

People Who Help Make It Happen on the Charles

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ANNUAL REPORT

Charles River Watershed Association

2001

Applied Science



Bob's Ten Years

It's been a decade of growth for CRWA, and a record of achievement for the Charles River.

When Bob joined us, CRWA had already worked for twenty-five years for the Charles River. We had achieved much in pollution control and watershed protection. Nevertheless, Bob faced a river still under severe and growing stress, still substantially polluted and with increasing low flow problems; and these seemed more and more complicated and intractable.

It is easiest to measure Bob's success building CRWA, not just in growth, but also in maturity and sophistication. In 1990, CRWA had a budget of under \$150,000, and a staff of three people. While talented and hard working, none could bring scientific or technical skills to the task.

Bob has increased CRWA's budget to over \$1.3 million for 2002.

Our staff has increased to eleven people, and we include environmental engineers, scientists, planners, lawyers, and biochemists. CRWA has its own water analysis laboratory, and computer modeling and mapping expertise.

Bob formed the Watershed Management Consortium to strengthen other watershed associations around the state, and harness their combined efforts to affect state water policy.

CRWA is now the largest watershed association in the country, with the strongest capabilities for addressing our river's problems. However, what counts is not CRWA's growth, but our success, led by Bob, in using that capacity to make real changes for a better river.

A few examples:

When we began monthly water quality sampling along the entire river in 1995, boating standards were achieved only 39% of the time, and stricter swimming standards only 19%. But our regular sampling has pinpointed sources of pollution, and enabled us, with appropriate agencies, to work with the polluters to remedy discharges. Improvement has been steady and substantial. For the first ten months of 2001, swimming standards were met 66% of the time, and boating standards a remarkable 84%!

In 1988, combined sewer overflows (CSO's) discharged 1.6 billion gallons of polluted water a year into the lower basin. CRWA's work with the Massachusetts Water Resources Authority (MWRA) has led to a reduction to 200 million gallons today, and to 27 million gallons projected for 2008, at a cost reduction from original MWRA expense projections of \$540 million to only \$49 million.

Treating municipal sewage in a regional wastewater facility, and then piping the effluent through MWRA facilities to Boston Harbor, was until recently thought to be good engineering, an efficient way to control pollution and protect drinking water supplies. But focusing on cases in Franklin and Holliston, CRWA has established that this "export" of sewage from the town and the watershed can threaten future water supplies, and reduce river flows. Now, after fundamental regulatory change, any community seeking a wastewater treatment plant must first do a comprehensive water resource plan.

More broadly fundamental to maintaining river flows and municipal water supplies is the necessity to limit unnatural runoff, and to assure that precipitation and locally used water supplies are recharged into a town's aquifers and not quickly lost downstream. Working with the US Geological Survey, CRWA has developed a comprehensive surface and groundwater management computer model for eleven upper watershed towns to help them manage their water withdrawals and to control and direct their recharge.

The problems we face on the Charles are deeply rooted. Correcting them will require revision of basic approaches to municipal engineering, and of agencies' basic application of their laws, if not of the laws themselves. This will take time, money, and will conflict with entrenched interests. But it is happening; it is happening now; and CRWA is leading the way.

Congratulations, Bob!

Kelly McClintock
Kelly McClintock
President

THE STATE OF THE RIVER

a ten-year review

By Kathy Baskin, CRWA Project Manager

A decade of improvements

Water quality on the Charles River received a huge boost in 1989 with the Charles River Watershed Association's successful push for stricter state-adopted water quality standards. These standards reclassified the river's intended recreational use from boating to swimming. At about the same time, the Massachusetts Water Resources Authority (MWRA) was discharging 1.6 billion gallons of combined sewage (untreated sanitary wastewater and stormwater) to the Charles from Boston and Cambridge each year. In the early 1990s, fecal coliform bacteria levels in the lower Charles River soared, meeting the state's standard for swimming a meager 17 percent of the time (see Figure 1).

