

THE PROTECTION OF OUR WATER RESOURCES

A CONSERVATION AUTHORITY PERSPECTIVE BY BOB EDMONDSON, DIRECTOR, WATERSHED MANAGEMENT SERVICES, CONSERVATION HALTON

Conservation authorities, particularly in the Greater Toronto Area, are known to most people for the conservation areas and large tracts of lands that they own and manage for outdoor recreation and education programs. In reality, the formation of conservation authorities came about with the passing of the *Conservation Authorities Act* in 1946 in response to concern expressed by agricultural, naturalist and sportsmen's groups "that all the renewable natural resources of the province were in an unhealthy state." The passing

of the Humber watershed in Toronto. Approximately 81 deaths were attributed to Hurricane Hazel and some 4,000 people left homeless. The damage was put at approximately \$1 billion in today's dollars. The significance of Hurricane Hazel is that it is the storm event that is used in today's standards in dealing with floodplain issues and the protection of life and property.

Hurricane Hazel served as an added initiative for municipalities to join and request the province to form a conservation authority as they were looked at as the ideal agency to deal with flood management on a watershed basis. Today there are 36 conservation authorities across Ontario.

Each conservation authority that was formed prepared a *Conservation Report* on the state of their watershed(s) that looked at flood management issues, the health of the watershed, opportunities for reforestation, recreation and land acquisition. In fact, most of the large tracts of land that are owned by conservation au-

thorities today were originally identified from these early reports that were done in the 1950s and 1960s. These early reports also looked at opportunities to protect life and property through flood management schemes that controlled flooding and erosion. This entailed the identification of sites for reservoirs to control flood flows and channelization projects to divert flows from susceptible areas or control erosion. As a result, significant investment was made in this type of structural

approach to flood management that took place throughout the 1960s and 1970s. Examples in the Conservation Halton watershed include the construction of the Kelso, Hilton Falls and Scotch Block dams and reservoirs on the Sixteen Mile Creek and the Mountsberg dam and reservoir on the Bronte Creek. Diversion channels were built in Oakville and Burlington to alleviate flooding in core areas of these centres. A channelization project in Milton was built to control the flows from the Sixteen Mile Creek and alleviate erosion through the downtown core.

Flood Damage Reduction Program

Later in the 1970s a regulatory approach was taken to deal with development within floodplains. Regulations were enacted by conservation authorities through the *Conservation Authorities Act* dealing with construction within floodplains, alteration of watercourses and the filling of valley systems and wetlands. Regional storm events were used as the regulatory storm event, which in the case of most of Southern Ontario is the Hurricane Hazel event that occurred over the Humber Watershed in 1954. In the early 1980s the federal and provincial governments sponsored the *Flood Damage Reduction Program*, which involved the mapping and delineation of floodplains by



Hurricane Hazel, 1954

of the Act provided the means by which the province and municipalities could join together to form a conservation authority within a specified area – the watershed – to undertake programs for natural resource management. A conservation authority is basically a community-based agency formed on a watershed basis in partnership with its municipalities and the province to deal with resource management issues that cross municipal boundaries.

Many of the earlier conservation authorities were formed to deal with resource management issues such as large reforestation initiatives within their watersheds. Most, however, came into being following Hurricane Hazel which found its way into the Province of Ontario in October 1954 resulting in significant loss of life and property damage, particularly within



conservation authorities based on the regulatory storm. In effect, the intensity and duration of that storm event is transposed over a watershed to determine the extent of flooding that would occur in that watershed during that storm event. Development is prohibited or discouraged from taking place within that flood line. This approach by the province, in restricting development within the floodplain has been borne out in comparisons between significant storm events in Ontario and other jurisdictions. A well documented study comparing flooding in Ontario and Michigan found that although Michigan sustained extensive damage and suffered loss of life, Ontario had, during that same time period, higher flood yields. Even though Ontario's yields were higher the province recorded a small fraction of Michigan's damages. The difference in damages was estimated to be approximately \$500,000 in Ontario compared to \$310,000,000 in Michigan.

