root systems hold the river bank together. The marsh is a nursery to finfish and shellfish, which feed on the microorganisms that thrive in the specialized, estuarine deposits there. Over 70 percent of fish caught commercially depend on salt marshes for all or part of their lives. Marshes are also the nesting and hunting grounds of wildlife and waterfowl. Migratory birds use them as stopovers between their summer and winter residences, and many other birds spend their entire winters there. Excessive boat speeds and poor navigation can disturb or damage this valuable plant life, as well as animal life along the River.

What You Can Do

•**Control the wake of your boat.**

A smaller wake causes less erosion and disturbance of the shoreline. The closer the shore, the greater the hull size of your boat, and the shallower the depth of the River, the more damage your boat wake can cause. Excessive speed, combined with a growing number of boaters, increases the potential for a serious accident. Reasonable boat speeds make the River a safer place to enjoy.

•**Keep as far to the right as possible.** Operators of motorized boats should give the right of way to nonmotorized craft, especially considering the increased numbers of inexperienced people in canoes and kayaks on the River. People in canoes and kayaks must remember that many motorized boats are limited to traveling in the center of the channel, depending on their draft and the water depth.

•**Navigate the River carefully.** Ever-changing conditions on the Narrow River make navigation a constant challenge. The most often-encountered hazards in the River are shoals and sandbars that make sections of the River difficult to navigate at low tide. Rivers will carve a channel on the outside of a river bend, while depositing sand and silt on the inside of the bend. The channel is a limiting factor for many power boats on the River.

•**Keep a respectful distance from**

DID YOU KNOW?

EPA studies estimate that a two-stroke outboard exhausts, unburned, one-quarter of the fuel it consumes, in addition to gaseous hydrocarbon emissions.

waterfowl and wildlife.

•**Follow all boating regulations**, especially as they pertain to water skis and personal watercraft or “jet skis”. These regulations are listed in Appendix IV.

•**Take a boating safety course.** The DEM Office of Law Enforcement provides a free booklet on boating safety. They also offer a correspondence course in boating safety, or you can attend a class at the Community College of Rhode Island.

DID YOU KNOW?

A shipbuilding business was established by John Aldrich Saunders in 1814 at the foot of Torrey Road, on the flat land near the River known as the Training Lot. Since shallow waters were a problem, Saunders specialized in ships with a centerboard design that could sit and maneuver in shallow water. One innovative vessel, the *None Such*, was a three-masted schooner that weighed 16 tons, was 60 feet long by 17 feet wide, and drew only 10 inches when unloaded. Saunders, with his son, built about 40 ships here before his death in 1832.

Who to Call	
R.I. Sea Grant.....	874-6842
R.I. DEM Narragansett Bay Estuary Program.....	222-4700 x 7270
R.I. DEM Boating Regulations/Enforcement.....	222-3070

Who to Call	
For information on boating on the River or to report misconduct:	
Police:	
North Kingstown	294-3316
Narragansett	789-1091
South Kingstown	783-3321
Harbormasters:	
North Kingstown	294-3316
Narragansett	789-1091
South Kingstown	783-3321
R.I. DEM 24-Hour Hotline	222-3370
U.S. Coast Guard	783-3021
Boating Safety Courses:	
Mettatuxet Yacht Club	789-6133
R.I. DEM Division of Law Enforcement	222-3370

Pets

Like their human owners, pets can have an impact on the environment. Unleashed, non-neutered, and non-vaccinated pets can become a nuisance to the neighbors, as well as a threat to human, pet, and wildlife health and to the River ecosystem. The tri-town stormwater study found pet waste to be a significant source of bacterial and nutrient contamination in the River.

What You Can Do

•**Curb your pets** to grassy or wooded areas. This prevents the waste from being washed away, and allows it to be broken down by soil organisms. Otherwise, pick up after your pets and dispose of their wastes in the garbage or in the toilet.

•**Neuter your pets.** The increased numbers of cats and dogs that result from uncontrolled breeding can have several negative effects within the River's

watershed. Cats, as natural predators, pose a serious threat to wildlife. They can disturb or kill nesting birds and small mammals, including mink and muskrat, which were once more common here. Stray dogs can also kill wildlife and cause damage. Most important, an increase in stray pets means more non-vaccinated animals who share our backyards, providing greater opportunity for the spreading of diseases such as rabies and distemper.

•**Vaccinate your pets** once a year. Although rabies does not affect water quality, it certainly affects the quality of

life in the Watershed. Raccoon, opossum, skunk, and fox share a habitat with us and our pets. A contaminated dog or cat can expose many people to the deadly rabies virus before it shows symptoms.

•**Leash your pets.** Unleashed pets have an increased chance of being injured or killed by other animals, in particular by the increasing number of coyotes living in the Watershed.

DID YOU KNOW?

Gilbert Charles Stuart's father came to America from Scotland in 1751. He entered into a partnership with a Dr. Moffat, a learned and cultivated Scottish physician, and an Edward Cole to build a snuff mill at the head of the Narrow River. They saw the venture as a way to make a fortune, as the taking of snuff was an addiction during this era.

In December of 1753, Gilbert

Charles Stuart was born. He was baptized by the Reverend James MacSparran in the old St. Paul's Church, which was located on what is now Shermantown Road and was later moved to Wickford. Prosperity at the mill came to a halt five years later due to a shortage of glass jars used to ship the snuff from Scotland. Gilbert's father sold his share in the mill and moved his family to a "...hovel on Bannister's wharf..." in

Newport.

Gilbert enrolled as a charity scholar in the parochial school of Trinity Church and showed his artistic and musical talents early on. He was proficient on the organ, harpsichord, and flute. At the age of 14, he met and was apprenticed to the esteemed portraitist Cosmos Alexander, thus starting his rise as one of the great portrait artists of America.

Who to Call

Animal Control

North Kingstown Animal Warden	295-5579
Narragansett (Police)	789-1091
South Kingstown (Police)	783-3321

Neutering and Vaccination

North Kingstown Animal Shelter	295-5579
South Kingstown Animal Rescue	789-5515
Local veterinarian or animal hospital — see yellow pages	

Rabies Information

R.I. Department of Health	222-2577 MF, 272-5932 other
R.I. DEM Fish and Wildlife	789-0281 or 789-7481 MF
R.I. Veterinary Medical Association (RIVMA)	(877) 521-0103



Gilbert Stuart Museum

Waterfowl and Wildlife

Wildlife is an integral part of our Watershed. We admire the birds that feed, nest, and winter in our midst. We watch for deer and fox, and we listen for owl and coyote. The John H. Chafee National Wildlife Refuge at Pettaquamscutt Cove is a jewel in our backyards, but did you know that by feeding ducks and geese we may be contributing to the pollution in the River?

The tri-town stormwater study suggests that the feeding of waterfowl could lead to significant fecal coliform bacteria and nitrogen loadings. Feeding by people not only attracts greater numbers of waterfowl to the area, it also causes the birds to delay their migration, sometimes encouraging them to become permanent residents. This adds up to a greater waste load on the River.



Canada Goose

What You Can Do

•**Don't feed waterfowl.** Human food is not nutritious for waterfowl. Bread is the worst food for ducks and geese. It becomes impacted in their gullets, and the birds can die of starvation or asphyxiation. Once birds perceive handouts as a nonthreatening source of food, they stop looking for natural, more nutritious food.

When large numbers of birds are attracted to one area, they become crowded, competing for limited resources. The added stress of harsh winter weather causes the birds to become susceptible to diseases, such as avian cholera, duck plague, and avian botulism. These can spread as easily as our common cold, resulting in huge waterfowl die-offs.

•**Don't disturb wildlife.** Keep a respectful distance from animals you observe. It's against the law and dangerous to handle wild animals.

