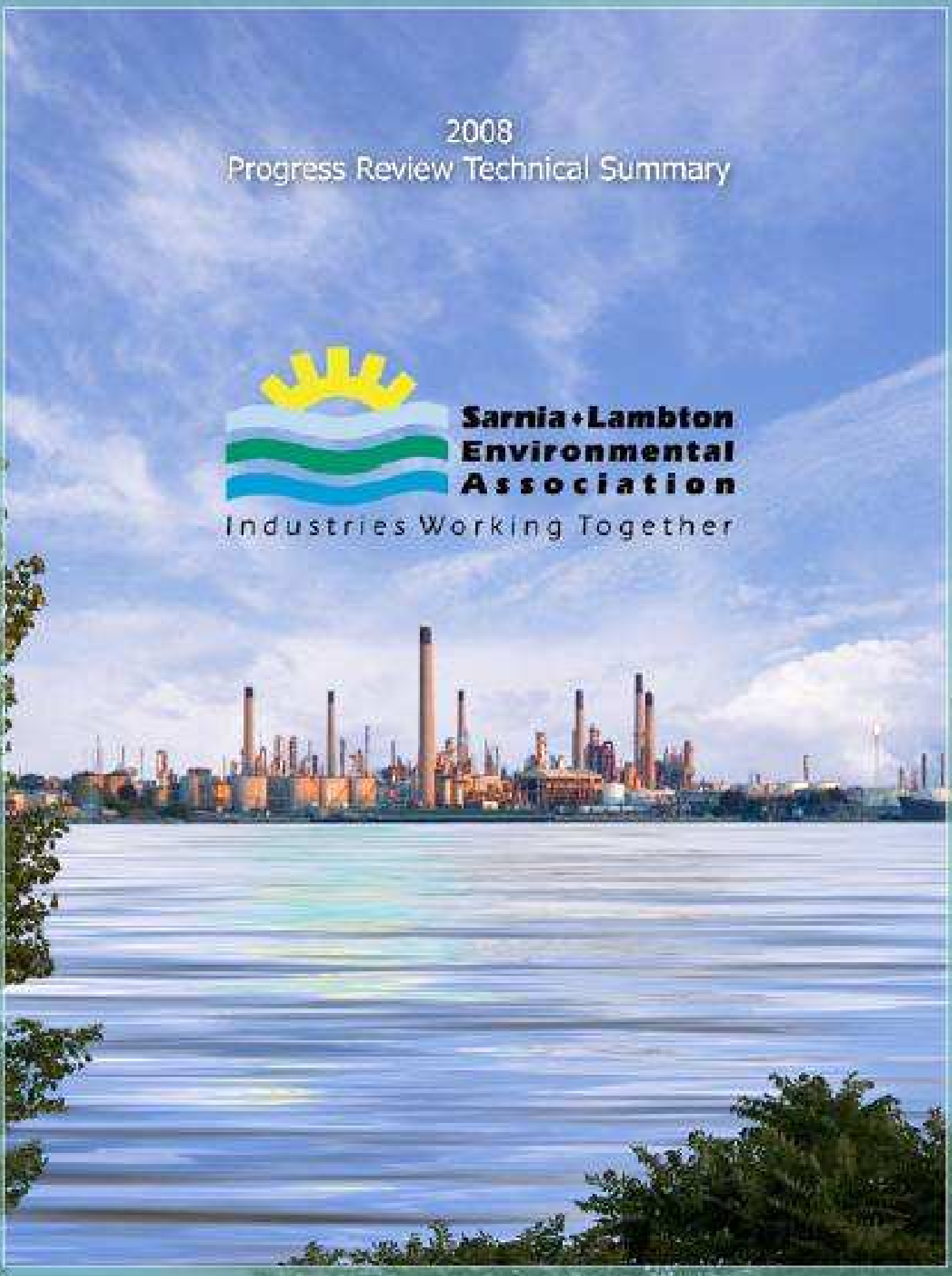
2008
Progress Review Technical Summary



Sarnia • Lambton Environmental Association

Industries Working Together

2008
Progress Review
Technical Summary

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For 57 years, the Sarnia-Lambton Environmental Association (SLEA) and its predecessors have been contributing a valued ingredient in the efforts by local industry to improve our environment. Member companies have worked under the umbrella of the volunteer industrial co-operative to establish and maintain respected, science-based measures of their performance in improving the air, water and soil resources of Sarnia-Lambton.

The day-to-day responsibilities for the organization's environmental monitoring network and data for its annual technical program, as presented in this summary report, rests in the capable hands of the following third-party consultants:

ORTECH Environmental is one of Canada's leading atmospheric science consulting firms, providing technology based consulting services and expertise in environmental science and engineering to government, industrial and financial organizations. Local services are provided through the company's Sarnia office, which has been in operation for over 50 years.

A long-time SLEA consultant, ORTECH has been designing, implementing and operating ambient air monitoring networks for industry since the 1950s. In addition to its air program expertise, the company has had 20 years of experience in developing and managing continuous water quality monitoring instrumentation.

Pollutech EnviroQuatics Limited maintains a solid reputation for its biological research and laboratory services, operated from its Sarnia/Point Edward facilities since the early 1970s. The analytical laboratory has been performing routine compliance bioassays, as well as developing new and innovative bioassay and biomonitoring techniques for private- and public-sector clients locally and across Canada for over 20 years.

An environmental advisor to the SLEA on St. Clair River water quality since the early 1970s, Pollutech EnviroQuatics' corporate capabilities also include ambient effects monitoring, zebra mussel control, marine diving and general marine services, as well as geo-environmental engineering and assessment services.

A Comprehensive Approach to Improving Our Environment

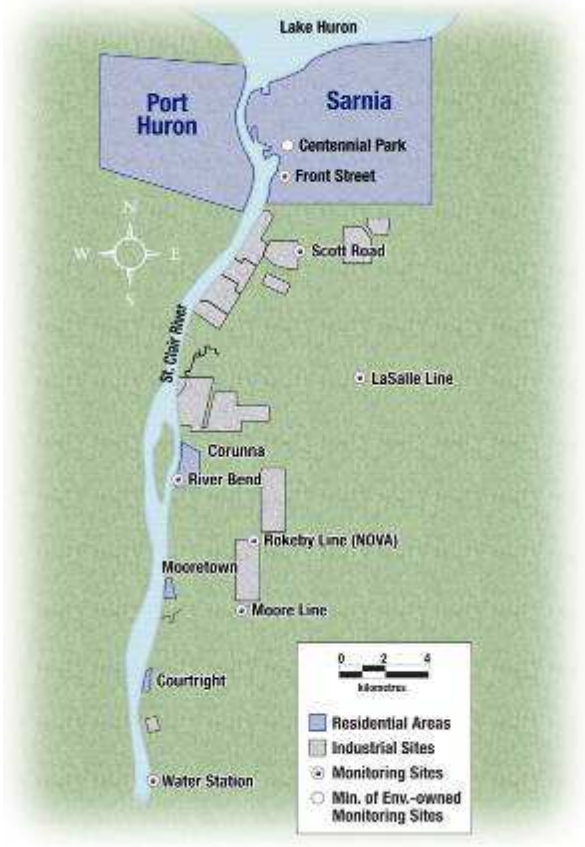
Long-term trends recorded by the Sarnia-Lambton Environmental Association (SLEA) show that efforts by area industries have contributed to improvements in local air and water quality. By the same standards, the 24 volunteer member companies of the SLEA also acknowledge that more must be done. As reflected in the organization's 2008 program activities contained in this report, the SLEA continues on a course of continuous improvement, applying innovative strategies along with sound scientific methods and practices.

