REGIONAL MUNICIPALITY OF OTTAWA CARLETON
MUNICIPALITÉ RÉGIONALE D'OTTAWA CARLETON

MEMORANDUM
NOTE DE SERVICE

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TO/DEST. The Chair and Members of Council

FROM/EXP. Director Water Environment Protection Division
Environment and Transportation Department

SUBJECT/OBJET **SURFACE WATER QUALITY PROGRAMME 1997**

INTRODUCTION

This report provides an overview of the Surface Water Quality Programme conducted in 1997, with emphasis on four of the major projects undertaken in that year. A more detailed summary report of programme activities in 1997 is available for information; the Table of Contents for the summary report is attached as Annex A. For specific technical results or recommendations on a project by project basis, individual reports prepared by or for the RMOC on aspects of the Programme are available in the Resource Centre. A list of such reports prepared based on data collected during the 1997 programme is attached as Annex B.

BACKGROUND

The Surface Water Quality Branch (SWQB) is an operational branch of the Water Environment Protection Division (WEPD), Environment and Transportation Department (ETD), Regional Municipality of Ottawa-Carleton (RMOC). Working out of the R.O. Pickard Environmental Centre, the SWQB conducts the Surface Water Quality Programme, funded out of the sewer fund.

In late 1990, a report outlining an enhanced Surface Water Quality Programme was brought to the Region's Environmental Services Committee and subsequently endorsed by both Executive Committee and Regional Council (*Executive Report #127 (1990)*. This report established the SWQB and empowered the Region to monitor and manage water quality within the Ottawa-Carleton area and to co-ordinate initiatives within the RMOC.

Information Previously Distributed
To be listed on Planning and Environment
Committee Agenda of 23 June 1998

The principal goals of the Surface Water Quality Programme are:

- to understand and report on the surface water environment;
- to protect the surface water environment from degradation and where necessary enable it to recover;
- to promote awareness of water environment issues through education;
- to co-ordinate surface water quality management activities of the RMOC with other concerned agencies.

The initiatives and deliverables of the RMOC's Surface Water Quality Programme are part of a larger effort within the regional, provincial and national communities to understand and protect our aquatic ecosystems.

Partner Agencies

The RMOC's Surface Water Quality Programme success is largely dependent on co-operation and participation by numerous water quality partners both within the region and outside of it. The technology and information transfer resulting from partnerships is of benefit both to the participating agencies and to the public.

The WEPD Director chairs meetings of the Water Quality Committee which are held quarterly. The goal of this Committee is to co-ordinate water quality initiatives within the Regional boundaries. Water Quality Partners invited to attend these meetings are the local municipalities, the three area Conservation Authorities, provincial representatives from the Ministries of Environment and Natural Resources and federal representatives from the National Capital Commission, Parks Canada and the Canadian Museum of Nature. Sub-Committees to the Water Quality Committee meet more frequently to address issues such as identifying priorities for sub-watershed studies, setting common conditions with respect to stormwater for development proposals, communication initiatives, etc. Any partner agency may participate on one or more sub-committees.

In addition to Water Quality Committee and Sub-Committee initiatives, the RMOC Surface Water Quality Programme has formed various partnership arrangements on a project-specific basis. Examples of such arrangements are:

- fish habitat assessment with the Ontario Ministry of Natural Resources;
- investigation of contaminants in stormwater facility sediments with Queen's University and the National Water Research Institute;
- zebra mussel investigation with the Canadian Museum of Nature;
- stormwater facility performance monitoring with various local municipalities.

This is not a complete list as many other projects are underway with other universities, agencies, etc. In some cases, Surface Water Quality Programme staff participate in projects for which other Water Quality Partners are the lead agency. For example, staff provide expertise and data as participants on the advisory committee for the Jock River Watershed Study being conducted by the Rideau Valley Conservation Authority (RVCA).

1997 Programme Highlights

Following are highlights from four of the projects or programmes undertaken in 1997. For more comprehensive information, please refer to the Surface Water Quality Programme 1997 Summary Report, or to the project specific reports available in the Resource Centre.

