



# THE SEVERN SOUND RAP:

TEN YEARS OF HARD WORK PAYS OFF

CANADA-ONTARIO AGREEMENT RESPECTING  
THE GREAT LAKES BASIN ECOSYSTEM

Canada  Ontario



8. leopard frog

## Overview

THE SPARKLE IS BACK IN THE CLEAR BLUE WATERS OF SEVERN SOUND. It has taken more than ten years of hard work and the coordinated efforts of the governments of Canada and Ontario, and local authorities to restore the health of the sound. While there will always be another environmental project to complete, another potential problem to monitor, Severn Sound is poised to be crossed off the list of Great Lakes Areas of Concern.

“We are hoping to be formally delisted later this year, but we still have to get through a technically rigorous review process,” says Keith Sherman. Working out of the Wye Marsh Wildlife Centre, Keith Sherman is coordinator of the Severn Sound Environmental Association and, until the sound is no longer considered an Area of Concern (AOC), coordinator of its RAP, as well.

## Welcome to Severn Sound

The Severn Sound Area of Concern – one of 16 AOCs identified for remedial action in Canada’s Great Lakes Basin – is located in southeastern Georgian Bay. The sound is dotted with thousands of rocky islands and its edges are scalloped by smaller inlets, bays and harbours, including Penetang, Midland, Hog, Sturgeon, and Matchedash.

The watershed – a patchwork of farms, forests, parks and urban centres – covers an area of 1,098 square kilometres. Situated on the dividing line between the majestic Canadian Shield country to the north and the rich agricultural lands to the south, the area is an extremely popular tourist destination. The shores of the sound are ringed by cottages, marinas and resorts, while two significant population centres – Midland and Penetanguishene – are situated on its south side.



9. Severn Sound riparian zone after fencing



*The Severn Sound Environmental Association is an excellent example of the kind of place-based, shared environmental responsibility that the governments of Canada and Ontario will be working to foster in AOCs around the Great Lakes under the new COA.*

## **Problems linked to phosphorous**

In the late 1980s, a number of the beneficial uses that people had come to take for granted – swimming and fishing – were deemed “impaired” in Severn Sound. There were restrictions on fish and wildlife consumption. The aquatic habitat, the bottom dwelling community, and the plankton populations were all degraded. The walleye, a valuable game fish, had almost abandoned the sound and was replaced by species that could better tolerate its murky waters and low oxygen conditions. There were also aesthetic complaints; on occasion, the drinking water could taste funny and smell worse.

Many of the environmental impairments were linked to excessive algal growth – filamentous slime covered much of the shallows and suspended algae clouded the water column. When those algal blooms died back and began to decompose, much of the oxygen was stripped from the water at the bottom of the sound in a process known as eutrophication. The problem was especially pronounced in the constricted bays on the south shore of the sound.

The algal population explosion was caused, primarily, by high phosphorus levels that could be traced back to sewage treatment plant (STP) effluents, agricultural activities, shoreline development, and other sources. The solution has been to reduce nutrient loadings from both point sources, such as the outfalls of sewage treatment plants, and non-point sources, such as urban stormwater and rural runoff. Overall, there have been definite improvements in water clarity and a significant decrease in suspended algae.

The Severn Sound Tributary Rehabilitation Program was launched in 1992 to help landowners restore stream habitats. Actions include restricting livestock access to streams by erecting fences, and planting trees along streambanks to reduce erosion. Over 70 kilometres of stream habitat have been rehabilitated, a total of 107,000 native trees and shrubs have been planted, and some 2,260 livestock have been fenced away from riverbanks. As a result, an estimated 1,000 kilograms of phosphorus will be prevented from reaching the watercourses each year.

## **Getting the lead out!**

Back in 1990, the Trumpeter Swan was reintroduced into the Wye Marsh, just east of Midland at the southern end of the Severn Sound. But as soon as the birds spread beyond the sanctuary boundary of the marsh where hunting takes place, they began to exhibit the classic symptoms of lead poisoning. Although lead shot has been banned for hunting waterfowl, many of the small pellets can still be found in the marsh sediments. The Trumpeter Swan seems to favour small pebbles (or grit) ... just about the size of a lead pellet. “The Trumpeter Swan is very susceptible to lead poisoning,” says RAP Coordinator Keith Sherman. “It only takes two or three pellets to make a bird sick, so we had to find some way to get rid of the lead.”

