



ANNUAL REPORT 2006

LICA INFORMATION

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Vision

LICA is recognized as the regional synergy group.

Mission

LICA gathers, interprets, shares, and responds to information on regional development for the benefit of all.

Values

- Trust, honesty and respect
- A healthy environment
- Open-mindedness
- Transparency
- Cooperation
- Responsible development

LICA GEOGRAPHICAL AREA



MESSAGE FROM THE CHAIRMAN

Welcome to the 2006 annual report of the Lakeland Industry and Community Association (LICA). It was an interesting year for the association, one of growth and change.

LICA evaluated its current boundary and has made a recommendation to its Board of Directors to extend the LICA region to include the entire M.D. of Bonnyville #87, as well as all of the County of St. Paul #19. This proposed change will be brought forward for approval at LICA's annual general meeting in April. LICA's structure also evolved over the past year to better meet its mission to gather, interpret, share, and respond to information on regional development for the benefit of all. The Board and committees now operate on consensus-based decision making, which allows all representatives at the table to have a voice in the decision-making process.

LICA's committee members have been very busy participating on various projects. The Airshed Zone is expanding its network, the Regional Environmental Water Monitoring Committee is involved in the formation of a Water Planning and Advisory Committee, and the Communications Committee is working towards making LICA a household word. LICA is also proud to have been a co-chair with Alberta Environment in the Cold Lake-Beaver River Basin Water Management Plan Review. This plan, which has now been approved, is to provide for adequate quantity and quality of water to meet the long-term user requirements of the basin. A summary of the Plan is included in this report and can be found on page 31.

LICA's operating budget has steadily increased due to the various projects on which the committees are working. We are hopeful that in 2007 we will be able to diversify industry involvement beyond oil and gas to include farming, forestry, and other related businesses.

LICA is pleased to welcome new members into the organization at any time. Individuals who support the Vision, Mission, and Values of the Association, are over 18, and reside or conduct business within the LICA area are eligible for membership. A membership form is available on LICA's website, www.lica.ca. Also available on the website are monthly calendars of activities and a list of resources. Resources include meeting minutes, maps, air monitoring results, study results, and other information as generated and approved by the committees.

On a more somber note, we were deeply saddened by the passing of long-time board member and director, Ron Pernarowski, in July 2006. Ron was a founding member and participated on various committees throughout his tenure with LICA. He served as board chair from April to December, 2004. LICA was very fortunate to have had such a committed community member and our sympathy goes to his wife, Carol, and their family.

The success of any volunteer association relies on the strength of its Board of Directors, the commitment of committee volunteers, and effective administration. Thank you to our administrator, E.(Bim) Bowers, her assistant, Debbie Dul, and committee members for their contributions and support during the past year. We are seeing great results because of the tremendous effort put forth by members. LICA has, and will continue to, facilitate the community's voice at the table when community, government, energy regulators, and industry meet to discuss responsible development in the LICA region. We look forward to LICA's continuing growth and progress in meeting new challenges throughout 2007.

Robert Deresh
Board Chairman



VOLUNTEER PROFILES



Mildred Dunham, Lindbergh Area

Like many of her neighbours, Mildred has lived in the Lindbergh area her entire life. She is not shy about saying that's just about 65 years! Mildred farmed alongside her husband and two sons and has many stories to tell about industry in the area - some good and some not so good.

Mildred will admit that in the past she didn't know much about industry in the area - who the operators were, what technology they used, and - most importantly - what impact they had on the community. Many of her neighbours feared that industry was polluting the air and sucking the lakes dry. Determined to find out for herself, Mildred took the plunge and joined LICA as a volunteer in 2004. She has served on the Resolution Committee, Regional Environmental Water Monitoring Committee, and Communication Committee.

There were many in the community who thought that LICA was industry-driven and too technical for "ordinary" folks, like Mildred, to participate in. Well, after more than two years, Mildred's dedication to the association is still going strong. She has seen first-hand that LICA can facilitate the resolution of issues. An example is an odour concern in the Lindbergh area that had been going on for years before LICA worked with the company and the community to resolve the issue.

Mildred agrees that while "LICA is not the total answer, it is a very big help to members of the community." By participating in LICA, people have the opportunity to hear first-hand what is going on in the region and provide input to industry about how the community feels.

If Mildred could have one wish granted, it would be that her neighbours become more involved in LICA. She has become the go-to neighbour for information on industry development and how to work with companies - a strange turn of events for a resident many once thought would be a fish out of water in an organization like LICA. Well, the time has come for the community - like Mildred - to take the plunge and experience the benefits of LICA!



Bernard Chartrand, Fort Kent Area

Being active in the community is not something new for Bernard Chartrand. Bernie was a founding member of the Lakeland Environment Agriculture Protective Society, which was one of the first organized community groups in the area. From there, Bernie became an active member of the Community Advisory Committee until its dissolution in the early 1990's, and has been with LICA since its inception.

Involved in running the family farm by the age of 15, Bernie has watched the landscape of the area change over the years, and seen the introduction of many challenges. He remembers a time when people didn't know the faces behind industry and were very suspicious of industry in general. This made it difficult when the community had concerns - there was no communication and therefore no effective route to resolution.

In 1999, when industry began discussing with the community how they could work together to resolve issues related to industry development, Bernie was one of the first community members to step forward. "When you work one-on-one with people and get to know them as individuals, there is encouragement between parties to better understand each other." While it didn't happen

overnight, Bernie saw how this new working relationship helped address concerns with unsafe truck routes, road damage, and dust. LICA has helped to "reduce suspicions ...it's no longer communication by writing letters, and there is additional accountability by people working face to face." Bernie has served on the Regional Environmental Water Monitoring Committee, Regional Environmental Air and Soil Monitoring Committee, the LICA Board of Directors, and the Basin Advisory Committee.

As a father of eight, Bernie knows the importance of open and honest communication. The best relationships happen when people are able to talk, share information, and solve problems. When asked what he would say if he could send a message to his neighbours about LICA, Bernie replied, "Get involved. You have to get involved if you want to make changes."

BOARD OF DIRECTORS AND COMMITTEE MEMBERS



BACK ROW: Ajaz Quarishi, Bob Swain, Keith Scheidt, Brent Moore, Russ Kowtun, Ralph McGregor, Sandy Martin, Sara Richard, Richard Chabaylo. MIDDLE ROW: Sherry Hennessey, Iris English, Debra Pelechosky. SEATED: E. (Bim) Bowers (Admin), Frank Haggard, Robert Deresh, Shawn Brockhoff, Debbie Dul (Admin). MISSING: Norman Quinney Jr., Trevor Matthews, Clifford Calliou.

ACTIVE COMMITTEE MEMBERS LIST

Abdi Omar-Said, Government, REWMC
Ajaz Quarishi, Community, REWMC, Resolution
Bernie Chartrand, Community, Resolution
Beverley Smith, Community, Communication, Resolution
Carol Engstrom, Industry, Vice-Chair REWMC
Clifford Calliou, Fishing Lake Métis Settlement, REWMC
Dalene Wilkins, Non-Government Organization, Airshed Zone
Darrel Downey, Non-Government Organization, REWMC
Darrell McOuat, Industry, Resolution
Debra Pelechosky, Community, Communication, Governance
Delano Tolley, Community, Chair REWMC
Frank Haggard, Community, Airshed Zone, REWMC
George Elchuk, Community, Airshed Zone
Glynis Carling, Industry, Co-Chair Airshed Zone, Governance
Hanna Janzen, Industry, REWMC
Harold Ross, Other Sector, Airshed Zone
Iris English, Community, Chair Governance
Kevin Golem, Industry, Communication, Airshed Zone, Governance
Mary Smith, Community, Communication

Maxine Howland, Community, REWMC
Megan Behnke, Health Authority, Airshed Zone
Michael Bisaga, Airshed Program Manager, Communication, Governance
Mike Trefry, Industry, Airshed Zone
Mildred Dunham, Community, Communication, Resolution
Norman Quinney Jr., Frog Lake, Airshed Zone, REWMC
Paula McMillan, Industry, Co-Chair Communication
Ralph McGregor, Community, Co-Chair Airshed Zone, Resolution
Robert Deresh, Communication, Airshed Zone, REWMC, Governance, Resolution
Roxane Bretzlaff, Industry, Airshed Zone, REWMC
Russ Kowtun, Community, Co-Chair Communication, Airshed Zone, REWMC
Shawn Brockhoff, Industry, Resolution
Sherry Hennessey, Industry, Airshed Zone, REWMC
Trevor Matthews, Non-Government Organization, REWMC
Yayne-abeba Aklilu, Government, Airshed Zone

FINANCIAL STATEMENTS

KAREN A. MERCIER Professional Corporation

Certified General Accountant

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REVIEW ENGAGEMENT REPORT

To the Members of:
Lakeland Industry & Community Association
Bonnyville, Alberta

I have reviewed the statement of financial position of the Lakeland Industry & Community Association as at December 31, 2006 and the statements of operations and change in net assets, equity in capital assets and cash flows for the year then ended. My review was made in accordance with generally accepted standards for review engagements and accordingly consisted of enquiry, analytical procedures, and discussion related to information supplied to me by the association.

A review does not constitute an audit and consequently I do not express an audit opinion on these financial statements.

Based on my review, nothing has come to my attention that causes me to believe that these financial statements are not, in all material respects, in accordance with the basis of accounting disclosed in the notes to financial statements.



KAREN A. MERCIER
Certified General Accountant

Bonnyville, Alberta
February 20, 2007

LAKELAND INDUSTRY & COMMUNITY ASSOCIATION
STATEMENT OF OPERATIONS AND CHANGE IN NET ASSETS
FOR THE YEAR ENDED DECEMBER 31, 2006
(Unaudited)

	2006	2005
Revenue		
Operating		
Annual report	\$ -	\$ 23,293
Memberships	53,000	60,000
Other receipts from members	249,807	139,656
Grants	35,627	-
Interest	77	47
	<u>338,511</u>	<u>222,996</u>
Programs		
Airshed	127,642	84,418
Water study	71,845	68,472
	<u>199,487</u>	<u>152,890</u>
Total Revenue	<u>537,998</u>	<u>375,886</u>
Expenditures		
Operating		
Airshed	79,286	81,116
Annual report costs	39,132	26,885
Board and committee	35,036	21,400
Capital expense	4,295	4,159
Contracted services	37,135	32,480
Insurance	2,413	2,348
Interest and bank charges	347	211
Meetings	8,126	8,034
Office	7,174	6,678
Professional fees	1,926	1,852
Public relations	17,069	11,334
Rent	6,000	6,000
Telephone	2,456	2,923
Training and development	450	4,632
Travel	11,067	13,311
Wages and employee benefits	17,946	11,052
Web site maintenance	4,336	1,200
	<u>274,194</u>	<u>235,615</u>
Programs		
Airshed costs	163,273	71,469
Water study costs	71,845	68,472
	<u>235,118</u>	<u>139,941</u>
Total expenditures	<u>509,312</u>	<u>375,556</u>
Excess of revenue over expenditures	28,686	330
Unrestricted net assets, beginning of year	51,940	51,610
Unrestricted net assets, end of year	<u>\$ 80,626</u>	<u>\$ 51,940</u>

KAREN A. MERCIER Professional Corporation

ACTIVE IN THE COMMUNITY

ECO DAYS 2006

LICA and Alberta Environment hosted Eco Day events at Moose and Crane Lakes during the summer of 2006. Volunteers from many partnership groups, including the M.D. of Bonnyville, Living by Water, Alberta Lake Management Society (ALMS), Moose Lake Water for Life Committee, Crane Lake Association Stewardship Society, and the Beaver River Naturalist Society organized interesting and interactive events that gave attendees a better understanding and appreciation of local lakes. They also shared their knowledge about lakes, local management issues, and possible stewardship opportunities.

Stay tuned, as locations for Eco Day 2007 are now being considered!



Cows and Fish Field Day

On 23 June 2006, LICA, in partnership with the Lakeland Agricultural Research Association (LARA), sponsored a Cows and Fish Field Day. The Cows and Fish program is a partnership established in 1992 to foster a better understanding of how improvements in management on riparian areas can enhance landscape health and productivity, for the benefit of ranchers, farmers, and others who use and value riparian areas.



Participants spent the morning learning the rudiments of riparian zone health assessment in lakes, sloughs, and wetlands in the area just south of Ardmore, and the afternoon in riparian assessment of streams and rivers in an area east of Glendon. The day also included an on-site demonstration of solar powered stock watering systems by Kelin Solar.

Great Canadian Shoreline Cleanup

In September 2006, the REWMC participated with the Crane Lake Advisory and Stewardship Society in the clean-up of Crane Lake. 15 volunteers participated in the Crane Lake clean-up. In addition to the clean-up organized by the REWMC, the Beartrap Lake Society along with LICA members, companies, and volunteers from REWMC also cleaned up Beartrap Lake.

Garbage and debris collected at these lakes included an amazing quantity and variety of items (and don't forget both these lakes were cleaned up just a year ago!).



Lake	Weight	Most unique	Sample of garbage found
Crane Lake	220 lbs.	4 balloons	143 plastic bags 59 straws 8 appliances 11 car parts



2006 INAUGURAL LICA PHOTO CONTEST

The first ever LICA Photo Contest has ended, the results are in, and the winners have been notified!

We were astounded by the overwhelming response to our inaugural photo contest. We quickly learned that there is something wonderful about seeing the Lakeland area of Alberta captured in so many different ways by so many photographers. With everything from the bizarre to the beautiful, we received nearly 400 entries; this made the decision about whose photo was the "best" a very difficult task for the judging panel.