Controlling Development

The Province of Ontario through the *Provincial Policy Statement* identifies the importance of restricting development within floodplains and hazardous lands through Part 3 of the policy statement dealing with Natural Hazards. Conservation authorities represent the provincial interest in matters of natural hazards at the local or municipal level in dealing with development applications.

A conservation authority's regulation for flood plains and fill-regulated areas (e.g. valley lands and wetlands) also deals with the control of pollution and conservation of land as they may be affected by development. Conservation of land within the context of a conservation authority regulation includes preserving the ecological integrity of, for example, a valley system.

Changes to the *Conservation Authorities Act* in 1999 resulted in the development of a *Generic Regulation* to be used by all conservation authorities to ensure more consistency among their individual regulations. In May 2004, the Province of Ontario enacted *Ontario Regulation 97/04* entitled, "Development, Interference with Wetlands & Alterations to Shorelines and Watercourses Regulation." This provides for the regulation of all wa-

tercourses, either permanent or intermittent, floodplains and meander belts (of watercourses), erosion hazards, shorelines, wetlands and associated lands and other hazardous lands (e.g. areas of karst topography). Conservation authorities had two years to bring their individual regulations into conformity with the *Generic Regulation*, which each conservation authority in the province has done as of May 2006.

Changes to the Act and the implementation of the *Generic Regulation* and the

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associated individual conservation authority regulations have essentially placed all natural hazards as identified in the *Provincial Policy Statement* under the regulations of a conservation authority. Development taking place within an area regulated by a conservation authority requires permission from that conservation authority. Violations of the regulation can result in fines of up to \$10,000 or three months in prison. Further, judgments can result in significant restoration costs.

The regulations, in addition to protecting against natural hazards, also allow for the protection of watercourses, valley lands and wetlands. Coupled with this are watershed studies undertaken by conservation authorities to identify restoration initiatives and opportunities to protect and enhance watercourses, valley lands, wetlands and other natural heritage features and to look at strategies for natural heritage systems that should be protected for the long term.

Protecting Fish Habitat

Conservation authorities have also formed partnerships with other agencies for the protection of natural features and habitats. This includes the signing of Memorandums of Understanding with

municipalities to provide expert advice on development applications as they may affect natural heritage systems and the signing of agreements with the Department of Fisheries and Oceans to protect fish habitat. Conservation authorities take an active role with their municipal partners in developing subwatershed studies and implementing recommended strategies as lands are urbanized.

The *Federal Fisheries Act* has become much more prominent in the last number of years in protecting fish habitat that may be affected by development. It should be noted that the Act is not new as it was first passed in 1868. Most conservation authorities have formed partnerships through agreements with the Department of Fisheries and Oceans to screen development applications for impacts to fish habitat with the guiding principle of no net loss to fish habitat. What is important to understand is the definition for fish habitat within the *Federal Fisheries Act*:

"Spawning grounds and nursery, rearing, food supply, migration and other areas on which fish depend directly or indirectly in order to carry out their life processes."

A watercourse does not have to contain fish in it to be considered fish habitat or have permanent standing water. An intermittent watercourse that does not have fish in it yet contributes a food supply to fish is considered fish habitat. Section 35 (1) of the *Federal Fisheries Act* prohibits the harmful alteration, disruption or destruction of fish habitat (HADD) without authorization by the Department of Fisheries and Oceans. Contravention of Section 35 (1) may result in a fine of \$1,000,000 and three years in prison.