With the new water quality standards in place, the river was poised for a successful decade of water quality improvements. The effort, involving citizen activists, regulatory agencies, municipal Departments of Public Works, and MWRA, as well as CRWA, began with an improved plan for the removal or treatment of combined sewage. Over 87% of the combined sewage has already been removed from the Charles this decade and by 2008, 98.3% will have been removed.

Recognizing that addressing combined sewer overflows was not enough to solve water quality problems in the Charles, in 1995 EPA declared its goal to make the Charles River swimmable and fishable by Earth Day 2005, and ordered several of the lower watershed communities to detect and remove any sewage discharging to the river through illegal cross-connections to storm drain systems. The towns have successfully removed 365 million gallons of untreated wastewater discharging to the river annually and they continue to find and correct problem sewers. All the while, CRWA volunteers have been collecting water quality samples, documenting pollution "hot spots" requiring immediate attention, and recording the remarkable story of the river's clean-up (see Figure 1). With the

reduction of combined sewage overflows and the removal of numerous illicit discharges of wastewater through storm drain pipes, 4.8 million gallons of sewage has been prevented from discharging to the Charles each day and the swimming standard is now met 66% of the time!

A decade of higher highs and lower lows

Along the first few miles of the Charles River, from its headwaters at Echo Lake in Hopkinton to Cedar Swamp Pond in Milford, the Charles is more like a nature path than a waterway, often drying up during periods of low rainfall and high drinking water demand. A look at average flows in the river does not describe the extreme nature of the river flow problem in the Charles. The 10-year annual average flow between 1990 and 2000 (305 cubic feet per second) at the U.S. Geological Survey streamflow gauge in Dover, Massachusetts, located about mid-distance along the 80-mile Charles) was exactly the same as for the entire period of record, between 1937 and 2000.

To get a better idea of how river flows are changing, CRWA looked at the highest and lowest daily flows ever recorded for each day of the year. For example, the highest flow ever recorded on January 1st was 1,300 cubic feet per second in 1970; the lowest was 56 cubic feet per second in 1981. Throughout the 1990s, the high flows got even higher and the low flows got lower. New records were set for highest daily flows on 77 of the 365 days in the year (or 21% of the days) and for lowest daily flows on 36 of the 365 days in the year (or 10% of the days) since 1990. Interestingly, all of the lowest flows recorded in the 1990s occurred between May 1 and October 31, when flows are already critically low (see Figure 2). Thus, the lowest of the low flows dropped even more during the last decade.

Rampant development in the upper watershed throughout the 1990s has caused more stormwater to rush off of pavement and through pipes to the river as quickly as possible (causing highest

daily flows to become even higher) and has short-circuited the natural water cycle step of using rainwater to replenish groundwater which ultimately feeds water to the Charles during the dry summer season (causing lowest daily flows to become even lower). Compounding the effects of development are changing weather patterns, with frequent floods and droughts. Future development in the watershed needs to accommodate changing land uses and weather by finding ways to mimic the natural water cycle and replenish aquifers that feed the Charles and its tributaries.

Moving ahead and leading the way

Through CRWA's technical projects and its public education efforts, citizens, agencies, and municipalities are developing a greater awareness and understanding of the Charles River watershed and the causes of water flow and quality problems. Considerable strides have been made in cleaning the river, however our job is not finished. Much work remains on improving water quality as more illicit discharges are discovered and removed and as the towns begin to manage their stormwater discharges. There is ample work to do controlling land development, water supply, wastewater collection and treatment, and stormwater management in order to reverse the trend of diminishing flows in the upper Charles. CRWA is working hard to understand and address these issues through several major initiatives including rezoning communities based on their natural resources, application of a groundwater model to help towns manage their water supplies, so they do the least damage to the Charles and its tributaries, evaluation of stormwater management practices in the Charles, and continued monitoring and computer modeling of river water quality. We hope, that by exploring these issues and pushing for solutions, we will see as much improvement in the Charles over the next 10 years as we helped achieve in the last decade.