Rideau River Fisheries Assessment

The SWQB, in partnership with the Ontario Ministry of Natural Resources (OMNR), continued the fisheries programme in the Rideau River in 1997 from Manotick to Ottawa. The fisheries programme in 1997 consisted of:

- a netting survey to monitor long term fish population trends;
- a survey to locate important fish habitat for reproduction (spawning and nursery habitat inventory);
- measuring contaminant levels in sport fish species;
- monitoring the degree of fish mortality during the fall water level drawdown of the river.

Since it is not possible (or desirable) to catch every fish in the river to determine the fish population, an index of the population is measured instead by using a standardized netting technique. The standard used for this programme is that of the OMNR and is used to indicate abundance of species and size variation. Results are evaluated to determine whether there are changes in the index from year to year. Use of the provincial standard allows for data comparisons with other provincial waterways.

The 1997 netting programme occurred between Hog's Back and Black Rapids (Mooney's Bay Reach) in August.

Fifteen species of fish were found within this stretch of the Rideau River. Some of the species showed a declining trend, others a stable trend and no trend is apparent for some species. It must be noted that fish populations naturally fluctuate and data from a period of at least eight years should be available before definitive assessments of trends can be made. Change in technique or in expertise can also cause a shift in the trend. With these cautions in mind, following is a summary of the information available from the fisheries assessment work to date:

- The number of fish caught declined for smallmouth bass, walleye and rock bass from 1995 to 1996 but remained stable in 1997 at 1996 levels;
- The number of northern pike and muskellunge were similar for all three years.
- Pumpkinseed, brown bullhead and silver redhorse sucker fluctuated in numbers with no definite trends from 1995 to 1997.
- There was a declining trend in numbers caught for yellow perch, black crappie, bluegill and greater redhorse sucker from 1995 to 1997.

Potential fish habitat reproduction areas were surveyed in July from Manotick to north of the Bank Street bridge. A total of 68 sites were surveyed in 1997. Eighty-six percent of the sites

were found to be used by young-of-the-year fish (nursery areas) for at least one species. A summary of the number of spawning and nursery sites found by species is:

- yellow perch, smallmouth bass, largemouth bass - 34 to 39 sites each
- black crappie and rock bass - 27 sites each
- pumpkinseed and walleye - 10 to 13 sites each
- muskellunge - 5 sites
- northern pike and white sucker - 2 sites each
- bluegill and brown bullhead - 1 site each.

The locations of the nursery sites are used for planning purposes and when reviewing development proposals to ensure the least impact on the fishery resource.

Each year, Parks Canada drains the Rideau Canal for the winter months. The water level draw-down is a 3 metre change in depth. Similar to 1995 and 1996, the fall drawdown of the Rideau River to winter levels was monitored at 7 sites between Hog's Back and Black Rapids to determine the degree of fish mortality. The total number of fish deaths decreased from 1,469 in 1995 when the drawdown occurred in 24 hours to 821 in 1996 when the drawdown occurred over a 9 day period to 12 fish deaths at monitored sites in 1997 when the drawdown occurred over a 16 day period.

The more gradual drawdown over the entire drawdown depth substantially decreased fish mortality in 1997. SWQB has identified the impact of drawdown on fish to Parks Canada. Each season since 1995 SWQB has made recommendations to Parks Canada on drawndown rates in an effort to minimize the impact on fish by canal operations.

In 1995, RMOC collected 20 smallmouth bass for contaminant analysis by the Ontario Ministry of Environment (MOE). In 1997, the MOE collected fish samples from 11 species between Smiths Falls and Black Rapids for contaminant analysis. The mean mercury levels ranged from 0.04 ppm to 0.68 ppm in 1995 and 1997. The consumption restriction level begins at 0.5 ppm, indicating the necessity for some restrictions. Consumption restrictions are based on the lengths of the fish and the mercury levels.

