

IMPROVING WATER QUALITY:
The Solution Starts with You!



*Making a difference for the
Charles River and its Parklands*



A publication of the Charles River Conservancy

Acknowledgements

The Charles River Conservancy is grateful to the following for contributing to
IMPROVING WATER QUALITY: The Solution Starts with You!

The Charles River Watershed Association
The Massachusetts Department of Conservation and Recreation
The U.S. Environmental Protection Agency
Executive Office of Environmental Affairs
Roger Frymire



This publication was made possible with a grant
from the Massachusetts Environmental Trust.



Printed on paper made from 100% de-inked post-consumer recycled fibers.

*Here's how you can make a difference
for the Charles River and its Parklands*

IMPROVING WATER QUALITY: The Solution Starts with You!



ometimes one person really can make a difference. Charles Eliot did at the end of the 19th century when he successfully lobbied for the creation of a world-class system of parks, dams and bridges, making the Charles River and its Parklands a model for cities around the world. Now, you have the opportunity to join a new generation of visionaries who are working to rejuvenate this remarkable resource and make it cleaner than it's been in two hundred years.

The Charles River and its Parklands are a place for recreation and self-renewal, a sanctuary that provides respite from the stress of everyday life and offers a rare chance to become better acquainted with the natural world and one's self.

But the river and surrounding open spaces still face challenges. Years of neglect and the destructive forces of time and weather, coupled with reduced funding, have taken their toll. Today, the Charles River and the Parklands – the centerpiece of a metropolitan park system that once was the envy of the world – need your help.

Together with the Charles River Conservancy and other dedicated environmental groups, you can ensure that the river is clean, and that adjacent parks, parkways and bridges continue to provide access, inspiration and opportunities for recreation and renewal for years to come.

But can one person really make a difference? YES, YOU CAN!



I. From Hopkinton to the Harbor

For runners in the Boston Marathon, the distance from Hopkinton to Boston is 26 miles. But from its headwaters at Echo Lake in Hopkinton to Boston Harbor, the Charles River winds more than 80 miles. It flows through 23 communities and drains a watershed of almost 311 square miles.

If you live within Route 128 your home is likely to be located within or nearby to the Charles River Watershed. More than one million people, about one sixth of the state's population, live in the general area. This watershed acts like a sponge, soaking up rainwater, and then eventually releasing it to the river. Development, drainage systems, the way waste is managed, and even the weather affect the aquifer and the cleanliness of the river all along its length.

Twenty dams, the first ones built during the Industrial Revolution, control the river's flow. The shoreline, bridges and parkways abutting the final stretch of the river – from the dam just above Watertown Square to Boston Harbor – comprise the Charles River Parklands. This nine-mile reservation, initiated in 1893 by Charles Eliot, substantially enhances the quality of life in Greater Boston and contributes to the health of the river that runs through it. This area is the focus of work by the Charles River Conservancy.

II. Your River, Your Responsibility

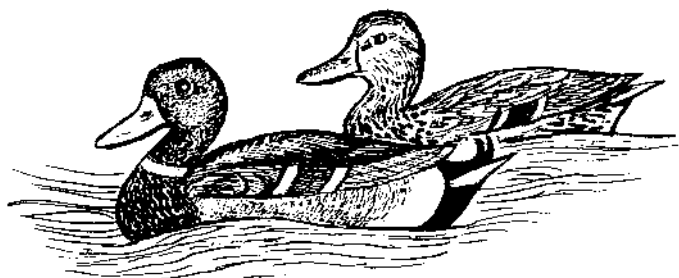
Thousands of people like you have joined in our "Conservancy Volunteers" program (over 2000 in 2004, alone) to help maintain the Parklands and ensure water quality in the river continues to improve. And it shows! They're part of an effort that includes the Charles River Watershed Association and other public and private agencies.

But there is much more to do. Cuts in funding for maintenance and repairs, combined with a growing pet and goose population have compromised the stewardship of the Parklands and health of the river. Whether you volunteer individually or pitch in as part of a group, your support is urgently needed. You don't have to be an expert in environmental policy or be able to tell a perch from a pickerel. You just have to want to make a difference – and you can.

Members of the Conservancy Volunteers identify and remove invasive plant species by hand and pick up trash that would otherwise end up in the water. Where erosion has occurred, groups of volunteers stabilize the riverbanks to prevent further pollution from topsoil lost into the water. Volunteers also seed lawns on the water's edge, and plant and prune trees (We'll teach you how!).