Figure 1: Percent of Time the Lower Charles River Met State Bacteria Standards

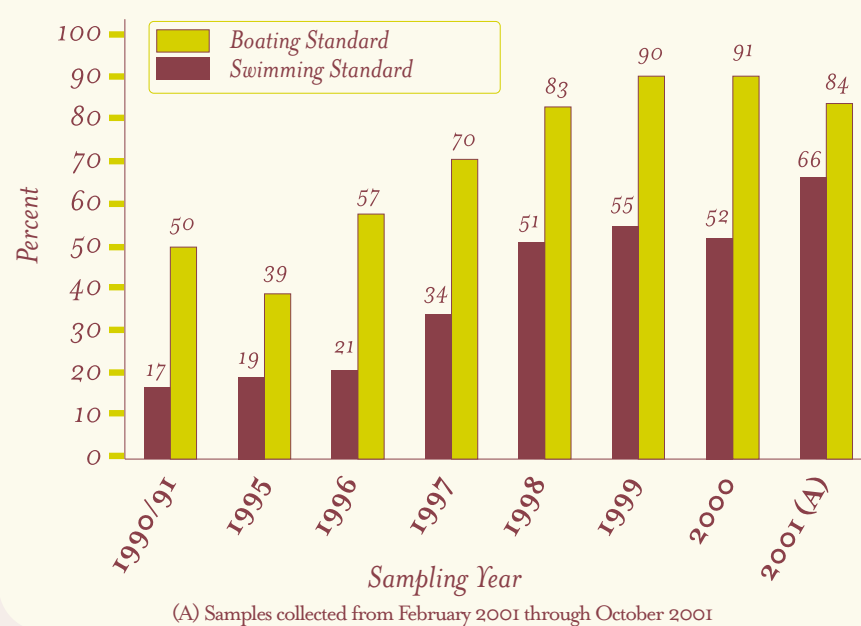
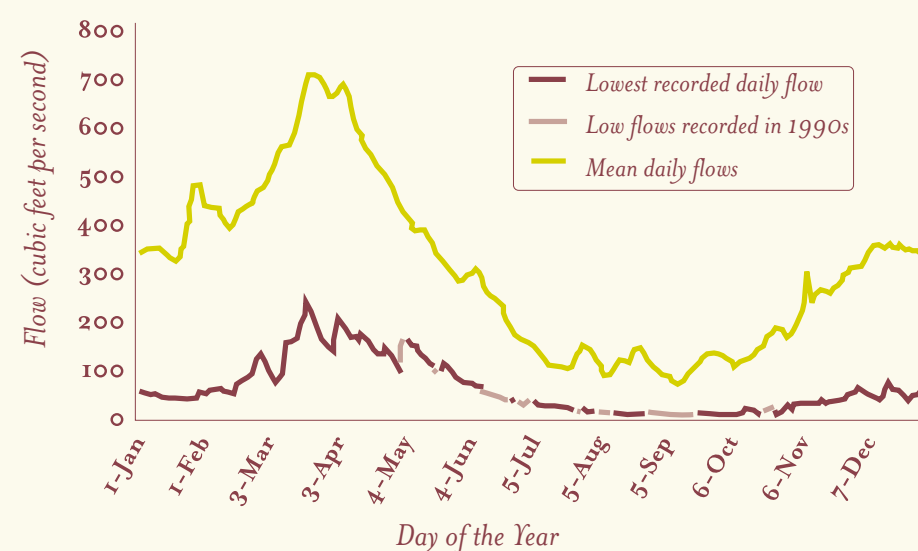


Figure 2: Minimum, Maximum, and Mean Daily Flows at USGS Streamflow Gauge in Dover, Mass. (from 1937 to 2000)



Design: Paratore Hartshorn design + communication

ACCOMPLISHMENTS

In Bob Zimmerman's 10th year as Executive Director of Charles River Watershed Association, the organization continued to explore new approaches to watershed management and work with similar organizations in implementing innovative strategies. Not only is the Charles improving as a result of this science-based stewardship, but other river systems stand to benefit from our work as well. In its 35th year of advocacy for the Charles, the Charles River Watershed Association continued to mark improvements in the health of the Charles and provide national leadership in watershed management, as recognized by U.S. Environmental Protection Agency, Natural Resources Defense Council, and River Network. We are most proud of our accomplishments in the areas highlighted below.