•**Enhance the habitat in your own backyard.** A varied landscape of trees, shrubs, and herbaceous layers creates a wide range of habitats that will encourage a wider range of wildlife inhabitants.

•**Select plants native to Rhode Island,** since many ornamentals are invasive, pushing out the native plants on

which wildlife depend (see Appendix II for list of recommended plants).

•**Choose trees and shrubs with berries.**

•**Leave some dead limbs** on trees for insect eaters and cavity nesters.

•**Consider hanging bird boxes or bat boxes.**

•**Include a water feature** in your landscape.

•**Most of all,** be especially careful in the use of pesticides and herbicides. Use the least toxic products or seek alternative products and practices (see Lawn and Garden Care).

When feeding winter songbirds:

•**Place bird feeders** where there is plenty of vegetative cover.

•**Provide a heated water source** for thirsty birds.

•**Thoroughly clean bird feeders** each spring.

•**Regularly clean up** seed droppings.

•**Do not feed in the summer;** this encourages diseases.

Who to Call

R.I. DEM Fish & Wildlife.....	789-3094
R.I. DEM Fish & Wildlife Field Station	789-7481
U.S. Fish & Wildlife Service	364-9124

To learn more about wildlife, join some of the organizations listed below or look for their publicly advertised walks and workshops.

Audubon Society of Rhode Island.....	949-5454
R.I. Wild Plant Society	783-5895
Save The Bay	272-3540
The Nature Conservancy, R.I. Field Office.....	331-7110
Wood-Pawcatuck Watershed Association	539-9017
R.I. Natural History Survey	874-5800

DID YOU KNOW?

Phragmites australis, easily recognized as the tall reed grass growing along the River, provides some shelter for birds, but is of no food value to them. It is an invasive species and takes over the habitat of native, marshland plants on which wildlife depend.

Several rare and uncommon species of flora and fauna have been found in the Narrow River watershed. The Narrow River is often only one of four or five places in the State where rare sea pinks or salt marsh sedges are found. It is the only location in the State where a rare sea cucumber has been documented, and one of only a few

sites in New England where a rare, luminescent moss has been found. There are also some kinds of microscopic organisms that are unique to the Narrow River. The unusually deep anoxic basins of the upper ponds are home to a few species that have not been identified anywhere else on the planet!

Coastal Buffer Zones and Freshwater Wetlands

Much of the unique sense of beauty found within the Narrow River watershed can be attributed to its extensive saltwater and freshwater wetlands. These habitats have been called “nature’s high production factories.” Acre for acre, their annual yield in raw plant and animal material equals the productivity of tropical rain forests. Coastal wetlands also serve as spawning grounds and nurseries for many species of finfish and shellfish. They provide critical habitat for plants and wildlife, including some species now considered rare and endangered.

Coastal and freshwater wetlands also act as a buffer between sources of nonpoint pollution and nearby bodies of water, including groundwater. Marshes absorb and break down pollutants, and they take up nutrients from fertilizers and septic system leachate. They also slow the effects of erosion by absorbing surface runoff and stabilizing the shoreline. And they are important in protecting private property from floods and storm damage.

Because naturally vegetated areas have proven superior to lawns and landscaped areas in helping control pollution and erosion, any alterations or management of coastal or freshwater wetlands are regulated by town, state, and federal laws. The following sections on Coastal Buffer Zones and Freshwater Wetlands are a brief introduction to the State laws and regulations that protect these resources.

Coastal Buffer Zones

The Rhode Island Coastal Resources Management Council (CRMC) has jurisdiction over land within 200 feet of a shoreline or coastal feature. The Narrow River Special Area Management Plan (SAM plan) extends CRMC’s jurisdiction to include certain large projects, such as subdivisions or large sewer and water extensions.

Managing the vegetative cover along the shoreline is an important element of CRMC’s mandate to protect and restore Rhode Island’s coastal resources. Coastal buffer zones are described in Section 150 of the Rhode Island Coastal Resources Management Program (RICRMP) as areas bordering the shoreline that have remained in, or are restored to, a natural vegetative condition. A construction setback (Section 140 of RICRMP) establishes a minimum distance between a shoreline feature and construction activities. Generally, the coastal buffer zone is contained within the established construction setback.

Due to an increasing number of requests to perform alterations within coastal buffer zones, the CRMC has established a permit application procedure and management guide. Proposed alterations should involve minor activities that support accepted management strategies such as shoreline access paths, view corridors, habitat management, selective tree removal, and recreational structures. Activities that are regulated include mow-

ing, selective tree removal, pruning and thinning of vegetation, restorative planting, clear-cutting, filling, and grading.

Where an existing naturally vegetated shoreline area is to be altered, an application for buffer zone management consistent with CRMC guidelines must be submitted prior to work. The guidelines provide a sample site plan necessary for CRMC approval. Photographs of the area of work are recommended to help expedite CRMC review. Permits are not required for landscape maintenance on existing lawn or landscaped areas, provided these areas were not previously protected by a CRMC buffer zone requirement or were not previously altered without the necessary CRMC permit.

Here are a few examples of activities requiring CRMC approval:

- Mowing , if done within 200 feet of a coastal feature—such as a salt marsh or shoreline—that is an area that has not been historically or continuously mowed.

- Controlling nuisance species of vegetation—such as European bitter-sweet or poison ivy—in areas not previously maintained in landscaped condition.

- Constructing decks, sheds, or fences.

Some activities that would not be consistent with CRMC buffer zone management guidelines, and would not be likely to be approved, might include:

- Establishing a lawn or mowing, except where consistent with guidelines for shoreline access and recreation.

- Clear-cutting naturally vegetated areas, including buffer zones.

- Using herbicides and pesticides indiscriminately in buffer zones and other naturally vegetated areas.

- Altering sensitive sections of the shoreline in a manner that may significantly impact plant and wildlife habitat and adjacent coastal wetlands and aquatic resources.

Freshwater Wetlands Freshwater wetlands in Rhode Island are protected by the state Freshwater Wetlands Act, passed in 1971 and most recently revised in 1994. DEM regulates activities in freshwater wetlands.

In our Watershed, ponds, streams, marshes, swamps, bogs, floodways, areas



subject to flooding and areas subject to storm flowage are considered wetlands. Wetlands may also include 100- to 200-foot wide riverbank wetlands, floodplains of rivers and streams, and a buffer zone of land within 50 feet of the edges of ponds, swamps, bogs, and marshes. (Full definitions of wetlands are contained in the Freshwater Wetlands Act and in DEM's rules and regulations.)

Any proposed project or activity that may alter a wetland or the buffer zone area requires a permit from DEM. Proposed alterations are reviewed to determine if they are random, unnecessary, or undesirable, and if their impact would be significant or insignificant.

Some alterations considered to have little impact on wetlands—such as limited cutting or clearing of vegetation, limited maintenance of structures, or farming and agricultural activities—are exempt from the permitting process, but may still be subject to other local, State, or federal restrictions. As noted above, the Narrow River SAM plan may extend CRMC jurisdiction over certain alterations to freshwater wetlands in the Watershed.

What You Can Do

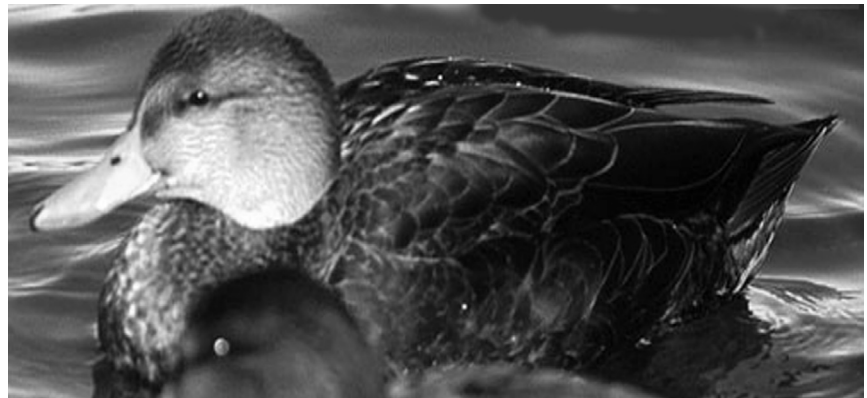
•**Obtain and read** a copy of Section 150 of the RICRMP pertaining to coastal buffer zone regulations before undertaking any activity within 200 feet of the shoreline.