Low Water Response Teams

Most conservation authorities have developed well-rounded programs over the years in caring for the health of their watersheds through restoration initiatives; acquisition of significant natural heritage areas; provision of open space recreational opportunities; stewardship initiatives with private landowners; providing assistance programs to landowners; establishing environmental monitoring programs; key messaging to the public on environmental



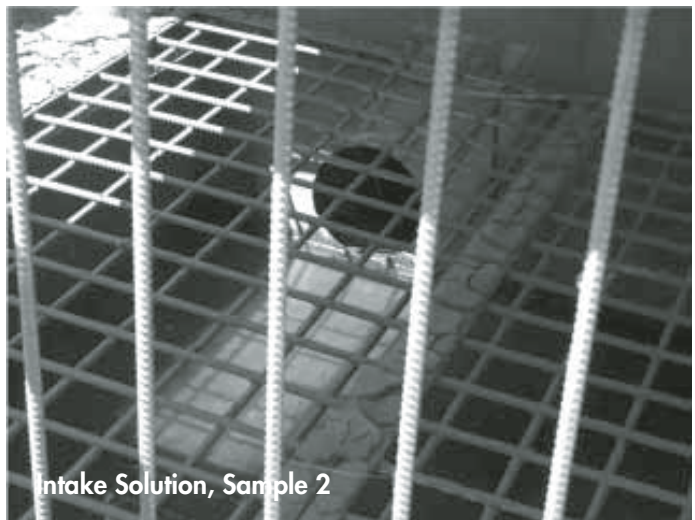
Flood Control Then



Flood Control Now



Intake Solution, Sample 1



Intake Solution, Sample 2

matters; advocating for environmental initiatives and implementing specific programs to address the needs of their watersheds.

An example of specific watershed programs includes the development of local *Low Water Response Teams* by most conservation authorities to deal with drought conditions within their watersheds. The programs were developed from measures undertaken by the province in the late 1990s in response to low precipitation. The programs are basically voluntary in nature to initiate actions to address low water conditions in streams or rivers and groundwater tables. The programs use indicators of precipitation and streamflow measured against normal averages. Three different levels of conditions are considered reflecting prolonged periods with little or no precipitation and corresponding reductions in streamflows. Initial actions include voluntary reductions in water use

with the most extreme level (Level III) potentially resulting in regulation of water restrictions by provincial agencies. The typical *Low Water Response Teams* that are formed include representatives from municipalities, provincial agencies, the agricultural community, sportsmen associations, golf courses, aggregate operators and the water bottling industry. The teams will meet to review low water conditions; communication action plans to landowners and water conservation recommendations.

Source Protection Initiatives

The contamination of the water supply in the Town of Walkerton in 2000 has led to the province looking at protecting drinking water supplies at its source. Conservation authorities have been identified as playing a key role in the development of source protection plans to protect municipal drinking water supplies. Technical

teams have been formed in watershed regions to gather data and information in characterizing the watersheds for the preparation of source water protection plans. The information gathered from existing studies and through new studies has helped all conservation authorities gain a better understanding of the dynamics of their watersheds and the impacts of water taking on surface and groundwater supplies. Shortly, *Source Water Protection Committees* will be formed for each watershed region to prepare assessment reports for their watersheds and ultimately source water protection plans to ensure the long-term protection of drinking water supplies.

Minimizing Sediment Loading

A continuing problem in protecting water resources has been attempting to control sediment loading to watercourses particularly from construction and de-

velopment activities. Section 36 (1) of the *Federal Fisheries Act* states that “no person shall deposit or permit the deposit of a deleterious substance into water frequented by fish.” The release of sediment to a watercourse is considered a deleterious substance by the Department of Fisheries and Oceans and there have been well documented cases of substantial fines levied for violation of the Act relating to the release of sediment particularly resulting from construction activities.

Excess sediment can have impacts on fish through abrasion of their gill membranes and suffocating of their eggs. Sediment can also carry toxins, bacteria and excess nutrients and can result in the depletion of oxygen within a water body. Physically, excess sediment can affect flooding, fill in wetlands and influence the geomorphic stability of a watercourse channel.

