

LSEMS

PHASE III

LSEMS PHASE III PROGRESS REPORT SUMMARY



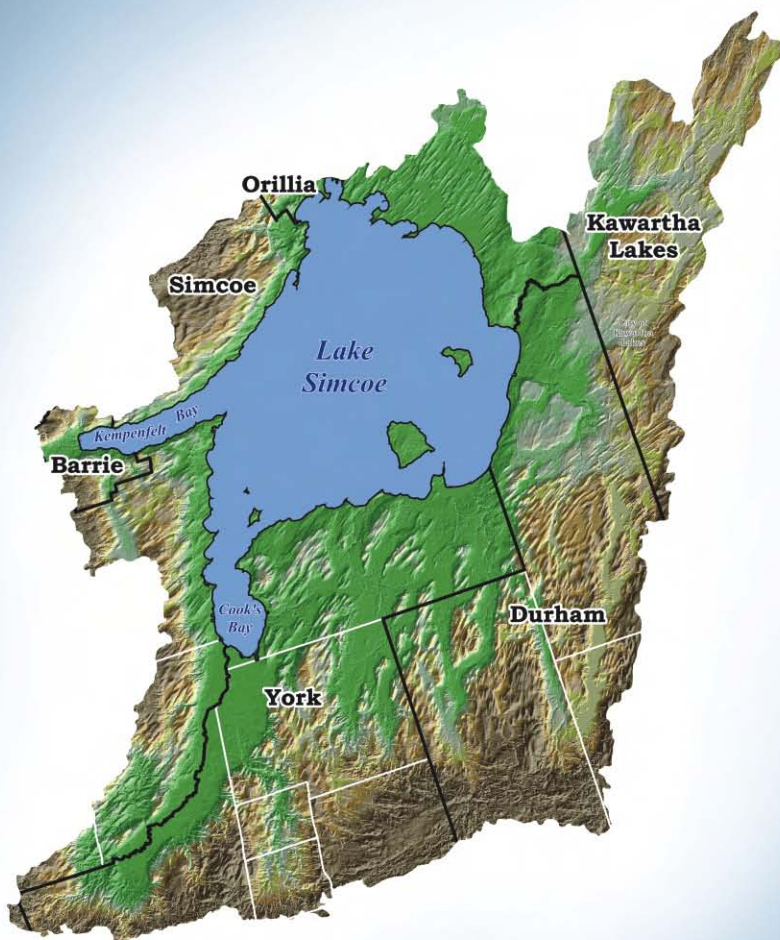
LAKE
SIMCOE
ENVIRONMENTAL
MANAGEMENT
STRATEGY

LAKE SIMCOE ENVIRONMENTAL MANAGEMENT STRATEGY

LSEMS PARTNERS

Chippewas of Georgina Islands First Nations
City of Barrie
City of Kawartha Lakes
City of Orillia
County of Simcoe
Fisheries and Oceans Canada
Lake Simcoe Conservation Foundation
Lake Simcoe Region Conservation Authority
Ontario Ministry of Agriculture, Food and Rural Affairs
Ontario Ministry of the Environment

Ontario Ministry of Municipal Affairs and Housing
Ontario Ministry of Natural Resources
Regional Municipality of Durham
Regional Municipality of York
Town of Bradford West Gwillimbury
Town of Innisfil
Town of New Tecumseth
Township of Oro-Medonte
Township of Ramara



The partner agencies of the Lake Simcoe Environmental Management Strategy would like to thank the public and all participating stakeholders for their ongoing support through Phase III of the program. Our success would not be possible without their hard work, funding, and dedication to saving the lake and its watershed.

This is a summary of the Phase III progress report.
You may download a copy of both this summary and the progress report at www.lsems.info.

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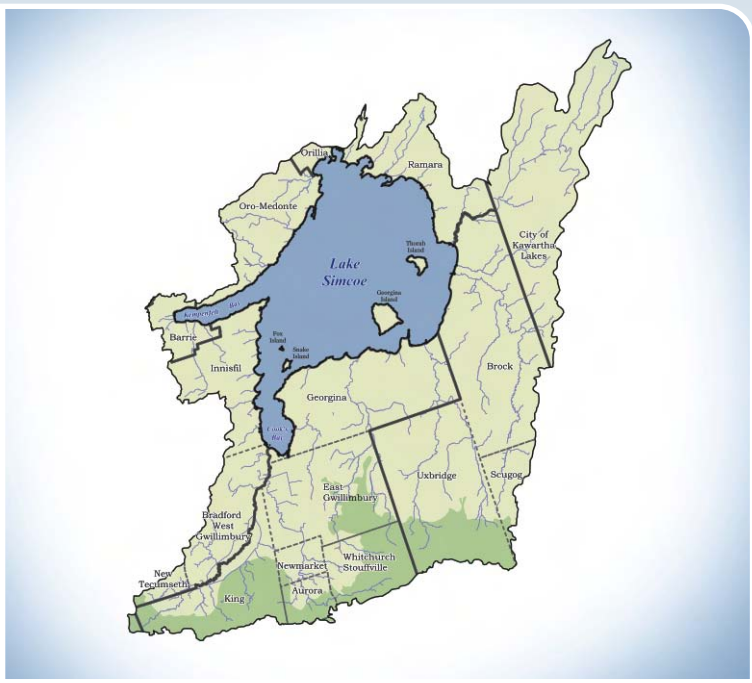
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THE LEGACY OF LAKE SIMCOE