•**Obtain and read** “A Guide to Rhode Island’s Freshwater Wetlands Regulations” and “Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act” from DEM before undertaking any project in or near a wetland.

•**Restore or enhance** a buffer zone or wetland. Where lawns or landscaping extend to the edge of the shoreline, CRMC encourages landowners to replant the upland edge with native plants and/or use a low-maintenance turf. Obtain “A Guide to Landscape Management in the Rhode Island Coastal Zone” from CRMC, or “A Shoreline Landscape Guide for Homeowners” from Save The Bay for tips on native planting. See Appendix II for a list of recommended native plants.

Who to Call

R.I. Coastal Resources Management Council, Permit Section	783-3370
R.I. DEM Water Resources, Permitting Section	222-2306
R.I. DEM Office of Compliance and Inspection	222-1360
Save The Bay	272-3540
North Kingstown Planning Department	268-1570
Narragansett Planning Department	789-1044
South Kingstown Planning Department	789-9331



American Black Duck

DID YOU KNOW?

•In the Narrow River watershed, 20 percent of the undeveloped, open lands are defined as wetlands. Of these, 30 percent are classified as salt marsh and 70 percent as freshwater marshes.

•Of all U.S. threatened and endangered species, 43 percent live in freshwater and saltwater wetlands. Of Rhode Island’s 1,950 native plants, 1,335 are wetland

species.

•Salmon, sea trout, redfish, striped bass, flounder, bluefish, shrimp, mussels, and oysters are just some of the marine life that, during some time in their life cycles, are dependent on coastal marshes.

•Engineers are experimenting with creating wetlands for pollution abatement purposes.

Land Conservation in the Watershed

Almost 70 percent of the land in the Watershed is undeveloped. Much is not developed due to natural constraints, such as high water tables, steep slopes, or wetlands. However, some areas remain undeveloped because they are protected by conservation easements. Because of high development pressure in the Watershed, more land can and should be permanently protected.

Several agencies, along with the three Watershed towns, have been actively preserving land in the Watershed through donations, conservation easements, and direct purchases. Over time, the Narrow River Land Trust and the U.S. Fish and Wildlife Service have been two of the most active agencies in the Watershed.

Narrow River Land Trust

In the early 1980's, the Narrow River Preservation Association (NRPA) created a sister organization whose sole purpose was land preservation. The Narrow River Land Trust, Inc. (NRLT) was created in 1982 "for the preservation and conservation of natural resources of, in, and around the Narrow River."

The original board of directors of the trust were longtime members of the NRPA; however, the two organizations are separate legal entities. While the NRPA continues its role in environmental education and advocacy, the NRLT is solely a land preservation group. At present, over 463 acres are now under perpetual preservation. Though NRLT depends mostly on donations of land, it has also applied for and received State open space funds and other grants for specific parcels. NRLT is a 501 (c) (3) nonprofit, membership organization.

U.S. Fish and Wildlife Service

In 1988, the U.S. Fish and Wildlife Service established the Pettaquamscutt Cove National Wildlife Refuge. An acquisition boundary for the Refuge has been established, whereby any property lying within the boundary is approved for acquisition. Over the last nine years, Fish and Wildlife has been actively acquiring land. Current ownership is around 322 acres. Funding for acquisition is allocated each year in the federal budget. Obtaining funds for the Refuge is made easier when properties are actively offered. Properties are normally purchased at currently appraised values. Alternatively, property donations do confer tax benefits to owners. In September 2000, in commemoration of his land preservation ethic and initiative, the Refuge was officially renamed the John H. Chafee National Wildlife Refuge at Pettaquamscutt Cove.

What You Can Do

•Encourage land preservation.

Call a friend, neighbor, or relative who might be considering a donation or easement and encourage them to contact one of the land trusts.

•Vote for open space and farmland acquisition bonds. Land trusts

can succeed much better in protecting undeveloped land when funds for acquisition are available.

•**Find out about the benefits of land preservation.** The acts of donating land, setting up a trust, giving a gift, or creating a conservation easement may all have different tax consequences. To learn more about land donations, sales, or gifts, order the booklet *Preserving Your Land: The Nature Conservancy's Guide to Land Protection in Rhode Island* from the R.I. field office of The Nature Conservancy.

Your Family Land: Legacy or Memory - Commonly Asked Questions on Estate Planning and Practical Answers is available from the Southern New England Forest Consortium, Inc.

Who to Call

Narrow River Land Trust.....	783-6740
U.S. Fish and Wildlife Service, R.I. Refuge Complex.....	364-9124
U.S. Fish and Wildlife Service, Northeast Region (online)	http://www.fws.gov/northeast/
The Nature Conservancy, R.I. Field Office.....	331-7110
Southern New England Forest Consortium, Inc.....	568-1610
Narragansett Land Conservancy.....	789-1044
South Kingstown Land Trust.....	789-0962
Land Conservancy of North Kingstown.....	294-7295

DID YOU KNOW?

What are now acres of dense woods in the Watershed were once open fields of a small plantation. The Reverend James MacSparran and his wife Hannah owned the land between the easterly ridge of the hill above Walmsley Lane "... to the broad meadows on the West

Bank of the Narrow River where the stream widens out into a small lake shortly below the Gilbert Stuart Mill." The farm produced corn and hay and raised cattle, sheep and poultry. An apple orchard even supported a cider press.



Conclusion

The Narrow River is a special place. It is our home. Residential development has profoundly altered the River's water quality and aesthetic value. While our towns and government agencies are working hard at controlling pollution through sewer installations and stormwater management, the greater part of remediation will still remain with the individuals who live in or use the Watershed. It is our waste, our fertilizers, and our lawn clippings that are polluting the River. When we can take the suggestions of this handbook to heart, then the remediation of pollution in the River will begin to be addressed.

The recommendations in this handbook are not merely theories or nice ideas. These are the recommendations of your town and State staff people, scientists, and engineers. This is what the professionals are telling us, so let's get to work!

Changing household routines is not something that can happen overnight. It takes time and incremental progress in small, but significant steps. That's why we've tried to make this handbook something you can keep handy and refer to when you need it. We hope that you will find it to be a useful reference.

Sources

Information for this handbook was obtained from many sources. The following lists the major publications used and the agencies from which several smaller publications were used.

Publications

Estuarywise - Handbook for the San Francisco Bay-Delta Estuary. 1992. The San Francisco Estuary Project.

University of Rhode Island Cooperative Extension Fact Sheets.

The Narrow River Stormwater Management Study: Problem Assessment and Design Feasibility. 1995. Prepared for the Towns of Narragansett, South Kingstown, and North Kingstown, R.I. by Applied Science Associates, Rhode Island Watershed Watch, SAIC Engineering, Inc., and UWR (Urish, Wright, and Runge).

The Narrow River Special Area Management Plan. 1999. Laura M. Ernst, Laura K. Miguel, and Jeff Willis. Rhode Island Coastal Resources Management Council.

50 Simple Things You Can Do to Save the Earth. 1989. The Earth Works Group. Earth Works Press.

Agencies & Organizations

R.I. Coastal Resources Management Council
R.I. DEM Office of Program Development
R.I. DEM Natural Heritage Program
R.I. DEM Office of Natural Resource Services
R.I. DEM Office of Water Resources

R.I. Resource Recovery Corporation
R.I. Wild Plant Society
Save The Bay
Dunn Foundation
Conservation Law Foundation
The Terrene Institute

Yankee Forest Cooperative Project



Circuit Drive Detention Pond System

Appendix I

Alternatives to Commonly Used Products

All-Purpose Cleaners

Combine hot water, soap, and borax. Or use 1/2 cup washing soda (available in most supermarkets) per bucket of water. Add a 1/4 cup lemon juice or vinegar for a more powerful solution.