We now have the great pleasure of presenting to you the first place winning photograph as well as the two runner-up entries.

The first place prize of \$200 was awarded to Jamie Hanson of Bonnyville. The judging panel thought Jamie's photograph best depicted how people enjoy the beautiful environment in this corner of the province; Jamie's "Sunset at the Lake" photograph truly captured the spirit of the Lakeland area.

The first runner-up prize of \$50 was awarded to Mark Kostelynk of Cold Lake. The judging panel was very impressed with the colour, clarity, and composition of Mark's photograph titled "Squirrel in our Backyard".

The second runner-up prize of \$50 was awarded to Shelly Kornelson of Bonnyville for her very creatively framed photograph of a hay-rake implement. The judging panel thought Shelly's photograph best illustrated the active local agrarian community and rural life of the Lakeland area.



Throughout the pages of this report, we have used several of the photo contest entries. Keep your eyes peeled; we may have used your photograph! Since the contest was a resounding success, we will have it again in 2007. Be sure to keep your cameras ready!



LICA would like to thank the Bonnyville Nouvelle for publishing an article about the photo contest in which the winning photograph was featured.

2006 AT-A-GLANCE

2006 key activities for each of the LICA committees are as follows:

REGIONAL ENVIRONMENTAL AIR AND SOIL MONITORING COMMITTEE AND LICA AIRSHED ZONE

- the Airshed Zone took over the work of the committee in June 2006
- championed adoption of consensus decision making across LICA
- initiated an amendment application process with Alberta Environment (AENV) to incorporate industrial monitoring into the Airshed Zone network
- expanded the passive monitoring network to 86 parameters measured monthly at 25 stations
- operated continuous in-place monitoring at Cold Lake South and prepared a plan to add two more continuous monitoring stations
- contracted a Program Manager and a Network Operator
- commissioned a study of potential acidification impacts on soil and surface water
- participated in project design and communication of results of a local tank vapour sampling project by AENV
- held public information meetings to promote understanding of air quality and airshed zones

REGIONAL ENVIRONMENTAL WATER MONITORING COMMITTEE

- completed riparian health assessments for Hilda, Ethel, Tucker, Muriel, Marie, and Crane Lakes
- co-chaired the Basin Advisory Committee for the 1985 Cold Lake-Beaver River Water Management Plan update
- supported the formation of the Beaver River Watershed Alliance
- furthered the paleolimnology study of Moose Lake
- worked in partnership with AENV and the Alberta Lake Management Society in the LakeWatch program
- promoted and participated in the Great Canadian Shoreline Clean-up, Eco Days, AENV's Water Quality Awareness Day, and the Cows and Fish Field Day

COMMUNICATION COMMITTEE

- increased community awareness of LICA
- developed LICA's Annual Report
- redesigned the LICA website
- standardized LICA's communication materials
- provided support and promotional materials to all committees

GOVERNANCE COMMITTEE

- reviewed, revised, and generated bylaws and policy at the direction of the Board
- developed a consensus-based decision-making process for LICA's Board and committees

RESOLUTION COMMITTEE

- revised the Terms of Reference, allowing the committee to convene only as needed

NEW DEVELOPMENT COMMITTEE

- dissolved the committee
- moved its outreach functions to the Communication Committee



AIRSHED ZONE REPORT

Letter from the Co-Chairs

The LICA Airshed Zone was endorsed by the Clean Air Strategic Alliance (CASA) as Alberta's seventh airshed zone in December, 2005.

In 2006, LICA made changes to its bylaws and committee structure to support the work of the airshed zone. The entire LICA organization adopted consensus decision making to be aligned with the decision-making process suggested by the Clean Air Strategic Alliance. The Regional Environmental Air and Soil Monitoring Committee was dissolved by the LICA Board of Directors since its work is now being done by the Airshed Zone.

The Airshed Zone's work in 2006 was focused on expanding the regional monitoring network and working to improve understanding of air quality in the region. It's been an exciting time! A highlight was hiring a Program Manager to oversee all technical aspects of the Airshed Zone's programs. There were some frustrations too – the fact that we've been unable to add two continuous stations to the network this year.

We invite anybody interested in regional air quality to read more details in this report, to have a look at the LICA website, or to come out to an Airshed Zone meeting.

Ralph McGregor and Glynis Carling
LICA Airshed Zone Co-Chairs

Regional Air Monitoring

Two types of monitoring approaches are used in the LICA Airshed Zone regional air monitoring program are:

- a network of passive air monitoring stations distributed across the region. Each of these stations provides monthly average measurements of the concentration up to four pollutants: sulphur dioxide, nitrogen dioxide, hydrogen sulphide, and ozone
- a continuous air monitoring trailer at Cold Lake South that provides hourly-average measurements of selected pollutants. The intention is that there will be three such stations in the program

The monitoring program was initially designed by consultants who considered results from industrial and Alberta Environment monitoring, as well as an understanding of air quality issues in the region. A few changes have been made to the network so far, based on stakeholder input and on the patterns of pollutant concentrations that have been measured to date. The Airshed Zone plans periodic third-party reviews of the network results and design to determine whether any adjustments should be made to the parameters measured or the locations of stations. The first such review is planned for 2007.

Alberta's Airshed Zones and CASA

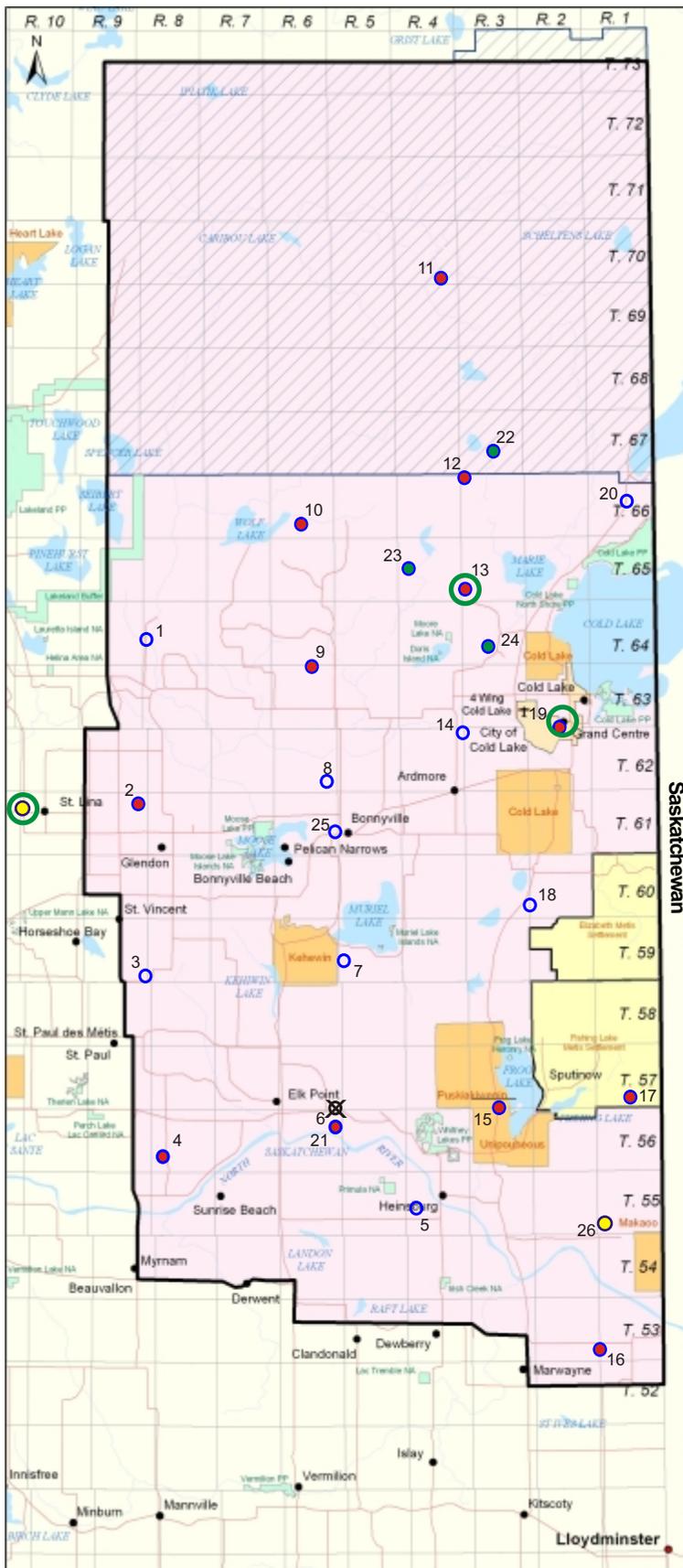
Airshed Zones are a made-in-Alberta solution to address regional issues about air quality. The concept, which is championed by the Clean Air Strategic Alliance (CASA), is that everybody who is interested in or concerned about air quality in a given area can collectively discuss issues, improve understanding about air quality issues, and make decisions about air quality management.

CASA is a multi-stakeholder partnership of industry, government, and non-government organizations, which recommends strategies to assess and improve air quality in Alberta.

All of the existing and forming zones in Alberta have worked together to create an informal organization called the Alberta Airshed Council. The purpose of the council is to collectively support and advocate for Alberta Airshed Zones.

More information about CASA and Alberta's airshed zones is available at www.casahome.org





LICA Air Monitoring Stations

1	Sand River
2	Therien
3	Flat Lake
4	Lake Eliza
5	Telegraph Creek
6	Elk Point Airport (decommissioned)
7	Muriel-Kehewin
8	Dupre
9	La Corey
10	Wolf Lake
11	Foster Creek
12	Primrose
13	Maskwa
14	Ardmore
15	Frog Lake
16	Clear Range
17	Fishing Lake
18	Beaverdam
19	Cold Lake South
20	Medley-Martineau
21	Fort George
22	Burnt Lake
23	Mahihkan
24	Hilda Lake
25	Town of Bonnyville
26	Tulliby Lake (proposed)

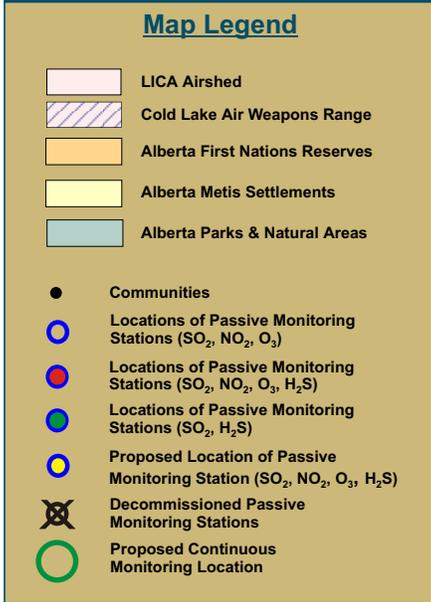


Figure 1: LICA Air Monitoring Stations

Passive Air Monitoring

A network of passive air monitoring stations was established by LICA's Regional Air and Soil Monitoring Committee in July of 2003. Regular analysis of the monthly-average measurements of levels of key pollutants has been very useful as one way of adding to the collective understanding of regional air quality. Before the advent of the network, the only measurements made of air quality in the area were at a few locations close to industrial facilities. The LICA Airshed Zone's regional monitoring network provides a consistent approach to air monitoring within the entire LICA area, and the monitoring results are readily available to the public at monthly meetings, through the LICA website, or from the LICA office.



Passive Monitoring

Passive air monitors are used by most of the Alberta airshed zones to develop understanding of average air quality and of trends across the region.

The samplers "collect" a volume of air that is controlled by a diffusion barrier and is estimated by calculations that account for site-specific meteorological conditions. With an accurate sample volume estimate, a concentration can be calculated.

The samplers are typically left in place for a month, so that a monthly average concentration is measured. No power supply is required, so passive samplers can be used at remote locations.

Monitoring Parameters

Sulphur Dioxide



- a toxic, colourless gas with a pungent odour
- primarily formed by combustion processes of by the flaring of gas containing sulphur compounds

Hydrogen Sulphide



- a toxic colourless gas with a "rotten eggs" odour
- potential sources include "sour" oil and gas, animal feedlots, and sewer gas (i.e. leaks)

Nitrogen Dioxide



- a toxic, pungent, reddish-brown gas
- formed by the reaction of atmospheric ozone with the nitric oxide produced from combustion

Ozone



- a strong oxidizer with a sweet smell
- can be transported from the upper atmosphere or produced by the reaction of oxides of nitrogen with volatile organic compounds

Passive Network Results Summary

Table 1 provides a summary of 2006 monitoring data from the passive monitoring network. Where comparisons to Alberta Ambient Air Quality Objectives are possible they are included in the table for reference. More in-depth analyses of patterns and other unique observations are included in the sections that follow.

	Maximum 1-Month Concentration	Month	Station	Annual Network Average	Alberta Ambient Air Quality Objectives Annual
Hydrogen Sulphide *	0.51	July	Clear Range	0.13	None
Sulphur Dioxide	2.7	March	Maskwa	0.5	11
Nitrogen Dioxide	6.0	January	Elk Point Airport	1.6	32
Ozone	50.6	March	Lake Eliza	27.3	None

Table1: Passive Monitoring Network Summary for 2006 (parts per billion)

* Hydrogen Sulphide data for December 2006 were unavailable at the time of publication. The data summary is for January through November only.

Analysis of Passive Monitoring Results

To illustrate the 2006 spatial patterns of the parameters measured by the passive monitoring network, the following series of "bubble charts" show the annual average concentrations in parts per billion (ppb) overlain on a map of the LICA Airshed Zone area. Only stations with a full year's record was available are included.