Throughout time, rivers and creeks have flowed down from the hills and into Lake Simcoe, bringing with them the life-sustaining energy of clean, fresh water that kept the lake and its abundance of inhabitants alive and healthy. An essential source of water for a profusion of plants and animals, the watershed poured its lifeblood into the lake, season after season, a seemingly endless renewal of the cycle of life for all who lived in, on, and around the lake.

This is Lake Simcoe, its surrounding watershed an ecosystem in which every living thing depends upon everything else for its survival. This natural balance has been the vital force of the watershed.

Since the retreat of the last ice age, this thriving ecosystem has been the legacy of Lake Simcoe and its watershed, an ecosystem that has nurtured a diversity of life.



THE LAKE SIMCOE WATERSHED

A watershed (or basin) is all the land that drains into a body of water. For Lake Simcoe, this is a huge area of 3,570 square kilometres rolling from the Oak Ridges Moraine in the south to Lake Couchiching in the north, from the headwaters of the Caledon Hills in the southwest to the Kawartha Lakes in the northeast. The Lake Simcoe watershed encompasses portions of 22 municipalities and a population of nearly 350,000 residents.

If you're on this map, you're on the Lake Simcoe watershed.

Ecosystems in their natural state have, over many centuries, become finely tuned to achieve a delicate balance. They support and depend on a tremendous diversity of plants and animals, each with an important job to do and role to play in keeping the ecosystem in balance. Their jobs succeed because their jobs are shared.

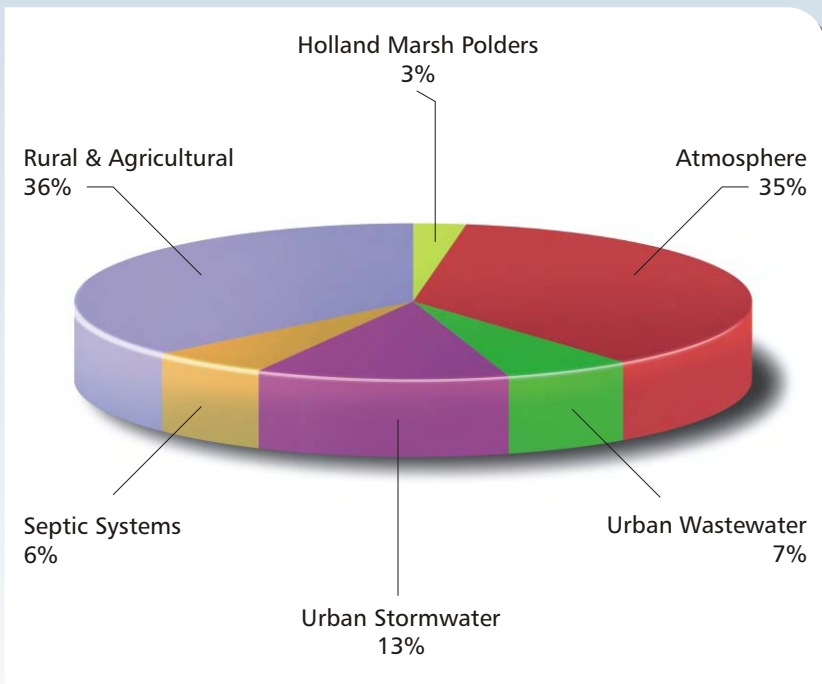
For example, as energy is produced by the sun, plants use this energy to grow. They provide energy to organisms that feed on them and which in turn are consumed by higher forms of life. When a plant dies, a different set of organisms, bacteria and fungi, break down the plant tissue to release nutrients for re-use in the cycle.