Disinfectants

Mix 1/2 cup borax in 1 gallon hot water. This disinfectant is approved for use in hospitals. This is an effective toilet bowl cleaner.

Tub and Sink Cleaners

Use baking soda or a non-chlorinated scouring powder like Bon Ami.

Oven Cleaners

Clean spills when they occur. Clean oven with a paste of baking soda and hot water. Steel wool will remove black spots.

Glass Cleaners

Combine 1/2 cup of white vinegar with 1/2 cup of water, then wipe glass with a lint-free cloth.

Drain Cleaners

Use a drain basket and pour boiling water down the drain once a week. For clogs, add a handful of baking soda and 1/2 cup of white vinegar to your drain. Cover tightly and let sit for 15 minutes while carbon dioxide bubbles work on clog. Rinse with 2 quarts of boiling water; follow with a plunger. For stubborn clogs, use a metal snake.

Floor Cleaners

For wood floors, use a damp mop with a mild vegetable oil soap and dry immediately. For vinyl floors, combine 1 teaspoon of washing soda with 1 gallon warm water, and mop. For scuff marks on vinyl, scrub with toothpaste.

Laundry Detergents

Look for products containing washing soda, which brightens fabrics, but is safer than bleach. Avoid products containing phosphates and fabric softeners.

Deodorizers

Ventilate. Absorb odors by putting out small dishes of baking soda or white vinegar. Mask strong odors by simmering cloves and cinnamon in water on the stove.

Aerosols

Purchase products in spray-pump bottles or other non-aerosol containers.

Wood Polish

Dust furniture with a barely damp cloth. Polish wood and floors with paste wax once or twice a year.

Metal Polishes

For brass: Mix 1/2 teaspoon salt with 1/2 cup white vinegar and enough flour to make and apply a thick paste; let sit for 15 to 30 minutes and rinse well. For silver: Boil for 3 minutes in 1 quart water, 1 tablespoon baking soda, 1 tablespoon salt, and a piece of aluminum foil (keep the foil in contact with the silver). For copper: Polish with a paste of lemon juice and salt.

Roach Controls

Dust boric acid (available at pharmacies) around baseboards. Be careful that it is not open to pets and small children.

Ant Controls

Pour a line of cream of tartar or red chili pepper where ants enter the house.

Moth Controls

Clean clothes before storing. Store clothes with cedar chips, dried lavender, cloves, or rosemary leaves.

Flea and Tick Controls

Pour 2 cups of boiling water over 2 sliced lemons, let mixture stand overnight. Sponge onto your pet. Vacuum your home frequently with salt in the vacuum bag to kill fleas and larvae. Ask your veterinarian about less toxic prescription alternatives for flea and tick prevention.

Household Plant Pesticides

Use a misting bottle to apply a mild soapy water to leaves. Rinse.

Watch Out for These Toxic Materials

Degreasers

Trichloroethylene (TCE), toluene, methylene chloride

Disinfectants

O-phenyl-phenol, phenol chlorobenzene, diethylene glycol

Drain cleaners

Sodium hydroxide, potassium hydroxide, hydrochloric acid

Dry cleaning fluids

TCE, perchloroethylene (PERC), 1,1,1-trichloroethane (TCA), naphtha

Gasoline

Benzene (never use gas as a parts cleaner or hand cleaner), methylethyl ketone (MEK)

Glue and glue solvents

Hexane, toluene

Moth balls

Naphthalene, chlorobenzene, paradichlorobenzene

Oven cleaner

Methylene chloride, sodium hydroxide, potassium hydroxide

Paint thinners

Methylisobutyl ketone, toluene

Paint strippers

Methylene chloride, xylene, toluene, methyl ethyl ketone (MEK)

Septic tank cleaners

TCE, TCA, methylene chloride

Shoe polish

TCE, methylene chloride, nitrobenzene

Spot removers or cleaning fluid

Carbon tetrachloride, TCA, TCE, PERC

Toilet bowl deodorizer

Paradichlorobenzene

Upholstery cleaner

TCE

Wood preservatives

Pentachlorophenols (PCPs), arsenic, creosote

Appendix II

Invasive Plants to Avoid

Reprinted with permission from the R.I. Wild Plant Society

Woody Plants

Norway Maple, *Acer platanoides*
Sycamore Maple, *Acer pseudo-platanus*
Tree-of-Heaven, *Ailanthus altissima*
European Alder, *Alnus glutinosa*
Japanese Barberry, *Berberis thunbergii*
Common Barberry, *Berberis vulgaris*
Oriental or Asian Bittersweet, *Celastrus orbiculatus*
Scotch Broom, *Cytisus scoparius*
Autumn Olive, *Elaeagnus umbellata*
Russian Olive, *Elaeagnus angustifolia*
Silverberry, *Elaeagnus commutata*
Amur Privet, *Ligustrum amurense*
Ovate-leaved Privet, *Ligustrum obtusifolium*
Chinese Privet, *Ligustrum sinense*
Winged Euonymus/Burning Bush, *Euonymus alatus*
Spindle Tree, *Euonymus europaeus*
Climbing Euonymus, *Euonymus fortunei*
Tartarian Honeysuckle, *Lonicera tatarica*
Morrow Honeysuckle, *Lonicera morrowii*
Bella Honeysuckle, *Lonicera X bella*
Amur Honeysuckle, *Lonicera mackii*
Japanese Honeysuckle, *Lonicera japonica*
White Mulberry, *Morus alba*
Amur Cork Tree, *Phellodendron amurense*
Japanese Black Pine, *Pinus thunbergiana*
White Cottonwood, *Populus alba*
Kudzu, *Pueraria lobata*
Common Buckthorn, *Rhamnus cathartica*
Glossy Buckthorn, *Rhamnus frangula*
Multiflora Rose, *Rosa multiflora*
Beach Rose, *Rosa rugosa*
Japanese Wisteria, *Wisteria floribunda*

Herbaceous Plants

Purple Loosestrife, *Lythrum salicaria**
Japanese Knotweed, *Polygonum cuspidatum*
Giant Knotweed, *Polygonum sachalinense*
Canada Thistle, *Cirsium arvense*
Crown Vetch, *Coronilla varia*
Cypress Spurge, *Euphorbia cyparissias* (toxic to livestock even when dried; other introduced spurge, such as leafy spurge, *Euphorbia esula*, are serious problems in other states.)
European Water-Milfoil, *Myriophyllum spicatum* (not yet a problem in R.I., but has taken over many ponds and lakes in other N.E. states, not only replacing native species, but also spoiling recreational swimming, boating and fishing)
Water Hyacinth, *Eichhornia crassipes*
Water Chestnut, *Trapa natans* (another escaped aquatic weed that is choking ponds and rivers in neighboring states)
Common Reed, *Phragmites australis*

For more information about invasive plants in Rhode Island, contact the Rhode Island Invasive Species Council/RI Natural History Survey at 874-5800.

