# 2022-2023 Annual Report

LICA
ENVIRONMENTAL STEWARDS

2022-2023

# LICA Report Card

**1,483**
Social Media Followers

**19**
Community Garden Plots Rented

**239**
Birds Sighted during Winter Bird Count

**2405**
Passive Air Samples Collected & Analyzed

**97.6%**
Time the AQHI was "low risk" across the entire LICA network

**3**
Creeks Monitored through CreekWatch Citizen Science Program

**1157.5**
Total Volunteer Hours

**30**
Pounds of Community Garden Vegetables donated to the Bonnyville Food Bank

**2405**
Passive Air Samples Collected & Analyzed

**1**
Development of Beaver River Integrated Watershed Management Plan

**97.4 %**
Air Monitoring Network Uptime

**288**
LICA Members

**5**
Low-cost air quality monitoring sensors deployed in our region

**2,113**
People reached through Education & Outreach Programs

**97**
Workshops & Events Hosted by LICA

**12**
Educational You-Tube Videos Uploaded

**10**
Lakes Sampled with ALMS LakeWatch

**521,360**
Hours of near-real time air monitoring data available to the public

# Table of Contents



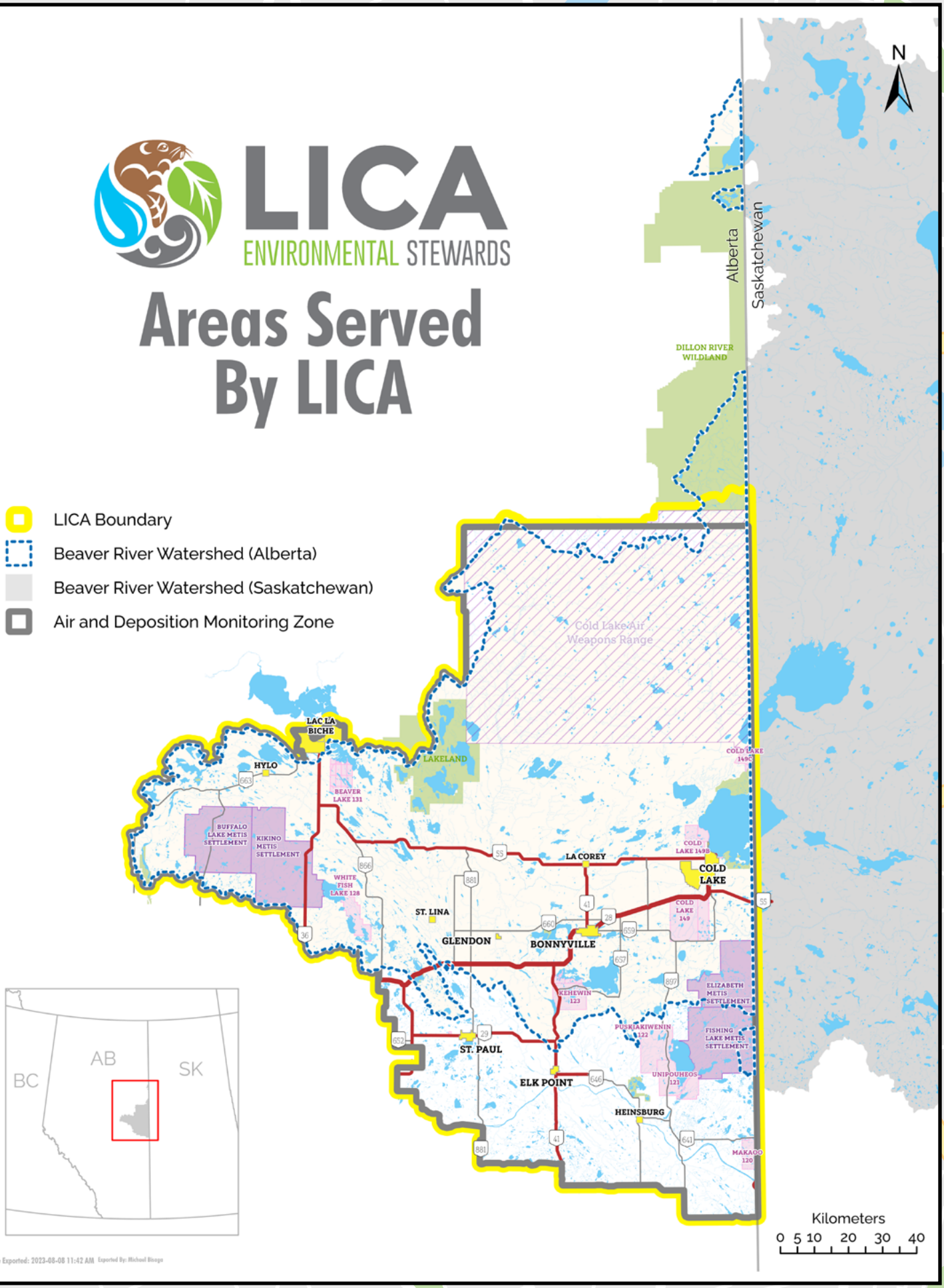
# Territorial Acknowledgement

LICA recognizes that our operational boundary falls within the traditional lands of the Dene, Cree, and Métis.

This recognition represents respect and gratitude towards sharing the land and honours our responsibility to truth and reconciliation as members of Treaty 6, 8, and 10 territory and the Métis Homeland.

# LICA
ENVIRONMENTAL STEWARDS

# Areas Served By LICA




Date Exported: 2023-08-08 11:42 AM Exported By: Michael Bisaga

# Organizational Overview

In response to the expansion of oil and gas production in the region, the Lakeland Industry and Community Association (LICA) was formed in October 2000. LICA, a community-based not-for-profit association registered under the Alberta Societies Act, has evolved to become a Synergy Group, Watershed Planning and Advisory Council (WPAC) for the Beaver River Watershed and an Airshed Zone with a focus on environmental monitoring, environmental management, and community education and outreach. LICA will continue to facilitate all stakeholders' voices when addressing issues concerning the environment in our region.

## VISION:

The environment in the LICA region is ecologically healthy and sustainable.

## MISSION:

LICA collects, shares, and acts upon credible data, Indigenous Knowledge, and information relevant to the environment. This will be achieved through scientific study, community engagement, and meaningful partnerships.

## VALUES:

- We connect stakeholders and promote community involvement
- We provide timely, defensible, and accessible data
- We educate the community, advocating for environmental stewardship
- We responsibly manage our resources to achieve our vision and mission

# LICA is...

## A Synergy Group:

The mission of Synergy Groups throughout Alberta is to foster mutually satisfactory outcomes in communities by providing information, mutual learning, communication, skills development, facilitation, and resources. The strength in Synergy Groups is that they connect people and organizations; all voices are heard at the same table. As a multi-stakeholder group, true information sharing happens, and environmental projects can be tailored to meet the needs of all stakeholders.