Our partner organization, The Charles River Watershed Association, monitors dams and maintains fish ladders along the river to make sure debris does not interfere with species movement. They take monthly water samples from locations all along the river – an important means of judging water quality.

It's not glamorous work, but it's always rewarding. Volunteering is also a great way to meet other people like you, people who care enough to get involved and know their efforts really do make a difference.



III. The River and Your Own Backyard

Your impact on the river and surrounding Parklands continues long after you return home from your volunteer work on the riverbank or pull your kayak out of the water. With a few simple steps, you can reduce pollution in the Charles, even if you live miles away.

Your personal contribution of time and energy can make all the difference. Here's how:

Recycle trash and dispose of household waste responsibly

APPLIANCES, TIRES, PLASTIC BOTTLES AND EVEN OLD CARS can end up in the river. By recycling, you reduce the amount of household waste sent to landfills. Minimize the amount of garbage that you generate at home, and when you picnic along the river, bring home your garbage to prevent it from ending up in the water. Shopping with reusable canvas bags, using a travel mug instead of a paper cup during your morning commute, and storing leftovers in reusable containers are other ways you can make a difference.

Dispose of toxins properly

NEVER DUMP ANTIFREEZE, PAINT OR MOTOR OIL on grass, at the curb or down a drain. Storm drains are often connected to the river. Mark your community's hazardous waste collection days on your calendar and join with your neighbors in disposing of hazardous materials properly.

Conserve water

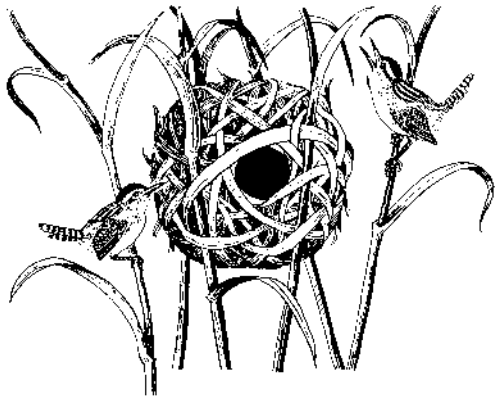
FIX LEAKY FAUCETS, water your lawn sparingly and install low-flow showerheads and toilets. Collect rainwater to water lawns and gardens. Redirect your downspouts to empty into gardens or onto lawns instead of across pavement. Consider installing a cistern to collect rainwater; you'll reduce your water bill, ease demand on drinking water supplies, and help replenish the aquifer.

Create a low-maintenance landscape

CHOOSE TREES, SHRUBS AND FLOWERS that thrive in the New England climate and your garden will look great all season long. Look for native perennials like sedum, day lilies, salvia, peonies, beach plum and phlox. These plants don't require a lot of water or special fertilizers (both are bad for the river), so you can spend less time working in the yard and more time canoeing, sailing or windsurfing on the Charles – perhaps even swimming some day soon.

Compost

YOUR LAWN CLIPPINGS, coffee grounds and vegetable peels are free fertilizer for your garden. Check with your town to see if they distribute composting bins or buy one from a local environmental group. If you must use commercial fertilizer, choose slow release formulations to minimize runoff. Nitrates from lawn and garden fertilizer collect in runoff water and end up in the Charles River. They promote excessive plant growth (a big problem!), destroy natural habitat and deplete oxygen supply.



IV. Working with Your Community

While individual efforts are important, you can't restore the Charles River by yourself. Here's the good news: federal, state, local and private programs aimed at improving water quality are already in place. And they're working. Although some towns along the Charles still need to eliminate drains that combine storm water and raw sewage, communities are now required to present action plans, create treatment facilities, and filter and store runoff.

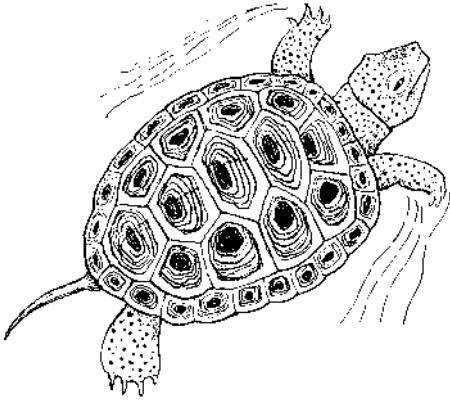
Some communities, like Newton and Needham, have adopted the Community Preservation Act to support preservation of open space and help replenish the Charles River aquifer. Together with the Trustees of Reservations and the Massachusetts Audubon Society, many watershed towns have moved to protect large tracts of land – much of it directly abutting the Charles. Preserving and restoring wetlands, forested areas and meadows along the river are important steps in improving water quality. Keeping water local and returning storm water to the aquifer greatly affects water quality. Working to preserve open space in your town is an important part of that effort.