Recommended Native R.I. Trees,

Shrubs

Reprinted with permission from the R.I. Coastal Resources Management Council

Trees for dry shady or sunny sites

Red Oak, *Quercus rubra*
Black Oak, *Quercus velutina*
Black Cherry, *Prunus serotina*
Sassafras, *Sassafras albidum*
Pitch Pine, *Pinus rigida*
Sumac, *Rhus glabra*, *Rhus typhina*, *Rhus copallinum*
Quaking Aspen, *Populus tremuloides*

Trees for moist shady or sunny sites

Red Maple, *Acer rubrum*
Shadbush, *Amelanchier canadensis*
Pagoda Dogwood, *Cornus alternifolia*
American Holly, *Ilex opaca*

Trees for sites with no salt spray

Red Cedar, *Juniperus virginiana* (full sun)
White Pine, *Pinus strobus* (shade or sun)

Shrubs for dry or moist shady or sunny sites

Arrow-wood, *Viburnum dentatum*
Blueberry (High Bush), *Vaccinium corymbosum*
American Hazelnut, *Corylus americana*
Inkberry, *Ilex glabra*
Huckleberry, *Gaylussacia baccata*
Virginia Creeper, *Parthenocissus quinquefolia* (vine)
Chokeberry, *Aronia melanocarpa*
Chokeberry, *Aronia arbutifolia*
Pussy Willow, *Salix discolor*

Shrubs for sunny dry sites

Sweet Fern, *Comptonia peregrina*
Blueberry (Low Bush), *Vaccinium angustifolium*
Bayberry, *Myrica pennsylvanica* (tolerates some shade)

Shrubs for shady moist sites

Sweet Pepperbush, *Clethra alnifolia*
Witch Hazel, *Hamamelis virginiana* (no salt spray)
Spice bush, *Lindera benzoin*
Elderberry, *Sambucus canadensis*

Shrubs for sites with no salt spray (sunny or shady)

Mountain Laurel, *Kalmia latifolia*
Sheep Laurel, *Kalmia angustifolia*
Swamp Azalea, *Rhododendron viscosum* (moist sites only)
Winterberry, *Ilex verticillata* (moist sites only)

Shrubs for beach sites

Groundsel-tree, *Baccharis halimifolia*
Beach Plum, *Prunus maritima*
Bayberry, *Myrica pennsylvanica*
Hudsonia, *Hudsonia tomentosa* (ground cover)

For a more extensive list of choice native Rhode Island flowering trees and shrubs, please contact the Rhode Island Wild Plant Society at 783-5895.

*To learn more about Purple Loosestrife control program, call the URI Plant Sciences Department at 874-2750.

Appendix III University of Rhode Island

Publications

Several publications with useful and practical information are available for a small fee from the University of Rhode Island's Land Grant and Sea Grant programs. For more information, write, call, or visit the web sites of either program office listed below.

LAND GRANT PUBLICATIONS

Cooperative Extension Education Center
University of Rhode Island
3 East Alumni Avenue
Kingston, RI 02881
874-2900
web site: www.uri.edu/ce/ceec

Publication Packages

RI Home*A*Syst Handbook

Single Fact Sheets

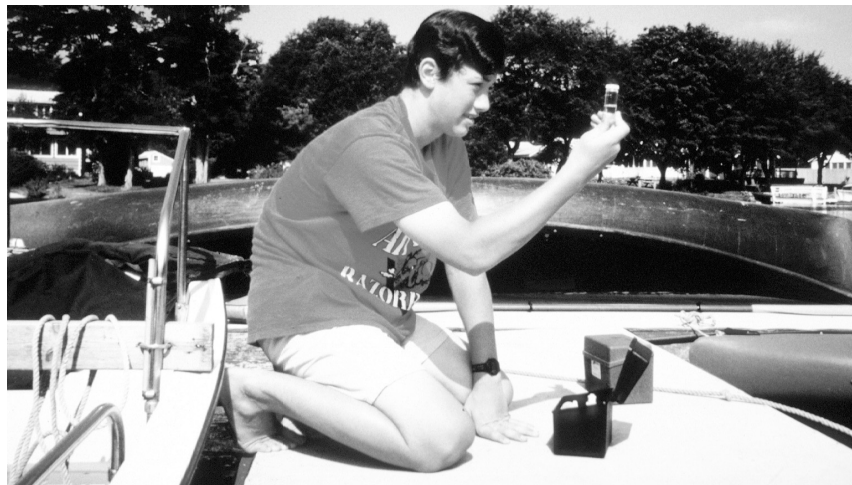
Maintaining Your Septic Systems (96-1)
Watershed Watch (89-2)
What Is a Watershed? (90-20)
Bacterial Monitoring of Surface Waters (92-1)
Municipal Training for Water Quality Protection (93-2)
Watershed Land Use and Water Quality: A Guide for Local Officials (93-5)
What You Can Do About "Nonpoint Source" Pollution (93-6)
Lawn Care Simplified: Your Guide to Low-Maintenance, High Water Quality Landscape (94-4)
Drinking Water Wells (94-6)
Home Water Testing (94-7)

Landscaping for Water Quality Protection (1999)

SEA GRANT PUBLICATIONS

Rhode Island Sea Grant Communications Office
URI Bay Campus
Narragansett, RI 02882-1197
874-6842
web site: <http://seagrant.gso.uri.edu/riseagrant>

A Guide to Rhode Island's Natural Places (P1372)
Fish of Narragansett Bay Brochure (P1145)
Coastal Birds of the Northeast Brochure (P1313)
Historical Trends: Water Quality and Fisheries, Narragansett Bay (P1258)
Vegetated Buffers in the Coastal Zone: A Summary Review and Bibliography (P1333)
Environmental Guide for Marinas: Controlling Nonpoint Source and Storm Water Pollution in Rhode Island (P1374)
Estuaries and the Coastal Zone: Challenges and Opportunities (P1338)
Boating Security Tips (P932)
Boating Security Tips #2 (P939)
Boater Fact Sheet Series
Marine Mammals & Turtles of U.S. Atlantic (P1489)



Volunteer water monitoring

Appendix IV

BOATING REGULATIONS

RULES OF THE RIVER

Exercise courtesy and common sense during every boating season.

Operating any vessel in a reckless or negligent manner endangers lives and property.

One PFD (personal flotation device) per person must be available on each vessel—seat cushions don't count!

Children under 11 years old must wear a PFD while riding in any vessel less than 26 feet long.

Never allow people to ride on bow, seat backs, or gunwales.

Observe good seamanship and keep as far to the right side of the channel as is safe and practical.

Power-driven vessels underway should keep out of the way of vessels restricted in their ability to maneuver.

Power boaters should be careful of their wake and speed with the increase in smaller vessels (kayaks, canoes) and inexperienced operators.

No vessel shall be operated in excess of 5 miles per hour and/or create a wake within the area from Mitchell Drive to 400 feet north of Radial Drive in Narrow River.

No one should operate any vessel while intoxicated or under the influence of drugs.

Water Skiing

No water skier or his/her boat shall approach any stationary or moving object closer than 200 feet, except as may be incidental to starting or finishing a run.

Water skiing is not permitted within a designated channel.

Thus, no waterskiing is allowed below Bridgetown (Lacey) Bridge or in designated areas of anchorage or mooring.

Those water skiing must have an additional person (12 years old or older) on board a boat to observe the progress of the water skier.

Personal Water Craft (PWC) or "Jet Skis"

Personal watercraft cannot operate between 1/2 hour after sunset and 1/2 hour before sunrise.

No person shall operate a personal watercraft within 200 feet of swimmers, divers, the shore, or moored vessels, except at headway speed (5 mph).

Operators should use good judgment...“maneuvers which unnecessarily endanger life, limb, or property, including, but not limited to, weaving through congested vessel traffic or jumping the wake of another vessel are prohibited.”

No person under 16 years of age can operate a personal watercraft unless accompanied by an adult, or unless he/she has passed a DEM-approved or U.S. Coast Guard-approved safety course.

Operators of personal watercraft must wear a PFD.

Remember...

Please be aware that some powerboats can only navigate safely in the channel of Narrow River where the water is deeper, especially at low tide.

The River is narrow and extremely shallow in spots, as well as extremely deep (the upper and lower ponds are 60 to 70 feet deep), so exercise caution.