The lines that once defined industry's environmental improvement programs are being reformed. That's positive news, because today's business practices and projects must be scoped in broader terms. There is a growing awareness in business and government that all aspects of their activities must offer environmental, economic and social benefits. The three-pronged approach reflects the principles of sustainable development – ensuring that future generations are not disadvantaged by our actions today.

During 2008, the SLEA's focus on sustainable development brought about some changes to its ongoing programs and priorities. An increasing role was taken on in the work of the Bluewater Sustainability Initiative, a forum of private- and public-sector stakeholders introducing sustainable development initiatives in Sarnia-Lambton. As well, the SLEA relocated its offices and resource library to the Suncor Sustainability Centre, established on the campus of Lambton College to encourage stakeholder synergies in the greening of our community. Acknowledging the success of its newly formed partnerships, the SLEA also agreed to administer the Chemical Valley Emergency Co-ordinating Organization for mutual aid and its community information and education arm, the Community Awareness and Emergency Response Committee.

While changes abounded, the SLEA was careful to maintain the scientific integrity of its own network of seven air and water quality monitoring stations, plus its link to a site owned by the Ontario Ministry of the Environment.

Independent, third-party consultants were contracted to measure and analyze long-term environmental changes along the St. Clair River, from the shore of Lake Huron downstream to Courtright, Ontario. Since 2001, the association has also maintained a mobile air quality monitoring unit.



The SLEA's Monitoring Network

The self-contained trailer can be moved promptly to the scene of an environmental incident, but is most often used on the sites of member companies during large-scale maintenance and construction projects.

Guided by scientific data and practical experience, the member companies encourage each other to reduce the environmental footprints of their plant sites. It is through their collective commitment to ongoing environmental improvements that positive and measured results are being realized locally.

The SLEA's mission is to be recognized by its members, regulatory agencies and the community for its excellence in promoting and fostering a healthy environment that is consistent with sustainable development.

To achieve the mission, members will have an exemplary awareness of environmental management and risk prevention regulations, technologies and procedures. They will fully understand the impacts of stressors on the local ecosystem. The SLEA is striving

to be recognized for its competency and reliability, such that regulatory agencies will seek information, expert advice and comment from the association and its members when developing environmental legislation and regulatory programs. On an ongoing basis, information and educational forums, such as its annual review meeting, are presented to maintain a well-informed community that will actively contribute to sound resolutions of environmental issues.

Taking on the administrative function of the Community Awareness Emergency Response organization, the SLEA helped organize a recent community Emergency Preparedness Day. The annual education event involved member companies in a variety of displays and demonstrations, such as an aerial rescue exercise, pictured above, conducted by employees from Nova Chemicals.

The community is encouraged to learn more about member company progress and programs from the SLEA office and resource library, at 1489 London Road, Sarnia, Ontario, Canada N7S 1P6, 519-332-2010, admin@slea.ca. See the latest environmental findings on the Internet at www.sarniaenvironment.com.

Member Companies

BP Canada Energy Company

Cabot Canada Ltd.

Canadian Commercial Services, L.P.

Clean Harbors Canada Inc.

Dow Chemical Canada Inc.

Ethyl Canada Inc.

Fibrex Insulations Inc.

H.C. Starck

Imperial Oil Limited

INEOS NOVA Ltd.

InvEnergy, St. Clair Energy Centre

LANXESS Inc.

NOVA Chemicals Ltd.

NEWALTA Corporation

Ontario Power Generation

PRAXAIR Canada Inc.

Royal Polymers Limited

Shell Canada Products

St. Clair Ethanol Plant

Suncor Energy Products Inc.

Terra International (Canada) Inc.

TODA Advanced Materials

TransAlta Generation Partnership

Waste Management of Canada

Monitoring Our Air Quality

It's not always easy to get a good understanding about the quality of the air we breathe. After all, we are dealing with a resource that you can't see and that is usually odourless. To complicate matters, even if our air was in a visible form, or came with an odour, it could still be safe to breathe.

As SLEA member companies learned decades ago, measuring air quality scientifically against specific health risk-related standards set by provincial and federal regulators is a sound way of assessing local plant emissions and ambient atmospheric conditions.

An Ortech Environmental field consultant services a sulphur dioxide air quality monitor at an SLEA's monitoring station, as part of an ongoing instru-mentation maintenance program. Reliable service and accurate data are hallmarks of the associ-ation's monitoring network.

Eleven stations, strategically situated up- and downwind of local industrial plants, form the SLEA's air monitoring network. The monitoring stations automatically collect and analyze air samples and record hourly averages of targeted contaminants present. With some data dating back to the late 1970s, the network tracks sulphur dioxide, ozone, nitrogen oxides, a preset series of volatile organic compounds, respirable particulate matter and total reduced sulphur. The compounds have been selected for their connections with local industrial manufacturing processes. As well, the monitoring network tracks local smog levels and general weather conditions.

In addition, the SLEA monitoring network is linked to the Lambton Industry Meteorological Alert Reg-ulation, a provincial requirement, which prompts changes in local industrial plant operating practices to help diminish the local effects of high-level sulphur dioxide (SO_2) emissions measured in the area. Established with local industry support almost 30 years ago, the regulation identifies the maximum average daily levels of SO_2 that can be reached at the association's monitoring stations. If upper limit levels are detected by the SLEA's network, participating area industries are advised to switch to lower-sulphur fuels, or reduce their production rates, in an effort to help reduce area SO_2 emissions.

The range and versatility of the SLEA's network was expanded significantly with the addition of a mobile monitoring unit in 2000. The trailer-based monitoring equipment is on standby to respond to any form of local air quality emergency. However, it is most frequently used by member companies for routine on-site monitoring during major plant equipment installations and maintenance projects.

While the association's air quality monitoring network was specifically developed to help member companies track local changes over time, its multi-year records have also identified influences from sources further afield. For example, the long-range transport of airborne contaminants into our region, which according to the Ontario Ministry of the Environment originates from industrial facilities in the Midwest United States, can also be identified by the SLEA network as having some influence over local air quality conditions.

The following sections describe the compounds tracked by the SLEA's annual air quality monitoring program and the 2008 findings.