Today the lake continues to provide a source of community drinking water, hosts many thousands of visitors, supports fishing and outdoor recreation, and nurtures agriculture. But it is not the basin of bounty that it once was. The effects of human occupation - such as fertilizers, sewage, urban stormwater runoff, and the clearing of forests - have deteriorated the quality of water in the creeks, the rivers, and the lake. When this happens, there may be a dramatic increase in weeds and algae; and consequently, when they die, there is much more tissue that must be broken down and decomposed.

This change in the balance can change the quality of the water. It is the deterioration of water quality that challenges the health of the natural environment that sustains us.

The coldwater fish in Lake Simcoe, once a thriving population and a celebration of the vitality of the watershed, are no longer self-sustaining. Low levels of oxygen in the deep waters of the lake, although improving, are threatening the lake trout, whitefish and lake herring. Mature coldwater fish in the lake are stocked, brought into Lake Simcoe from fish hatcheries.

In the 1970s, the Province of Ontario began studying the lake to find out why the fish were in trouble. These studies found that the health of the fishery, and of the watershed, depended upon reducing the phosphorus that was being carried into the lake. On July 27, 1990, a program called the Lake Simcoe Environmental Management Strategy, or LSEMS, was launched on the shores of Lake Simcoe to begin the long undertaking to improve the health of the native coldwater fish.



WHY IS PHOSPHORUS THE CENTRE OF ATTENTION?

Phosphorus is a nutrient that promotes plant growth. When plants die in the fall, the process of decomposition consumes oxygen as part of a natural cycle. When phosphorus levels are low, oxygen levels are still adequate to support the fish. When phosphorus levels are high, plant growth is excessive and the consumption of large amounts of oxygen creates a shortage that the fish cannot tolerate. Phosphorus enters

the lake from sources throughout the watershed including fertilizers, urban storm water runoff, sewage, and airborne particles. Project results are often reported in terms of “phosphorus reductions per year”. What this means is that the results are a measure of the amount of phosphorus that finds its way into Lake Simcoe every year. A faulty septic system, for example, might be leaking 10 kg of phosphorus every year into a creek and ultimately the lake. A restoration project that repaired the system and stopped the leak would prevent that 10 kg of phosphorus from reaching the lake not just in the first year but every year.

During its 16 years of operation, the LSEMS program has made steady progress:

- the amount of phosphorus emptying into the lake each year has been reduced;
- levels of dissolved oxygen in the lake's deep water zones have increased;
- there is evidence that a small number of naturally produced wild lake trout are able to survive.

PHASE I (1990 - 1994) THE BEGINNING

Phase I of LSEMS was a co-operative partnership between the Province and the Lake Simcoe Region Conservation Authority. The goal was "to restore a self-sustaining coldwater fishery in Lake Simcoe".

The many important accomplishments of Phase I that helped to improve water quality included:

- over 300 projects were completed that reduced phosphorous pollution by about 14 metric tonnes per year;
- regulations were established that minimized new sources of phosphorus associated with urban development;
- a model was created to calculate the relationship between phosphorus levels and deep water dissolved oxygen concentrations, which helped establish a lake-wide phosphorus reduction target.

The fundamental recommendation of Phase I was that phosphorus needed to be reduced by another 25% in order to restore the quality of water that would support coldwater fish.

PHASE II (1995 - 2000) BUILDING ON OUR SUCCESS

The goal for Phase II, similar to that of Phase I, was "to re-establish a naturally reproducing coldwater fish community in Lake Simcoe". Simcoe County, the Region of Durham, the City of Barrie and the Region of York joined the LSEMS partnership to help ensure that projects could continue, despite funding challenges, to reduce phosphorus and restore areas of the watershed that were degraded.

Phase II continued to make important progress toward the 25% phosphorus reduction target:

- 55 water quality improvement projects were completed, reducing phosphorus pollution by 2.5 metric tonnes each year;
- additional partners were added to the program;
- a water quality study was conducted to establish the benefits of phosphorus control measures;
- a holistic watershed approach was adopted to monitor continued population growth.



