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# Stream Assessments and Water Quality Monitoring in the Cocheco River Watershed 2001 Project

Cocheco River Watershed Coalition

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**STREAM ASSESSMENTS**  
**and**  
**WATER QUALITY MONITORING**

in the Cocheco River Watershed

**2001 Project**

A Final Report to

The New Hampshire Estuaries Project

Submitted by the

Cocheco River Watershed Coalition

259 County Farm Road, Unit 5

Dover, NH 03820

June 2002

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## **Executive Summary**

The purpose of this project is to gather data and information through volunteer water quality monitoring and stream surveys in the Cocheco River Watershed. The data will be analyzed and disseminated for use in watershed management planning by the Cocheco River Watershed Coalition (CRWC) with the watershed communities.

Even after municipalities have made major improvements to their waste water treatment facilities and processes, the Cocheco River is still a major contributor of bacteria and nutrients to the Great Bay Estuary (NHEP Technical Characterization, 1995). Recent monitoring data reveals cumulative impact of upland conditions in the watershed. Individual land use decisions and septic system maintenance, as well as community decisions regarding development, road construction and maintenance, stormwater runoff and wastewater treatment all can influence the water quality of the Cocheco. Tributary streams, at a smaller scale, in turn reflect conditions in their watersheds and cumulatively impact the Cocheco River. They are less protected by state and community regulations. What is the status of the tributary streams?

Volunteers from the CRWC have completed their third year of monitoring baseline sites on the Cocheco River and have begun surveying of a dozen tributary streams. They worked with equipment, training and guidance from the NH Department of Environmental Services, Volunteer River Assessment Program (VRAP). They also tested water quality using macro-invertebrates and surveyed riparian land use, wildlife habitat and vegetative cover on small tributary streams in the headwaters and in urban Rochester and Farmington. The VRAP report with analysis and recommendations has not been completed for use in preparing outreach activities. A presentation was made with preliminary information by the VRAP Coordinator and the public was invited. Press releases and newsletter articles were published. Display material for community events was prepared and used.

In an exceptionally dry year, stream flow was low and some of the smallest streams were dry. Those streams should be tested again when conditions are improved. However the low flow made accessibility easier for stream walks.

Monitors observed considerable impairment of stream banks in the urban areas, especially the dumping of yard waste and trash. In Rochester they organized a cleanup, recruiting neighbors and youth to help.

Monitors also found areas of pristine beauty and healthy trout habitat in the midst of Rochester on Axe Handle Brook, Hurd Brook and Willow Brook. Those areas should be protected from urban infringement.

Local shoreline protection regulations are inadequate to protect the small streams in both Farmington and Rochester at present. The New Hampshire Shoreland Protection Act does not effect the streams surveyed except the Isinglass River.

The tributaries in Dover, Somersworth and Rollinsford should be surveyed next season.

## **Goals and Objectives**

The purpose of the project is to gather data and information through volunteer water quality monitoring and stream surveys in the Cocheco River watershed. The data will be analyzed and disseminated for use in watershed management planning by the Cocheco River Watershed Coalition with the watershed communities.

This was the third year of monitoring at ten sites on the river for baseline data. The original sites were chosen to bracket perceived hotspots and to coincide with sites previously monitored by NH Department of Environmental Services. (NH DES). This year the corps of volunteers monitored the same sites with the addition of one site in Dover. Monitoring was done with the NH DES Volunteer River Assessment Program (VRAP). The baseline parameters measured were dissolved oxygen, air and water temperature, pH, turbidity, and specific conductance.

In the upper watershed small streams which join the Cocheco River were thought to be clean and unimpaired. Downstream there are beautiful stream corridors surrounded by urban development, particularly in Rochester. Some of those streams are impaired by historic uses and threatened by pressures associated with population growth. Surveys on a dozen streams by trained volunteers provided information about the present status, appropriate use, the need for protection and recommendations for action which will restore and enhance the watershed.

The project goals and objectives are presented in detail in the Quality Assurance Project Plan which is in Appendix A. Please see pages 5 through 7.

## **Project Design and Methods**

The project design and methods are thoroughly described in the Quality Assurance Project Plan which is in Appendix A. Please see pages 7 through 18.

## Results and Discussion

Training: Sixteen volunteers were trained by VRAP Coordinator, Beth Malcolm, on June 2, 9, and 25. Additional skills were observed in the field by VRAP staff and individual training needs were addressed as they arose during the season. Other volunteers who undertook supporting efforts contributed as well. A list of volunteers is Appendix B.

Water quality monitoring: Volunteers conducted biweekly sampling of eleven baseline sites from June through September, eight times. They used VRAP equipment. Both wet and dry weather sampling was done. Fortunately in June there was a wet event because there was not another one during the season. At monthly intervals *E. coli* bacteria samples were collected at baseline sites. They were tested at the Rochester Wastewater Treatment Plant( WWTP). Control samples were tested at the NH DES Laboratory. Additionally, the NH DES Ambient Sampling Program staff agreed to fund a one-time nutrient sampling on September 24 which was analyzed at the NH DES Lab. Tests were for total phosphorus, total nitrogen, nitrates, nitrites, and ammonia. All the data gathered has been forwarded to the VRAP Coordinator for entry, analysis and reporting.