Sulphur Dioxide (SO_2)

Sulphur dioxide (SO_2) has been tracked by the SLEA, since the inception of its local air quality monitoring program in the 1960s. The compound is typically emitted from industrial smelters, petroleum refineries, iron and steel mills and pulp and paper mills. Other sources, including residential, commercial and industrial heating systems and motorized vehicles, can also raise SO_2 levels in localized areas. In the Sarnia area, petroleum refineries account for most of the local emissions. Other sources extending far beyond Sarnia-Lambton, such as the U.S. Midwest, are also identified by the SLEA's monitoring network.

The presence of SO_2 can be identified by it characteristic burned matches odour. It can be oxidized to form sulphuric acid aerosols and also may form sulphates, which contribute to the

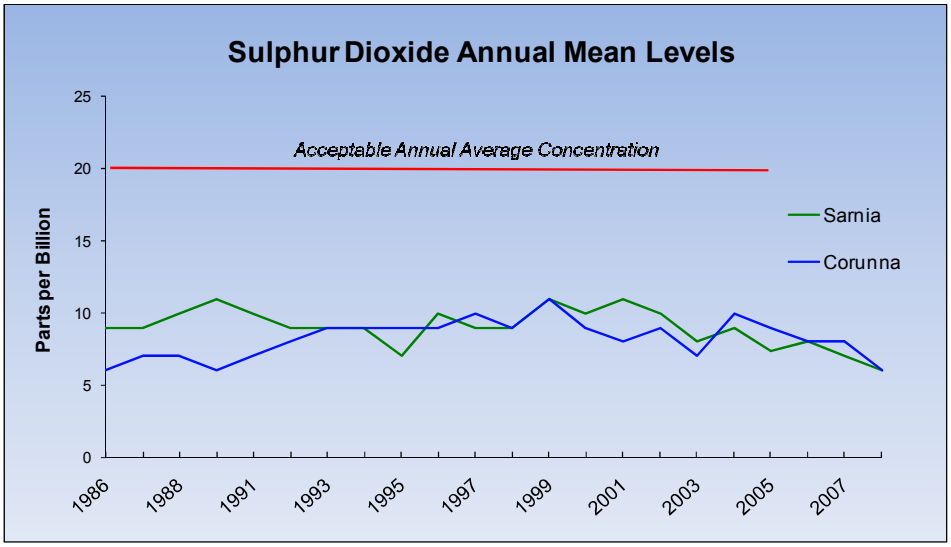


Figure 1

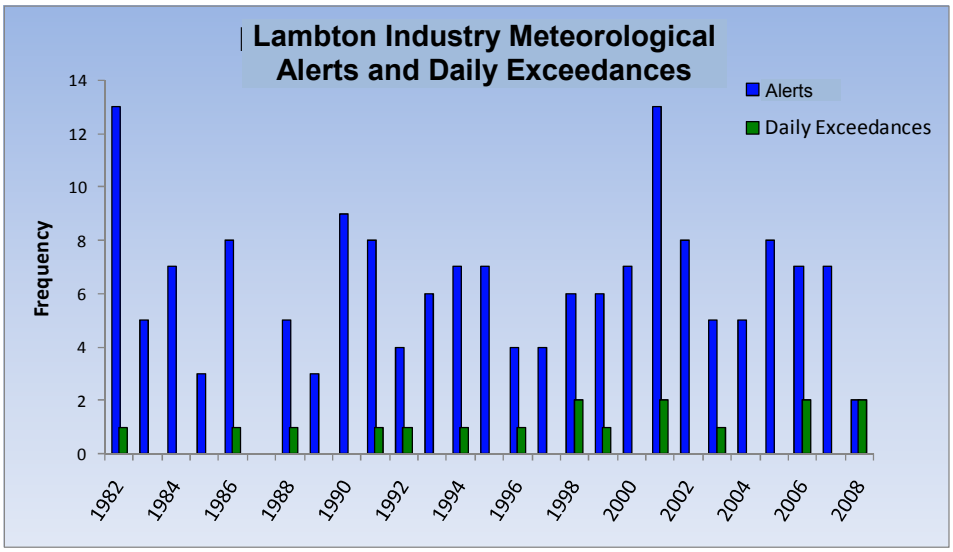


Figure 2

formation of fine particulate matter. Health effects related to exposure to the compound can include breathing problems and respiratory illness. People most sensitive to SO_2 are asthmatics and those with chronic lung disease or heart disease. SO_2 is an acid rain precursor that may play a role in lake, stream and soil acidification and cause the corrosion of buildings. Higher than average concentrations of SO_2 generally occur with southerly-to-southwesterly winds at greater than 15 kilometres per hour. SO_2 is measured in the ambient air by continuous monitors, using the principle of fluorescence. The molecules absorb ultraviolet light and become excited at one wavelength, decaying to a lower energy state over time and emitting ultraviolet light at a different wavelength. As the excited molecules decay to lower energy states, they emit light that is proportional to their SO_2 concentration. The method is recommended by the Ontario Ministry of the Environment and accepted as a suitable application by the United States Environmental Protection Agency.

The monitoring of SO_2 levels at the SLEA's Sarnia and Corunna stations is an integral part of the unique Lambton Industry Meteorological Alert Regulation, established by the Ontario Government in co-operation with local industries. The alert system is an area-wide approach to maintaining acceptable air quality during periods when poor air dispersion conditions for local plant emissions could lead to high concentrations of SO_2. The regulation is designed to maintain the daily average concentration of SO_2 below the Ontario ambient air quality objective of 100 parts per billion (one part per billion is equal to a single step in a walking trip extending seven times around the world). When levels trend towards the 24-hour average of 70 parts per billion at one of the regulation monitoring stations, industries that emit quantities of the compound are directed to switch to lower-sulphur fuels, or reduce production.

Historical annual average levels of SO_2 at monitoring stations in Sarnia and Corunna, including those obtained during 2008, are presented in Figure 1. Levels have remained relatively constant over the last 20 years, and are well below Ontario's acceptable annual average concentration level.

In 2008, there were two Lambton Industry Meteorological Alert events (January 5 and January 7), where the provincially set 24-hour criterion of 100 parts per billion was exceeded. The average SO_2 concentrations were 108 and 189 parts per billion, respectively. The two events each averaged 37 hours in duration. Also on January 7, from 1 a.m. to 9 a.m., the Ontario one-hour objective of 250 parts per billion was exceeded. During the five-hour period, averages in the range of 362 parts per billion to 574 parts per billion were recorded at the Sarnia monitoring station.

Over the past 27 years, there have typically been six events per year, each lasting approximately 16 hours in duration. A long-term summary of SO_2 Lambton Industry Meteorological Alerts and daily exceedances is shown in Figure 2.

Total Reduced Sulphur (TRS)

Total reduced sulphur (TRS) can be created by industrial sources, such as oil refineries, pulp and paper mills, steel mills and sewage treatment facilities. It can also be generated naturally, being released from swamps, bogs and marshy areas.