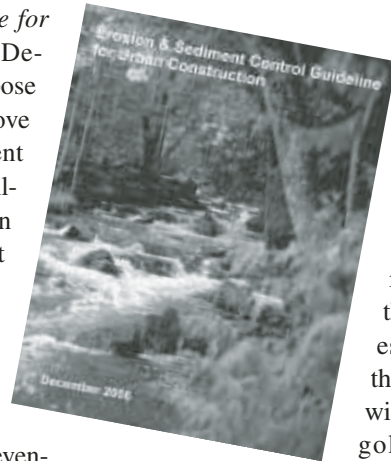
Fish are typically stressed where total suspended solids (TSS) exceed levels of 200 mg/L for prolonged periods. Studies on construction sites in Piedmont, Vermont show the benefits of having erosion and sediment control practices in place in relation to concentrations of sediment:

Pre-construction (background level):	25 mg/L
Post construction:	50 mg/L
Erosion & Sediment Controls:	283 mg/L
Erosion Controls Only:	680 mg/L
No Erosion or Sediment Controls:	4145 mg/L

Studies undertaken more recently in the Toronto area have shown similar results.

Typical factors contributing to problems on construction sites relate to lack of phasing during clearing and grading; long lags between soil disturbance and stabilization; unnecessary clearing of sensitive areas such as riparian buffers, steep slopes and wetlands; inadequate maintenance of sediment controls; poor field inspection practices and enforcement of erosion and sediment control plans.

Erosion and Sediment Control Plans are typically required by conservation authorities through approvals associated with their regulations or by municipalities as conditions of development through the planning process. Recently the conservation authorities within the Greater Toronto Area have produced an *Erosion and Sediment Control Guide for Urban Construction* (December 2006). The purpose of the guide is to improve the practice of sediment control, ensure that a well-defined process is in place and ensure that Erosion and Sediment Control plans are prepared, implemented and enforced. The guide stresses the importance of erosion prevention. It is intended for contractors, consultants, developers/owners, government agencies and government inspectors. Current erosion and sediment control practices and methods are illustrated. More information on the document and up-to-date information on sediment and erosion control is at www.sustainabletechnologies.ca.



Water Takings

A *Permit to Take Water* (PTTW) is required from the Ministry of the Environment where the taking of water from a surface or groundwater source exceeds 50,000 litres per day (10,000 gallons). In recent years, the Ministry of the Environment has initiated new water conservation requirements for permits to take water. A new classification system has been introduced that places takings in categories as to their potential for causing adverse environmental impacts. There is a greater emphasis on maintaining data on the taking of water on a daily basis and requirements for monitoring and reporting on an annual basis. Water takings in high use watersheds can be refused. Conservation authorities have always been concerned with the taking of water within their watersheds and the cumulative impacts that can affect the aquatic environment. While the Ministry of the Environment

through their PTTW controls the actual taking of water, conservation authorities can influence the water takings through their regulatory control on the structures that are required to facilitate the water taking.

In some watersheds, strategies have been developed that set thresholds below which water cannot be taken. In permitting the intake structures, the conservation authority can establish the setting of the intake to ensure that water is not taken during periods of low flow where the taking would affect the established threshold for that watercourse. In dealing with developments such as golf courses, new golf courses and changes in designs to older golf courses, designers have

looked at retaining more runoff from overland flow into larger irrigation reservoirs. This ensures that there is less reliance on water taking, particularly during drought or periods of low precipitation. In many cases, these reservoirs are large enough to supply other ponds scattered throughout the course that are in place for aesthetics or “water hazards” rather than for irrigation purposes. With many of these new designs or re-designs, conservation authorities will work with the Ministry of the Environment and the applicant to ensure that any water taking from a watercourse will not result in environment impacts by constructing the intakes so that water can only be harvested during high flows.

In summary, the main role and mandate of a conservation authority is to provide for programs that protect and enhance the natural resources of its watershed and to provide for the protection of property and life through regulatory control pertaining to natural hazards. Hopefully, this article has helped explain some of the history of the conservation authority movement and some of the tools, programs and partnerships that are utilized by conservation authorities to fulfill their role and mandate. ♦