Better management of water resources is having a positive impact on the river and the Parklands, as well. To find out what your town is doing, contact your Conservation Commission, Open Space Committee or Community Preservation Act (CPA) committee. As of this writing, a hundred municipalities, many of them within the Charles River Watershed, have adopted the CPA, a highly effective means of creating and protecting the open space so valuable to a healthy aquifer.



As a member of your community and as a resident of the Charles River Watershed, it's up to you to continue to support sound environmental policy. Get involved locally and make your voice heard when issues affecting water, recycling and waste removal are on the ballot. Your commitment to a greener, more environmentally aware lifestyle can help improve your quality of life, while sustaining the Charles River and its Parklands.





V. Love That Dirty Water

“But I love that dirty water, Oh, Oh, Boston you’re my home.”

That refrain from The Standell’s song “Dirty Water” put the Charles River on the pop music map in the 1960s. But, since the song hit the charts, the river has become healthier and the water cleaner than it’s been in over two centuries. Construction of a metropolitan sewerage system in the late 19th century was the first step in cleaning up a river that had become “foul and dangerous.”

More recently, the Massachusetts Water Resources Authority (MWRA) has implemented a multi-billion dollar, region-wide sewage and water system, making an enormous contribution to a cleaner river. Plus, the MWRA and the U.S. Environmental Protection Agency (EPA) have worked to enforce the Clean Water Act – further improving water quality. Increased shoreline management and a statewide effort to reduce combined sewer outflows (CSO’s) have also been successful in reducing water pollution and storm run off.

Locally, the Clean Charles Coalition, a voluntary association composed of industry and public interest groups (including the Charles River Conservancy and the Charles River Watershed Association), along with academic, health

and research institutions have joined together to advocate for the vision of a swimmable river. The Conservancy, as a Parklands advocate, is spearheading the effort to make public river swimming possible.

Today, the Charles River bears little resemblance to the dirty water of the 1960’s. In fact, it’s usually safe for swimming – except after heavy rains. But don’t jump in quite yet! A few CSO’s remain and there are toxic sediments on the bottom of the river. Until swimming platforms and protected beaches have been devised, safe swimming is not possible.

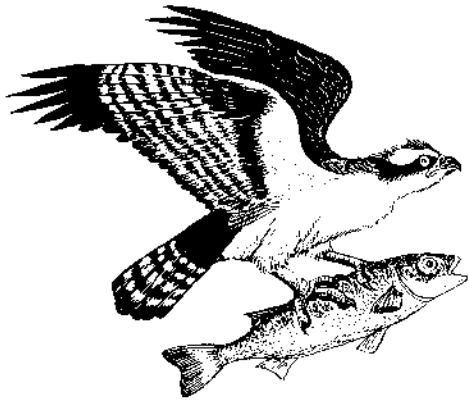


Q. If the water is so much cleaner, why does it still look brown and dirty?

A. The brown color (turbidity) of the Charles River is caused by natural tannins and algae that slow-moving water gathers up-stream as it flows eastward to the sea.

To ensure continued improvement in water quality, the Charles River Watershed Association (CRWA) and the Federal Environmental Protection Agency (EPA) monitor sewer discharge and check bacteria levels regularly. Next time you’re out on the river in a sailboat or kayak, look for a series of colored flags flown prominently above boathouses. Blue (safe for boating and swimming), yellow (safe for boating; swimming not recommended) or red (elevated bacteria levels) flags can be seen flying up and down the river.

These flags, posted from July through October, are part of the Charles River Watershed Association’s water quality management plan. Thanks to extensive clean-up efforts and the work of volunteers like you, blue flags fly most of the time these days.



VI. The River Wild

Many of the trees and shrubs found throughout the Charles River Parklands are prime specimens of flowering varieties, making spectacular displays throughout the seasons. But there's another side to them that's worth exploring.