## An Airshed Zone:

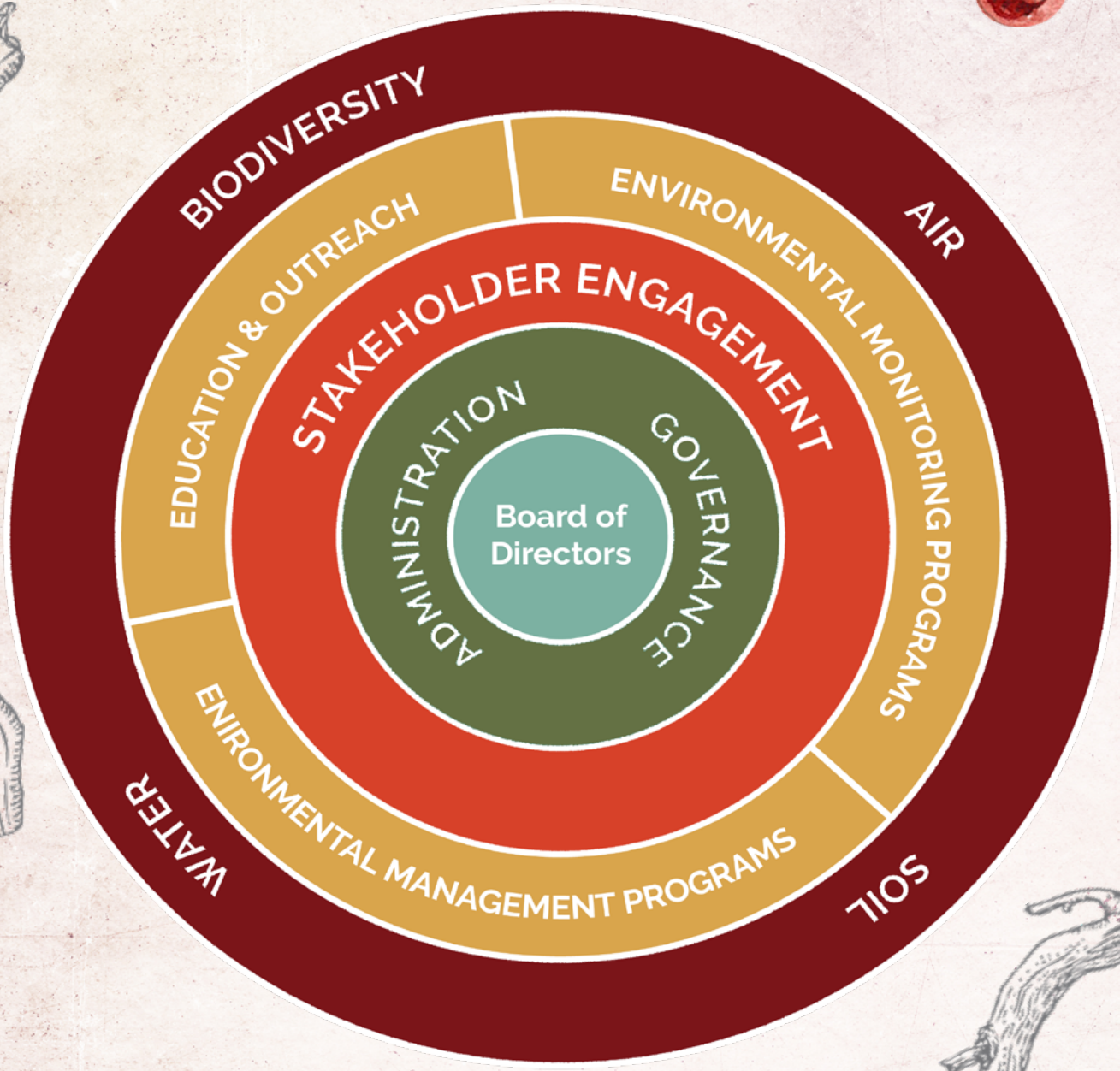
An Airshed's role is primarily to monitor air quality. Guided by the Air Monitoring Directive, Airsheds implement stakeholder-tailored air monitoring programs to meet regional data and information needs. Monitoring efforts undertaken by Airsheds include direct measurement of air quality parameters and air effects on the environment (e.g., lake and soil acidification, precipitation chemistry, and forest health). Airsheds provide data which allow for the assessment of the state of air quality and trends, as well as for community monitoring needs including Air Quality Health Index (AQHI).

## A Watershed Planning and Advisory Council (WPAC):

The intent of having a regional WPAC is to reach a balance between ecological values and a sustainable economy that contribute to a healthy overall community. The organization is designed to achieve Alberta's "Water for Life Strategy" which strategically looks to ensure water availability for future generations. The three main goals of the "Water for Life Strategy" are:

1. Safe, secure drinking water
2. Healthy aquatic ecosystems
3. Reliable, quality water supplies for a sustainable economy

# Our Structure



2022/2023

# Board of Directors

Board Members appointed as of October 2022

From Left to Right: Kelly Dion-McFeeters, John Ilchuk, Nikole Andres, Amanda Avery Bibo (Chairperson), Louise White (Vice-Chairperson), Colin Cote, Leo Paquin (Secretary-Treasurer), Duane Zaraska.

Not Pictured: Wayne Bamber, Shawn Elgert, Phil Kushnir/ Kayla Blanchette, Vicky Lefebvre, Robert Machatis, Murray Phillips, Abdi Siad-Omar, Lorin Tkachuk, Xiaofeng (Will) Wang.

# LICA Staff


From Left to Right:: Michael Bisaga (Environmental Monitoring Programs Manager), Lily Lin (Data & Reporting Specialist), Lori Jodoin (Administrative Professional), Stephanie Sitkowski (Education & Outreach Coordinator), Kayla Hellum (Environmental Coordinator), Kristina Morris (Executive Director).
In Front: Maria Cueva (Financial Coordinator), Eveline Hartog (Administrative Professional)

# Our Committees

## Education & Outreach:

Under the direction of the LICA Education and Outreach (E&O) Coordinator, the E&O Committee plans, coordinates, and facilitates educational opportunities, outreach activities and special events for the community. This standing committee provides opportunities for public education and participation and develops educational materials and informational resources.

## Governance:

Under the direction of the LICA Executive Director, the Governance Committee is a standing committee that spearheads policy development, bylaw, and policy review, and provides their recommendations to the LICA Board of Directors for approval.

## Integrated Watershed Management Plan/ LICA Watershed Committee

Under the direction of LICA's Environmental Coordinator, the Integrated Watershed Management Plan (IWMP) Committee oversaw the development of the Beaver River Watershed IWMP. In October 2022, this committee evolved into the LICA Watershed Committee (LWC) to support watershed management planning and projects including IWMP Implementation.

## Acid Deposition Monitoring Program Expansion Committee

Under the direction of LICA's Manager of Environmental Monitoring Programs, the ad-hoc Acid Deposition Monitoring Program Expansion Committee (ADMPEC) assists LICA in the development and oversight of the expansion of LICA's Acid Deposition Monitoring Program. In 2022-23, the ADMPEC developed an Acid Deposition Monitoring Plan (the Plan) to meet the needs of new regional regulatory compliance acid deposition monitoring and reporting requirements. The ADMPEC is currently working on Phase Two, addressing the implementation of the Plan. Phase Three will address further enhancement of the Program to implement a complete regional approach to acid deposition monitoring and reporting.

LICA Events/Meetings Calendar

Overview

# Education & Outreach

LICA strives to educate and foster environmental stewardship by offering a diverse range of education and outreach events, programs, and activities. Highlights from 2022-2023 include:

## 57 Classroom Presentations

were delivered to students in kindergarten to Grade 8. Each program is curriculum-aligned and consists of a presentation, and hands-on activities that teach our students about local airsheds and watersheds have been updated and improved.