Be careful while going under bridges—some are narrow and very low. Watch out for fishing lines!

Please be cautious at the mouth of the River. There are many vessels and people swimming in this area during the summer. The current is very strong through here, especially when the tide is going out. Often, big surf at the mouth of the River makes exiting unwise and reentry all but impossible.

And finally, please be careful around wildlife and waterfowl. They are sensitive and easily disturbed.

Compiled from the Department of Environmental Management's 1995 Rhode Island Boater's Guide, and the South Kingstown Marine Patrol. Special thanks to South Kingstown's Harbormaster for his assistance.



Kayaking on Narrow River

Appendix V

Contacts

Town Government

Narragansett Town Hall
25 Fifth Avenue
Narragansett, RI 02882
789-1044
www.narragansettri.gov

North Kingstown Town Hall
80 Boston Neck Road
North Kingstown, RI 02852
294-3331
www.northkingstown.org

South Kingstown Town Hall
180 High Street
Wakefield, RI 02879
789-9331
www.southkingstownri.com

State Government

R.I. Coastal Resources Management Council
Oliver Stedman Government Center
4808 Tower Hill Road, Suite 116
Wakefield, RI 02879
783-3370
www.crmc.ri.gov

R.I. Department of Environmental
Management
235 Promenade Street
Providence, RI 02908-5767
222-6800
24-hour Hotline 222-3070
www.dem.ri.gov

Bureau of Environmental Protection.....
222-4700
Compliance & Inspection.....222-1360
Technical & Customer Assistance.....
222-6822
Water Resources -Permitting.....
222-2306, 222-6820

Bureau of Natural Resources.....222-4700
Agriculture 222-2781
Enforcement..... 222-2284

Fish & Wildlife
Oliver Stedman Government Center
4808 Tower Hill Road
Wakefield, RI 02879
789-3094

Fish & Wildlife Field Station
Great Swamp Headquarters
277 Great Neck Rd.
West Kingston, RI 02891
789-7481

Bureau of Policy & Administration.....
222-4700
Boating Safety.....222-2284
Management Services (Boat Registration &
Licenses).....222-3576, 222-6647
Planning & Development 222-6825
Strategic Planning & Policy..... 222-3434

R.I. Department of Health
3 Capitol Hill
Providence, RI 02908
222-2231
www.health.state.ri.us

Rabies information 222-2577

Federal Government

Southern R.I. Conservation District
10 High St.
Wakefield, RI 02879
284-1885
www.sricd.org

U.S. Coast Guard
Point Judith Station
1460 Ocean Road
Narragansett, RI 02882
Emergency 783-3021
Nonemergency 789-0444
www.uscg.mil

U.S.D.A. Natural Resources Conservation
Service
60 Quaker Lane, Suite 46
Warwick, RI 02886
828-1300
www.ri.nrcs.usda.gov

U.S. Fish & Wildlife Service
Rhode Island NWR Complex
Kettle Pond Visitor Center
50 Bend Rd.
Charlestown, RI 02813
364-9124
http://www.fws.gov/northeast/ri/

State Agencies & Institutions

R.I. Coastal Resources Center
University of Rhode Island
220 South Ferry Road
Narragansett, RI 02882
874-6224
www.crc.uri.edu

R.I. Home*A*Syst Program
University of Rhode Island
001D Coastal Institute Kingston
1 Greenhouse Rd.
Kingston, RI 02881
874-5398
www.uri.edu/ce/wq/has/

The R.I. Natural History Survey
University of Rhode Island
101 Coastal Institute Kingston
1 Greenhouse Rd.
Kingston, RI 02881
874-5800
www.uri.edu/ce/rinhs

R.I. Sea Grant Communications Office
University of Rhode Island
Graduate School of Oceanography
South Ferry Rd
Narragansett, RI 02882
874-6842
http://seagrant.gso.uri.edu

Cooperative Extension Education Center
University of Rhode Island
3 East Alumni Avenue
Kingston, RI 02881-0804
874-2900
www.uri.edu/ce/ceec

Nonpoint Education for Municipal Officials
001B Coastal Institute Kingston
1 Greenhouse Rd.
Kingston, RI 02881
874-2138
www.edc.uri.edu/ce/wq/NEMO

NE Onsite Wastewater Training Program
001H Coastal Institute Kingston
1 Greenhouse Rd.
Kingston, RI 02881
874-5950
www.edc.uri.edu/ce/wq/OWT

URI Watershed Watch
001A Coastal Institute Building Kingston
1 Greenhouse Rd.
Kingston, RI 02881
874-2905
www.uri.edu/ce/wq/ww

R.I. Resource Recovery Corporation
65 Shun Pike
Johnston, RI 02919
942-1430
www.rirrc.org

R.I. Veterinary Medical Association
11 South Angell St. #347
Providence, RI 02906
751-0944
www.rivma.org

Land Conservation

Narrow River Land Trust
P.O. Box 641
Wakefield, RI 02880
783-6740

Land Conservancy of North Kingstown
P.O. Box 1499
North Kingstown, RI 02852
294-7295

Narragansett Land Conservancy Trust
Narragansett Town Hall
25 Fifth Avenue
Narragansett, RI 02882
789-1044

South Kingstown Land Trust
313 Main Street, Suite C
Wakefield, RI 02879
789-0962
www.skl.org

The Nature Conservancy
Rhode Island Field Office
159 Waterman Street
Providence, RI 02906
331-7110
www.nature.org

U.S. Fish and Wildlife Service
Northeast Regional Office
300 Westgate Center Drive
Hadley, MA 01035-9589
(413) 253-8200
<http://northeast.fws.gov/ma.htm>

Historic Sites

Casey Farm
2325 Boston Neck Road
Saunderstown, RI 02874
295-1030
www.historicnewengland.org/visit/homes/

Gilbert Stuart Museum
815 Gilbert Stuart Road
Saunderstown, RI 02874
294-3001
www.gilbertstuartmuseum.com

South County Museum
P.O. Box 709
Narragansett, RI 02882
783-5400
www.southcountymuseum.org

Community Associations

Narrow River Preservation Association
P.O. Box 8
Saunderstown, RI 02874
783-6277
www.narrowriver.org

Coalition for Consumer Justice
145 Waterman Street
Providence, RI 02906
521-1534

Girl Scouts of Rhode Island
125 Charles Street
Providence, RI 02904
331-4500
www.gsri.org

Forest Lakes Preservation Association
294-3174

Mettatuxet Improvement Association
783-6133
Mettatuxet Yacht Club
5 South River Road
Narragansett, RI 02882
789-6133

Middlebridge Homeowners Association
789-4706

Northgate Homeowners Association
789-5228

Pettaquamscutt Lake Shores Improvement Association
294-6344

Pettaquamscutt Terrace Improvement Association
789-6009

Rio Vista Association
783-1108

South Meadow Acres Association
789-6686

Environmental Organizations

Audubon Society of Rhode Island
12 Sanderson Road
Smithfield, RI 02917
949-5454
www.asri.org

Clean Water Action/R.I. Office
741 Westminster St.
Providence, RI 02903
331-6972
www.cleanwateraction.org/ri/

Conservation Law Foundation
55 Dorrance St.
Providence, RI 02903
351-1102
<http://clf.org/states/rhodeisland>

Dunn Foundation
320 Thames St., Rm 274
Newport, RI 02840
367-0026
www.dunnfoundation.org

East Coast Greenway Alliance
27 North Rd.
Wakefield, RI 02879
789-4625
www.greenway.org

Environmental Council of Rhode Island
P.O. Box 9061
Providence, RI 02940
621-8048
www.environmentcouncilri.org

Grow Smart Rhode Island
235 Promenade St. Suite 550
Providence, RI 02903
273-5711
www.growsmartri.org

Northeast Organic Farming Association/RI
51 Edwards Lane
Charlestown, RI 02813
364-7557
www.nofari.org