Although the Charles River Parklands were created by more than a century of dredging, landfill and dam building, the largely man-made landscape of the Parklands teems with natural life. In Boston's dense urban environment the river and its surroundings provide habitats for an abundance of plants and animals. Among those to be found in and around the river are:

Fish

Fresh water species include carp, large mouth bass, perch, and yellow perch. Anadromous species (salt water fish that migrate to fresh water to reproduce) include alewife and blue back herring, rainbow smelt and American shad.

Reptiles

Garter snake, Eastern painted turtle, diamondback terrapin, snapping turtle, Eastern box turtle all make their home in the river and Parklands.

Amphibians

Eastern red backed salamander, Eastern newt, American bullfrog, green frog and Fowler's toad can all be found in the Parklands.

Mammals

Eastern chipmunk, Eastern cottontail rabbit, raccoon, opossum, red fox and striped skunk inhabit various parts of the shoreline.

Birds

The river and the Parklands are a flyway for migration but many birds make their permanent homes in the trees near the river and along the shore. They include American kestrel, belted kingfisher, double crested cormorant, great blue heron, Canadian goose, Northern oriole, red tailed hawk, downy woodpecker and American black and mallard duck.

Native Plants

The plants, shrubs and trees that grow in the Parklands along the river and even in the water provide excellent habitat for birds and animals. Plants also help to improve water quality by preventing erosion. Volunteers with the Charles River Conservancy work to protect and strengthen native species which include cinnamon and marsh fern, milkweed, marsh marigold, water lily, wild celery, high bush blueberry, red maple, sugar maple, American beech, dogwood, hazelnut and many more.

The presence of ever more diverse wildlife and plant species is thrilling to observe, and a barometer of environmental health. The increasing variety of life found throughout the Charles River Parklands and in the river is a positive sign water quality and the overall health of the Parklands is improving.



VII. Invasive Species Management in the Charles River Parklands

Maintaining a healthy balance between planted landscapes and natural species is part of the work of the Conservancy Volunteers, but invasive plant species on land and water are second only to outright habitat destruction as the greatest threat to biodiversity. They pose a threat not only to water quality but also to wetlands and forested areas along the upper Charles. The landscaped areas of the Parklands along the lower stretches of the river are subject to such incursions, as well.

Problem species in and along the Charles include:

AILANTHUS (TREE OF HEAVEN)
FALSE INDIGO
ORIENTAL BITTERSWEET
BLACK SWALLOW WORT
PHRAGMITES
PURPLE LOOSESTRIFE
GARLIC MUSTARD
FANWORT, AN AQUATIC PLANT
EURASIAN WATER MILFOIL

The CRC, along with other area organizations, including the New England Wildflower Society, is working to develop a comprehensive plan to combat the spread of invasive plants and to encourage growth of beneficial native species. Many Conservancy Volunteers are trained to identify harmful plants and work to contain unwanted growth through seasonal cutting. They will continue to play a key role in future efforts to control and eliminate the spread of invasive plants throughout the Parklands.



INVASIVE WATER PLANTS: SUBMERSION SUBVERSION

Once established, non-native plants can clog freshwater tributaries, cause flooding and create breeding grounds for mosquitoes. Densely growing milfoil robs water of oxygen and increases sedimentation, making it more difficult for fish to breed. Because milfoil starts spring growth early it inhibits the growth of native plants. Typically, when milfoil is present the diversity of aquatic plant life declines along with the health of a river or lake.



RIVERSPEAK

Here's a quick glossary of terms you'll hear from people familiar with water quality issues.

Aquifer

An underground bed or layer of earth, gravel, or porous stone that yields water.

Aquatic ecosystem

Any body of water and all the organisms & nonliving components within it.

Combined Sewer Overflow (CSO)

An older type of sewer system that combines sewage and rainwater in one pipe. During heavy rains, these systems become overloaded and release untreated waste into nearby bodies of water. Boston and Cambridge have some combined sewer systems, which occasionally impact the Charles.

Eutrophication

The process in which a body of water is impacted by over-enrichment (such as nitrates from lawn fertilizer runoff), causing the depletion of dissolved oxygen, so important to aquatic health.

Greenbelt

Vegetation that provides wildlife habitat and, when parallel to streams and rivers, provides erosion control and flood buffering zones.

Non-point source (NPS) pollution

Pollution that does not originate from a clear or discrete source. NPS pollution is caused by rainfall or snowmelt moving over and through the ground, then picking up and carrying man-made pollutants as they flow into streams and rivers.