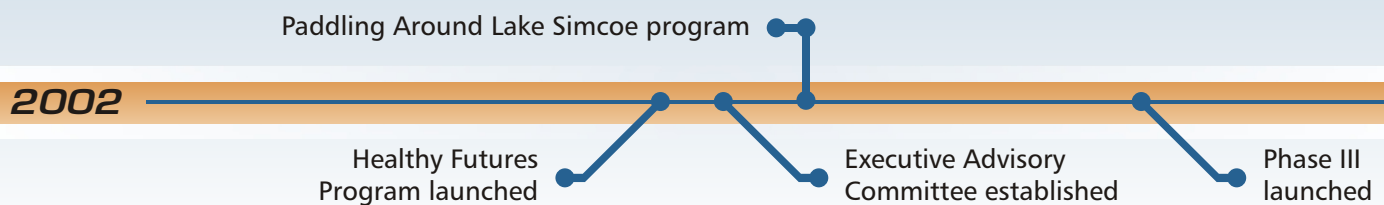
Lake Simcoe Symposium
Georgian College, Barrie

Ecological Land
Classification begins

2001



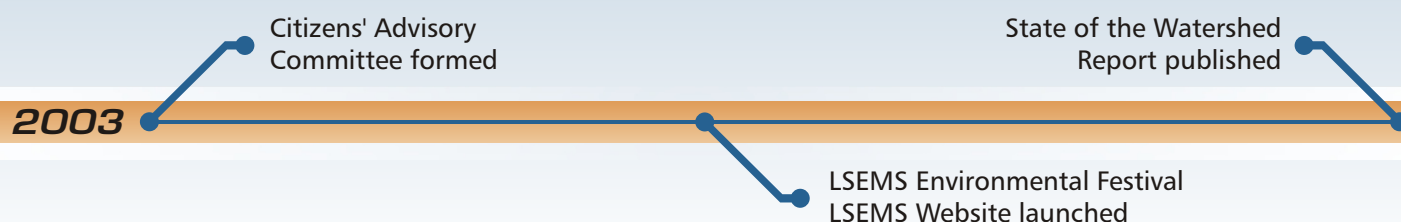
To achieve the LSEMS goal, the partners have continued their efforts to reverse the impact of human activities on the lake and its communities. The result will be a healthier lake and watershed in which our future generations will live, work and play. *LSEMS Phase II Progress Report, 1999*



PARTNERS	RESPONSIBILITIES
Lake Simcoe Region Conservation Authority	watershed science and research, protection and restoration, education and outreach advice to municipalities, watershed planning, regulation, restoration, communications & education
Ministry of the Environment	monitoring water quality in the lake and tributaries, gauging precipitation, control of communal water quality, controlling sewage treatment plants, discharges, control industrial pollutant emissions, responding to spills
Ministry of Natural Resources	planning and management of fisheries, fish community and population monitoring, watershed science, restoration, in-water permitting, natural heritage mapping and standards
Ministry of Municipal Affairs and Housing	land use planning, provincial policy statements and provincial land use plans
Ministry of Agriculture, Food and Rural Affairs	agri-environmental programs, agricultural land drainage, nutrient management, technology transfer
Fisheries and Oceans Canada	fish habitat management
City of Barrie, City of Kawartha Lakes, City of Orillia, County of Simcoe, Regional Municipality of Durham, Regional Municipality of York, Town of Bradford West Gwillimbury, Town of Innisfil, Town of New Tecumseth, Township of Oro-Medonte, Township of Ramara	land use, infrastructure planning and implementation
Chippewas of Georgina Island First Nation	First Nations issues
Lake Simcoe Conservation Foundation	provide funding for projects that protect and restore Lake Simcoe and its watershed

Note: Collectively, all LSEMS partners share in stewardship responsibilities.

The Ontario Ministry of Public Infrastructure Renewal joined the LSEMS partnership in 2007 and is responsible for developing growth management strategies for the Province.



PHASE III (2001-2008) GOING THE DISTANCE

At the beginning of Phase III an expanded LSEMS goal was developed to improve and protect the health of the Lake Simcoe watershed ecosystem and improve associated recreational opportunities by:

- restoring a self-sustaining coldwater fishery;
- improving water quality;
- reducing phosphorus loads to Lake Simcoe;
- protecting the natural resources in the surrounding watershed.

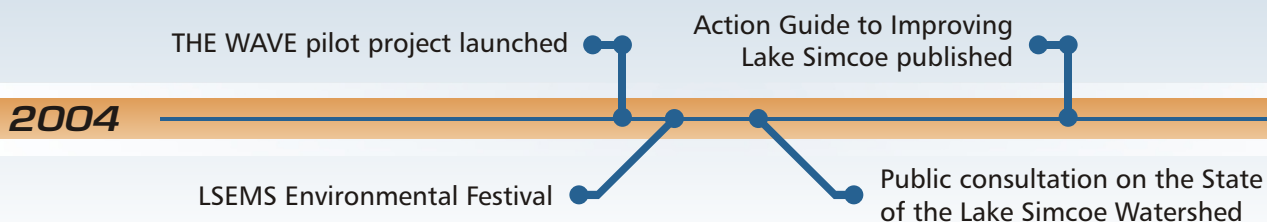
The important program thrusts during Phase III were:

- continuation and expansion of stewardship projects;
- upgrades to municipal stormwater and private septic systems;
- continued improvement to environmental science and monitoring in the watershed;
- greater focus on basin-wide planning to help guide land use and development;
- expanding the LSEMS partnership;
- engaging the community.