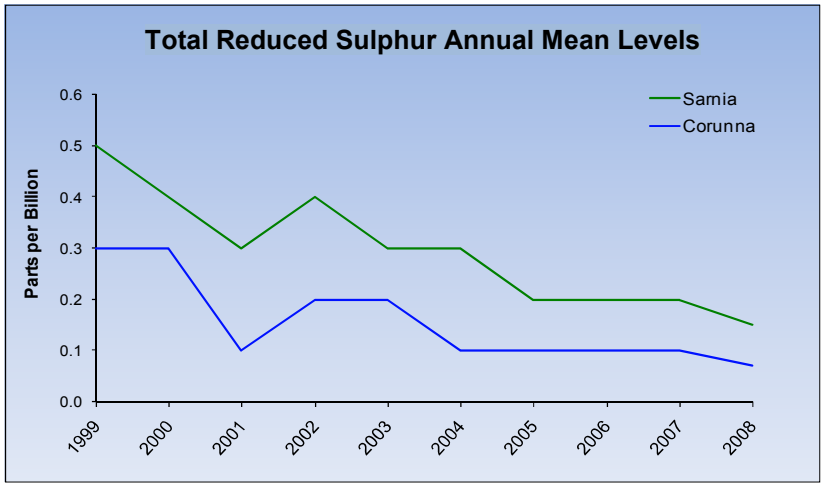


Figure 3

TRS compounds in small concentrations are not normally considered a health hazard. However, they produce a rotten egg or cooked cabbage-like odour, which is offensive to many people. Most people can smell TRS compounds at very low levels. So, for affected industrial operations, the challenge is to manage TRS compound materials in such a way so as to avoid the escape of errant odours. With most industrial plant sites having comprehensive odour control programs in place, fugitive emissions of TRS normally last for only a short duration.

Fluorescent technology, similar to the method used for tracking SO_2, is applied to continuously monitor TRS compounds in ambient air. An air sample is first drawn through a filter that removes any trace of SO_2. In a second step, a high-temperature converter changes the TRS components to SO_2, with the resulting concentration measured by fluorescence.

During 2008, Ontario's acceptable one-hour level for TRS of 20 parts per billion was not exceeded at either of the SLEA's Sarnia or Corunna monitoring locations. Although already very low, annual levels of TRS, as shown in Figure 3, have continued to decrease over the past ten years.

Nitrogen Oxides (NO_x)

Three oxides of nitrogen, or nitrogen oxides (NO_X), are typically present in the atmosphere. Nitric oxide (NO) is a colourless and odourless gas. Nitrogen dioxide (NO_2) gas has a reddish-brown hue and produces a pungent and irritating odour. Nitrous oxide (N_2O) is a commonly used anaesthetic, known as laughing gas. N_2O is produced by microbiological processes, while the other gases are mainly by-products of fossil fuel combustion processes and significant air contaminants. The largest sources of NO_X are motor vehicles, fossil fuel power generation plants and industrial processes. NO_2 transforms in air to form gaseous nitric acid and nitrates, which contribute to the formation of fine particulate matter. It also has a major role in the atmospheric reactions that produce ground-level ozone.

For more than 30 years, NO_X have been monitored by the SLEA at its Sarnia and Corunna stations, the locations where emission dispersion modelling predicts the highest local concentrations will occur. The monitoring method for NO_X, called chemiluminescence, was set by the U.S. Environmental Protection Agency and is based on the reaction of nitric oxide with an excess amount of ozone to produce a measurable emission of light

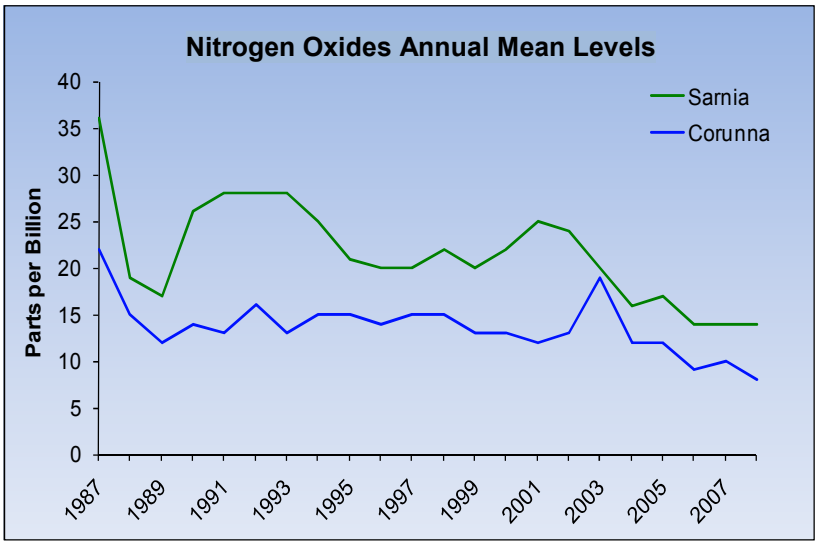


Figure 4

energy. The amount of light energy produced is proportional to the concentration of NO in the air sample being tested.

In 2008, NO_X levels remained below the Ontario hourly and daily criteria. Annual mean levels of NO_X recorded at Sarnia and Corunna stations since 1987 are presented in Figure 4. During the past 20 years, local levels have declined significantly, although only gradually over the past decade. However, efforts underway to reduce industrial emissions of NO_X further could result in a renewed downward trend in levels during the next five years.

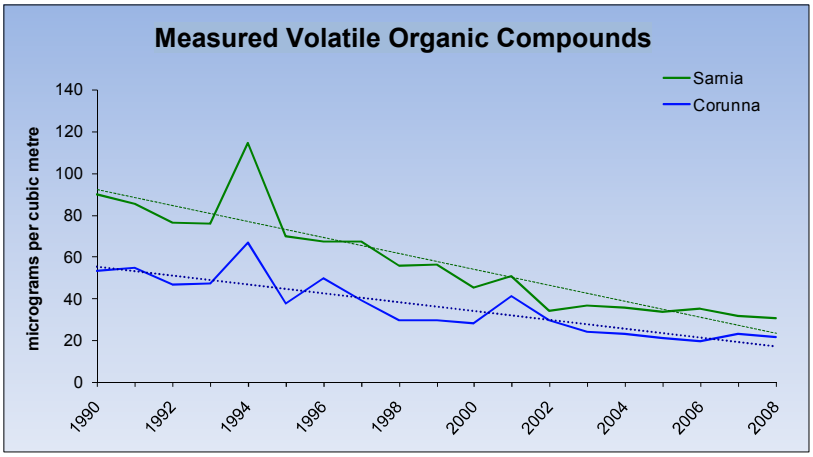


Figure 5

Volatile Organic Compounds (VOCs)

Volatile organic compounds (VOCs) are compounds containing carbon atoms and are present in a wide variety of materials, including crude oil, that form a basic raw material for many local industries. VOCs, such as benzene, ethylene and toluene, have low boiling points, which cause them to evaporate readily. As a result, they can appear in gaseous form, or will evaporate easily into the atmosphere at normal temperatures. VOCs contribute to the formation of ground-level ozone and smog and are a possible health concern.