Point-source (PS) pollution

Pollution discharged from any identifiable point including pipes, ditches, channels, sewers, and various types of containers.

Riparian area

The land and vegetation adjacent to a stream. This includes woodlands and floodplains.

Water quality

A descriptive term for the chemical, physical and biological characteristics of water, usually in respect to its suitability for a particular purpose such as swimming or drinking.

Watershed

The geographic region draining into a river, system of waterways, or other body of water.



VIII. Once Upon a River

Long before there was a city of Boston, there was a place the Algonquians called Mushauwomuk, or “where there is a big river.” For thousands of years the native people of what is now Eastern Massachusetts inhabited the woodlands, hunted in the salt marshes and fished in the shallow waters where the ocean and fresh water meet.

More of a tidal estuary than the well-defined river we know today, it was drained by the tides, surrounded by expansive wetlands and included some small tree-covered islands. In the early 1600s John Smith named the river after Charles I of England.

In 1617, plague brought by the English settlers wiped out almost the entire Native American population and by 1690, in the aftermath of King Philip’s War, the Algonquin and Nipmuck tribes had deeded away their claims in the Charles River Basin. Settlers built dams for gristmills, constructed wooden bridges and dug canals.

In 1814, America’s first factory, run by the power of a Charles River waterfall at Waltham, launched the industrial revolution just a mile west of the Parklands. Soon tanneries, textile mills, slaughterhouses, tripe works, coal-fired power plants, fertilizer manufacturing plants and glue factories lined the river’s shores. Their effluent, as well as waste from most of the

households in Boston and Cambridge, drained into the river. Low tide revealed vast mudflats reeking with human and industrial waste until the end of the 19th century.

By the beginning of the Civil War the mouth of the river at Boston Harbor was blocked by railroad trestles. The river could no longer be cleansed adequately by tidal flows. It was filthy, stagnant and unhealthy.

In 1893, Charles Eliot, an apprentice and later partner of Frederick Law Olmsted (of Central Park and Emerald Necklace fame), and the journalist Sylvester Baxter led an initiative that persuaded the state legislature to form the Metropolitan Park Commission. Their goal was to reclaim the region’s rivers and natural landmarks and create a park system for public use.

The newly formed regional Commission acquired the Boston side of the river and the City of Cambridge began construction of Charles River Road (now Memorial Drive), improving public access to the riverfront. The Charles River Dam (where the Museum of Science is now located) was completed in 1910, creating a new, fresh water basin which submerged the foul-smelling mudflats and provided the opportunity for a great water park linking Boston and Cambridge. The overall result attracted attention worldwide as an example of progressive city planning.

The construction of the dam transformed the riverbanks and ushered in a new era. The completion of the Esplanade in 1936 established a public space that made the Charles River Parklands a new focus for urban life.

At the start of the 21st century, as part of the Big Dig, the last half-mile of the river closest to Boston Harbor is receiving renewed attention. Some 40 acres of new parklands, pedestrian pathways and bridges will replace a former industrial wasteland at North Point. The elegant Zakim Bunker Hill Bridge now marks an area open to new development on both sides of the river, creating a vibrant new addition to the Charles River Parklands.

TIMELINE *The Charles River was named for England's Prince (later*

King) Charles in 1615. The Prince was 15 years old at the time.

1630 ~ 1634 ~ 1662 ~ 1814 ~ 1816 ~

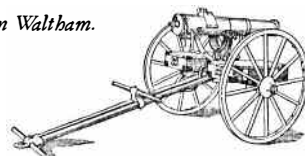
English settlers, led by Richard Saltonstall, land on what is now Mt. Auburn Street.

First gristmill built in Watertown.



Great Bridge constructed on site of Anderson Bridge.

Francis Cabot Lowell builds America's first integrated factory, a textile mill, on the banks of the Charles in Waltham.



The Arsenal is moved from the Charlestown Navy Yard to Watertown Square.



~ 1936 ~ 1941 ~ 1950 ~ 1951 ~ 1955

The Esplanade is completed and in 1937 Community Boating is founded.



The Hatch Shell is built for the Boston Pops.



The old I-93 crossing of the Charles is opened to traffic.



Storrow Drive is completed and the Esplanade extended.