Rhode Island Tree Council
P.O. Box 6144
Providence, RI 02940
861-1995
www.ritree.org

Rhode Island Wild Plant Society
P.O. Box 2488
Providence, RI 02906
453-3777
www.riwps.org

Salt Ponds Coalition
P.O. Box 875
Charlestown, RI 02813
322-3068
www.saltpondscoalition.org

Saugatucket River Heritage Corridor Coalition
313 Main St.
Wakefield, RI 02879
782-0149

Save The Bay
100 Save The Bay Drive
Providence, RI 02905
272-3540 or 800-NARRABAY
www.savebay.org

Sierra Club, Rhode Island Chapter
116 Valley St. Building L, 2nd Floor
Providence, RI 02909
521-4734
www.ri.sierraclub.org

Southern N. E. Forest Consortium, Inc.
P.O. Box 760
Chepachet, RI 02814
568-1610
www.snefci.org

The Ocean Project
P.O. Box 2506
Providence, RI 02906
709-4071
www.theoceanproject.org

Wood-Pawcatuck Watershed Association
203B Arcadia Road
Hope Valley, RI 02832
539-9017
www.wpwa.org

The Narrow River Preservation Association

The mission of the Narrow River Preservation Association (NRPA) is to preserve the quality of the communities and natural environment within the Pettaquamscutt (Narrow River) Watershed. Since 1969, NRPA has been the voice of the Narrow River community on issues affecting land use and environmental quality.

Activities and Accomplishments

Advocacy

NRPA actively participated in the development of the Narrow River Special Area Management (SAM) plan and reviewed its recent update. Over the years, NRPA has attended hundreds of public hearings and has raised thousands of dollars to retain legal counsel and expert witnesses to ensure that the regulations and initiatives of the SAM plan are upheld. NRPA continues to review every permit application filed with the R.I. Coastal Resources Management Council and the R.I. Department of Environmental Management that falls within the Watershed.

Land Preservation

In 1982, NRPA helped found the Narrow River Land Trust, a separate organization dedicated to the preservation of open space. In 1988, NRPA helped establish the Pettaquamscutt Cove National Wildlife Refuge. In cooperation with these entities, NRPA has assisted in the protection of hundreds of acres of land in the Watershed.

Road and Bridge Design

NRPA consulted with engineers to redesign aspects of Sprague Bridge and has commissioned studies regarding the replacement of Middle Bridge.

Water Quality Monitoring

Since 1991, teams of monitors have taken measurements and collected water samples at 11 different locations on the Narrow River. Organized by NRPA through the Watershed Watch program at URI, nearly 100 volunteers have received training and have made over 14,000 data entries on water quality in the River.

Historic Preservation

NRPA negotiated with owners and the town of South Kingstown for the Town's purchase and preservation of

historic Pettaquamscutt Rock. NRPA worked with the town of Narragansett to analyze the Canonchet Farm area and helped to support the Town's acquisition of the farm.

Education

The purpose of NRPA's education program is to instill an environmental ethic in the Watershed community, by presenting an ongoing outreach agenda and an environmental curriculum, with the goal of improving the water quality in Narrow River. The Narrow River Active Watershed Education (*AWESome*) Program is a science curriculum offered in participating Watershed schools that provides students with the tools to take an active role in learning about and protecting the Watershed. We are expanding *AWESome* by offering field activities including: water quality sampling and analysis, and a storm drain marking project to reduce non-point source pollution to the River.

The Narrow River Handbook, first produced by NRPA in 1997 and revised in 2002 and 2008, was conceived and written by NRPA volunteers as an educational tool for those who live in or use the Watershed.

Additional components of NRPA's education program include environmental achievement and science fair awards, college scholarships, quarterly newsletters, a magnet detailing water quality improvement tips, and the *Narrow River Bibliography*-a comprehensive source of information on scientific, cultural, historic, and other public interest issues

Join the NRPA

The Narrow River Preservation Association is a 501 (c) (3) non-profit, membership organization. Donations are tax-deductible. Contributions may be directed to NRPA through the United Way's Workplace Campaign using the donor option number 6239. Many employers will match your gift to NRPA. We suggest you check with your Human Resources office about this or call NRPA for assistance. For more information on gifts, membership, and volunteer services, please write to NRPA at P.O. Box 8, Saunderstown, RI 02874, call 783-6277, E-mail at nrpa@netsense.net or visit the NRPA web site at www.narrowriver.org.

concerning Narrow River and its watershed.

Shoreline Surveys

NRPA volunteers worked on a saltmarsh survey of the River under Save The Bay's Habitat Restoration Program. A detailed shoreline survey is on-going.

Youth Awards

NRPA offers college scholarships to local high school seniors who have shown exemplary work in science and environmental projects. NRPA attends all science fairs in the area and offers recognition and awards for well-executed projects on environmental subjects. Youth awards are presented to students who, on their own initiative, have accomplished environmental projects of note.

Local Events

Since 1987, NRPA has held the annual Narrow River Run as a benefit for the River with support from local businesses. Over 400 participants spend a Saturday morning enjoying the scenic beauty of the Watershed. Since 1999, NRPA has coordinated an annual Narrow River celebration, as part of South County Rivers Day. The day's events include river-oriented activities for all ages. Since its early days, NRPA has conducted River cleanups with the assistance of Watershed residents and volunteers. The Annual Narrow River Turn-around Swim was started in 2006 by local swimmers as a benefit for NRPA. The swim highlights the beauty of the Lower Pond and its improvement in water quality. Since 2005 NRPA has participated in the RI Rivers Council's Environmental Awareness Day at the Beach. The event at Narragansett Town Beach in July provides environmentally-oriented activities to hundreds of beach goers.

Become a Volunteer

One of the most important things you can do for your Watershed is to volunteer your time to the activities of your local grass roots organizations. There are some listed here that hold events and pursue activities consistent with the goals of this booklet. The Narrow River Preservation Association has several events whose success rides completely upon the support of volunteers. Get involved! It's always fun to be part of a winning team!

Who to Call

NRPA (cleanups, Rivers Day, road race).....	783-6277
Narrow River Water Monitoring.....	789-3407
URI Watershed Watch (water quality monitoring)	874-2905
R.I. Home*A*Syst (residential pollution prevention).....	874-5398
Mettatuxet Yacht Club (boating safety courses, cleanups).....	789-6133
Save The Bay (cleanups, habitat restoration)	272-3540

The Narrow River Handbook Acknowledgments

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Cover Photo: Bill Krul

The information presented in this booklet is accurate to the best of our knowledge. If you have suggestions on how to make this publication more useful, we'd like to hear from you. Write to the Narrow River Preservation Association, P.O. Box 8, Saunderstown, RI 02874 or e-mail at nrpa@narrowriver.org