Dredging would destroy the wetland. So the Severn Sound RAP team and Wye Marsh staff put their heads together and devised a kind of large vibrating hairbrush to do the job. Built with the support of the Great Lakes 2000 Cleanup Fund, the brush is mounted on the end of a hydraulic arm which, in turn, is set on a shallow-draft barge. Steered into pools in open areas of the marsh, the arm pushes the brush into the muddy bottom where it begins to vibrate rapidly. As a result, the lead pellets sink deeper into the sediments and out of the reach of the swans.

So far the incredible sounding scheme seems to be working. On-going monitoring has shown blood lead levels are declining in the swan population, and there have been fewer lead-related health problems observed.



**Cover:** Severn Sound  
**Cover inset:** volunteers

1. Penetang Bay wood wastes
2. Severn Sound
3. Getting the lead out
4. Severn Sound algae

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Approximately 900 agricultural operations are located across the watershed. Farmers have been encouraged to do their bit to restore Severn Sound by adopting better manure storage and handling methods, switching to conservation tillage, treating milkhouse washwater, controlling barnyard runoff, and upgrading private sewage disposal systems. To date, more than 80 on-farm projects have been undertaken.

The urban communities have also embraced the RAP objectives. For example, a number of stormwater management options were examined for downtown Penetanguishene, and a constructed wetland was judged the most suitable. The wetland receives stormwater diverted from existing urban catchments that formerly discharged – directly and untreated – into Penetang Bay.

The project had the support of the Ontario Great Lakes Renewal Foundation, the Town of Penetanguishene, the Ministry of Natural Resources, the RAP Office, the Rotary Club and other service groups, and dozens of volunteers. “As a result, Penetanguishene has gained a well designed and sustainable urban stormwater treatment area that also functions as an educational wetland feature within the town’s waterfront park,” says J. Boucher, Director of public works for the Town of Penetanguishene.

### **There is always more to do**

There will always be long term projects to sustain the gains – reducing farm runoff, re-establishing habitat, controlling urban stormwater – that will require the attention of local communities over the years ahead. A municipality cannot afford to dig up all its roads and replace all its combined sewers or control stormwater right away.

Nothing is ever simple in the restoration business. In the midst of the clean-up, the voracious zebra mussel began its invasion of the sound. “They’ve taken out much of the algae, but they’re very selective,” says Sherman. “Unfortunately, they won’t eat the blue-green variety. If we hadn’t reduced the phosphorus levels, the problem would have been much worse.” Further action to control non-point sources of phosphorus should help clear up any residual algae problems.

### **Harvesting an underwater forest**

For the past 140 years, much of the bottom of Penetang Bay has been carpeted with a thick layer of sawdust, wood slabs and logs – the legacy of the sawmills that used to operate in the area. As long as the water was murky, nobody could see the debris. But as the water began to clear – thanks to the efforts of the Severn Sound RAP – a violent storm temporarily lowered the water level in the Bay, dramatically exposing the ugly blanket of waste wood. People began to complain.

Through a partnership between the town of Penetanguishene, the Great Lakes 2000 Cleanup Fund and the Severn Sound RAP, a cleanup campaign was undertaken in October of 1994. About 4,000 cubic metres of sludge and wood wastes were scraped off the bottom of the bay. The recovered logs were donated to the local museum for its sawmill demonstration. The mixture of sawdust, mud and algae was composted and quickly snapped up for use in local parks and gardens. The stumps and other wood wastes were sent to a stump composting facility, and a single hopper of trash was delivered to the dump.

“Most importantly, we restored some four hectares of nearshore habitat,” says RAP Coordinator Keith Sherman. With the layer of wood waste removed and the water clean again aquatic plants could re-establish themselves on the bottom. “This was an unusual project; we had to learn as we went along,” says Sherman, “but the same techniques could easily be applied in other RAPs.”

### **Success through partnership**

Through the Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA), the governments of Canada and Ontario have been supporting the RAP work since 1987. The Great Lakes Cleanup Fund – now the Great Lakes Sustainability Fund – has provided \$3.1 million toward restoring environmental quality in the sound. This investment has generated a further \$3 million in direct partner

*“Nothing is ever simple in the restoration business”*

funding, \$2 million in in-kind donations, and volunteer labour valued at approximately \$30,000. In addition to the cash, the fund has acted as a catalyst, providing the critical scientific and technical skills that made many of the RAP projects and partnerships so successful.

In total, the government of Ontario has contributed almost \$23 million to finance STP upgrades, to alleviate combined sewer overflows, and to bring private sewage systems on-line. In addition to funding, the government of Ontario has committed highly motivated staff to aid restoration efforts in the sound.

*Most at risk are the shallow nearshore areas of Severn Sound, and they are essential to maintaining a healthy and productive fish community.*

In 1997, local stakeholders banded together to form a partnership agreement. In the end, eight municipalities, Environment Canada, the Ontario Ministry of the Environment and the Friends of Wye Marsh Inc. (an environmental non-profit organization) have pledged their continued support for RAP implementation through the Severn Sound Environmental Association.