Water quality testing was a component of the stream surveys, using the same baseline parameters. *E. coli* sampling was done on streams in Farmington which flowed through older residential neighborhoods in which bacterial contamination was suspected. Again, Rochester's WWTP performed the bacterial testing with control samples tested by NH DES.

Results of baseline monitoring are in Appendix C.

Stream surveys: Stream surveys were completed on the following streams.

Mad River

Isinglass River

Hayes Brook

Upper Cocheco

Unnamed Tributary from Sunrise Lake outlet

Dick Dame Brook

Kicking Horse Brook

Ela River

Pokamoonshine Brook

Rattlesnake River

Hurd Brook

Axe Handle Brook

Willow Brook

Results, field data sheets, maps and aerial photographs for the streams are located in Appendix D.

Report development and community outreach: The 2001 VRAP report has not been completed, nor will it be until after the as yet uncompleted 2000 report is completed. This is a major impediment to community outreach. The validating effect of the official report gives credibility to volunteer participants. It must be said that the CRWC monitoring program is more ambitious than the other VRAP participants, and VRAP is examining their policy on report development as a result.

Nevertheless, CRWC has held two public informational meetings at which the VRAP Coordinator presented preliminary findings. Among those in attendance have been several community officials, including Conservation Commissioners from the watershed towns involved. The press has covered those meetings. Press releases have been published as well. A community cleanup of Willow Brook was successful. Many photos are on file. See Appendix E.

Project evaluation: In a written survey at the end of the season, volunteers commented on the project.

They stated that they participated because they wanted:

to see more of the river

to contribute to an information base

to use the equipment in doing something scientific

to join the other volunteers

to learn about water quality of the river.

They are frustrated when equipment doesn't work or supplies are missing or the kit is left messy.

They want to better understand the significance of the results. They want more timely analysis and reporting from the VRAP program. They are grateful for the support of the VRAP.

Some like going out early in the morning and others don't.

They liked doing the stream surveys because they saw new places and learned new concepts and skills.

They want to go ahead with the outreach efforts, but await the completed reports.

They are disappointed, but not discouraged by the trash, yard waste and neglect of the urban streams.

Farmington planning and conservation officials want to look further at their shoreland protection regulations and locate septic problems. Rochester planning and conservation officials are actively developing a new shoreland protection ordinance. They are also looking at access to and protection of Willow Brook. Several infrastructure improvements have already been made which will improve Willow Brook. CRWC members are involved in both communities and data has been made available for their use.

## **Conclusions and Recommendations**

As anticipated, the upper watershed tributary streams are in good condition where development pressure has not yet occurred. Where forest and wetland systems are intact, the streams continue to provide fish habitat and maintain high water quality. When development does occur in the upper watershed, it is apt to have significant impact on those streams because of slope and soil conditions. There is little shoreland protection by regulation of the small streams except where they are associated with wetlands. Strengthened regulation of development in rural and remote areas is necessary to prevent sprawl.

In the rural areas as well as in developed, but un-sewered, areas, older septic systems may be sources of bacterial contamination. Due to the lack of rainfall during the monitoring season, the monitors were unable to detect that occurrence. Areas were identified for further investigation by local officials in both Farmington and Rochester. The CRWC should continue to work with them as appropriate.



The practice of dumping trash and yard waste was observed on most every stream. Changes in individual behavior along with strong community policy may help alleviate the problems. Composting, recycling, environmental ethics awareness, and community beautification efforts are needed. Deadend roads are hotspots for dumping, and that is usually on public property.

Road crossings were almost universally sources of stream degradation. Debris, sand, erosion from runoff, and wear on roadsides were observed, especially at several stream crossings which were heavily used for parking for fishermen and other stream users. Community education on sustainable alternatives for road crews, decision-makers and citizens is recommended

The small streams which are within town or city developed areas are a resource worthy of protection and good management for public benefit. Planned access which prevents the wear of random access may be beneficial. Buffering areas should be maintained and protected as community open space instead of dumping grounds.

Wildlife habitat in the rural-urban interface can present problems. All the aspects of healthy urban habitats should be explored on Hurd Brook and Willow Brook. The confirmation of wild trout habitat may trigger changes in habitat management, including changes in fishing regulations.

## APPENDIX A: Quality Assurance Project Plan

## Appendix B: List of Volunteer Monitors

## Appendix C: Baseline Monitoring Results

## Appendix D: Stream Survey Results

Mad River

Isinglass River

Hayes Brook

Upper Cocheco

Unnamed Outlet from Sunrise Lake

Dick Dame Brook

Kicking Horse Brook

Ela River

Rattlesnake River

Pokamoonshine Brook

Hurd Brook

Axe Handle Brook

Willow Brook

## Appendix E: Outreach Materials