Information gathered as part of this project is incorporated into the MOE's "Guide to Eating Ontario Sports Fish", a public information and health document.

A report summarizing the 1995, 1996 and 1997 fisheries assessment programmes (*Rideau River Fisheries Assessment Report 1995-1997)* was prepared at the conclusion of the 1997 programme.

Baseline Monitoring

The Baseline Monitoring Programme goal is to provide data for long term assessment of general water quality trends within the RMOC. The concept of baseline monitoring of RMOC surface waters was initiated in 1991 although, at that time, the majority of sampling and analysis focused on bacteriological data collection. In 1993 water quality analysis was expanded to include nutrients, general chemistry, anions, suspended solids and metals. Currently, within the Region, approximately 150 baseline monitoring sites are sampled on a monthly cycle. In 1997, approximately 1700 samples were collected and analysed.

The Baseline Monitoring Programme is under review and additional parameters are being considered for analysis which will embrace the ecosystem approach to offer better watershed management and decision-making information. Parameters such as oxygen, chlorophyll, and phytoplankton give indications of what potential the water environment has to support aquatic life forms.

Trends through time are not expected to be evident until approximately 10 years of data are available. One reason for this length of time is the fact that baseline samples are collected on a time specific basis, not on a weather related basis. Statistically, it takes years of data to 'average' out the effects of dry weather and wet weather sample data for a given location.

The locations of baseline sampling sites are selected to obtain data from within significant sub-watersheds of the RMOC. Many of the data requests received annually from the public are answered based on baseline monitoring results. Through the Water Quality Partners, efforts are made to co-ordinate sampling locations of partners so that there is no duplication of effort for data collection and common data utilization needs are identified.

Rideau River - Mooney's Bay Modelling

The Rideau River upstream of Hog's Back Dam, and in particular the Mooney's Bay area, has historically warranted a substantial effort by the SWQB due to its significance as an important urban water recreational area and since much of the land development pressures will potentially impact this stretch of the Rideau River. The SWQB has initiated various monitoring activities and studies encompassing an "ecosystem approach" to water quality monitoring in this stretch of the river.

In 1993, the SWQB, Environment Canada and the National Research Council identified common interests and proceeded with the development and implementation of an integrated monitoring programme geared to assess management options for a portion of the Rideau River Watershed. The three main target issues to be addressed were: beach closures, beach-pumping operations and prioritization of stormwater infrastructure improvements.

In order to support environmentally sound development within the watershed, the SWQB has been investigating the river's physical, chemical and biological characteristics. Part of the SWQB programme includes the development of computer-based numerical models to aid in planning future development and drainage within the Rideau River Watershed. Contracted to the SWQB,

the consulting firm of Baird & Associates Ltd., in conjunction with the National Research Council's Canadian Hydraulics Centre (CHC) worked together to develop three and two dimensional models for Mooney's Bay and for the reach of the Rideau River extending from Manotick to Mooney's Bay, respectively.

Calibration of the 3-dimensional model was completed in 1997 with model runs initiated to evaluate the predictive capabilities of the model. Work commenced on the 2-dimensional model for the section of the river from Manotick downstream to Hog's Back, encompassing all major inputs to the river.

The immediate application of these models is to enable policy review by the MOE for discharge criteria for stormwater management facilities outletting to the Rideau River. To meet the requirements of the MOE for criteria discussions, full development build-out scenarios are planned to be run by the model and the information used for public discussion in 1998. This component of the project is being co-ordinated by SWQB with the Cities of Ottawa, Gloucester and Nepean and the MOE.

Stormwater Management Facility Performance Monitoring

In 1997, Surface Water Quality staff undertook monitoring of a number of stormwater management facilities. This monitoring effort works towards the goal of protection of the aquatic environment because evaluation of the success of existing management techniques is conducted with the view to improve the design, operation and maintenance of existing and future controls.