BOGART CREEK RESTORATION PROJECT

The East Holland River is the most heavily populated and degraded tributary in the Lake Simcoe watershed. It adds more phosphorus to the lake than any of the other 34 watercourses feeding the lake. The Bogart Creek Restoration Project is an ongoing initiative of caring local residents in partnership with the Town of Newmarket, the Conservation Foundation, the Conservation Authority, and a number of other stewardship organizations. Its goal is to improve the creek as a habitat for brook trout and other wildlife. Enthusiastic volunteers have improved the shoreline, vegetation and habitat by conducting clean-up events, planting 2,500 trees and installing 40 bird houses. With these improvements, it is hoped that brook trout can be reintroduced.





Many important results were achieved. Following are the highlights of Phase III.

Stewardship projects

Hundreds of restoration projects have been completed in partnership with private landowners, on urban and agricultural properties. These projects were planned and implemented with co-funding from the landowners. The results improved water quality and prevented about 1.5 metric tonnes of phosphorus from entering the lake each year. This was accomplished by implementing:

- 90 agricultural projects to reduce erosion, upgrade manure storage facilities, manage livestock access to streams, reforest lands, and restore wildlife habitats;
- 200 individual environmental farm plans to improve land use practices;
- 8 major projects to reduce pollution in urban stormwater ponds;
- 73 private septic system replacements to reduce contamination;
- 45 projects to repair and control stream bank erosion;
- 64 projects supported by the Canada-Ontario Farm Stewardship Program, Greencover Canada and the Canada-Ontario Water Expansion Program.

Sewage projects

More than 100 direct connections from household washrooms into storm sewers were redirected to septic sewers, reducing pollution in stream waters. All sewage treatment plants in the watershed are currently using best available technologies, resulting in phosphorus removal among the most effective in Canada. The Town of Georgina decommissioned 2,200 residential septic systems along the lake shoreline and placed them on municipal service, resulting in a net phosphorus reduction estimated at 1.2 metric tonnes per year.

Improved land use practices

In 2003, the Province of Ontario implemented a ban on the application of portable toilet waste on agricultural lands. These materials must now be treated at sewage plants. In addition, Simcoe County has adopted tree-cutting bylaws. York and Durham Regions have also adopted tree-cutting bylaws and soil conservation bylaws. The City of Barrie has eliminated the use of pesticides on City-owned lands. Municipalities have also implemented a program to reduce the use of road salt.

Water quality projects

A network of monitoring stations throughout the watershed, including an annual flow monitoring program, continues to evaluate the water quality and aquatic life. As a result of improvements in water quality, warm water fish

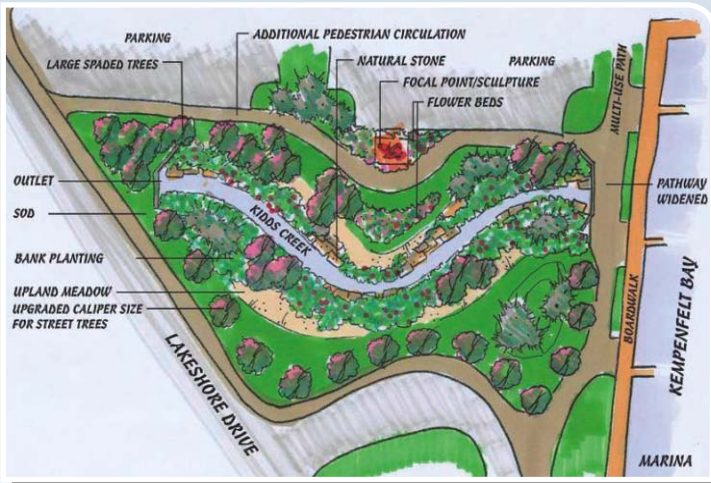
Beaver River Wetlands securement project approved