Sulphur Dioxide

The highest concentrations of sulphur dioxide were measured near the thermal heavy oil plants northwest of Cold Lake. It is not surprising that sulphur dioxide concentrations were higher at these locations since these plants are the major sources of sulphur dioxide in the LICA area. Although the annual average concentrations were elevated at the monitoring stations located near these plants, they were well below the annual Alberta Ambient Air Quality Objective of 11 ppb.

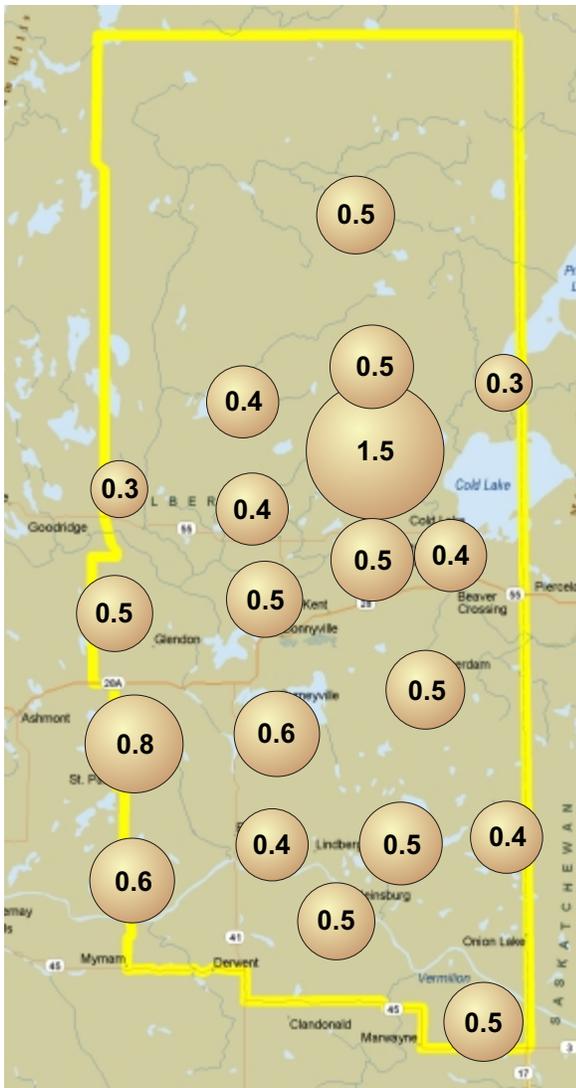


Figure 2: Annual average concentration (ppb) of sulphur dioxide in the LICA region

Nitrogen Dioxide

The highest concentrations of nitrogen dioxide were measured in the City of Cold Lake and at the Fort George/Elk Point Airport. In the urban centre of Cold Lake, a local high density of combustion processes (automobiles, home heating, aircraft) are the likely causes for these elevated concentrations. Upwind from the Fort George/Elk Point Airport station, a number of seemingly "small sources" of nitrogen dioxide dot the landscape; cumulatively, these sources appear to have a measurable impact on this monitoring site. Although the annual average concentrations were elevated at these two monitoring stations, they were well below the annual Alberta Ambient Air Quality Objective of 32 ppb.

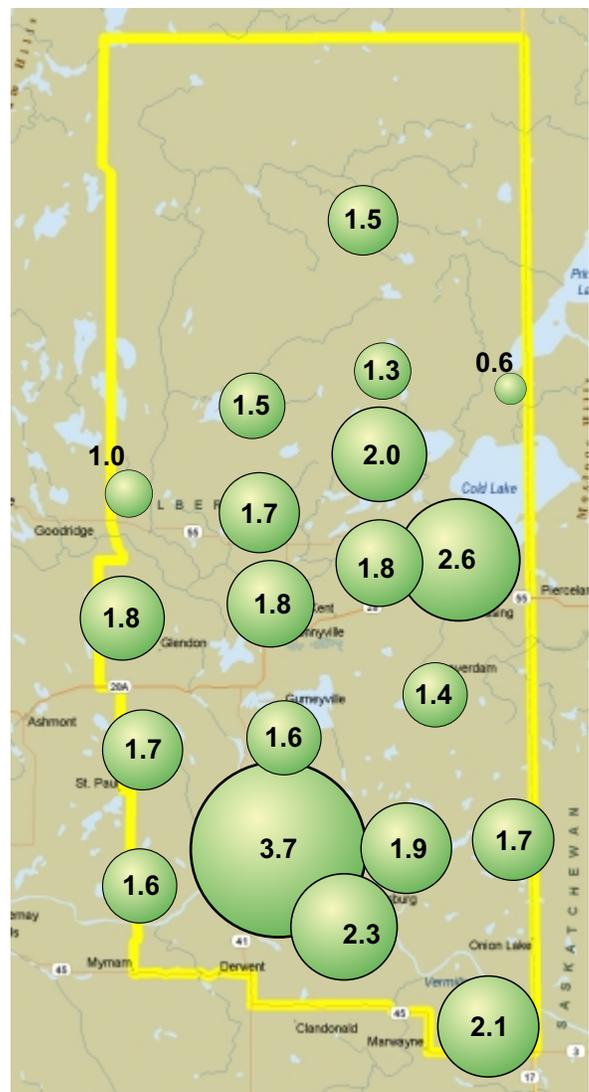


Figure 3: Annual average concentration (ppb) of nitrogen dioxide in the LICA region

Ozone

The spatial pattern of ozone in the LICA area is very subtle. In general, the monitoring sites that have the lowest concentrations are the ones that are closest to, or downwind from, combustion sources. These sites include those close to Bonnyville, Cold Lake, and Highways 55 and 646. This is due to the destruction of ozone by nitric oxide that is emitted by vehicles, space heating, and other high temperature fossil fuel-burning processes. Higher concentrations of ozone were generally observed at the rural monitoring stations, particularly in the southwest near Elk Point and Lake Eliza. These sites do not have many combustion sources nearby. There is currently no annual Alberta Ambient Air Quality Objective for ozone.

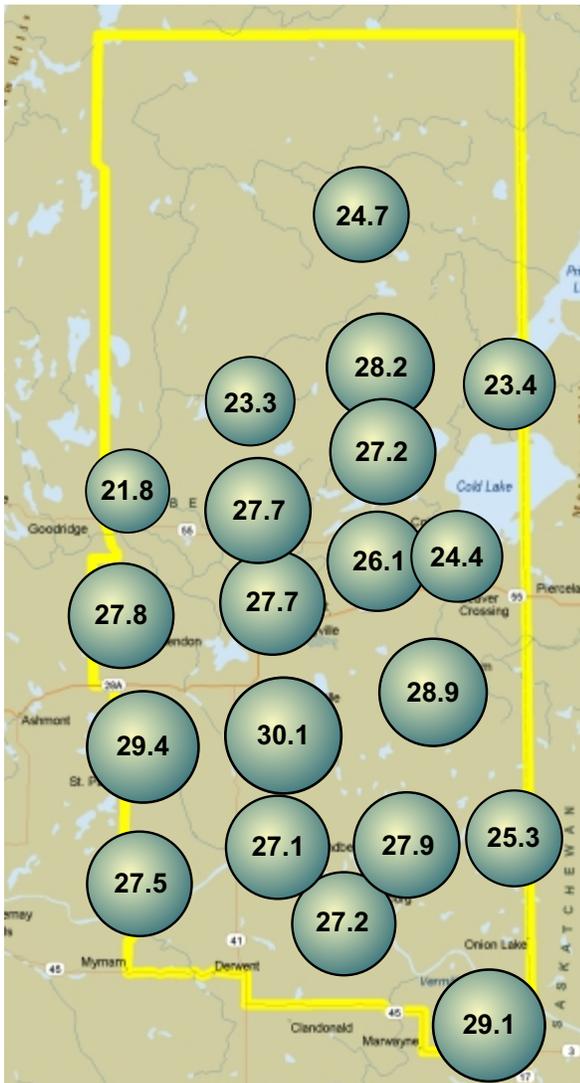


Figure 4: Annual average concentration (ppb) of ozone in the LICA region

Hydrogen Sulphide

LICA is currently monitoring hydrogen sulphide at locations close to industrial sources. The data below is for January through November; December data were unavailable. The highest concentrations of hydrogen sulphide were measured near Fishing Lake and Clear Range in the extreme southeast corner of the LICA area. Elevated concentrations at these locations are thought to be episodic: it is suspected a slough and a small feedlot are the local sources. Higher readings were measured at the station closest to thermal recovery heavy oil plants (Maskwa Station). Similar to sulphur dioxide, this finding is not surprising since these plants are a major source of hydrogen sulphide in the area. There is currently no annual Alberta Ambient Air Quality Objective for hydrogen sulphide.

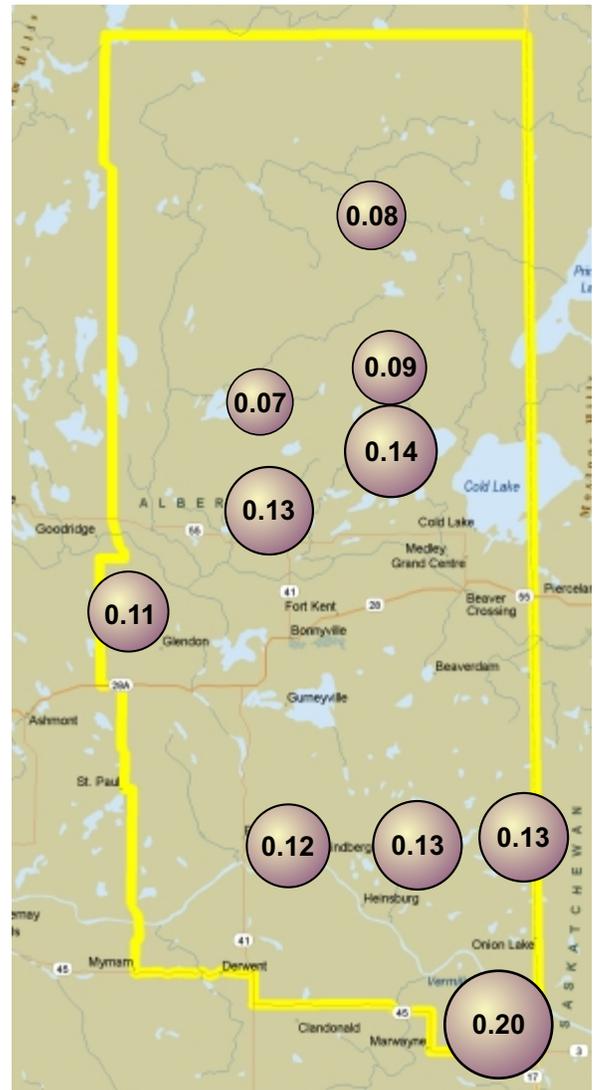


Figure 5: Annual average concentration (ppb) of hydrogen sulphide in the LICA region

Air Quality Indicators

The Clean Air Strategic Alliance (CASA) has developed improved air quality indicators that can be used by airsheds. The air quality indicators and the methodology for calculating them are well documented and have been reviewed and endorsed by a statistician, stakeholders, and the CASA Board.

The methodology is based on using continuous air monitoring data collected over a period of five years. For airsheds with only passive data, or with a shorter period of record, it is possible to calculate approximate (based on passive rather than continuous monitoring data) and interim (based on a period of record of less than five years) air quality indicators. Since LICA has only been operating the Cold Lake South continuous station for one year, we are using the available data from the passive network (2004, 2005, and 2006) to calculate approximate interim air quality indicators. In the following discussion, all conclusions about the significance of trends are approximate and interim.

Annual network averages were calculated for each pollutant measured. In addition, a statistic called the 99th percentile was calculated for each pollutant for each year. By definition, 99 percent of all measurements in a given year fall below the 99th percentile value. Statistical trend tests were performed to determine whether there are any trends in the data over the period 2004 through 2006 that are statistically significant. A statistically significant trend is one that is unlikely to exist due to chance. The trend test used was the Daniel's trend test (also known as Spearman's rho test) and statistical significance was based on the 95% confidence level.

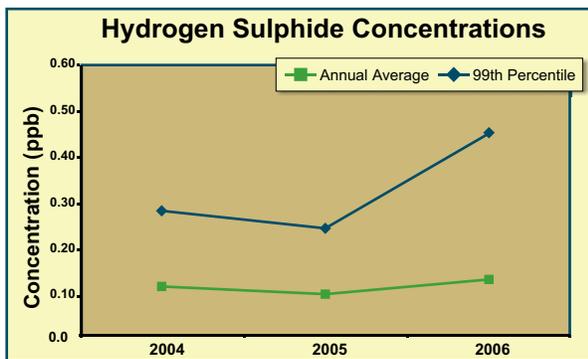


Figure 6: Hydrogen Sulphide Concentrations

The annual average concentration for hydrogen sulphide was 5 percent higher in 2006 than in 2004. The increase does not represent a statistically significant trend. The 99th percentile shows an increase in 2006; this is due to higher concentrations measured in the southeast area of the LICA Airshed Zone (see bubble map section for further explanation).