Parkland Protection

As part of its mission to protect accessibility to the Charles, CRWA challenged Boston University's bid to appropriate prime parkland on Boston's Esplanade for its new sailing pavilion. In protest of this precedent-setting proposal, CRWA succeeded in stalling legislation that would enable the university to lease 1.45 acres without public review, and urging the state to require BU to undertake a comprehensive environmental analysis of alternative sites. To best serve the public interest, CRWA commissioned an independent study of alternative locations. This analysis provides model criteria for evaluating similar public trust land conversions.

Water Quality Monitoring

Over 80 dedicated volunteers helped us complete our fifth full year of monthly water quality monitoring along the entire length of the Charles. US Environmental Protection Agency uses the data for its annual Charles River report card. The data also guides the decisions of organizations and environmental agencies responsible for control of illicit connections, stormwater, and combined sewer overflows.

Water Resource Management

Ground water management alternatives are being evaluated in the upper Charles using computer modeling and data collection. CRWA, in partnership with the US Geological Survey, completed the data collection phase and is finalizing the modeling. The model will be used to evaluate the effects of prior and new development on ground and surface water levels and river flows and make recommendations for improved town planning and regional water management. CRWA also developed a recharge map for the upper watershed showing important areas for replenishing aquifers.

Constant Vigilance

In many cases, CRWA is the only protective voice for the river in the state's environmental review process for building plans in the watershed. This year we reviewed and critiqued over 23 building plans, permits, and variances with potential impacts on the river. In addition, CRWA provided guidance to developers, businesses, and agencies on minimizing pollution and recharging aquifers connected to the Charles.

Color-Coded Flags

Boaters on the Charles River Basin benefited from CRWA's fourth season of signaling water quality conditions with color-coded flags. Red flags warn boaters of dangerous bacteria levels during warm weather months while blue flags signal suitable conditions. Flags were hoisted at eight boathouses and reported on WBZ newscasts, as well as CRWA and boston.com websites.

Earth Day Clean Up

Over 1,000 volunteers participated in a second annual Charles River Earth Day Clean Up on April 21st. Sponsored by CRWA, Massachusetts Community Water Watch, the Clean Charles Coalition, Senator Stephen Tolman's office, and Charles River Stream Teams, participants removed over 2,000 bags of trash and debris from the riverbanks.

Pollution Control

CRWA is working with the US Environmental Protection Agency and the MA Department of Environmental Protection to calculate the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and to allocate that amount among the pollutant's sources. This project will provide the basis for the state to establish water quality-based permits and controls for the treatment and discharge of nitrates and phosphates.

Technical Assistance

CRWA secured funding to provide 13 watershed organizations in southeastern New England with technical equipment and expertise. The CRWA-led initiative has provided computer equipment, training, guidance documents, and also spearheaded the formation of the Watershed Management Consortium.

Habitat Assessment

CRWA is working with the US Geological Survey to determine whether low flows in the upper Charles River watershed are having an effect on the habitat of the river's fish and aquatic organisms. Fieldwork measuring the types of habitats that exist in the upper Charles began in late summer.

Run of the Charles Canoe and Kayak Race

Nearly 1,800 professional and amateur paddlers filled the Charles with hundreds of boats on April 29th for our 19th Run of the Charles Canoe and Kayak Race. This popular event enhances public appreciation of the river as a recreational resource.