Reduced levels of phosphorus found in Lake Simcoe

2005

Round goby eradication project in the Pepperlaw Brook

Lake Simcoe Watershed Conference



KIDD'S CREEK RESTORATION PROJECT

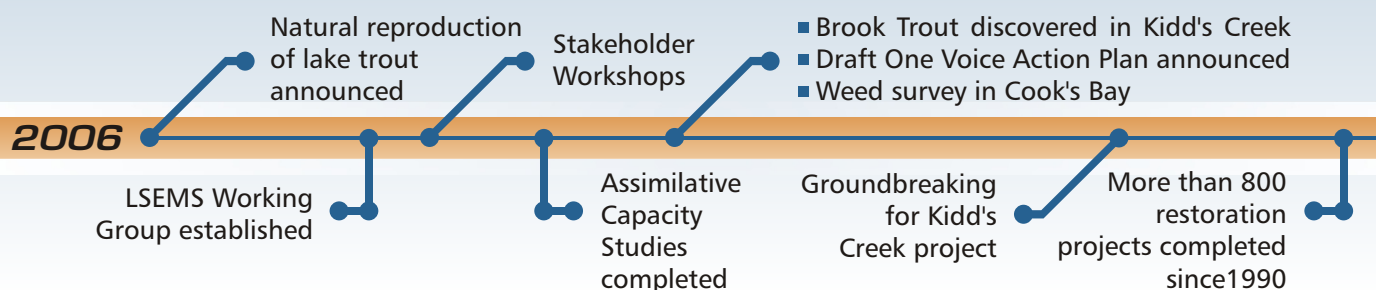
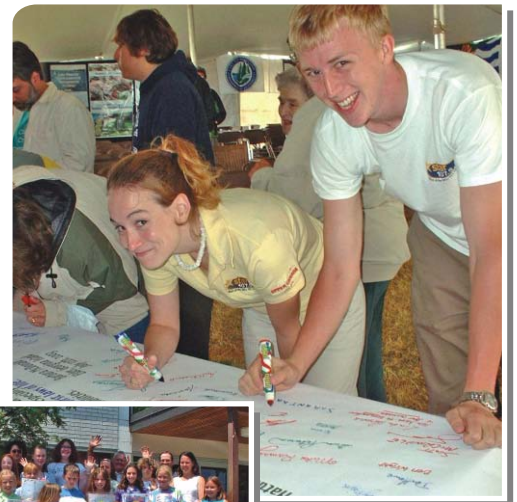
In the heart of downtown Barrie, most of Kidd's Creek has been forced underground over time through a series of culverts. In October 2006 a project was launched to reopen sections of the channel. When completed, this will add green space to the busy downtown, allow the creek to handle a larger volume of stormwater, and return portions of the watercourse to a more natural, open state. It is hoped that, with time, warm water fish such as bass, perch and sunfish will once again thrive, and that the creek will recover as a living, breathing habitat.

communities are stable or increasing, and deep water habitat conditions have improved for coldwater fish. Floating islands have been placed in 7 storm water ponds, supporting plants that absorb pollutants and reduce the lake's phosphorus load.

Engaging the community:

During Phase III, new levels of community participation in the LSEMS program were achieved by:

- establishing a Citizens Advisory Committee that includes a broad cross-section of partners and stakeholders;
- establishing a stakeholder Working Group to develop recommendations on governance for the future of LSEMS;
- holding 28 public sessions to explain the complex scientific work being conducted on the lake;
- hosting an LSEMS conference in partnership with the Lake Champlain Basin Program;
- holding a two-day conference for 180 partners and community members as a starting point in consultations for the next phase of LSEMS;
- hosting roundtables with watershed mayors;
- supporting and promoting dozens of community tree planting events, fairs and festivals;
- developing and operating the Paddle Around Lake Simcoe program.





BEFORE

RESTORATION PROJECTS

LSEMS projects like this one on the East Holland River are repairing eroded stream banks to reduce silt and phosphorus entering the watercourse and damaging fish habitat in the lake. Materials such as river stone and native plants complement the existing surroundings.

This is a natural solution that, in addition to repairing the erosion problem, also filters water running into the river, and provides a natural habitat for fish, birds and animals.



AFTER



Land securement

In addition to stewardship of private property, the LSEMS program includes the acquisition of sensitive ecological lands to protect them from the increasing pressures of urban development. Working together, the partners secured a total of 307 hectares (759 acres) of land during Phase III, including properties on the Oak Ridges Moraine and the Beaver River Wetlands.

2007

Phase III extended
to April 2008

Continuing the science

Science continues to advance our understanding of the ecosystem. The Intergovernmental Action Plan for Simcoe, Barrie and Orillia was begun to address common concerns about planning for sustainable growth, protecting the environment and providing effective municipal services. There were four phases in this Plan, including the Assimilative Capacity Study; a review of the area's current resources to accommodate growth; an assessment of the area's growth potential; and an implementation plan.