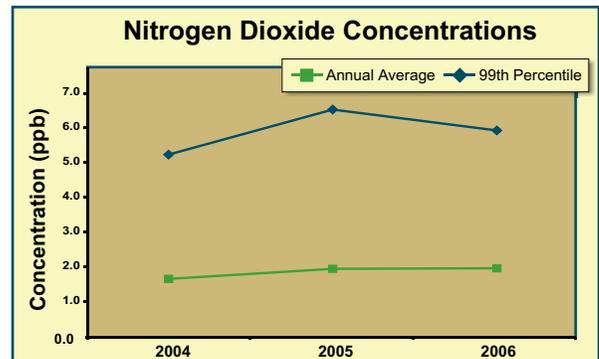


Figure 8: Nitrogen Dioxide Concentrations

Neither the annual average nor the 99th percentile concentrations of nitrogen dioxide show large year-to-year fluctuations over the period of record. The annual average and 99th percentile concentrations of nitrogen dioxide are 18% and 13% higher, respectively, than those in 2004. This change does not represent a statistically significant trend.

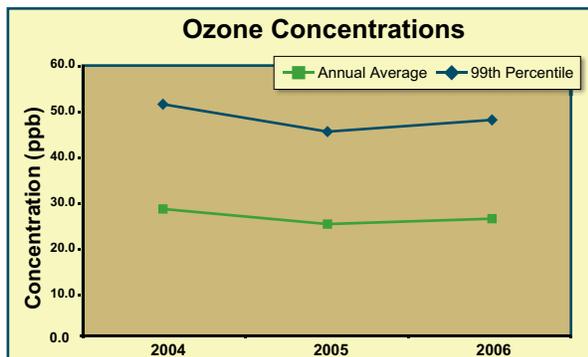


Figure 7: Ozone Concentrations

In 2006, both the annual average and 99th percentile concentrations of ozone were higher than in 2005, but lower than in 2004. The annual average and 99th percentile concentrations of ozone in 2006 are 8% and 7% lower, respectively, than the corresponding values in 2004. These decreases do not represent statistically significant trends.

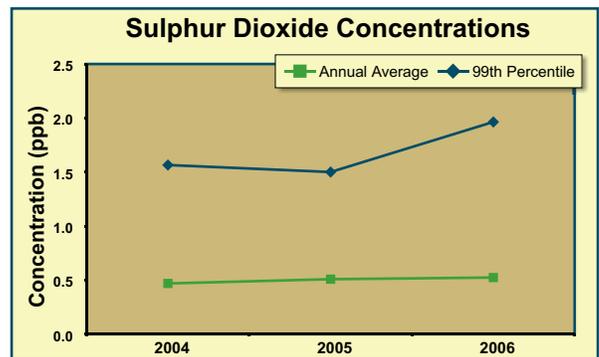


Figure 9: Sulphur Dioxide Concentrations

In 2006, the annual average concentration of sulphur dioxide was higher than it was in 2005 and 2004. The annual average and 99th percentile concentrations of sulphur dioxide in 2006 were 12% and 27% higher, respectively, than in 2004. These changes do not represent statistically significant trends.

Continuous Air Monitoring

A continuous-air-monitoring trailer was installed in Cold Lake South in October 2005. The station and the analyzers within it were provided by Alberta Environment for LICA's use. The analyzers provide hourly-average measurements of a set of parameters selected by the LICA Airshed Zone in consultation with Alberta Environment. LICA contracts a third-party company to operate the station and to report the results. The most recent data from the station can be viewed at www.lica.ca.

The LICA Airshed Zone implementation plan provides for three continuous-monitoring trailers to be part of the network. The two trailers that have not yet been added to the network are currently being used for compliance monitoring by one of the member companies. A set of requests to amend operating approvals under the Alberta Environmental Protection and Enhancement Act (AEPEA) will have to be processed before the trailers can be made available to the LICA network.

Cold Lake South Trailer Opening Ceremony

In June 2006, the Cold Lake South monitoring equipment was installed in a new shelter.

The shelter, which replaced the original one that had developed some serious leaks, was provided by Alberta Environment. LICA paid to transport the shelter to the site and to move the equipment from the old trailer into the new one.

On June 21, 2006, LICA hosted a ribbon-cutting ceremony to recognize the milestone of providing continuous monitoring services.



Continuous Monitoring

Continuous air monitoring equipment is used to provide nearly instantaneous measurements of air quality. This type of monitoring is often termed "real-time" and is extremely valuable when public advisories about air quality (e.g. during forest fires) are required.

Continuous sampling involves drawing air into a device (often called an analyzer) which has been set up or calibrated to produce an output proportional to the ambient concentration of a pollutant. There is a wide spectrum of substances that can be continuously monitored with commercial analyzers.

Although data can be stored in shorter intervals, most airsheds store data from continuous monitoring stations in one-hour average time blocks. This type of monitoring provides the highest time resolution but is costly, due largely to the capital and operating costs involved.



Cold Lake South Continuous Monitoring Station Results Summary

Table 2 provides a summary of 2006 monitoring data from the Cold Lake Continuous Monitoring Station. Where comparisons to Alberta Ambient Air Quality Objectives are possible, they are included in the table for reference. More in-depth analyses of patterns and other unique observations are included in the sections that follow.

	Maximum 1-Hour Avg. Concentration	Date	Maximum 24-Hour Concentration	Date	Annual Average	Alberta Ambient Air Quality Objectives		
						1-hour	24-hour	Annual
SO₂ - Sulphur Dioxide	26.3	Apr-30	2.8	Nov-28	0.5	172	57	11
NO - Nitric Oxide	91.4	Dec-07	53.8	Dec-08	0.9	<i>None</i>	<i>None</i>	<i>None</i>
NO₂ - Nitrogen Dioxide	37.6	Dec-20	23.1	Dec-21	3.0	212	106	32
NO_x - Total Oxides of Nitrogen	127.9	Dec-20	74.9	Dec-08	3.8	<i>None</i>	<i>None</i>	<i>None</i>
O₃ - Ozone	65.8	Apr-04	56.8	May-12	25.5	82	<i>None</i>	<i>None</i>
THC - Total Hydrocarbons (parts per million)	4.9	Dec-21	2.7	Dec-08	2	<i>None</i>	<i>None</i>	<i>None</i>
TRS - Total Reduced Sulphur Compounds	8.6	Jul-30	1.4	Jul-23	0.4	<i>None</i>	<i>None</i>	<i>None</i>
PM_{2.5} - Respirable Particulate Matter (micrograms per cubic meters)	80.5	Jun-26	22.1	Jul-07	3.5	<i>None</i>	<i>None</i>	<i>None</i>

Table 2: Cold Lake Continuous Monitoring Station (parts per billion unless otherwise noted)

Monitoring Parameters

Total Hydrocarbons

THC

- a family of chemicals containing carbon and hydrogen
- sources include vegetation, petroleum and chemical industries, dry cleaning, fireplaces, natural gas combustion, and aircraft traffic. Vehicles are the major source of hydrocarbons at urban locations.

Respirable Particulate Matter

PM_{2.5}

- airborne particles in solid or liquid form with median diameter less than 2.5 micrometers
- sources include construction, agriculture, combustion, and forest fires
- can also be formed by the reaction of other pollutants

Total Reduced Sulphur

TRS

- includes hydrogen sulphide, mercaptans, dimethyl sulphide, dimethyl disulphide, and other sulphur compounds, but does not include sulphur dioxide
- potential sources are as listed for H₂S



Air Quality Index Summary

An Air Quality Index (AQI) can be determined at the continuous monitoring station in Cold Lake South. The AQI provides a meaningful measure of outdoor air quality based on concentrations of carbon monoxide, respirable particulate matter, ozone, nitrogen dioxide, and sulphur dioxide. Measurement of at least four of these five pollutants is required to calculate the AQI. The calculation procedure for the AQI produces a number for which we are able to cross-reference air quality ratings of Good, Fair, Poor, or Very Poor (see sidebar).

For 2006, the reported AQI for Cold Lake South was Good 96.9 percent of the time. This was the first full year for which it was possible to calculate the AQI. There were no instances of poor or very poor AQIs in 2006. The chart below illustrates that most of the Fair AQIs were caused by high ozone levels in the spring.

AQI Ratings

Good: This is the desirable range (1-25): No known harmful effects to soil, water, vegetation, animals, materials, visibility, or human health. The long-term goal is for air quality to be in this range all of the time in Canada.

Fair: This is the acceptable range (26-50): Adequate protection against harmful effects to soil, water, vegetation, animals, materials, visibility, and human health.

Poor: This is the tolerable range (51-100): Not all aspects of human health or the environment are adequately protected from possible adverse effects. Long-term control action may be necessary, depending on the frequency, duration, and circumstances of the readings.

Very Poor: This is the intolerable range (greater than 100): In this range, continued high readings could pose a risk to public health.

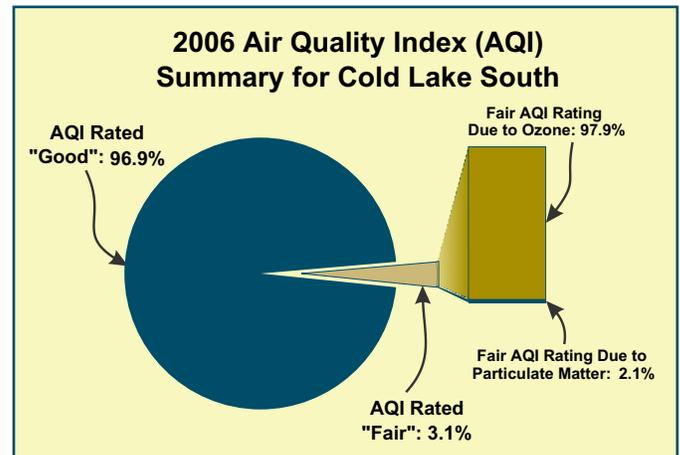


Figure 10: Cold Lake South Summary

Building Capacity

Program Management

As the LICA Airshed Zone's regional air monitoring network grows and the committee tackles more projects to further understanding of regional air quality, it has become obvious that a Program Manager is needed to oversee technical aspects of the Airshed Zone program. In June 2006, Michael Bisaga joined LICA as the Airshed Zone Program Manager.

Michael oversees network operations, provides and presents monthly reports about monitoring results, and coordinates any investigations required to understand unusual monitoring results. Michael also provides technical advice to the committee.



Introducing....

Michael previously worked in different air quality monitoring and reporting roles for Alberta Environment and Ontario's Ministry of the Environment. Originally from Ontario, Michael knew that he had to return to Alberta after completing an internship in the Cold Lake area. An avid camper and canoeist, Michael spends several weekends each summer in the Lakeland region enjoying the area's many lakes, rivers, and parks.



Network Operations

With the expansion of the passive air monitoring network and the prospect of operating three continuous-air-monitoring trailers, the LICA Airshed Zone issued a request for proposals in August 2006 from contractors interested in undertaking network operation, maintenance, and quality assurances services. These services must be executed correctly so that the LICA Airshed Zone will be able to provide reliable, scientifically-defensible measurement information from its air-monitoring network. Maxxam Analytics assumed the network operator role for the LICA Airshed Zone effective January 2007.

The LICA Airshed Zone thanks Jacques Whitford and Focus Corporation, who provided these services in 2006.

Consensus Decision Making

The LICA Airshed Zone uses a consensus decision-making process. For a proposal to be accepted by the Airshed Zone, all designated members have voice in decision making and must be able to "live with" the decision. The designated members represent constituencies, or "sectors", and their consent to a proposal indicates that it meets the interests of the group they represent.

Each sector appoints its own representatives. If you are interested in participating as a community member, LICA invites your expression of interest. Forms are available from the LICA office or at the LICA Annual General Meeting.

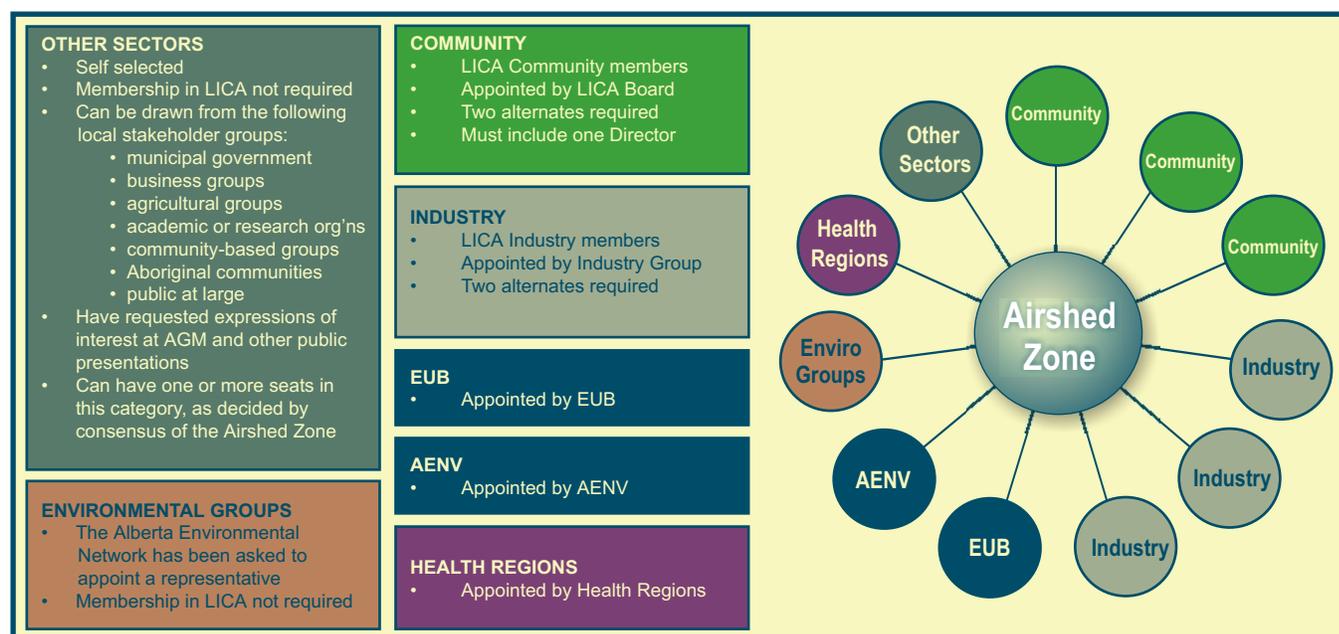


Figure 11: Airshed Zone Structure

Organizational Support

The LICA Airshed Zone is unique in Alberta in that it shares infrastructure with an existing synergy group. The LICA Airshed Zone's governance structure was established in 2006. LICA bylaws and policies were also amended in 2006 to provide for LICA support of a committee which is an independent decision-making body. The Airshed Zone sets its own budget, secures its own funding, and determines its own programs. Infrastructure shared with the LICA synergy group includes administration, accounting, and communication services. Membership on the Airshed Zone by community members appointed by the LICA Board of Directors and the consensus decision-making process used by the Airshed Zone ensure that the Airshed Zone plans are compatible with overall LICA vision, mission, and values.