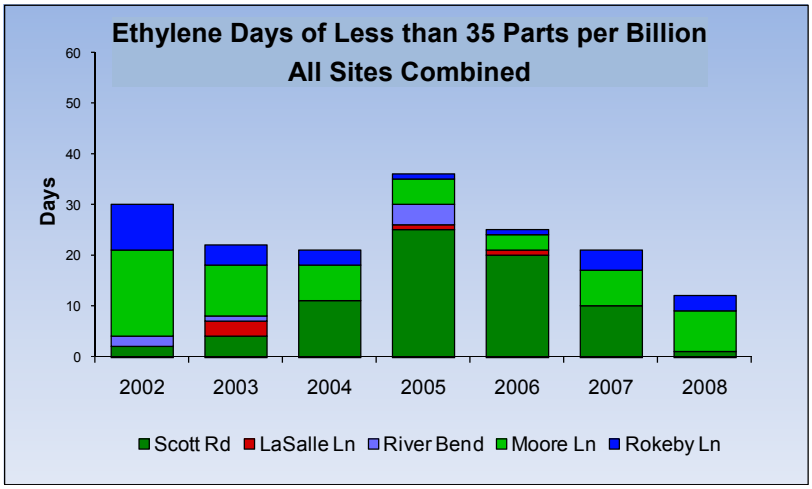


Figure 6

The SLEA's VOCs monitoring program encompasses three components:

1. A group of 50 VOCs is collected over a 24-hour period once every 12 days at the Sarnia and Corunna monitoring sites, with the samples taken to the laboratory for analysis. This component of the program has been in operation since 1986.

2. A sub-group of 11 of the 50 VOCs is measured via hourly automated sampling at the Sarnia site. This unique aspect of the program has been ongoing since 1994.

3. The VOC, Ethylene, had been monitored on a continuous hourly basis at five SLEA monitoring sites since 1976. The compound is of particular interest, as it is a major commodity produced, used and stored locally.

In 2008, all compounds were below any associated Ontario ambient air quality criteria.

The annual sum averages of the group of 50 VOCs, excluding ethylene, have continued a consistent downward trend over the past 19 years (see Figure 5). Total levels have dropped by approximately 60 percent since 1990, although annual levels have not changed much over the last five years. The Ontario daily ambient air quality criterion for ethylene was exceeded at the various monitoring locations on 12 days in 2008 (see Figure 6), which is the lowest number of such occurrences in the past seven years.

Particulate Matter ($PM_{2.5}$)

Whether you can see it, or not, the air around us carries dust particles. The particles can range in size from a grain of sand down to molecular dimensions and be of wide-ranging compositions.

Particulates originate from many different industrial and transportation points, as well as from natural sources. Similar to ozone, particulates can be carried on prevailing winds over great distances. For scientific purposes, airborne particulate matter is classified according to its aerodynamic size. The

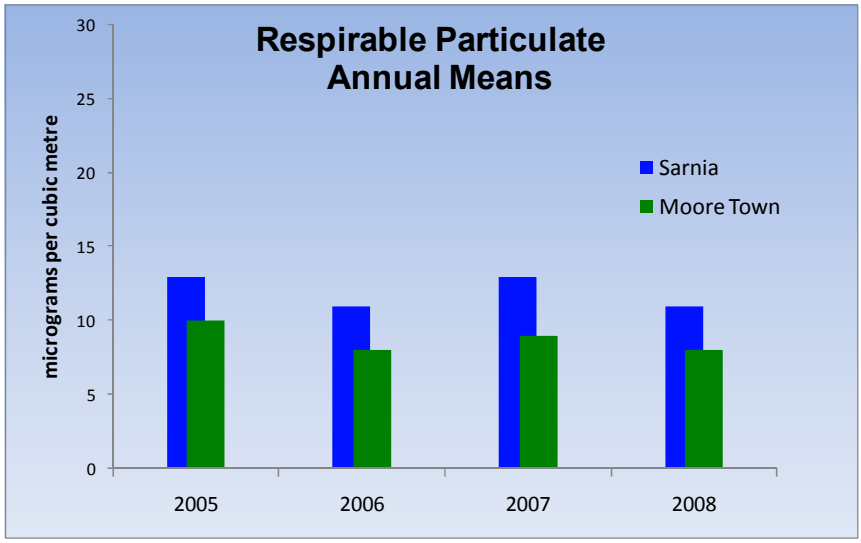


Figure 7

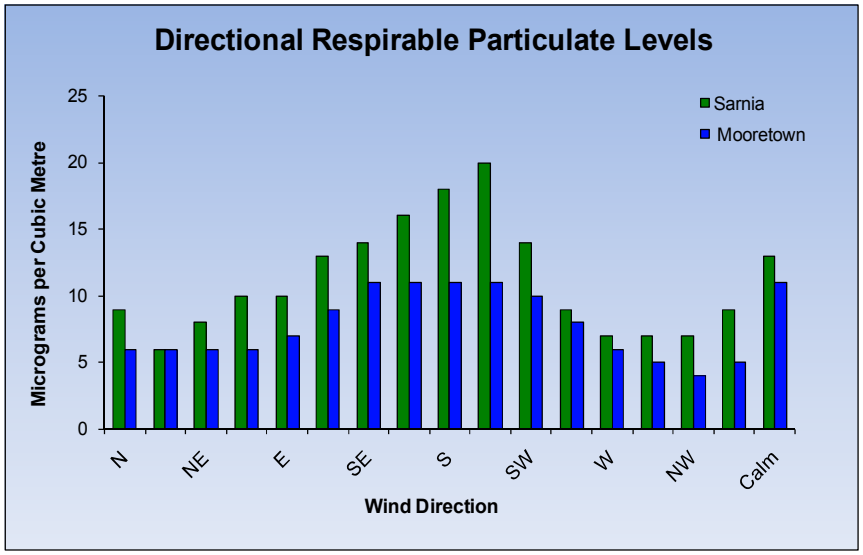


Figure 8

SLEA has focused on the monitoring of fine particulates, or respirable particulates ($PM_{2.5}$), which are 2.5 microns or less in diameter and are capable of penetrating deep into a person's respiratory system. $PM_{2.5}$ has also been added to the Ontario Air Quality Index Program, reaffirming the connection of fine particles to the formation of smog and its associated human health concerns.

The Tapered Element Oscillating Microbalance Method for real-time continuous measurement of $PM_{2.5}$ is relatively new. Having been developed and refined over the past 12 years, the method is used by Environment Canada and the Ontario Ministry of the Environment.

The SLEA has measured $PM_{2.5}$ at its Moore Line station, situated south of the main industrial area, since 2000, complementing the Ontario Ministry of the Environment's monitoring activities in Sarnia. In 2005, a second Sarnia monitor was commissioned by the SLEA at its Front Street station, situated north of the main industrial area.

Annual respirable particulate levels are shown in Figure 7. Levels in Sarnia are generally higher than those recorded at the Mooretown station, due to the higher amount of industrial activity carried out upwind of the monitor. The Canada-wide daily standard for $PM_{2.5}$ is 30 micrograms per cubic metre (one microgram per cubic metre is comparable in scale to one part per billion), averaged over a 24-hour period.