In July 2006, a major piece of leading-edge science called the Assimilative Capacity Study was completed. It looked at the relationship between changing land uses in the watershed and phosphorus loads to the lake. The study estimated the impacts of growth on the amount of water as well as the quality of the water entering the lake. Phosphorus was used as the main indicator of water pollution. Total maximum phosphorus loads were established for each tributary. The results of the Assimilative Capacity Study are being used to help guide land use and municipal planning decisions.

An ongoing study by the University of Guelph is currently looking at how phosphorus is deposited into the lake in rain and snow, and by winds that carry dust from unvegetated or unpaved surfaces. This is estimated to constitute about 34% of the phosphorus that pollutes the lake.

A study by the LSRCA discovered that aquatic plants in Cook's Bay increased 25% at about the same time that zebra mussels were introduced to the lake. There is a complex relationship between zebra mussels, plant growth, and nutrients such as phosphorus. Nurtured by sunlight and nutrients, small organisms thrive in the water, causing it to be cloudy. Zebra mussels feed on these organisms by filtering huge amounts of water every day and as the organisms are consumed, the water becomes clear. This allows more sunlight to reach the lake bottom, promoting plant growth. The study determined that phosphorus is not the only factor contributing to plant growth, but at the present time it is the only one that can be managed on a large scale. Additional studies are being conducted by the University of Waterloo to explore options to control plant growth.



FLOATING ISLANDS

An innovative pilot project developed during Phase III of LSEMS involved the installation of floating islands in seven stormwater ponds in the watershed. These islands were constructed using porous material infused with native plants. As the plants grew, an intricate root network developed below the islands, feeding on the phosphorus in the water. This absorption prevents the phosphorus from flowing toward the lake. The roots also provide additional habitat for fish. The islands are being monitored to measure how successful they are at removing phosphorus.

A critical benchmark for future work, the State of the Lake Simcoe Watershed report defined the state of the watershed in terms of six main health indicators:

- water quality;
- water quantity;
- phosphorus pollution;
- oxygen concentrations;
- organisms that live in the soil under the water;
- fish.

This report, completed in 2003, developed an important reference point for measuring the success of restoration and protection efforts.

To further the development of a Natural Heritage System, the LSRCA evaluated natural heritage features to determine their provincial and watershed significance. This information has helped to target lands for protection, limited development, restoration and potential securement.



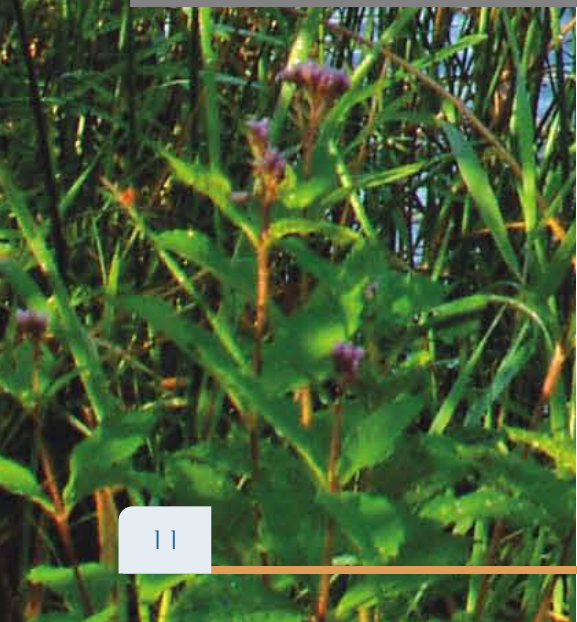
INVASIVE SPECIES

Invasive species are one of the greatest threats to Ontario's waters, wetlands and woodlands. Originating from other regions of the world, and without natural predators, they can have devastating effects. Several invasive species, such as the round goby, zebra mussel, common carp, spiny water flea, purple loosestrife, and Eurasian watermilfoil, have been found in the watershed. Preventing their spread is extremely difficult and will require public awareness and

involvement. For example, efforts to prevent round goby from entering Lake Simcoe from the Pefferlaw River raised public awareness but more needs to be done to inform people about the environmental threats to biodiversity of the watershed.

Recreational boating

Many of the activities related to recreational boating can impact the health of the lake. Large volumes of water can be polluted by refueling leaks, discharge of bilge water, cleaning chemicals, and the improper disposal of waste. Also, boat wakes can cause the erosion of shorelines and wildlife habitat. Several Lake Simcoe marinas now participate in a new initiative called the "Clean Marine Program", a voluntary program of best practices that is recognized as the leader in North America. It is recommended that this program be promoted, with information provided to boaters, and speed limits enforced.