## 3 Contests

were organized in the LICA region. The 13th annual Calendar Contest, with the theme "Living Green" had 7 drawings submitted. 6 additional pages were made from the 2018-2022 youth photo contests. The 2022 Earth Day Writing Contest, themed "Gardening Based on Your Space" invited students grade 4-6 to write newsletter articles about gardening in their community. There were 143 entries to the writing contest. The 2022 LICA Photography contest saw 75 entries between the youth and adult categories.

## 1 X-Stream Science Field Trip

was conducted with students from Ecole des Beaux-Lacs in the fall of 2022. X-Stream Science is an educational water quality program that allows middle and high school students to gain hands-on experience in field work. The students collect benthic macroinvertebrates, as well as chemical and physical data to learn more about the health of local streams.

## 8 LICA Workshops & Events

were hosted in the LICA region. Please see the 'Community Events' and 'Workshops' sections on page 12 & 13 for more highlights.

## 15 Youth/Summer Programs

were delivered during June and July of 2022. Two Walking with Moose programs were delivered, in partnership with the Moose Lake Watershed Society. 13 youth camp programs were delivered to the Lakeland Centre for Fetal Alcohol Spectrum Disorder (FASD), Kiev's Ki Hi Summer camp, the Military Family Resource Center, St. Paul Family and Community Services (FCSS), and Elk Point Library.


## 2 Stream of Dreams

programs were delivered to Aurora Middle School in Lac La Biche, and Cold Lake Family and Community Support Services. Stream of Dreams is an eco-education program for all ages. Each class receives a presentation on watershed health, followed by an art project. Each student paints a wooden fish, which is then installed within a mural on a fence outside their school. This program aims to create an art legacy that starts a conversation about watershed health in our communities.

# Community Garden

The Bonnyville Community Garden and Compost (BCGC) is an outreach project initiated by LICA in 2020. The BCGC is used to promote sustainability within the Town of Bonnyville and Municipal District of Bonnyville No. 87, provides a dedicated space for LICA's existing and future education and outreach programs, and acts as a communal gathering place for our community. This transformation of a vacant lot will beautify the space and raise LICA's presence within the community, as the BCGC site is in a high-traffic area.

Phases 1 and 2 were completed between 2020-22. The garden started with 15 raised garden beds, built with locally donated lumber and soil, and is now home to 41 beds. Additional installations in the first 2 phases include a chain-link fence, a garden shed, a compost facility and a water tank/stand. Now, the garden is also home to a gazebo, picnic tables, and numerous perennials, berry bushes, and fruit trees. Signs have been installed to communicate the garden guidelines, and to promote our many generous sponsors.

In 2022, a total of 7 of the 41 beds were reserved as community plots, where 30lbs of food was donated to the local Food Bank. This included potatoes, beets, lettuce, and tomatoes. Additional plots that remained unreserved were planted with a native wildflower seed mix to encourage pollinators.

LICA strives to take community suggestions into consideration when making changes to the garden. This year, we have hired a groundskeeper to maintain the lawn. We have also received an in-kind donation of regular water delivery for the season. Concerns about vandalism have been addressed by installing security cameras and motion activated lights.

## What's next?

The BCGC space is now a fully functional community garden! This year's focus has been shifted to improving accessibility and beautification. A landscaping professional will complete several projects in summer 2023 including: levelling the ground to reduce water pooling, installation of a wheelchair-accessible pathway, planting of additional fruit trees, berry bushes, and perennials.

Community
# Events & Campaigns

## Shoreline Cleanups

One shoreline cleanup was co-hosted with Cold Lake FCSS at Sandy Beach in Cold Lake.

## Keep Our Lake Blue

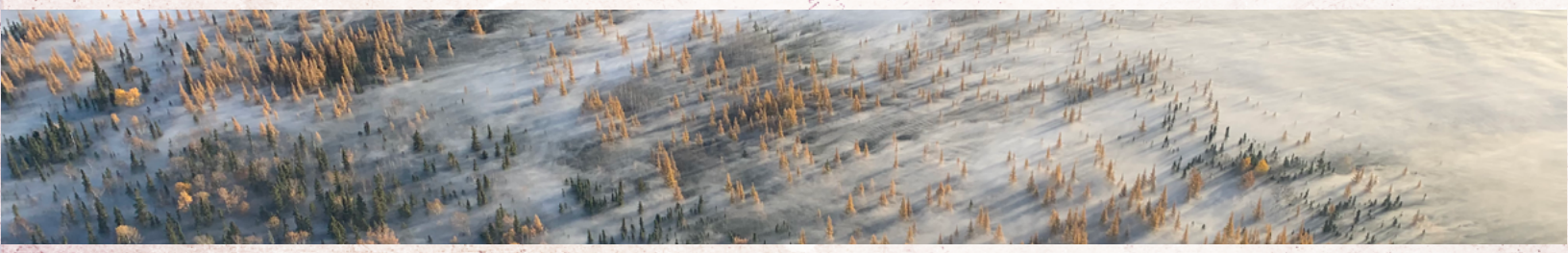
The Keep Our Lake Blue (KOLB) campaign began as a collaboration between LICA and the Moose Lake Watershed Society. The campaign aims to encourage community members to take action in reducing pollutants and runoff from entering our lakes. Blue-green algae is often the result of excess nutrients leaching into the water. Households that pledge to take action receive a lawn sign to display their commitment, as well as a list of 52 actions that they may take to reduce runoff and pollutants in their nearby lakes. In 2022, LICA sought to expand the campaign through partnerships with other Water Stewardship Groups. This resulted in discussions with Healthy Waters Lac La Biche to commence KOLB in the Lac La Biche area in the Summer of 2023.

## Community Events

LICA strives to promote its presence within the LICA region through participating in community events. In April 2022, a presentation was provided to the Beaver River Fish and Game Club, and a booth was hosted at their open house. Administrative staff attended the University of Blue Quills Job Fair in May, 2022. Staff also attended the Bonnyville Family and Community Services Discovery Day, where connections were made with some great organizations and community members!

## Stop Needless Idling

LICA worked collaboratively with the Alberta Airsheds Council (AAC) to continue the province-wide Stop Needless Idling Campaign. This educational campaign describes two major benefits of stopping needless idling: keeping the air healthy and saving fuel and money. Drivers are asked to pledge to idle 60 seconds or less when they are parked. In 2022, the AAC Communications Committee shifted the delivery of its campaign. A week-long educational social media campaign was shared by airsheds each quarter. These offered different tips and facts regarding the benefits of reducing one's idling time. In addition, LICA posted information on air quality and its effect on our health every month to further raise awareness.
For more information about the campaign, and to pledge to Stop Needless Idling, please visit: https://www.albertaairshedscouncil.ca/idle-free



# Workshop Highlights

## Gardening Workshops

The Education and Outreach Coordinator provided four gardening workshops: Garden Orientation, two Starting Seeds workshops, and a Companion Planting workshop. Each of these garden workshops aimed to educate community members on gardening topics, while delivering credible and easy-to-understand information.

## Vermicomposting

Vermicomposting continues to be one of our most popular presentations. In 2022 – 2023, at least 87 free vermicomposting bins went out into the region with this program! Vermicomposting is an easy way to incorporate composting into your home. This form of recycling diverts food and yard waste from our landfills and turns it into a nutrient-rich soil additive for our gardens. The workshop provided all the supplies participants need to build a worm bin, including the Red Wiggler worms! Attendees learned about waste reduction, the worms, and basic worm care.