Understanding Air Quality Issues

Potential Acidification Impacts Study

When companies apply to build or expand in situ bitumen-recovery facilities in Alberta, they conduct environmental impact assessments (EIAs) that consider, among other things, if the proposed project's emissions are likely to cause acidifying deposition ("acid rain") that could impact soil or surface water within an agreed study area. The Airshed Zone is in a very good position to take an even broader view to understand potential impacts on a regional and cumulative basis.

The LICA Airshed Zone has commissioned an exploratory study to review existing information collected by Alberta Environment, industry, and other organizations that have studied acidification impacts. Based on the review of this information, the consultant has been asked to develop specific recommendations on monitoring and the development of management frameworks for acid deposition in the area.

This study was awarded to AMEC Earth and Environmental, and is now underway. Results and recommendations are expected by March 2007.



WISSA completes six-year study

A six-year study of cattle herds near oil and gas facilities in western Canada, completed in 2006, has found few associations between emissions and the overall health of cattle. Studies like this one help the LICA Airshed Zone increase our understanding of air quality.

The Western Canada Study of Animal Health Effects Associated with Exposure to Emissions from Oil and Natural Gas Facilities, released by the Western Interprovincial Scientific Studies Association (WISSA) in May 2006, involved the collection and analysis of data from approximately 33,000 cattle in 205 herds in Alberta, Saskatchewan, and northeast B.C.

Copies of the *Interpretive Overview by the Science Advisory Panel*, and the *Technical Summary of the Western Canada Study of Animal Health Effects Associated with Exposure to Emissions from Oil and Natural Gas Field Facilities* are available at <https://www.wissa.info>.

Alberta Environment conducts Tank Vapour Sampling Project

In late 2005, Alberta Environment approached the LICA Airshed Zone to provide input for a monitoring project near La Corey. The objective of the project was to characterize vapour released by heated heavy oil storage tanks used in primary production operations. Although the project was not initiated by the LICA Airshed Zone, Alberta Environment requested the Airshed Zone's input into project design and communication of results. Initial results and key findings were presented at the June 2006 LICA Airshed Zone meeting:

- some polycyclic aromatic hydrocarbons were detected; however, Alberta Health and Wellness' review of the results indicates that no adverse health effects are expected at the levels measured
- where comparisons could be made, hydrocarbons were below Alberta Ambient Air Quality Objectives
- results confirmed previous field work regarding reduced sulphur compounds
- some compounds identified in the field were similar to those identified in previous laboratory work, but were at lower concentrations

There is continuing discussion of results with local industry and stakeholders. The LICA Airshed Zone will ensure that the network review and emissions inventory projects in 2007 incorporate understanding gained from this work.



Focus on Air Quality

Ozone and Nitric Oxide Patterns at Cold Lake

Unlike other pollutants, ozone is not emitted directly by human activities. Ozone in the lower atmosphere is produced by a complicated set of chemical reactions involving oxides of nitrogen and volatile organic compounds in the presence of sunlight. Ozone and these precursors may also be carried from upwind sources such as urban centres and industrial complexes.

During high-temperature combustion (burning of natural gas, coal, oil, and gasoline), atmospheric nitrogen may combine with molecular oxygen to form nitric oxide. Most nitric oxide in the ambient air will react with ozone to form nitrogen dioxide.

Ozone concentrations are generally lower at urban locations than at rural locations. This is due to the destruction of ozone by the nitric oxide that is emitted by vehicles. In Cold Lake, there appears to be a "pulse" of nitric oxide during the morning and afternoon rush-hours.

Figure 12 shows how high-resolution continuous data can be used to illustrate the weekly cycle of ozone and nitric oxide. The pattern is derived by plotting the average concentration for a given hour, using all data collected during the year at the Cold Lake Continuous Station. For example, the ozone data point for 02:00 on Monday was calculated by taking the average of all one-hour ozone concentrations measured at 02:00 on Mondays throughout the year.

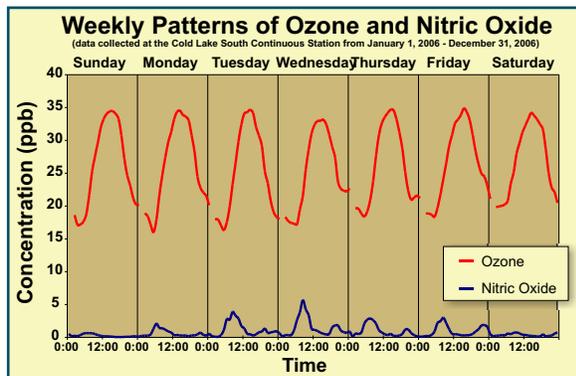


Figure 12: Weekly patterns of ozone and nitric oxide measured at the Cold Lake South Continuous Station

Notes:

- 1) Data collected at 01:00 have been removed from the ozone series. The reason for the missing data is that the analyzer runs a daily "self check" at 01:00; this is necessary for data validation and is a requirement of Alberta Environment's Air Monitoring Directive.
- 2) Refer to Table 2 to understand how nitric oxide and ozone concentrations measured in Cold Lake compare to air quality objectives.



Case Study: Investigation of Particulate Matter in July – Forest Fires Impact Air Quality

In July 2006, the Cold Lake South Continuous Monitoring Station measured elevated concentrations of particulate matter. Across northern and central Alberta, monitoring stations operated by Alberta Environment and other Airshed Zones also measured elevated particulate matter concentrations.

Although air quality in the LICA area did not deteriorate to the same level, smoke from forest fires throughout northern Alberta reduced air quality in the Capital Health region to "fair to poor," due to elevated levels of particulate matter. Respirable particulate matter can be absorbed deep into the lungs, where it can cause health problems, particularly for people with respiratory conditions.

Eye-witness accounts from Ardmore noted that there was a visible haze in the area and local officials indicated that there were also small fires on the Cold Lake Air Weapons Range during the event.

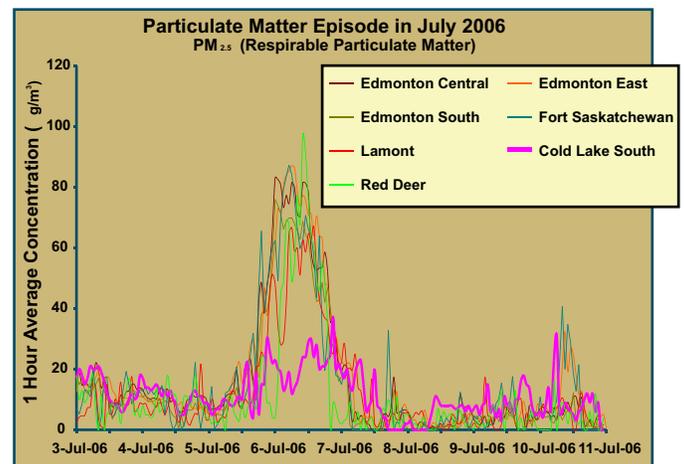


Figure 13: Particulate matter data collected in July by stations from across Central Alberta



Case Study: Investigation of Nitrogen Dioxide near the Elk Point Airport

As shown in Figure 14, nitrogen dioxide values measured at Station 6 (Elk Point Airport) and Station 21 (Fort George) have consistently been higher than the network average. Although no ambient air quality objectives have been exceeded, the values were unexpected. An investigation was undertaken to try to understand what nitrogen dioxide sources could be influencing the two stations.

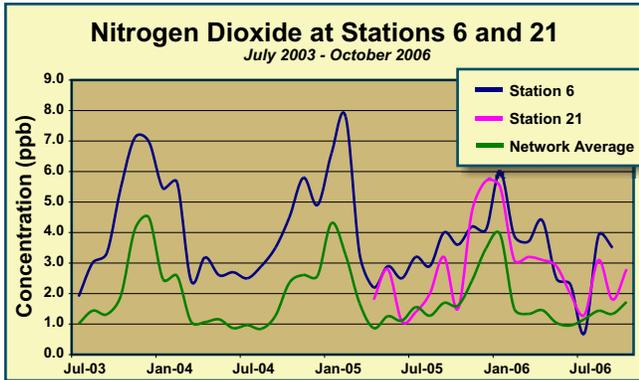


Figure 14: Nitrogen dioxide observations from July 2003 to November 2006 at Stations 6 and 21

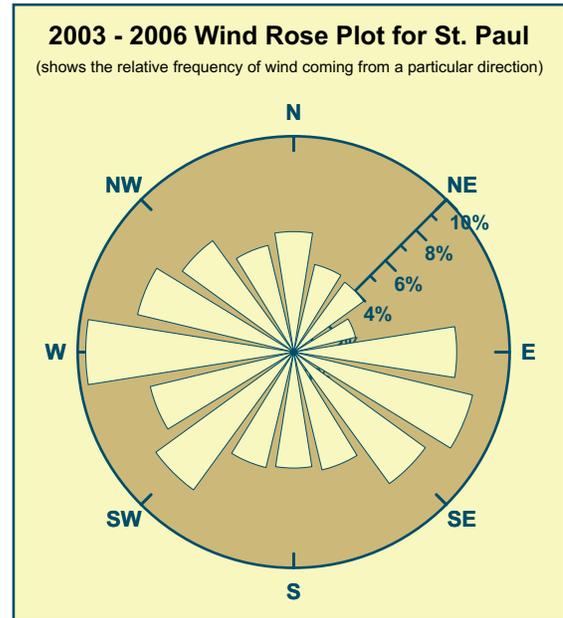


Figure 15: Windrose plot for St. Paul from January 2003 to December 2006 (Environment Canada)

Wind direction data collected in St. Paul from January 2003 to December 2006 (courtesy of Environment Canada) suggest that winds from the west, southwest, and northwest predominate. Satellite imagery was used to look for potential sources upwind from the stations.

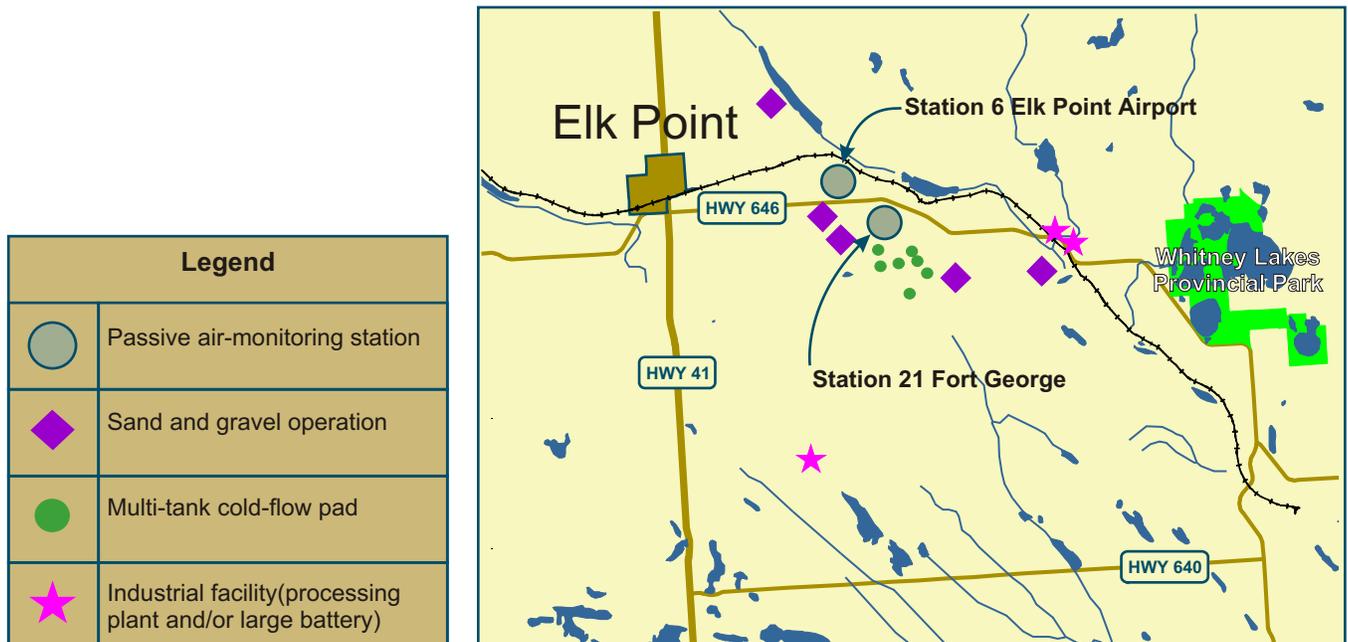


Figure 16: Map of nitrogen dioxide sources in the area surrounding the Elk Point and Fort George passive monitoring stations

Several small nitrogen dioxide sources in the area were identified and these may collectively be influencing the nitrogen dioxide readings. The sources identified include a highway, high density cold-flow well configurations, multi-tank cold-flow pads (up to seven heated storage tanks per pad), large batteries, small processing plants, and several sand and gravel operations. The map above shows the locations of the Elk Point and Fort George stations as well as the nitrogen dioxide sources identified.