The association has continued the coordinated implementation of the RAP by marshalling the expertise, perspectives and resources needed to restore and sustain the Severn Sound ecosystem.

The association will continue to operate even after the RAP work is completed. The municipalities find the association is very useful in dealing with all their new environmental responsibilities.

Life is good in Severn Sound. Sports fishing and other beneficial uses have been restored, an overloaded environment has largely recovered, and the economic viability of the whole watershed has improved. In the years ahead, association members will strive to protect and sustain the environmental gains

## Protecting habitat for fish

Most at risk are the shallow nearshore areas of Severn Sound, and they are essential to maintaining a healthy and productive fish community. Most fish species use the nearshore as spawning, nursery and feeding habitats, yet these areas are most often affected by filling, shoreline hardening, dock construction and beach clearing, etc. The Severn Sound RAP team recognized a potential future threat and developed a Fish Habitat Management Plan to guide development away from the most sensitive areas.

The Department of Fisheries and Oceans and the Ontario Ministry of Natural Resources collaborated on a multi-year research study to identify the various habitat types in Severn Sound and the fish community that uses them.

The result of their study was a Geographic Information System based model of Severn Sound that puts the nearshore habitats into three categories: highly sensitive (to development), moderately sensitive and least sensitive. The classification system is presented as a three colour map of Severn Sound and is used by township planners to direct development away from the most sensitive areas.

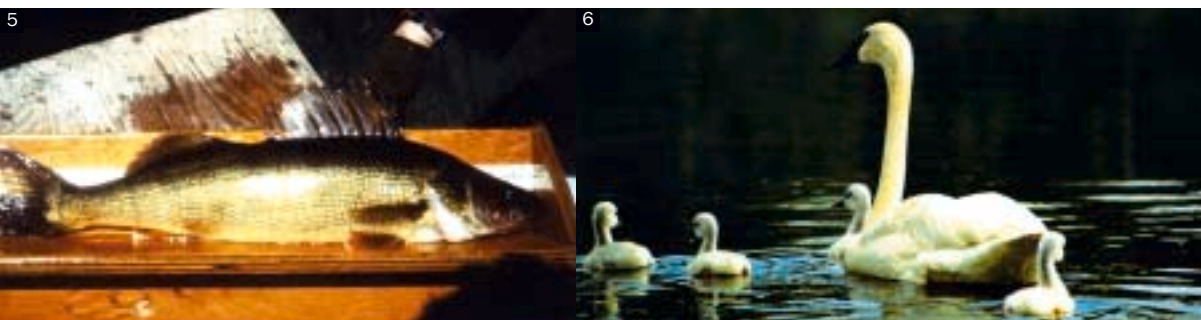
The Severn Sound RAP is the first Canadian RAP to develop a Fish Habitat Management Plan to steer development away from important habitat to less sensitive sites. Similar plans are being developed for the Bay of Quinte and Hamilton Harbour.

that have been achieved, and work to ensure that new development and other environmental stresses do not threaten any of these hard-won improvements.

The Severn Sound Environmental Association is an excellent example of the kind of place-based, shared environmental responsibility that the governments of Canada and Ontario will be working to foster in AOCs around the Great Lakes under the new COA.

Over the next five years, it is anticipated that a number of AOCs will be fully restored and that significant progress will be made in meeting the objectives of the other RAPs in the remaining AOCs. The remediation of Collingwood Harbour was completed in 1994.

5. walleye 6. Trumpeter Swans 7. Severn Sound



## Great Lakes acronyms

The purpose of the Canada-U.S. Great Lakes Water Quality Agreement (GLWQA), is to restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem.

The Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA) promotes cooperative action between the governments of Canada and Ontario and enlists partners to restore and sustain the environmental quality of the Great Lakes. COA helps Canada meet its obligations under the GLWQA.

Under the GLWQA, Canada and the United States have presently designated 42 Areas of Concern (AOCs), 16 of which are in Canada. In AOCs, environmental degradation is particularly pronounced causing impaired beneficial uses such as restrictions on swimming, fishing and drinking water consumption, and/or contributing to the overall degradation of the Great Lakes.

For each of the AOCs individually tailored Remedial Action Plans (RAPs) have been developed and are being implemented. Restoring the beneficial uses in the AOCs through the RAPs is a key priority for the governments of Canada and Ontario under COA.

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Respecting the Great Lakes Basin Ecosystem

*To learn more about COA and the  
RAPs, contact:*

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