## BIRDS

As an introduction to the Environmental Coordinator's Winter Bird Count, a Bird ID Workshop was hosted at LICA. The presentation allowed attendees to learn the basics of birdwatching such as choosing optics, using field guides, and basic bird identification techniques. The session also included a presentation on common bird species in the LICA region, and how to identify them by sight and sound.

# Adult Education
## Industry Talks & Lunch 'n' Learns

### ALUS 101
LICA hosted Alternative Land Use Services (ALUS) in February, 2023. Christine Campbell, Senior Hub Manager of the West, visited LICA in order to share information about the ALUS program. The intention of this presentation was to act as a liaison, allowing LICA region communities the opportunity to learn about ALUS, with the potential of bringing the program to our surrounding municipalities.

### Cenovus Caribou Restoration
Jason Barrie, Senior Environmental Advisor at Cenovus Energy, visited LICA to host an Industry Talk on the Cenovus Caribou Restoration Project. He discussed the methods that Cenovus uses for preventing Caribou from travelling cut lines, thereby preventing excessive predation.

### ALMS Lunch 'n' Learn
LICA hosted a Lunch 'n' Learn in February 2023 by inviting community members to the LICA Office to join the Alberta Lake Management Society (ALMS) Lake Stewardship Community of Practice Meeting. During this meeting, Kellie Nichiporik, of the Moose Lake Watershed Society, and Peter Cordingley of the Muriel Lake Basin Management Society spoke about lake water levels at Moose Lake and Muriel Lake. Community members who attended this presentation learned about the high-water level challenges at Moose Lake and the low-water level challenges at Muriel Lake.




Collaboration with

# Post-Secondary Institutions

## University nuhelot'ı̨ne thaiyots'ı̨, nistameyimâkanak Blue Quills

LICA staff taught the air quality component of UnBQ's Community-Based Environmental Monitoring Training (CEMT) Program. LICA provided 35 hours of in-class, field, and computer lab training where students learned about atmospheric science, air monitoring methods, and how to interpret and present air quality data. The CEMT is an accredited multi-media environmental monitoring training program with an emphasis on Indigenous knowledge and worldviews.


UNIVERSITY
nuxetho̓ı̨ne thaa?ehots'ı̨
nistameyimâkanak
BLUE QUILLS

## Portage College Seminar

For the second year in a row, LICA was invited to deliver an air quality monitoring seminar to students enrolled in the Natural Resources Technology Program at Portage College. This half-day seminar introduced students to LICA's regional air quality and deposition monitoring programs and included a tour of LICA's Portable Air Monitoring System.

PORTAGE COLLEGE

Overview

# Monitoring Programs

LICA operates a network of air quality and deposition monitoring stations. Several different methods are used to monitor ambient air quality, deposition, and deposition effects. These range from instruments that continuously sample and analyze the air onsite, to samples that require off-site laboratory analysis.

*Instrument rack at Cold Lake*

## Continuous Monitoring

Continuous monitoring equipment provides an almost instantaneous measurement of ambient concentrations for several pollutants. These include hydrocarbons, hydrogen sulphide, total reduced sulphurs, oxides of nitrogen, ozone, particulate matter, and sulphur dioxide. This monitoring method can provide a measurement of pollutant concentration for intervals as short as one minute, although the most reported sampling interval is a one-hour average. Continuous monitoring data are used to determine the Air Quality Health Index (AQHI). LICA has 4 continuous monitoring stations: Cold Lake, St. Lina, Tamarack (near in situ oil sands operations), and the Portable Air Monitoring System (located in Lac La Biche).


*Cold Lake Monitoring Station*

*Partisol sampler - measures particulate matter concentrations*

## Intermittent Time-Integrated Monitoring

In some cases, a more detailed investigation is needed to determine what pollutants are present in the air. In these situations, intermittent time-integrated monitoring is used and involves collecting of samples over a period of time commonly ranging from 1 to 24 hours. These samples are then analyzed at a laboratory to determine air pollutant concentrations. Time-integrated monitoring is often used to identify concentration and composition of particulate matter, hydrocarbons, and/or reduced sulphur compounds in the air.

## Sensor-Based Monitoring

Sensor-Based monitoring can be used to provide an indication of real-time air quality at the neighbourhood level. LICA has a growing network of sensor-based monitors that can detect near real-time particulate matter concentrations.

*Small sensor for particulate matter monitoring*

Overview Continued

# Monitoring Programs

## Passive Monitoring

This method is often used in rural and remote areas and requires no power to operate. Passive monitoring is named for the technique used to collect samples. With this method, a small cartridge is deployed every month; air passively crosses a diffusion barrier and pollutants are collected on a reactive surface which is then sent to the laboratory for analysis. Passive monitors usually sample for an entire month. Analysis provides a monthly average for pollutants being monitored and is a key method in determining regional acid deposition patterns. In 2022, LICA's passive network was enhanced to support implementation of the Acid Deposition Monitoring Strategy for the Cold Lake Region.

*Sample media for ozone monitoring*


*Station deployment showing sampling media in weather shelter*

## Acid Deposition Monitoring

Acid deposition results when acid forming pollutants are deposited on the earth's surface. Sulphur dioxide and oxides of nitrogen are the main acid forming pollutants. Deposition of acidifying substances and their reactive products to terrestrial or aquatic ecosystems may result in acidification and damage to the ecosystem. Components of LICA's passive monitoring network were enhanced in 2022 to support acid deposition monitoring; 2023 will bring additional monitoring methods including ion exchange resins and denuder samplers. Parameters monitored in the program include nitrogen, sulfur, base cations, nitric acid, and ammonia.