During 2008, the annual average levels in the local area were low, at 11 micrograms per cubic metre at the Sarnia monitoring site and 8 micrograms per cubic metre at the Mooretown station. However, the Canada-wide daily standard was exceeded on three days in Sarnia and on one day in Mooretown. All of the incidents occurred on days when ozone concentrations were elevated and the winds were out of the south. Figure 8 shows data from the SLEA's upwind monitoring station, in Mooretown. The influence of distant sources of air contaminants is recorded as a gradual increase in the level of $PM_{2.5}$ under southerly winds.

Ground-level Ozone (O_3)

There are two types of ozone (O_3), each affecting our quality of life. Naturally occurring as a gas in the stratosphere surrounding the earth, O_3 protects everything living on the surface from the harmful ultraviolet rays of the sun. However, ground-level O_3, which is monitored by the SLEA, is formed through reactions of precursor compounds, like nitrogen oxides and volatile organic compounds, in sunlight and impairs the quality of our air.

At normal background levels, O_3 is a colourless and odourless gas, forming a major component of smog. In addition to the amount of bright sunlight, temperature, as well as wind speed and direction, influence its formation. Elevated concentrations of

O_3 are often detected on hot, sunny days during the months of May through September. Health effects of O_3 include irritation of the respiratory tract and eyes, with children and people with respiratory disorders being the most vulnerable. Plants can also be adversely affected by O_3, stunting the growth rates and yields of such species as white beans, potatoes and tomatoes.

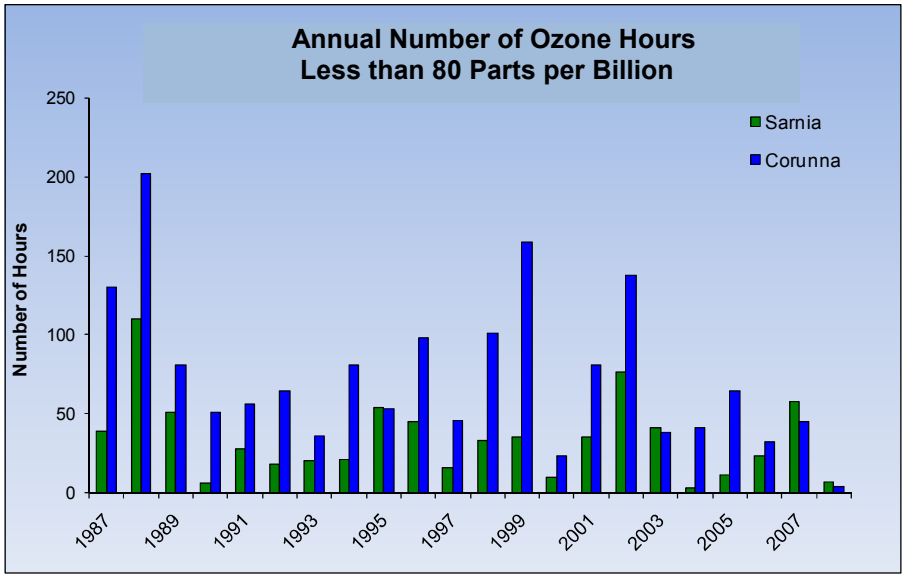


Figure 9

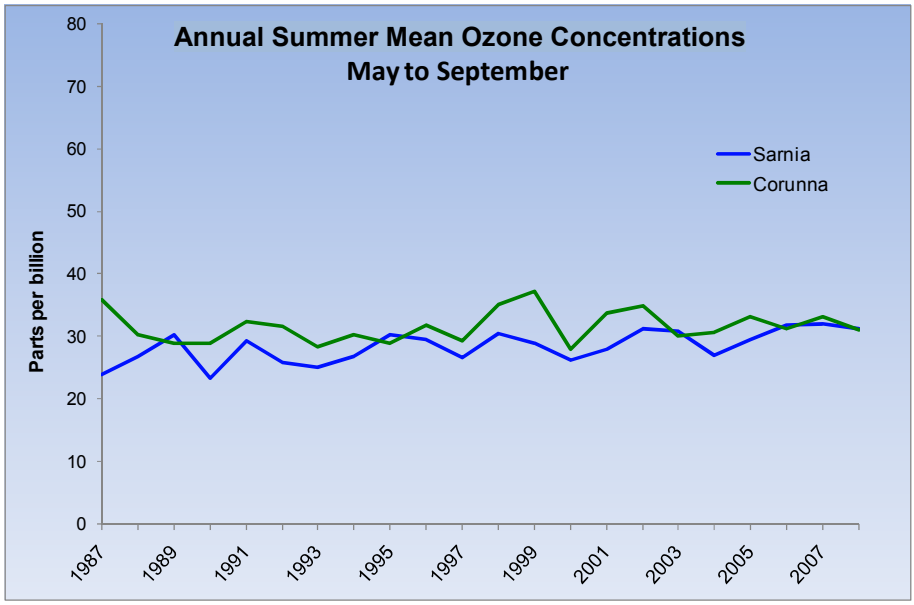


Figure 10

The SLEA measures O_3 using continuous monitors that apply an ultraviolet light absorption principle. The rate of absorption of ultraviolet light by ambient air containing O_3 is compared to that of an O_3-free air sample. The method is recommended and used by Environment Canada and the Ontario Ministry of the Environment. Generally, when the concentration of ozone is less than 50 parts per billion, the Ontario Ministry of the Environment rates the quality of the air as 'good.' The air is considered poor, if ozone levels register greater than 50 parts per billion. The compound is monitored at two SLEA network sites: 1) in an urban location situated downwind of the area's industrial area, in downtown Sarnia, and 2) at a suburban location on the south side of Corunna, which is situated upwind of the main industrial zone.

Concentrations of O_3 are generally lower in urban areas, such as Sarnia, as it is consumed in reactions with the nitric oxides emitted by vehicles and local combustion sources. Both of the SLEA monitoring sites are impacted by the long-range transport of O_3 and its precursors from distant sources in the Midwest United States.

In 2008, the highest hourly concentration of O_3 was recorded at 97 parts per billion, measured at the SLEA's monitoring stations south of Corunna, on July 16, under southerly winds. Further, O_3 concentrations exceeded Ontario's hourly ambient air quality criterion of 80 parts per billion on seven occasions at the Sarnia site and four times at the Corunna station.

Figure 9 illustrates the annual number of hours greater than 80 parts per billion at both of the monitoring sites since records began, in 1987. The lower values in 2008 were due primarily to an upper air disturbance, which stalled over Northern Ontario, due to a persistent ridge of high pressure over the North Atlantic Ocean. The stagnant, low-pressure system settled in for a period extending from late May until mid-August, resulting in a repetitive cycle of rain, cloud and fog and relatively cool temperatures, with only the occasional sunny period – conditions that precluded the formation of O_3.

Annual May to September mean concentrations are shown in Figure 10. The graph indicates a possible trend of increasing levels over the 20 years plotted.

Monitoring River Water Quality

From the earliest days of its oldest predecessor, the St. Clair River Research Committee, the SLEA has monitored the quality of Sarnia-Lambton's largest watercourse.