THE CHANGING LANDSCAPE

Phase III has been a period of important progress, with over 300 projects completed since 2001. Phosphorus has decreased, oxygen levels have increased, and small numbers of cold water fish are surviving their first year in the wild. These results of over 800 restoration projects conducted during the past 16 years are reasons for optimism about the future of Lake Simcoe. But so much more needs to be done.

During Phases I and II, restoration projects were targeted to areas of the watershed where phosphorus loading was most concentrated and where gains could be made most cost-effectively. During Phase III, the types of restoration projects became more difficult and expensive to accomplish.

Urban growth is changing the landscape, putting greater pressure on our natural resources. As we go forward, more effort will be required to ensure that pollutants such as phosphorus remain below sustainable annual targets each year as development increases.

In 1990 it was thought that, if an annual phosphorus load of 75 metric tonnes per year was achieved, then dissolved oxygen levels would rise sufficiently to permit a self-sustaining coldwater fishery. Scientific modeling has demonstrated that the phosphorus load of 75 metric tonnes per year can be maintained through the implementation of best management practices. These practices are expected to cost around \$163 million, and will result in properly planned urban development to occur without the lake exceeding the target limit. If this investment in restoration is not made, the costs will be much higher in the future, both in money and in lost natural resources.

Additional programs are required to restore the lake to optimum health. The success of these programs will depend upon dedicated effort and continued funding by all levels of government, non-government and community organizations and individuals. The lake ecosystem has taken many years to deteriorate, and it will take time to recover. Sustained commitment from all corners of the watershed is needed to support this recovery.

New provincial legislation

Several important pieces of provincial legislation were enacted during Phase III that are providing additional direction for urban development and land use planning. As a result, municipalities in the watershed are working on growth management plans to determine where future growth will be distributed within the watershed without compromising lake health. The relevant legislation is listed below. For more information, please visit www.lsems.info.

- Oak Ridges Moraine Conservation Act (2001);
- Oak Ridges Moraine Conservation Plan (2002);
- Greenbelt Act and the Greenbelt Plan (2005);
- Provincial Policy Statement update (2005);
- Places to Grow Act (2005);
- Growth Plan for the Greater Golden Horseshoe (2006).

LOOKING TO THE FUTURE

Lake Simcoe and its watershed are resources of immeasurable value to all who live in, on and around the lake. Even those of us who do not watch the sun rise over the lake every morning are privileged by the benefits that the watershed offers-clean drinking water, fishing, tourism, local produce, and a majestic natural environment. If we and our children are to enjoy these benefits in the future, we must all work together to find a balance so that the lake will satisfy our needs today, and it will also be there to satisfy the needs of generations to follow.

Our vision for the future of LSEMS is a continuing program of protection and restoration to improve the quality of water in the lake and natural resources in the watershed. As the human population grows, conservation efforts will continue to be an important part of urban development. At the same time, restoration projects will become more challenging and expensive since the most easily implemented, low-cost projects have been completed. Success will require commitment, participation and funding.

Citizens and stakeholder groups have made it clear that they wish to be more active LSEMS participants, working hand in hand with government to protect and improve the lake. Phase III has been extended to March 2008 to allow a working group that includes caring citizens and interest groups to study governance options and recommend a structure for the future.



PRIORITIES FOR THE CONTINUED SUCCESS OF LSEMS

- a new structure that involves a much greater role for citizens in the watershed community;
- continuing best practices to manage water quality;
- increased community involvement;
- better and simpler communication; and
- sustained adequate funding.

Priorities for the future include a growth management strategy for the entire basin. Leading-edge science will continue to predict the environmental impacts of additional development. A new study of how phosphorus enters the lake from the atmosphere will open up new opportunities to eliminate these pollutants. Following the Walkerton Inquiry and passage of the Clean Water Act, work will continue to protect sources of drinking water.

An action plan for the watershed, called the Comprehensive Basin-Wide Plan, will be completed by the end of 2007 with implementation to begin in 2008. It will provide objectives that include water quality, land resources, invasive species, recreation, climate change, and sustainable growth.





Working together, we can restore a state of balance in the lake and the natural resources of the watershed. With commitment and effort, we can protect environmentally sensitive areas from further damage. With vision and leadership, we can have sustainable growth and continue to enjoy a clean and healthy environment.

Our vision for the future of Lake Simcoe is a renewed and recharged lake, invigorated with a continual supply of fresh water from its tributaries flowing down from every corner of the watershed. Human settlements co-existing with wildlife habitats. The basin flourishing in a state of balance, all of its inhabitants integrated with the land and water, with respect for each other and a shared sense of responsibility to sustain these natural resources for future generations. The lake belongs to everyone.



**LAKE
SIMCOE
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MANAGEMENT
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