Recreational Guide

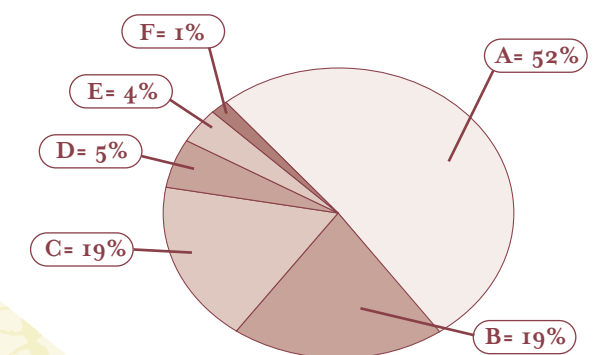
To encourage recreational use of the Charles, CRWA published a new Charles River Recreational Guide for the park from Watertown Dam to Boston Harbor. The pocket-sized map shows the river's recreational highlights and includes a mileage grid indicating distances between bridges.

Recognition

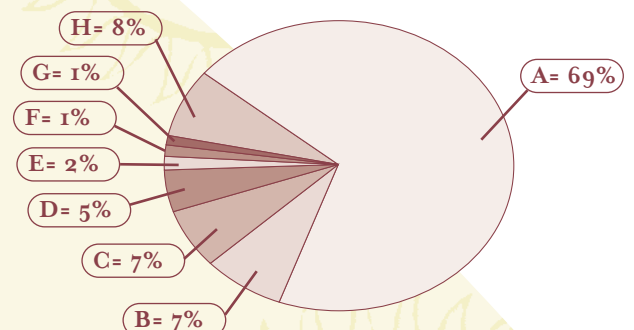
The Environmental Business Council of New England (EBC) presented CRWA with one of four environmental leadership awards at its June annual meeting. The award recognized CRWA's work in developing and implementing a "comprehensive watershed management program that has dramatically improved the quality of water in the watershed and approaches to water resource management."

Financial Highlights for Fiscal Year 2001

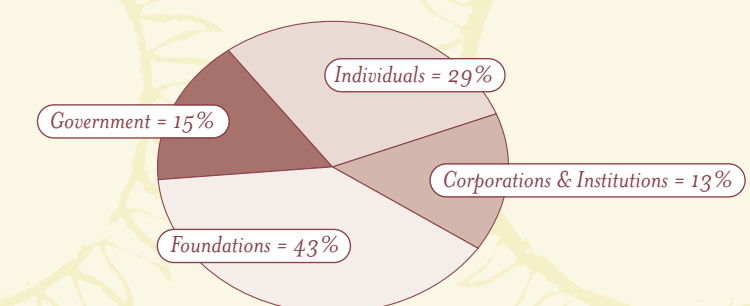
Revenue	
A Restricted Grants	\$ 649,541
B Donations	\$ 242,879
C Membership	\$ 242,845
D Programs and Events	\$ 69,848
E Unrestricted Grants	\$ 53,517
F All Other	\$ 18,001
Total Revenue	\$ 1,258,632



Expenses	
A Payroll Expenses	\$ 777,071
B Contract Services	\$ 84,012
C Printing & Supplies	\$ 72,789
D Occupancy & Depreciation	\$ 54,230
E Utilities & Telephone	\$ 17,188
F Postage & Delivery	\$ 13,002
G Equipment & Repairs	\$ 11,112
H All Other	\$ 87,715
Total Expenses:	\$ 1,117,127
Net of Revenue and Expenses	\$ 141,504



Major Sources of Operating Funds



Government: \$187,577

Boston Water and Sewer Commission
City of Cambridge Water Department
MA Dept. of Environmental Protection
Massachusetts Environmental Trust
Massachusetts Water Resources Authority
Metropolitan Area Planning Council
Metropolitan District Commission
Town of Franklin
US Environmental Protection Agency

Foundations: \$451,668

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