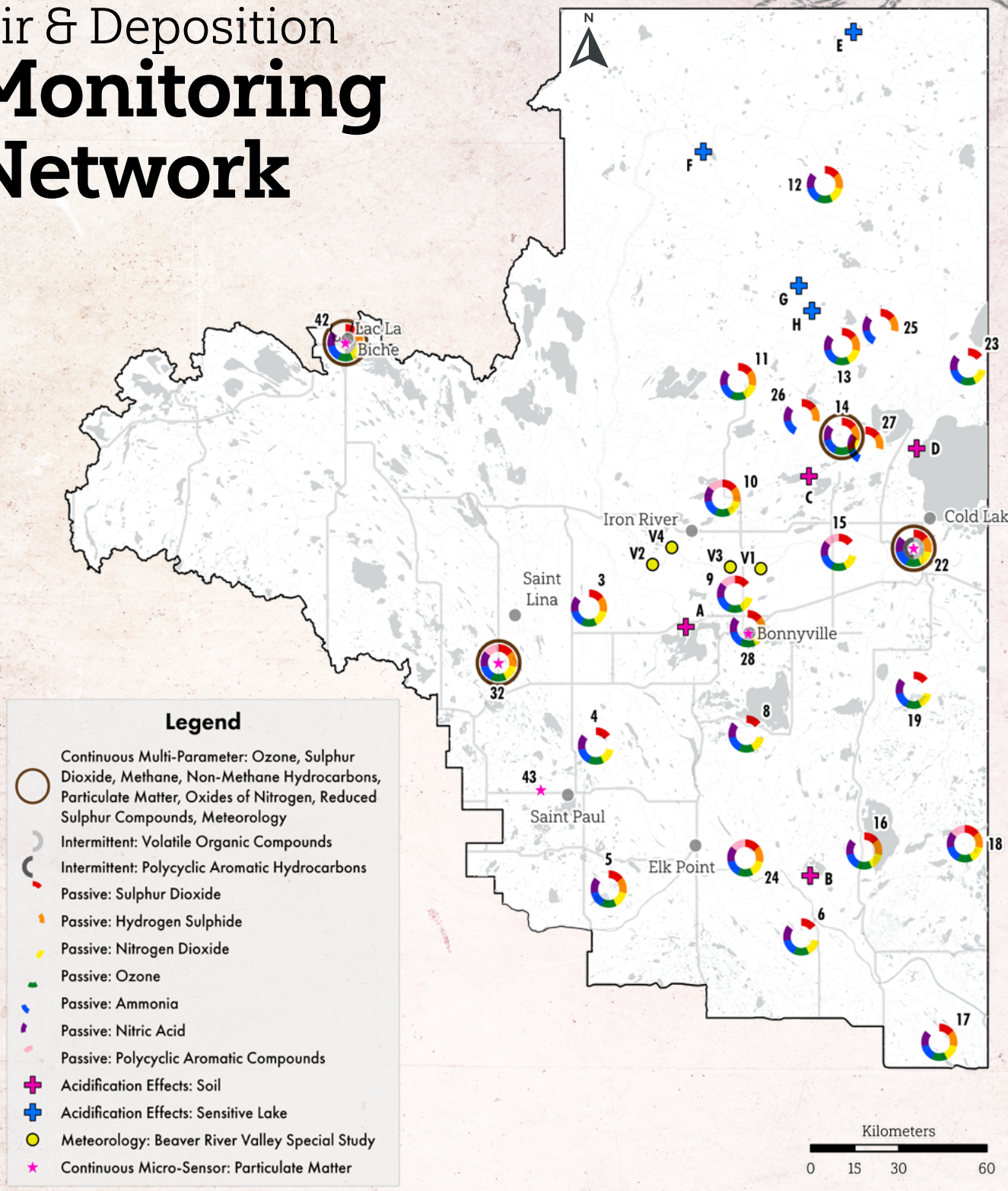
## Soil Acidification & Acid Sensitive Lake Monitoring

Monitoring for changes in forest soils and acid sensitive lakes, specifically changes caused by acidifying substances, is an important part of understanding the effects of acid deposition. This type of monitoring involves collecting a sample of soil or lake water and sending it to a laboratory for analysis. Soil and lake acidification parameters are attributes that can be directly affected by acidic inputs, and which in turn could affect other components of the ecosystem. These attributes include pH, alkalinity, and calcium.

*Sample collection at the Tucker Lake soil sampling plot*

Air & Deposition

# Monitoring Network




## Legend

- Continuous Multi-Parameter: Ozone, Sulphur Dioxide, Methane, Non-Methane Hydrocarbons, Particulate Matter, Oxides of Nitrogen, Reduced Sulphur Compounds, Meteorology
- Intermittent: Volatile Organic Compounds
- Intermittent: Polycyclic Aromatic Hydrocarbons
- Passive: Sulphur Dioxide
- Passive: Hydrogen Sulphide
- Passive: Nitrogen Dioxide
- Passive: Ozone
- Passive: Ammonia
- Passive: Nitric Acid
- Passive: Polycyclic Aromatic Compounds
- Acidification Effects: Soil
- Acidification Effects: Sensitive Lake
- Meteorology: Beaver River Valley Special Study
- Continuous Micro-Sensor: Particulate Matter

## Monitoring Location Identification

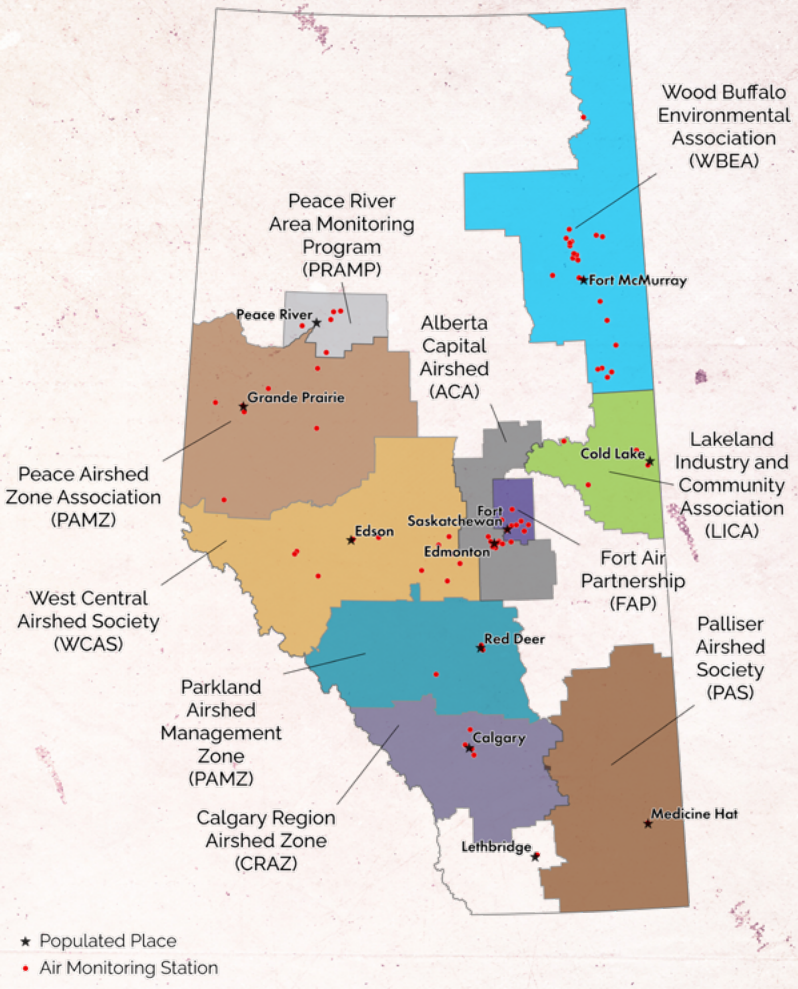
- 3 Therien
- 4 Flat Lake
- 5 Lake Eliza
- 6 Telegraph Creek
- 8 Muriel-Kehewin
- 9 Dupre
- 10 La Corey
- 11 Wolf Lake
- 12 Foster Creek
- 13 Primrose
- 14 Tamarack
- 15 Ardmore
- 16 Frog Lake
- 17 Clear Range
- 18 Fishing Lake
- 19 Beaverdam
- 22 Cold Lake South
- 23 Medley-Martineau
- 24 Fort George
- 25 Burnt Lake
- 26 Mahihkan
- 27 Mahkeses
- 28 Bonnyville
- 32 St. Lina
- 42 Lac La Biche
- 43 Blue Quills
- A Moose Lake
- B Whitney Lakes
- C Tucker Lake
- D Cold Lake
- E Underwood Lake
- F Caribou Lake
- G Lake # UN-5
- H Lake # 599
- V1 Lessard
- V2 Sand River
- V3 Rocky Meadows
- V4 Iron River

# Continuous Monitoring Program

## 2022 Annual Data Summary

In 2022, Alberta's Airsheds collectively operated over 80 continuous monitoring stations across the province. Airsheds monitor a variety of pollutants and meteorological parameters. Each Airshed operates a monitoring program that is designed to meet local objectives including long-term trend analysis, air quality health index reporting, and compliance assurance.