At the beginning of the monitoring program, in the early 1950s, the industrial co-operative applied its scientific approach to establish a long-term, water quality measuring stick. Member companies could use the annual results as a further means of assessing the effectiveness of their plant improvements. It was reasoned that, over time, continuous reductions in plant discharges to the river would be tracked through improvements to the quality of the St. Clair River.

In 1987, the organization established an automated water quality monitoring station along the St. Clair River near Courtright, downstream of the area's main industrial complex. The monitor collects water samples hourly around the clock, ready to detect, measure the concentration and then issue a warning alarm of elevated levels of specific organic compounds, if they occur in the river. The monitor targets 20 compounds associated with oil refining and the production of petrochemicals. Contaminant concentrations of less than one part per billion* can be detected by the system. While being instrumental in helping the SLEA to track long-term water quality trends, the station's records are used by the SLEA and the Ontario Ministry of the Environment to assess the nature and severity of spills to the river involving the selected compounds, should they occur.

More than 55 years after the first samples were collected for analysis, the SLEA's St. Clair River water quality measuring stick remains firmly in place. Available for public review, the organization's monitoring records mark the significant improvement in the quality of the St. Clair River that has occurred since the early 1950s. In part, the reductions in river contaminants can be attributed to the ongoing drive by member companies to work towards their goal of zero discharge to the river, combined with the introduction of new manufacturing and water treatment technologies, as well as the sharing of knowledge, experience and encouragement.

Today, the St. Clair River meets Ontario's stringent water quality guidelines 99 percent of the time. Plants have completely eliminated, or significantly reduced their discharges to the river. For the most part, industrial discharges that remain today can only be measured in parts per billion, totalling less than half of the amounts permitted by the Ontario Ministry of the Environment. At the same time, other non-industry discharge sources have been identified by the SLEA water quality monitoring system. For example, summer weekend increases in levels of toluene and benzene, possibly from outboard pleasure craft traffic, have been recorded in recent years.

In 2008, more than 8,700 samples from the St. Clair River were collected and analyzed, under the SLEA's continuous water quality monitoring program. As shown in Table 1, only five of the 20 targeted compounds were detected over the course of the year. From a total of 174,240 separate findings, only 1,641 results – less than one percent – were greater than, or equal to the minimum detection limit** established for instrument testing precision. For the third year in a row, and the fourth time in six years, all analyses were below one part per billion.

Table 1
Continuous Water Monitor Results for 2008*

Compound	Detection Limit (mdl) (ppb)	Frequency of Detection (%)	Number of Analyses	Average (ppb)	Min (ppb)	Max (ppb)
Cyclohexane	0.04	0.3	26	< mdl	< mdl	0.09
Benzene	0.05	1.9	162	< mdl	< mdl	0.10
Toluene	0.08	15.1	1,318	< mdl	< mdl	0.47
Ethylbenzene	0.08	0.2	14	< mdl	< mdl	0.09
m+p-Xylene	0.16	1.4	121	< mdl	< mdl	0.28

* Note: ppb = parts per billion, which is equal to a single step in a walking trip extending seven times around the world
mdl = method detection limit, which is the smallest measure at which an accurate result can be achieved using the prescribed analytical procedure

2008 Activities Updates

Studying the Environment-Health Relationship

A community approach to answer local questions

The Community Health Study Board of Directors continues to investigate funding from the provincial and federal governments, so that it can proceed with its assessment. Initiated in 2008, the study involves an independent analysis of the health of Lambton's residents, as well as environmental exposures and risks. Essentially, it is focussed on answering the age-old question, *"Is our health any different from that of other, similar communities?"* Funding from the SLEA and the Sarnia-Lambton Chamber of Commerce, along with in-kind assistance from the County of Lambton Community Health Services Department enabled the board to complete phase one of the study in 2008. The work involved the establishment of the board and the governance model it will follow (see Figure 11), including the appointment of an independent process observer to ensure the interests of the community-at-large were represented continuously.

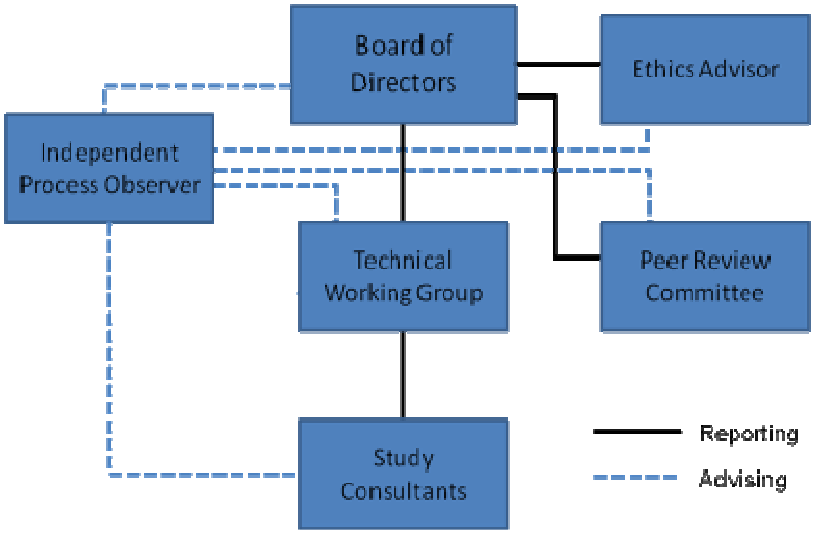


Figure 11 Community Health Study Governance Organization

Chaired by Lambton County Warden Jim Burns, the steering board consists of: Keith McMillan (unions); Dr. Chris Greensmith (county medical officer of health); Alison Mahon (community roundtable); Dr. Jim Mackenzie (Ontario Health Centre for Occupational Workers); Sharilynn Johnston (Aamjiwnaang First Nation); Janet George (Chippewas of Kettle and Stony Point First Nation); Larry McKenzie (Village Point Edward); Anne Marie Gillis (City of Sarnia); Steve Arnold (Township of St. Clair); Barb Millitt (Victims of Chemical Valley); Garry McDonald (Sarnia-Lambton Chamber of Commerce); and Dean Edwardson (SLEA). Mary Jane Marsh, former county warden/St. Clair Township mayor, was appointed as the independent process observer. The community health study board retains a project consultant to help guide it through the process.

In addition to the possibility of public funding, potential sources of private-sector contributions are also being investigated.

Phase two includes: a comprehensive literature review that will look at past studies of the area; a public consultation plan, including town hall-style meetings; and the construction of a Website. It will also include the development of health-related questions believed to be relevant to the study.

With files compliments of Lambton County

Going With the Flow to Promote Improvements

Local partnership helps students appreciate water

Sometimes, you just have to go with the flow to improve the environment. It's a practical philosophy that is helping the SLEA send an important message about water conservation to hundreds of young people across Sarnia-Lambton each year.

For close to 10 years, the SLEA has given financial support to the St. Clair Region Conservation Authority's *Go with the Flow Program*, a series of in-class activities designed to help students from grades 4-8 learn about our water resources and the need to manage them wisely.