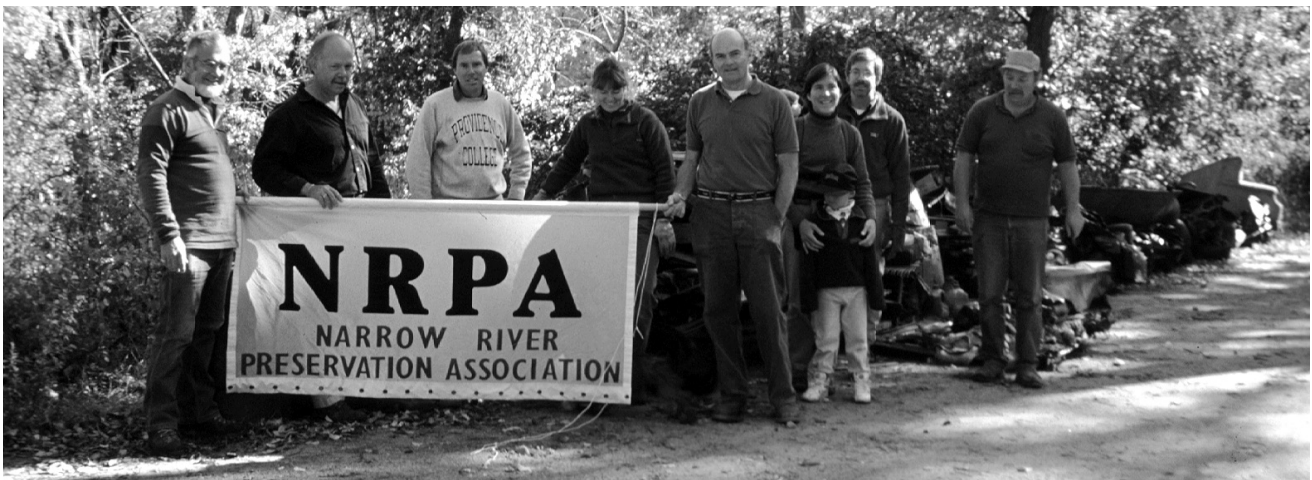
The Narrow River Preservation Association assumes no responsibility and disclaims any liability for any injury or damage resulting from the use or effect of any product or information specified in this publication.

Special thanks to the many individuals who reviewed this publication. From URI, CRMC, and DEM to local citizens, professionals, and elected officials—thank you for your input and interest in this project.

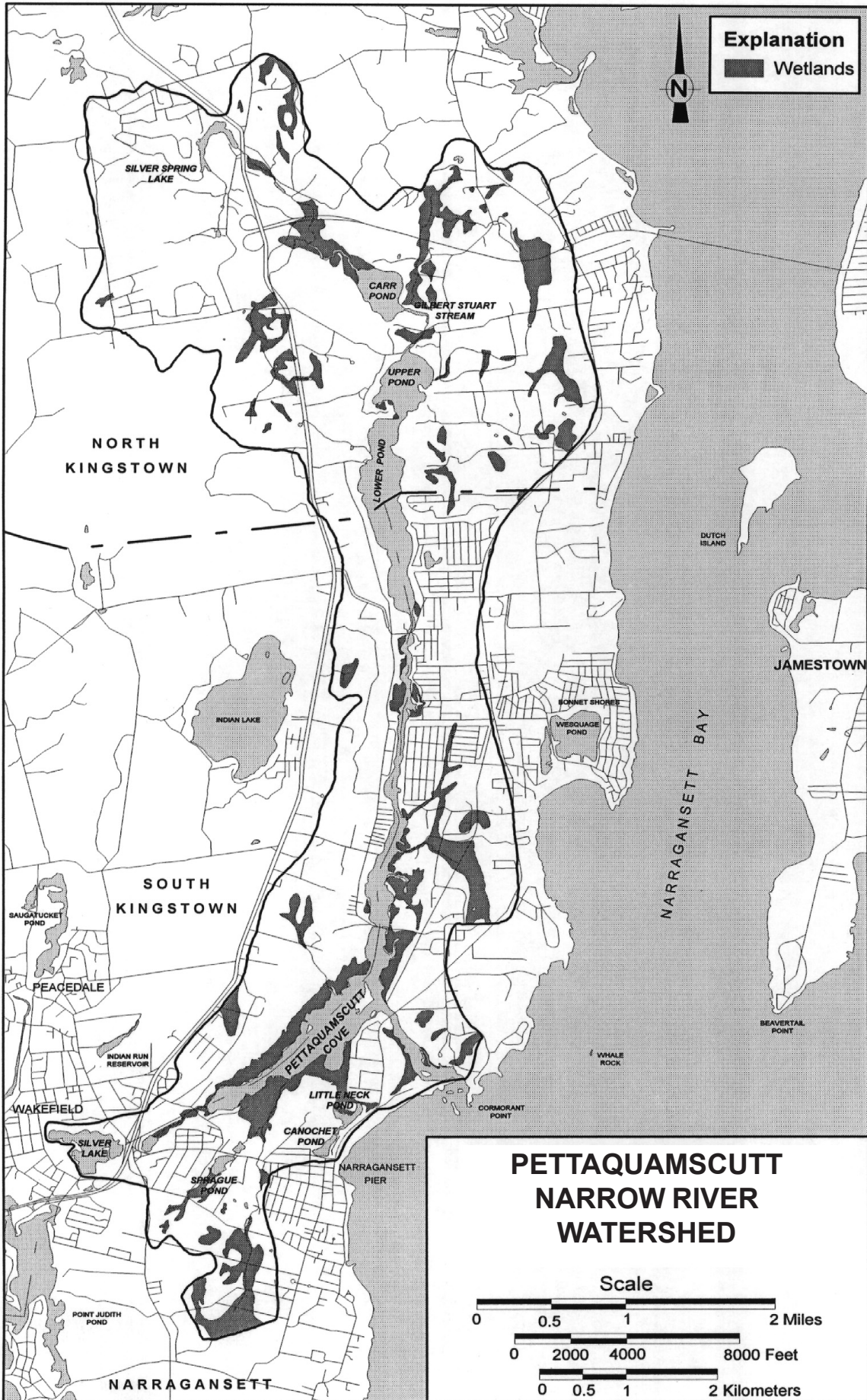
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Narrow River cleanup



Handbook Wins Award

In October 1998, the Rhode Island Chapter of the American Planning Association (RIAPA) honored the Narrow River Preservation Association (NRPA) by giving the *Narrow River Handbook* the RIAPA award for Outstanding Work in Journalism. In presenting the award, they described the Handbook as "an excellent example of how to assemble and disseminate a wide variety of information in a readable format for the practical use of the average homeowner. While not as eloquently delivered as Rachel Carson's message in *Silent Spring*, it resonated with the same immediacy in the need for grass roots measures to be taken, by each of us, to ensure the health of our environment."

It was also noted that in its commitment to "deliver" the message, NRPA had not stopped at simply producing the publication but took the next step and mailed it free of charge to every household in the Watershed. Additionally, the Handbook was not copyrighted, to allow for the potential to replicate the Handbook and tailor it to other watersheds with missions similar to NRPA.

The River Feeds

The river is the earth's low lands
stretched around the world,
to feed the tree roots and animals.

—Danielle D'Ambra

Grade 2, Narragansett Elementary School, Ms. Smith
River of Words Rhode Island Grand Prize Winner, Grades K–2

The Wild River

While the fish are swimming around in the river,
The river laughs.
While children throw rocks in the river,
The river makes ripples.
When the children run through the woods, the river races them.
The river is blowing with the wind.
It is rushing by the shore.
Sometimes the river will have a current.
In the winter the river is chilled.
In the winter the river will shiver.
The river is running to the island for exercise,
And it is gushing with bubbles to catch its breath.

—Aubrey Considine

Grade 4, Narragansett Elementary School, Mrs. Christensen
River of Words Rhode Island Grand Prize Winner, Grades 3–6



NARROW RIVER PRESERVATION ASSOCIATION

TOP TEN LIST

WHAT YOU CAN DO TO IMPROVE THE WATER QUALITY OF NARROW RIVER

10. **DO** tie into the town sewers.

-Or-

9. **DO** inspect and pump your septic tank regularly.
8. **DON'T** use lawn fertilizers or herbicides.
7. **DON'T** dump lawn clippings, leaves, or trash into the River.
6. **DO** operate watercraft responsibly.
5. **DO** keep pet waste away from the River and storm drains.
4. **DON'T** feed waterfowl.
3. **DON'T** put anything down the sink that you wouldn't eat or drink.
2. **DON'T** dump anything down storm drains.
1. **DO** report suspected problems to RI DEM at **(401) 222-1360**.

PO BOX 8 ~ SAUNDERSTOWN, RI 02874
(401) 783-6277
nrpa@narrowriver.org
www.narrowriver.org