In light of the higher-than-expected nitrogen dioxide readings in the area, the regional air monitoring network design has been adapted to locate the planned "background" continuous air monitoring trailer farther away from the nitrogen dioxide sources identified in this investigation.

LICA Airshed Zone Plans

Terms of Reference	2007 Plans
Serve as the Alberta Airshed Zone in the LICA area.	<ul style="list-style-type: none"> ● Build membership (work to ensure that all interested sectors are represented at the table)
Facilitate and co-ordinate regional air quality monitoring in the LICA area.	<ul style="list-style-type: none"> ● Add two continuous monitoring trailers to the LICA network ● Initiate a third-party review of the network design and monitoring results
Further and promote understanding of air quality in the LICA area.	<ul style="list-style-type: none"> ● Review Potential Acidification Impacts study and implement recommendations, as agreed at the Airshed Zone table ● Conduct an emissions inventory to further understanding of the types, quantities, and sources of pollutants in the area ● Conduct public meetings and an event to promote understanding of air quality



REGIONAL ENVIRONMENTAL WATER MONITORING COMMITTEE REPORT 2006

Letter from the Chair and Vice-Chair

The Regional Environmental Water Monitoring Committee (REWMC) compiles and shares information about surface water, groundwater, and aquatic ecosystems in the LICA region. The committee's objective for 2006 was to further our understanding of water issues through participation in local environmental initiatives, and by working with other area groups.

In 2006, the REWMC participated in several activities to help meet our objectives. These include sponsorship of the Six Lakes Riparian Zone Project, co-chairmanship of the Basin Advisory Committee responsible for updating the 1985 Cold Lake Beaver River Water Management Plan, and continued partnership with Alberta Environment and the Alberta Lake Management Society in the LakeWatch program. Support for formation of a Watershed Planning and Advisory Council (WPAC) for the Cold Lake Beaver River basin was high on the committee's priority list, as was promotion and participation in local environmental events such as The Great Canadian Shore Line Cleanup, EcoDays, and Water Quality Awareness Day.

We invite anybody interested in the regional surface water and groundwater quality and quantity in the LICA area to join us for a meeting or come out and participate in an environmental event in 2007.

Del Tolley and Carol Engstrom
LICA Regional Environmental Water Monitoring Committee Chair and Vice-Chair

Six Lakes Riparian Zone Project

In the summer of 2006, REWMC and the Alberta Conservation Association completed shoreline assessments for Hilda, Ethel, Tucker, Muriel, Marie, and Crane Lakes. The riparian zone is the 'ribbon of green' at the edge of a lake, stream, river, or wetland that is influenced by the presence of water. This zone, with its associated vegetation, provides habitat for wildlife and improves water quality and quantity by acting as a filter. The health of the riparian zone is an overall indicator of lake health.

The methodology used for the shoreline assessments was developed by the Alberta Conservation Association. Video footage of the shoreline of each lake was filmed from a low-flying aircraft. The videos were transferred to a computer. Each section of the shoreline was assessed using a set of pre-determined criteria, and was categorized as healthy, moderately impaired, or highly impaired. Criteria for the assessment include the presence of vegetation, the presence of woody plants, and how much of the surface has been changed from its native state (whether by addition of rock or sand, soil cultivation, the presence of livestock, or ATV traffic).

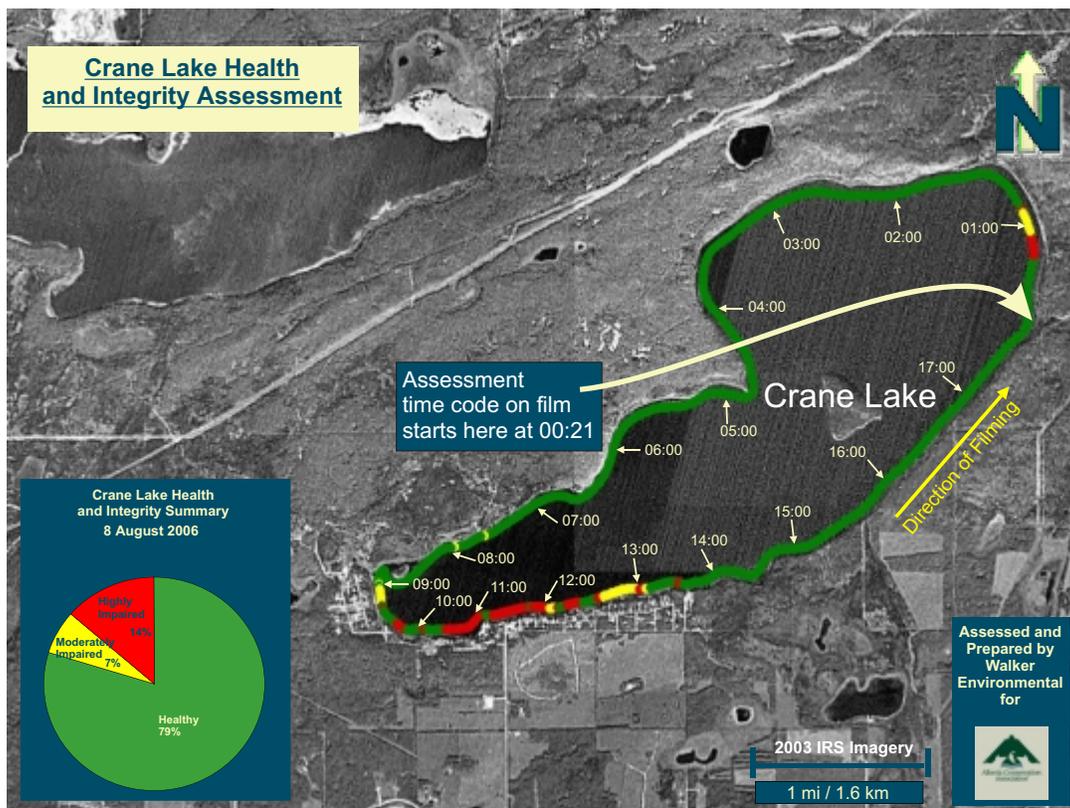
The overall results of the assessments for the six area lakes studied in 2006 are shown in Table 3 and in the maps below. Detailed results that show the rating of each shoreline section together with the film footage are available in a set of videos that can be borrowed from the LICA office.

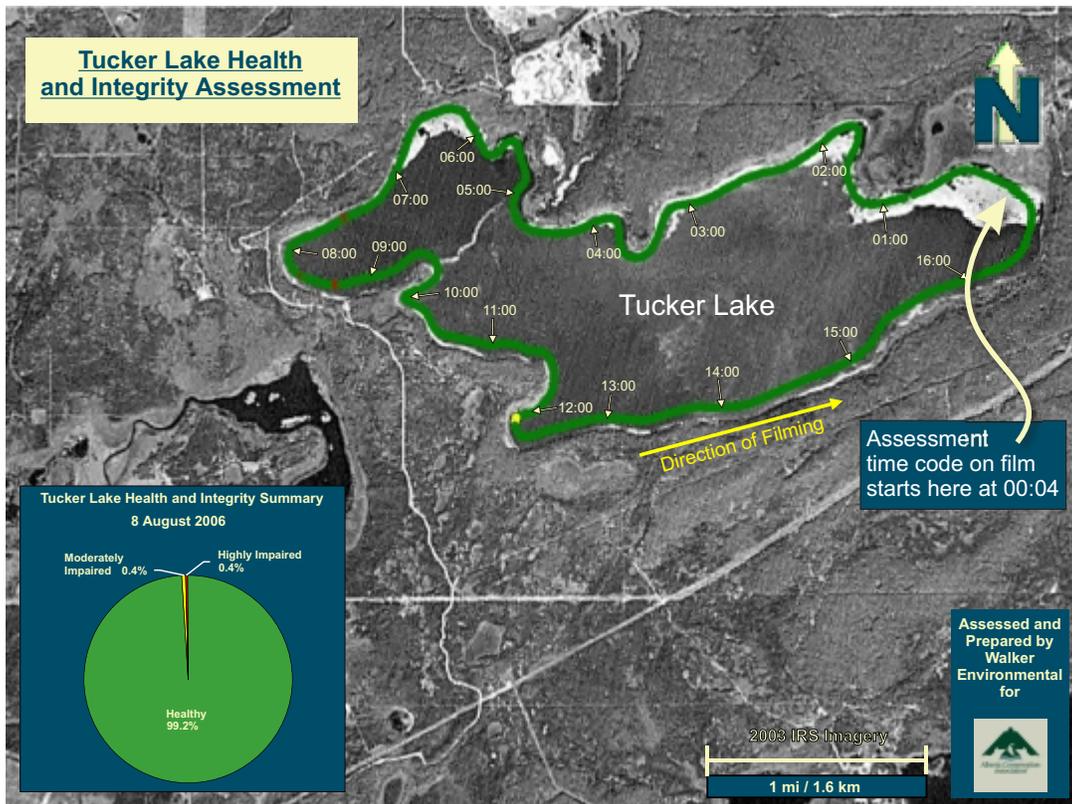
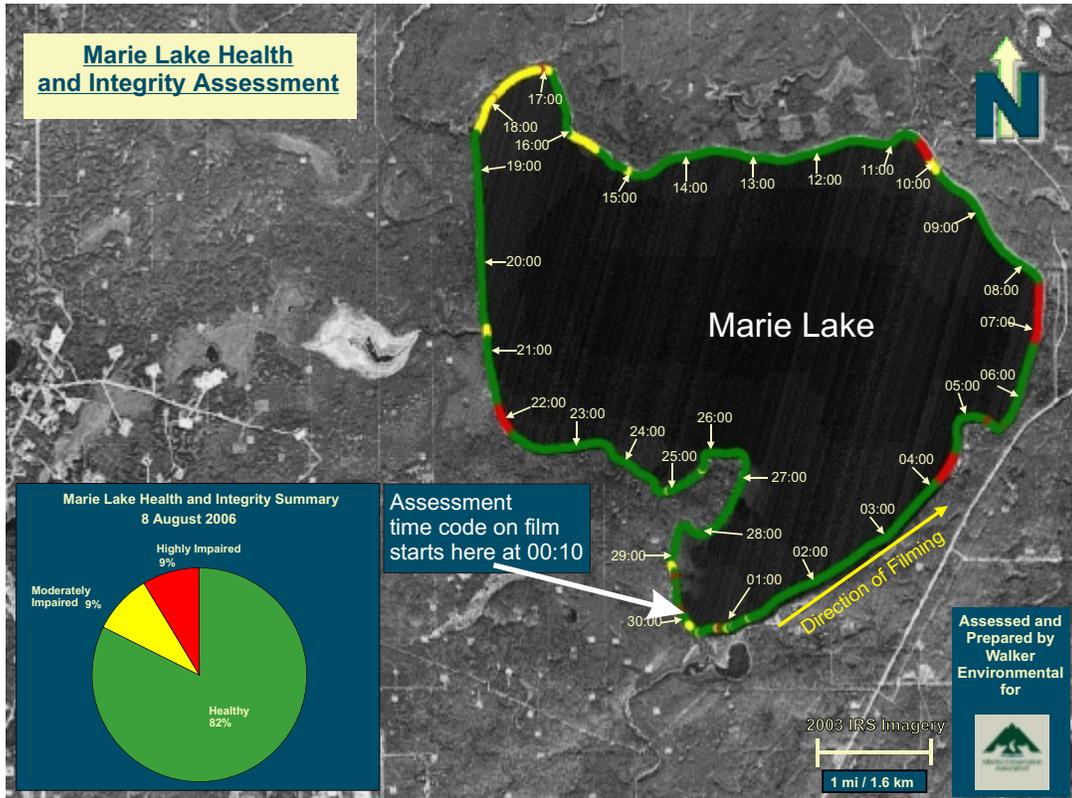