SWQB was under contract to the City of Nepean and the consulting firm of CH2M Gore and Storrie for the City of Gloucester to monitor the following facilities:

- Kennedy-Burnett Settling Pond
- Fisher Glen Stormwater Pond
- Merivale Gardens Settling Pond
- Merivale Trunk Storm Sewer (MTSS, or Colonnade)
- Foster Drain Stormwater Facility
- Phase-1 of the Gloucester South Urban Community Stormwater Pond #1

Monitoring the Region of Ottawa-Carleton's infiltration facility at Hunt Club Road was also undertaken by the Branch in 1997, for the seventh year. This facility is one of the few successful examples of stormwater infiltration technology within the Province and has drawn interest from the MOE's SWAMP (Stormwater Assessment Monitoring and Performance) Programme membership. The technology is of interest for potential transfer to other areas of the Province. A technical paper regarding the facility was presented at the first SWAMP conference in Toronto in February 1998.

Reports on the performance results of these facilities were prepared by the SWQB at the conclusion of the monitoring field activities.

1998 and Future Activities

The 1998 programme is continuing on the basis of the four principal goals stated above. There has been some re-direction of focus in order to take time to review the baseline program and to ensure that monitoring activities support and complement each other in a comprehensive manner for area watercourses. Efforts are also being directed towards Regional facilities, both in terms of receiving water and stormwater management monitoring. Data management is being examined with the view to ensure data reliability and accessibility from the time of sample collection to storage in the computer archival system. Public education and involvement of the public in setting priorities for the management of funds allocated towards the aquatic environment will be an on-going initiative of the programme.

The Branch will continue to work in partnership with other agencies to meet common goals. The Canadian Museum of Nature Biodiversity Study of the Rideau River is one example of such a project in 1998.

As is the case for any successful programme or project, planning is a key requirement. In the case of environmental initiatives, the planning process is iterative since original decisions must be reviewed as more current information becomes available. The sub-watershed planning process will be the foundation for all sound decision-making for Region of Ottawa-Carleton watercourses. The Surface Water Quality Programme and Water Quality Partners are in the process of conducting some studies, of setting priorities for next studies and of reviewing recommendations of past studies. Recommendations of the studies will be brought to the appropriate decision-making bodies of the Water Quality Partners, as required.

Core activities of the Region of Ottawa-Carleton Surface Water Quality Programme, such as Baseline Monitoring and Fisheries Assessment, will contribute information necessary for public consultation and decision making processes done in the course of sub-watershed plan development.

Approved by
Nancy B. Schepers, P. Eng.

MT/mlb

Attach. (2)

ANNEX A

SURFACE WATER QUALITY PROGRAMME
WATER ENVIRONMENT PROTECTION DIVISION
1997
PROGRAMME SUMMARY REPORT

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APPENDIX

ANNEX B

SURFACE WATER QUALITY PROGRAMME
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List of Reports Prepared by / for the SWQB in 1997

- Britannia Beach 1997 Water Quality Monitoring Report (SWQB)
- Development of a Numerical Model of Mooney's Bay (Baird & Associates)
- Surface Water Quality Branch Statistical Analysis Study (Aquafor Beech Limited)
- Gloucester South Urban Community, Stormwater Management Pond #1, Enhanced Monitoring Programme Data Report, 1997 (SWQB)
- Hunt Club - Rideau Bridge Stormwater Management Facility, 1997 Monitoring and Operations Report (SWQB)
- City of Nepean Stormwater Management Facilities, 1997 Monitoring Report (SWQB)
- Seasonal and Disturbance Event Fluctuations in Phytoplankton Composition and Water Quality in the Lower Rideau River, including Mooney's Bay, during 1996 (Canadian Museum of Nature)
- 1997 Larval Settlement of the Zebra Mussel in the Rideau River and Ottawa River, Eastern Ontario - Draft (Canadian Museum of Nature)
- Rideau River Fisheries Assessment Report 1995-1997 (A. Bendig for SWQB)
- Erosion and Sediment Control Practices on Construction Sites in Ottawa-Carleton (MOE)
- Laboratory Loading Analysis (SWQB)