In this section, data from continuous monitoring stations are presented using graphs displaying annual averages (solid coloured bar) and 95th percentile markers (black line). The black lines, also known as "whiskers", show readings on the high end of the data collected at the monitoring stations, which helps to highlight the 95th percentile data (this excludes highest five percent of hourly average measurements.) The highest five percent has not been reported here as it may contain "outliers" (observations that are distant from the rest of the data that might be caused by extreme events from upsets to natural conditions such as wildfires).




Each monitoring station has a label that includes an acronym for the Airshed operating that operating the site; Airsheds' acronyms and their geographic location can be found on the map on this page. In some cases, Alberta Environment and Parks (AEP) also operates monitoring stations.

Stations operated by LICA are highlighted in yellow. In 2022, LICA's continuous stations included Cold Lake, Tamarack, and St. Lina. The Lac La Biche monitoring station is not included here as it doesn't have the minimum amount of data needed to represent an annual average (75% of the year); the station was commissioned in Lac La Biche part way through 2022.
If available, the relevant threshold (the acceptable provincial or federal levels) for the guideline or standard for the pollutant is presented below each pollutant summary in an information box.

# Sulphur Dioxide

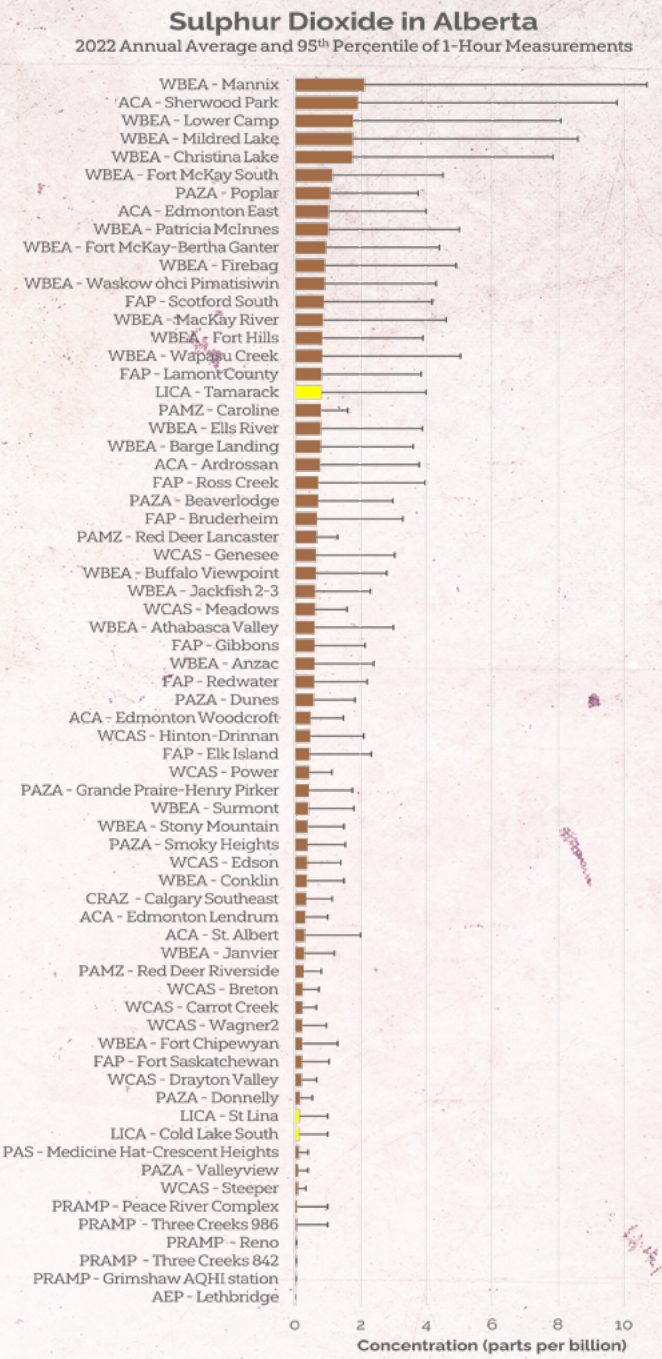
Sulphur dioxide is a highly reactive, colourless gas. It has an odour like the smell of a struck match. In Alberta, major sources of sulphur dioxide include industrial processes (upstream oil and gas, petroleum refining, pulp and paper) and electric utilities.

When released, sulphur dioxide can react with other pollutants in the air to form fine particulate matter. This is made up of small solid or liquid particles suspended in air. Sulphur dioxide, along with nitrogen oxides, is a precursor of acid deposition.

Health effects caused by exposure to high levels of sulphur dioxide include breathing problems, respiratory illness, and cardiovascular disease. People with asthma or chronic lung or heart disease are the most sensitive to sulphur dioxide.

In Alberta, oil and gas operations and their associated sulphur dioxide emissions range from relatively small (small, distributed well sites) to very large (oilsands operations or sour gas processing); many operations can be, and typically are, located close together resulting in higher localized concentrations of sulphur dioxide. This pattern of elevated concentrations near major sources or clusters of facilities is evident it the monitoring data. In 2022, the highest annual concentrations of sulphur dioxide were measured north of Fort McMurray near oilsands mines, east of Edmonton near refineries, and near Fort Saskatchewan's petrochemical operations.

In 2022, LICA's Tamarack monitoring station had an annual average concentration among the 20 highest measured in the Alberta; this is because of the cluster of oil sands facilities near the station. LICA's other monitoring stations are some distance from sulphur dioxide sources and had comparatively low concentrations.




**Alberta Ambient Air Quality Objectives**

Sulphur dioxide 1-Hour: 172 parts per billion
Sulphur dioxide Annual: 8.0 parts per billion