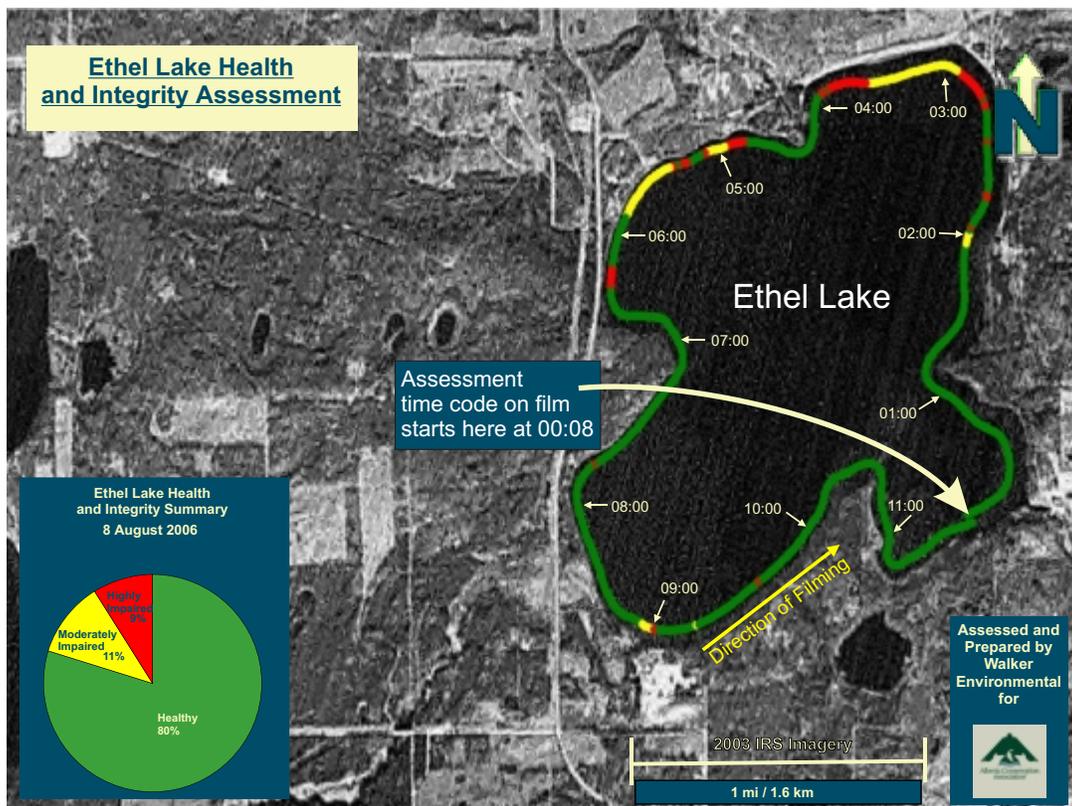
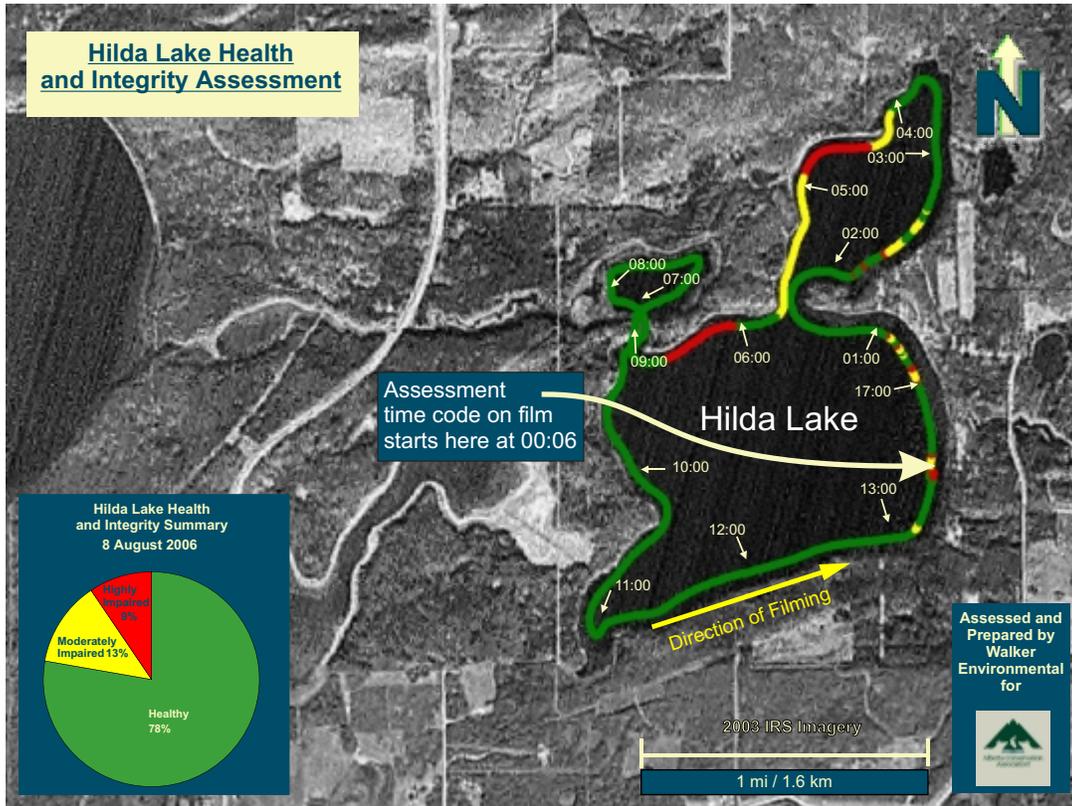
Although the riparian health assessments are interesting in themselves, their true value will only be realized if the results are used to improve riparian health. Potential projects range from education of lakeshore landowners, recreationists, and the public about the value of vegetation in the riparian zone to restoration projects that could result in an improvement of lake health.

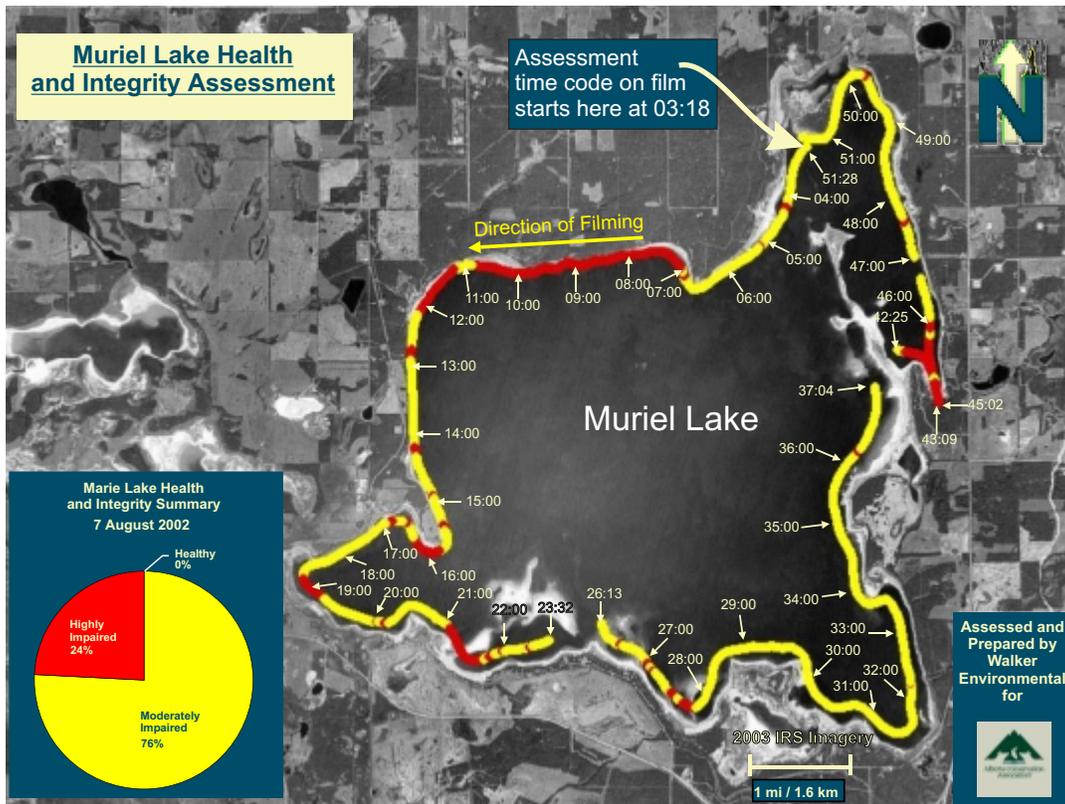
Lake	% Healthy	% Moderately impaired	% Highly impaired
Crane	79	7	14
Ethel	80	11	9
Hilda	78	13	9
Marie	82	9	9
Tucker	99.2	0.4	0.4
Muriel	0	76	24

Table 3: Riparian Health Assessment Results









Special consideration was necessary when assessing Muriel Lake due to its tremendous water loss since the mid-1980s. Moderately impaired areas score close to highly impaired, and highly impaired usually score low due to human activity.



Cold Lake - Beaver River Basin Water Management Plan

After a final round of public open houses in June 2006, an update of the 1985 water management plan has been completed by the Basin Advisory Committee (BAC) and submitted to Alberta Environment for approval and implementation. The 2006 Cold Lake – Beaver River Basin Water Management Plan will, once approved by Alberta Environment, be the guiding document for water resource management decisions within the basin. This updated plan is the result of several years' effort by many dedicated individuals.

The management guidelines in the 2006 plan strive to balance community, economic, and environmental issues and values with government legislation and policy for protecting and managing water resources. The goal was to provide effective, fair, and wise water management. All BAC partners support the management guidelines and endorse the implementation of this updated plan.

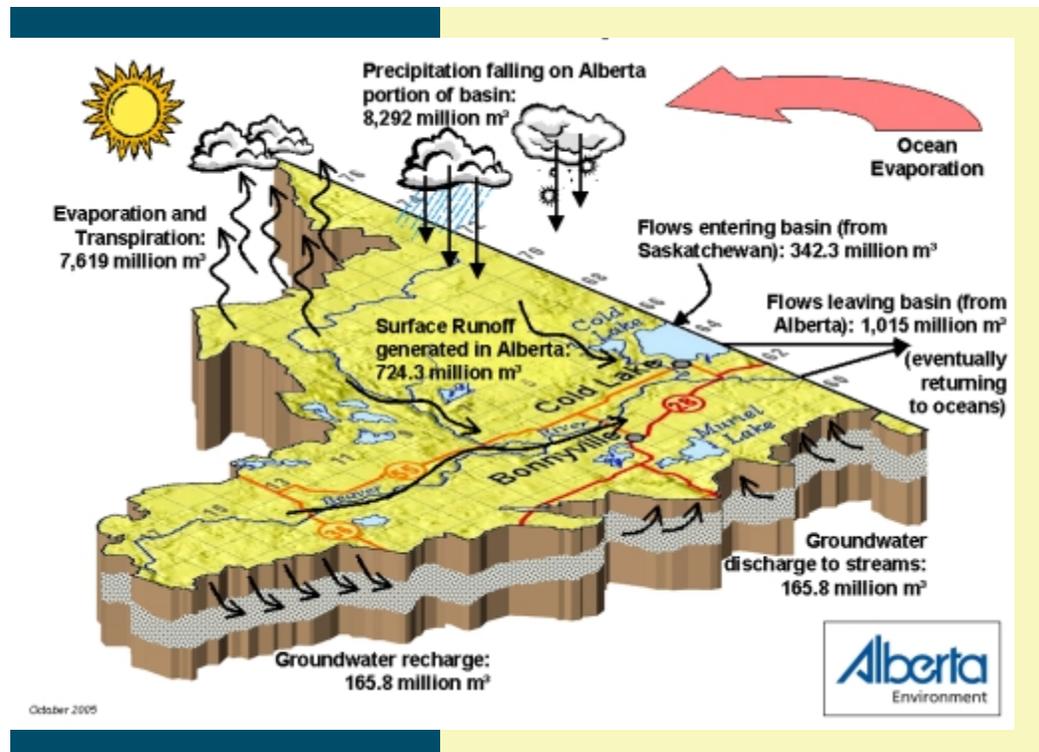
The plan was updated to reflect current environmental and socio-economic conditions within the basin, and to integrate recent provincial water management initiatives like the Water for Life strategy. The update team relied heavily on the four State of the Basin Reports – Surface Water Quality, Surface Water Quantity and Aquatic Resources, Groundwater Quantity and Brackish Water, and Groundwater Quality, researched and written by BAC technical teams in 2005.

Comparison of 2006 and 1985 Plans

The 2006 water management plan retains some aspects of the 1985 plan guidelines, while updating others to reflect provincial directions in water management, and current and future water-use profiles in the basin. For example, the existing cut-off level (534.55 metres above sea level) for industrial water withdrawals from Cold Lake has been retained, as have withdrawal moratoriums for May, Muriel, Manatokan, Reita, and Tucker lakes. A notable change from the 1985 plan is the guideline to manage water use demands within the capacity of the basin. This precludes the construction of a water supply pipeline from the North Saskatchewan River as was recommended in the 1985 plan, since the North Saskatchewan River is outside the basin. Table 4 summarizes the main differences between the two plans:

1985 Plan	2006 Plan
Water management: focused mainly on water allocations.	Watershed approach: integrate water quantity, quality, land use practices, and protection of aquatic resources.
Target management approach: established maximum target limits for surface water and groundwater withdrawals in the basin.	System management approach: focuses on the interdependence and interactions of surface water and groundwater, land use practices, aquatic resources needs, climate change, and cumulative impacts on the system.
Interbasin water transfer: recommended transfer of water from the North Saskatchewan River to augment future industrial water demand in the basin.	Manage within the capacity of the watershed: consistent with the Water for Life Strategy, focuses on meeting water demands within the capacity of the basin.
Structural solution: recommended the construction of control structures (e.g., weirs) for water storage purposes.	Non-structural solutions: focuses on water conservation and best management practices to protect aquatic resources and the recreational values of local lakes and wetlands.
Government and regulatory management approach: a tool for Alberta Environment to make water allocation decisions in the basin.	Shared responsibility and partnership approach: In addition to being a tool for AENV to make water allocation decisions, this updated plan focuses on building partnerships and establishing a Watershed Planning Advisory Council (WPAC) to implement the non-regulatory components of the plan.
Separate management model: groundwater and surface water were managed separately.	Integrated approach: groundwater and surface water are interconnected and recognized as a single resource.

Table 4: Comparison of 1985 and 2006 Plans



FYI

The management plan, state of the basin reports, and other documents related to the planning process are available through Alberta Environment's website at www.gov.ab.ca/env.