During 2008, conservation educators presented the highly popular program to close to 850 young people, including visits to 24 schools across Sarnia-Lambton.

Teachers appreciate the program, because it gives them direct access to knowledgeable conservation authority technical personnel, who can provide the

required water and soil curriculum lessons to the students in a manner that is accurate, effective and with a local context. The hour-long lessons comprise of a variety of grade-appropriate and hands-on activities. From the students' perspective, the important environmental lessons are fun to learn.

Participating students learn about water's role in the hydrologic cycle, aquifers, photosynthesis and the transformation of rocks and minerals into soil. Through experiments, role playing and discussions, the young people discover how factors, such as drought, flooding and human demands, affect our water resources. Most importantly, the young participants discover how they can apply a variety of measures, ranging from planting trees to daily conservation practices, to help protect water quality and quantity.

Kim Gledhill, conservation education technician with the St. Clair Region Conservation Authority, prepares a groundwater model simulator for an upcoming presentation of "Go With the Flow," to an area school class. The unique and highly popular water resources conservation program has been provided with annual funding contributed by the Sarnia-Lambton Environmental Association.

In addition to providing post-presentation worksheets, conservation education staff has also built a program evaluation component into the *Go with the Flow* activities. Through a water-related game show-type quiz conducted at the end of each class visit, young participants have consistently confirmed that they have understood and are able to apply the program's conservation messages.

With files and photo from the St. Clair Region Conservation Authority

Protecting a Precious Resource

Local coalition develops water source protection plan

Bringing area private- and public-sector groups together to develop a science-based plan for protecting sources of local drinking water is an approach that is gaining positive results.

The drinking water source protection initiative was established by the Ontario Ministry of the Environment in 2006, following an investigation into the drinking water supply tragedy in the Town of Walkerton, Ontario. The grassroots effort is advancing on a watershed unit basis, to include all local sources of municipal drinking water, such as the Great Lakes, rivers, streams and aquifers.

Locally, the St. Clair Region, Lower Thames Valley and Upper Thames River conservation authorities have partnered to co-ordinate the development of the watershed source protection plans. The grassroots organizations are committed to working with area municipalities, concerned stakeholders and the public to develop plans that will protect our drinking water, while taking into account various community needs.

Appointed in 2007, the Thames-Sydenham and Region Source Protection Committee has been guiding the development of a local plan. Its 22 members, including SLEA General Manager Dean Edwardson, represent a wide range of interests and bring a considerable breadth of knowledge and experience to their planning table. As laid out in the regulations, the committee is composed of representatives from local governments, major economic sectors of the region, environmental non-government organizations, recreationalists, academics and concerned landowners.

The group has come to value guiding principles related to: developing fair and reasonable solutions; achieving a consensus of opinion; gaining clarity of information; open communications; and respecting the diversity of stakeholder opinions.

The committee's first major task was to develop a work plan that will guide the source protection planning process over the next five years. Referred to as terms of reference, a work plan was developed for each source protection area within the region (one for each conservation authority area),

As part of their investigations, members of the Thames-Sydenham and Region Source Protection Committee toured several municipal drinking water source areas and treatment facilities, including the plant serving Walpole Island First Nation.

describing who does what, when it will happen and how much it will cost. Following input from area municipalities, interest groups and the public, the terms of reference were submitted to the province for approval in April 2009.

Public involvement is an important part of the planning process. Over the next three years, there will be a number of opportunities for residents to participate in open houses, information forums and working groups. In addition, information is provided through a variety of publications, including the committee's Website at www.sourcewaterprotection.on.ca

In the St. Clair source protection area, initial technical studies have been conducted in the vicinity of water supply intakes for Petrolia, the Lambton area municipal system and Wallaceburg. Potential threats to these critical areas are being investigated. Provincial technical study rules provide the framework for the investigations. As a critical plan reference, an initial water budget for the area is nearing completion. A water budget is a method that will help the project to balance local demands for water with available supplies. In the initial, tier-one stage, the budget development process has focused on the identification of local drinking water sources that might already be negatively impacted by our current water-taking practices. Sub-watersheds where additional water budget work is required will also be identified.

During 2008, a number of community outreach activities were undertaken within the planning region: several open houses were held; a newspaper was distributed to 186,000 households; regular updates were reported; two children's water festivals were supported; and presentations were made to a number of organizations.

With files and photo compliments of the St. Clair Region Conservation Authority

The Greening of Sarnia-Lambton
Groups unite to advance sustainable development

Two short years ago, representatives from local companies, governments and special interests, including the SLEA, united to share their ideas about sustainable development and its future in Sarnia-Lambton. They became the catalyst for the introduction of sustainability initiatives, to transform the local area into a recognized hybrid, green community.

The organization formed to advance the gathering's mission was the Bluewater Sustainability Initiative, which was comprised of representatives from the city and county, the Sarnia-Lambton Economic Partnership, Lambton College, industry and business and community interest groups. Since its inception and particularly during the past year, the SLEA has also continued to take an active leadership role in advancing the initiative's various projects.

Remaining true to its grassroots inception, the sustainability initiative has sponsored and promoted a number of workshops and seminars, to educate citizens about sustainable development principles and practices. Of equal importance are the discussion forums, which are often a popular part of the workshops. Through the various sessions, participants identify opportunities and strategies for pursuing new business initiatives, such as the introduction of bio-based feed stocks into traditional manufacturing processes, new alternative energy sources and ongoing community education projects. Each idea realized has helped to move Sarnia-Lambton further towards its intended standing as a global leader in sustainability practices.

In September 2008, the Suncor Sustainability Centre was officially opened as a prominent feature of Lambton College's Sarnia Campus. The facilities were a collaborative effort of Lambton College and the Suncor Energy Foundation. They were established to advance in concrete terms the ideas and goals of the Bluewater Sustainability Initiative. In addition to being the home of the SLEA's administration offices and resource library, the centre also offers computer workstations and meeting areas for those who want to gather to research and discuss sustainability concepts and projects. Also, opportunities will be sought to work on areas of mutual interest with organizations such as the University of Western Ontario Research Park - Sarnia Campus, the Sarnia-Lambton Economic Partnership, the SLEA and local school boards.

The Bluewater Sustainability Initiative continues to bring interests of people and organizations together. Further information about its activities and events is available online at bsi.lambton.on.ca.

With files compliments of the Bluewater Sustainability Initiative; Photo compliments of Lambton College

The Suncor Energy Sustainability Centre opened officially on Lambton College's Sarnia Campus on September 26, 2008. The facility provides the means to combine the interests, resources and activities of industry, community organizations and the college under one roof in the interest of pursuing sustainability locally. The initiative was made possible by a $1-million donation from the Suncor Energy Foundation. In addition to the administrative offices of the Bluewater Sustainability Initiative, the Sarnia-Lambton Environmental Association and the Community Awareness and Emergency Response organization, the building is also home to the Sarnia-Lambton Industrial Educational Co-operative.

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