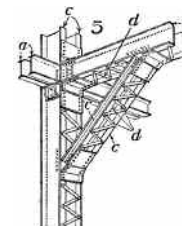
Swimming at Magazine Beach and elsewhere is prohibited as pollution is recognized. The beaches are planted with grass.

1855-80 ~ 1893 ~ 1907 ~ 1910 ~ 1918

The Back Bay is filled for residential use.



The Metropolitan Park Commission is formed.



Bridge constructed which was named for Longfellow in 1927.

Charles River Dam and lock are completed.



The beach at Gerry's Landing (also known as Hell's Half Acre and the last "wild" area in the Parklands) is provided with lifeguards.

~ 1965 ~ 1976 ~ 1995 ~ 2000

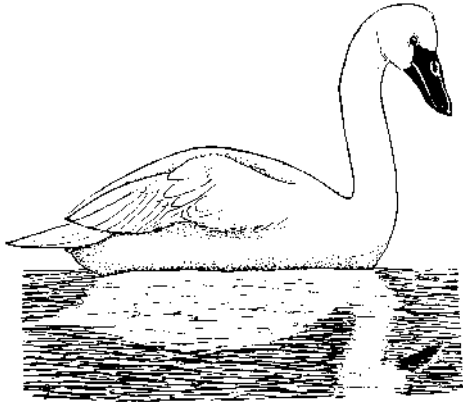
The first Head of the Charles Regatta, the world's largest two-day rowing event.



An estimated 400,000 people celebrate the American Bicentennial with fireworks and a Pops concert on the Esplanade.

The Environmental Protection Agency, under the leadership of John de Villars, sets the goal for a swimmable, fishable Charles in 2005.





IX. Creating Active and Attractive Parklands

The Charles River Conservancy advocates for the renewal and stewardship of the Charles River Parklands. Founded in 2000, the Conservancy works with community organizations, government, corporate, and institutional partners. With the support of private citizens like you, it strives to improve public access and safety, provide education and outreach and initiate planning and restoration programs. Its goal is to bring increased attention and resources to the task of renewing the Charles River Parklands as the centerpiece of Greater Boston's metropolitan park system.

The Charles River Conservancy offers year-round educational and volunteer programs designed to help students and citizens learn about and contribute to the Parklands, while helping to improve the quality of the water in the Charles River. The Conservancy Volunteers program brings more than 2000 people annually to work along the banks of the river, making them more active and attractive through their efforts.

Another Conservancy initiative seeks to bring public swimming back to the Charles through collaboration with other environmental groups, public agencies and the Massachusetts Institute of Technology. In addition,

RiverSing, an annual celebration of the autumnal equinox, jointly sponsored by Revels and the Conservancy, attracts thousands of participants while helping to increase public awareness of the river and Parklands.

The Charles River Watershed Association

One of the country's first watershed organizations, the Charles River Watershed Association (CRWA) was founded in 1965 to address public concern about the declining condition of the Charles River. Since then, the CRWA has played a major role in water resource management and watershed protection efforts by working directly with municipalities throughout the Charles River Basin. Through joint efforts with state government, private citizens and 35 Massachusetts towns from Hopkinton to Boston, the CRWA's initiatives have resulted in dramatically better water quality in the Charles River.

Show Your Support and Fund Environmental Education

When your license plate has a whale on it, you tell the world you are committed to the environment and to water quality. Your purchase of a Massachusetts Environmental Trust license plate (sporting an image of the largest mammal on the planet) supports groups across Massachusetts working to improve water quality and environmental awareness. To find out more, visit your local Registry of Motor Vehicles office or order online at www.mass.gov/rmv.mass/rmv

Resources

For more information about the Charles River, the Parklands and how you can help improve water quality visit these websites.

The Charles River Conservancy www.TheCharles.org

Charles River Esplanade Association www.esplanadeassociation.org

The Charles River Watershed Association www.crwa.org

The Clean Charles Coalition www.cleancharles.org

The Massachusetts Environmental Trust www.MassEnvironmentalTrust.org

New England Wild Flower Society www.newfs.org

The Charles River Museum of Industry www.crimi.org

Charles River Clean Up Boat www.cleanupboat.org



*For an in-depth history of the Charles River, the Parklands and Boston read *Inventing the Charles River* by Karl Haglund, published by the MIT Press in cooperation with the Charles River Conservancy, 2003*



MASSACHUSETTS
ENVIRONMENTAL
TRUST