Figure 17: Cold Lake – Beaver River Basin

Beaver River Watershed Alliance

This past year also saw a great deal of activity related to the formation of a Watershed Planning and Advisory Council (WPAC) for the Cold Lake – Beaver River Basin. In *Water for Life: Alberta's Strategy for Sustainability*, the Government of Alberta introduced the concept of forming stakeholder-led watershed reporting and planning organizations. These WPACs work to identify regional issues, understand their watershed, and seek solutions collaboratively, using consensus-based decision-making. The Beaver River WPAC will build on the work of the Basin Advisory Committee and of LICA's Regional Environmental Water Monitoring Committee, and will expand the focus area to include the upper portion of the basin. LICA has participated in workshops and Initiator's Group meetings and helped develop the Strategic Plan that will guide the WPAC in its early years.

The working name for the WPAC is the Beaver River Watershed Alliance (BRWA). The BRWA will seek to establish an independent Steering Committee within the structure of LICA early in 2007. LICA will continue to support the WPAC as an active member bringing expertise, resources, and administrative support to the BRWA as it grows. The WPAC will work on the development and implementation of watershed plans, gather and share information on the state of the watershed, and undertake fun, interesting activities for its members and the public. It is our goal that together we will ensure the health of this watershed for the present and the future.



Paleolimnology Study

Alberta Environment, LICA, and researchers from the University of Waterloo and McGill University have continued their partnership to learn about the environmental history of Moose and Kehewin lakes over a time scale of 200 years. Paleolimnology uses the physical, chemical, and biological information archived in lake sediments to reconstruct and interpret past environmental conditions. This branch of science can also track the cumulative stress effects of such things as climatic variability, acid deposition, and nutrient enrichment on aquatic communities.

In 2006, the researchers also partnered with the LakeWatch program to take sediment core from most of the 30 lakes in the provincial LakeWatch program, some of which are in the LICA area. The additional sediment cores will provide regional and provincial context for the more detailed study of Moose and Kehewin lakes.

Preliminary results show that, although Moose and Kehewin lakes have always been nutrient-rich, they became more so around the middle of the 1900s. There is also evidence that climate has had physical and biological effects on lakes in the area. Teasing apart the effects of climate and land use change will be the focus over the coming year, with the final results expected by the end of 2007.



Figure 18: Zofia Taranu, McGill University, cutting a core sample for analysis

Muriel Lake Study:

As discussed in last year's report, the REWMC and the Muriel Lake Basin Management Society commissioned Dr. Bill Donahue to complete a study on why the water level has decreased in Muriel Lake. The final report is now available on the LICA website.



LakeWatch Program



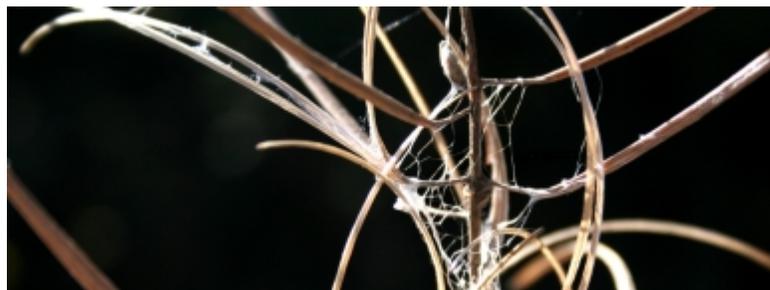
Figure 19: Volunteers Bob Hornseth and Laurier Sylvester, with LakeWatch Coordinator Megan McLean at Moose Lake

Alberta LakeWatch is a monitoring program for stewardship groups to understand water quality and water quality trends at their lakes while increasing awareness and community participation. Volunteers provide their time and a boat, and the Alberta Lake Management Society (ALMS) provides equipment, professional guidance, and training. Since 1996, over 60 lakes have been sampled, with reports of the results available on the ALMS website (www.alms.ca). LICA supports the program with funding and by organizing volunteers within the LICA area.

The information collected through the LakeWatch program is used to support local management decisions. For example, this information was a key input to development of the Cold Lake – Beaver River Basin and the Moose Lake water management plans.

Thirty lakes were sampled throughout Alberta on a three-week rotation in the summer of 2006. Lakes sampled in the LICA area include Beartrap, Crane, Fishing, Frog, Hilda, Moose, Muriel, Tucker, and Wolf lakes. The LICA area sampling was supported by more than a dozen local volunteers, who were recognized at a LICA-sponsored dinner in October 2006. Special mention goes to Bob Hornseth who has volunteered for five years.

Reports from the 2006 sampling season will be available at the end of April, 2007, at www.alms.ca.



Focus on Water Quality: LakeWatch Results from Bear Trap Lake

According to Alberta Environment records, Beartrap Lake was sampled for the first time ever in 2006. Secchi disk measurements show the water as quite clear in Beartrap Lake; the total phosphorus concentration and measurements of water greenness indicate the lake does not have severe algae problems. The lake is classified as moderately productive, or "mesotrophic" on the algal scale.

Parameter	Value
Total P (µg/L)	33
Water greenness (µg/L chl _a)	5.6
Water clarity (m Secchi)	3.5
Salinity (mg/L TDS)	727
PH	9.1

Table 5: Average concentration of selected parameters in Beartrap Lake (summer 2006)

Quotes from participants

"I am very pleased that ALMS have collected this data, so that my stewardship group can work effectively to protect the Crane Lake watershed"
Gord Coulman, President of the Crane Lake Advisory & Stewardship Society

"With the help of ALMS we have some idea of what we can do to keep the lake in as good a shape as possible." *Bob Hornseth, 25+ year resident of Moose Lake and 5-year volunteer for LakeWatch*

Lake	2002	2003	2004	2005	2006	2007	2008	2009	2010
Angling	X	X	X			X	X		
Bluet	X	X	X	X				X	X
Garnier	X	X	X	X				X	X
Laurier	X	X	X			X	X	X	
Kehewin	X	X	X	X				X	X
Marie ¹	X	X	X			X	X	X	
Moose ²	X	X	X	X	X		X	X	
Frog		X	X	X	X			X	X
Hilda ¹			X	X	X			X	X
Fishing				X	X	X	X		
Crane				X	X	X			X
Wolf				X	X	X	X		
Muriel					X	X	X		
Bear Trap					X	X	X	X	X
Tucker					X	X	X		

¹ Sampled by IOR on an annual basis

² Sampled by the Town of Bonnyville

X Sample Season Completed

X Partial Sampling Season Completed

X Proposed Sampling

Table 6: Lakes monitored by LICA



Regional Environmental Water Monitoring Committee Plans

Terms of Reference	2007 Plans
Develop a comprehensive program that monitors regional natural water systems, which may include working with and through a Beaver River Watershed Planning Advisory Council, the North Saskatchewan River Watershed Alliance, and other partners to cover the entire LICA region	<ul style="list-style-type: none"> ● Continue to participate in the WPAC Initiators Group ● Support formation of the Beaver River Watershed Alliance ● Support transition of REWMC projects to WPAC
Compile and share information on regional environmental water data (surface, groundwater, and aquatic ecosystems)	<ul style="list-style-type: none"> ● continue to support LakeWatch program, with ten lakes identified for monitoring in 2007 ● continue to support the paleolimnology study of Moose and Kehewin lakes
Combine partner resources and share best practices	<ul style="list-style-type: none"> ● progress work towards a partnership with LICA, Ducks Unlimited, and local municipal governments towards a wetland restoration project ● share recommendations with WPAC about the methodology to obtain information about which road crossings of creeks in the northern LICA area are in need of repair



SPILL CO-OP

Western Canadian Spill Service Ltd. (WCSS) is the upstream petroleum industry's oil spill-preparedness organization. This non-profit corporation is owned and directed by the petroleum industry with day-to-day management by the industry's safety and training arm, Enform.

A crucial part of WCSS is the 18 geographically-based Oil Spill Cooperatives that have been in place since 1972. The petroleum companies in each Co-op area work together to achieve a state of spill-response readiness. To accomplish this, Cooperatives maintain area oil spill-contingency plans and strategically place OSCARS (oil spill containment and recovery units), boats, and specialized equipment that are available to all member companies in the area. In addition, Cooperatives hold annual oil spill training exercises for Co-op members and train industry volunteers to assist with initial spill response when the need arises. More than 1500 petroleum company field representatives attended Co-op oil spill exercises in 2006.



The Lakeland Industry and Community Association's area of jurisdiction is within the boundaries of WCSS Oil Spill Cooperative VR1. This progressive Cooperative is managed by a group of dedicated industry volunteers, with exceptional support from Alberta and Saskatchewan regulators. Spill response equipment in VR1 includes OSCAR units, boats, and a winter spill response unit located in Lloydminster (see www.wcss.ab.ca).

Although the upstream petroleum industry has demonstrated that it truly does have a world class spill-preparedness program, it is not willing to accept the status quo; continuous improvement is always on the agenda. We have made significant progress in the last 35 years, but there is always room for improvement. WCSS is up for the challenge!



CURRENT MEMBER COMPANIES INFORMATION

BAYTEX ENERGY LTD.
Head Office: 2200, 205 - 5th Ave., S.W.
Calgary, AB T2P 2V7

Field Office: Box 358
Ardmore, AB T0A 0B0

Kevin Golem (780) 826-3410



CCS ENERGY SERVICES
2400, 530 - 8 Ave., S.W.
Calgary AB T2P 3S8

Kerri Engler (403) 231-1132



FLINT ENERGY SERVICES LTD.
6411 - 52nd Avenue
Bonnyville, AB T9N 1L3

Brian Wittmack (780) 812-3919



INTER PIPELINE FUND
P.O. Box 7189
Bonnyville, AB T9N 2H5

Mel Hawryluk (780) 826-3620



SHELL CANADA ENERGY
400 - 4th Ave., S.W.
Box 100, Station M
Calgary, AB T2P 2H5

Murray Ireland (780) 639-0381



DEVON CANADA CORPORATION
P.O. Box 7905, 6210 - 50th Ave.
Bonnyville, AB T9N 2J2

Kevin Ryan (780) 573-2476
Brent Moore (780) 689-0414



HUSKY ENERGY
Box 6525, Station D
Calgary, AB T2P 8G7

Carol Engstrom (403) 298-6175
Keith Scheidt (780) 639-5010



OPTI CANADA INC.
Suite 2100, 555 - 4th Ave., S.W.
Calgary, AB T2P 3E7

Michael Burt (403) 218-4706



CANADIAN NATURAL RESOURCES LTD.
Box 6968
Bonnyville, AB T9N 2H4

Shawn Brockhoff (780) 826-8124
Roxane Bretzlaff (780) 826-8214



ENCANA CORPORATION
Bag 1015
Bonnyville, AB T9N 2J7

Sherry Hennessey (780) 573-4584



IMPERIAL OIL RESOURCES LTD.
P.O. Box 1020
Bonnyville, AB T9N 2J7



PARAMOUNT ENERGY OPERATING CORP.
3705 - 53rd Street
Athabasca, AB T9S 1A9

Michael McCullagh (780) 675-6827
Martin Newberry (780) 675-6833



Sandy Martin (780) 639-5117
Paula McMillan (780) 639-5194



KEY CONTACTS

UTILITY EMERGENCIES

Atco Electric 24 Hour	1-800-668-5506
Alta Gas, Bonnyville	1-866-222-2067
North East Gas Co-op, Bonnyville	780-826-4002
EPCOR	1-800-667-2345
Buried Utilities Locations	1-800-242-3447

ALBERTA ENERGY AND UTILITIES BOARD

Bonnyville Field Office	780-826-5352
General Inquiries about the EUB	403-297-8311

GOVERNMENT OF ALBERTA

Service Alberta (toll free access)	310-0000
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Alberta Environment

Emergencies, Spills and Complaints	1-800-222-6514
General Inquiries (Northern Region)	780-427-7617

Alberta Sustainable Resource Development

Fish and Wildlife Division	
Bonnyville	780-826-3142
Cold Lake	780-639-3377
St. Paul	780-645-6313

Public Lands Division

Bonnyville	780-826-4297
St. Paul	780-645-6336
Report a Poacher	1-800-642-3800
Forest Fire Line (report a forest fire & smoke)	310-FIRE (3473)

Alberta Agriculture, Food and Rural Development

General Inquiries	1-866-882-7677
The Farmer's Advocate	780-427-2433

Alberta Human Resources and Employment

Workplace Health and Safety	1-866-415-8690
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Alberta Infrastructure and Transportation

Transportation of Dangerous Goods (Emergencies)	1-800-272-9600
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Regional Health Authorities

Aspen Regional Health Authority	349-8705
East Central Regional Health Authority	608-8800

Registrar of Land Agents

Surface Rights Board	780-415-4600
Land Compensation Board	780-427-2444
MLA Denis Ducharme	780-422-2988
MLA Ray Danyluk	780-826-5658
	780-645-6999

GOVERNMENT OF CANADA

Environment Canada	
Prairie and Northern Office (General Inquiries)	780-951-8600
Severe Weather Reporting	1-800-239-0484
MP Brian Storseth	1-800-667-8450
National Energy Board	1-800-899-1265

OTHER

Pacific Geoscience Centre (earthquake inquiries)	1-250-363-6500
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PHOTOGRAPHERS

Thanks to all the photographers who entered the LICA Photo Contest! Contest pictures used in this report were taken by the following photographers:

Breanne Scott
Darwin Stupka
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Lilliane Ayres
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Marlaina Pura
Shelly Kornelsen
Silke Skinner
Trevor Starchuk