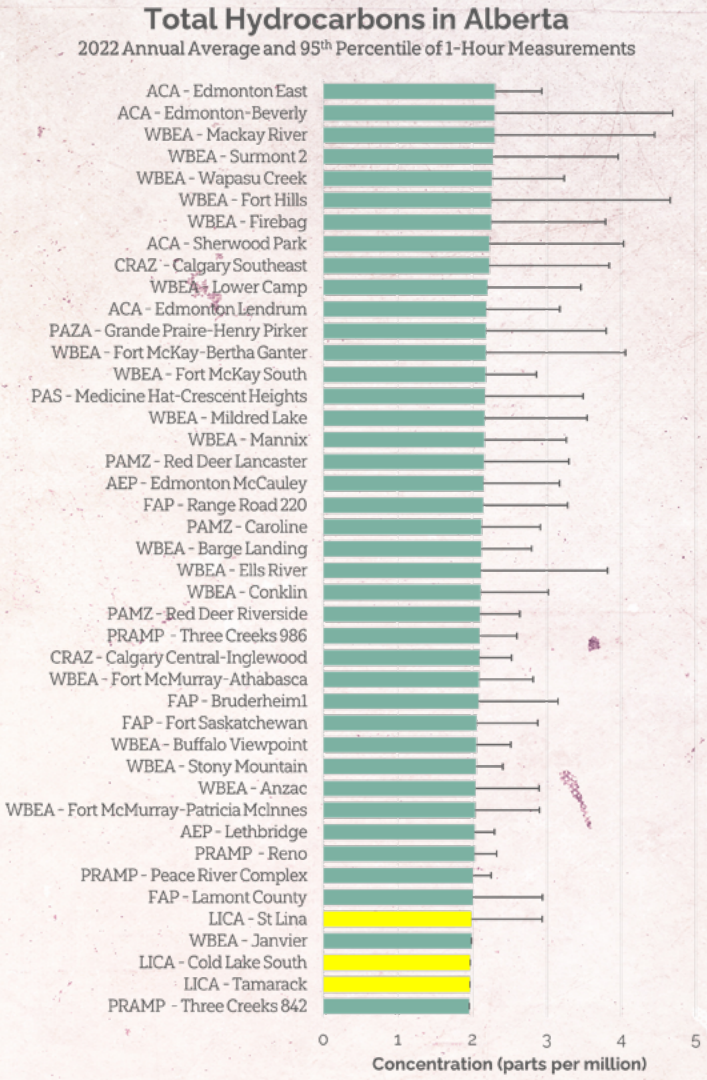
# Total Hydrocarbons

Total hydrocarbons refer to a broad family of chemicals that contain carbon and hydrogen atoms. Total hydrocarbons are the sum of non-reactive and reactive hydrocarbons. The major reactive hydrocarbon in the atmosphere is methane. Major worldwide sources of atmospheric methane include wetlands, ruminants such as cows, energy use, landfills, and burning biomass such as wood. Methane is the primary component of natural gas.

The reactive (or non-methane) hydrocarbons consist of many volatile organic compounds, some of which react with oxides of nitrogen in the atmosphere to form ozone.

While Alberta does not have ambient air quality objectives for total hydrocarbons, methane or non-methane hydrocarbons, the oxidation of hydrocarbons in the atmosphere contributes to an increased amount of nitrogen oxides and ozone, which do have objectives. Additionally, there are objectives for specific reactive hydrocarbons such as benzene, toluene, ethylbenzene, xylene, styrene and ethylene.

In 2022, the highest concentrations of hydrocarbons were measured near the industrial complexes east of Edmonton as well as oilsands mining areas north of Fort McMurray. LICA's monitoring stations have concentrations that are very close to the natural background for rural Alberta (1.5 - 2.0 parts per million).



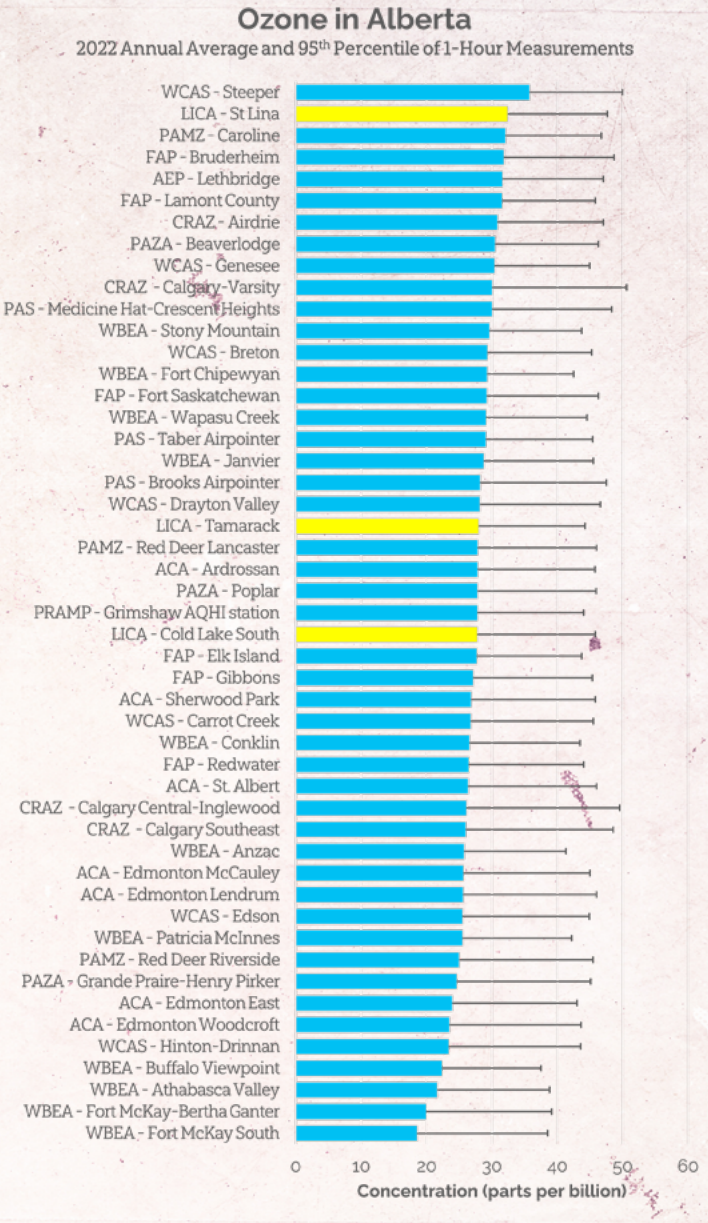

**Alberta Ambient Air Quality Objectives**
Total hydrocarbons 1-Hour: *None*
Total hydrocarbons Annual: *None*

# Ozone

Ozone is a colourless, odourless gas at ambient concentrations and is a major component of smog. While ozone in the upper atmosphere (the ozone layer) plays an important role protecting life on the planet from harmful ultraviolet radiation, ozone produced near the surface (ground level ozone) of the earth has environmental, health, and economic impacts.

Ground-level ozone is a secondary pollutant which means it is not directly emitted by industry or vehicles. It forms and degrades by complex atmospheric processes. Ozone is formed when nitrogen oxides and volatile organic compounds, the "precursor" chemicals, react in the presence of sunlight. However, under certain conditions, ozone can be degraded by some of the compounds by which it is also formed. This degradation occurs more often in cities than in rural areas because of the increased presence of key precursor compounds, namely nitric oxide. In Alberta, rural areas often have higher concentrations of ozone than urban areas. This is because ozone levels are generally higher downwind of ozone precursor sources such as cities, at distances of hundreds or even thousands of kilometers.

This pattern of elevated concentrations in downwind rural areas can be seen in 2022 ozone monitoring data in Alberta. LICA's St. Lina monitoring station for example, is on the western edge of the airshed zone, making it downwind from the large precursor sources including the City of Edmonton and Fort Saskatchewan; because of this, LICA measured the second highest Provincial annual average concentrations of ozone at this site. Conversely, some of the lowest annual average concentrations of ozone in Alberta are measured at monitoring sites in cities and next to large industrial complexes because of the presence of other pollutants.




**Alberta Ambient Air Quality Objectives**
Ozone 1-Hour: 76 parts per billion
Ozone Annual: *None*

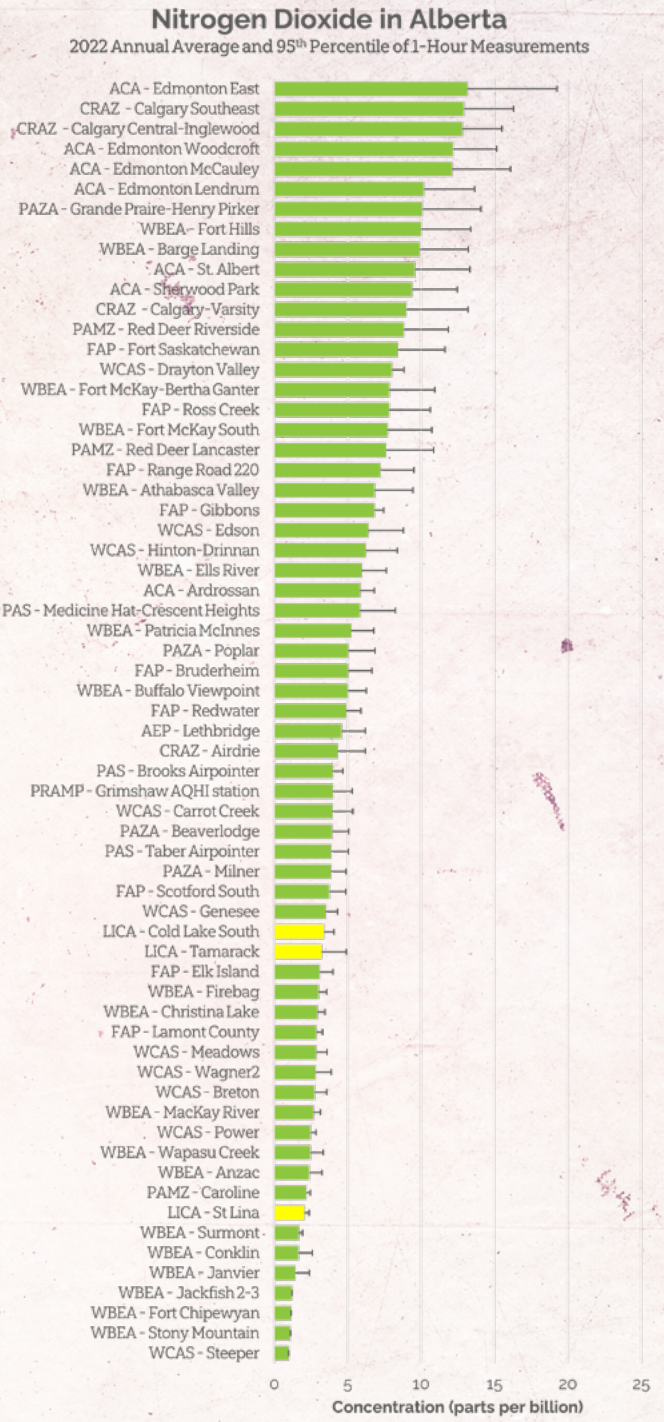
# Nitrogen Dioxide

Nitrogen dioxide is a gaseous pollutant produced along with other nitrogen oxides during high temperature burning of fossil fuels.

In Alberta, air emissions of nitrogen dioxide are predominantly the result of combustion namely vehicle exhaust, as well as industrial processes were natural gas, coal, and oil are used as fuel sources.

Exposure to nitrogen dioxide is known to affect human health and the environment. Long term exposures, for example, has been shown to induce the development of allergic responses, asthma, increases the susceptibility for respiratory infections, and has been linked to cardiovascular system effects. Short term exposures can reduce lung function and aggravate respiratory symptoms and airway inflammation.

The highest annual average concentrations in Alberta occur almost exclusively in Alberta's large cities including Edmonton, Calgary, St. Albert, Red Deer, and Grande Prairie. The next group of elevated concentrations were generally measured at smaller urban centers and stations in the vicinity of large industrial operations. In 2022, all of LICA's stations, have annual averages in the lower third of all monitoring sites in Alberta.



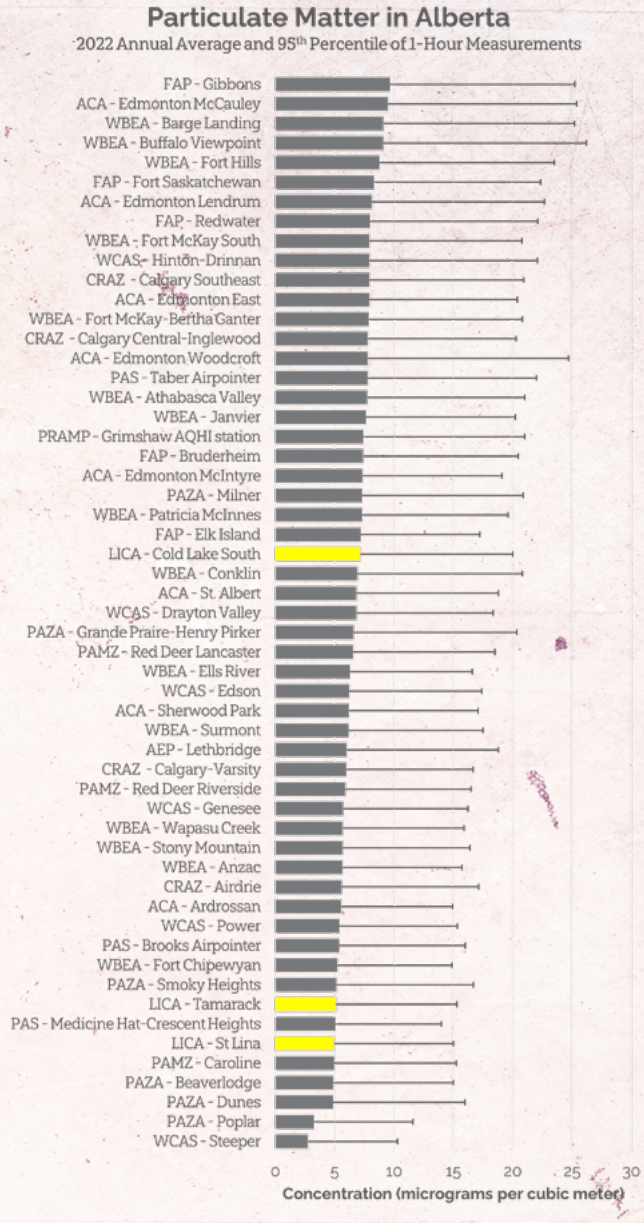

**Alberta Ambient Air Quality Objectives**
Nitrogen dioxide 1-Hour: 159 parts per billion
Nitrogen dioxide Annual: 24 parts per billion

# Particulate Matter (Fine)

Particulate matter is characterized according to size - mainly because of the different health effects associated with particles of different diameters. Particulate matter is the general term used for a mixture of solid particles and liquid droplets in the air. It includes smoke, dust, ash, and pollen. The composition of particulate matter varies with place, season, and weather conditions. Fine particulate matter is 2.5 microns in diameter and less; in comparison, a human hair is about 70 microns in diameter. It is also known as PM2.5 or respirable particles because it penetrates the respiratory system further than larger particles.

Fine particulate matter is primarily formed from chemical reactions in the atmosphere and through fuel combustion. Major sources of fine particulate matter in Alberta include forest fires, vehicles, power plants, oil and gas facilities, residential fireplaces and wood stoves, and agricultural burning.

In 2022, the highest overall concentrations were generally measured in Alberta's large cities and urban centres (Edmonton, Calgary Fort Saskatchewan, Red Deer) and the areas downwind of them (Gibbons, Lamont County). Past studies have determined that this is largely the result of secondary fine particulate matter formation; there are a greater frequency of days with fine particulate matter events between January and March driven by weather conditions associated with calm winds and temperature inversions. The other notable area that has elevated particulate matter concentrations is the oil sand mining area north of Fort McMurray; this is likely caused by dust from mining operations. In 2022, the Cold Lake Station had the highest particulate matter measurements in the LICA region likely due to local formation of particulate matter from home heating and vehicle exhaust.




**Alberta Ambient Air Quality Guidelines**
Fine Particulate Matter 1-Hour: 80 micrograms per cubic meter
Fine Particulate Matter Annual: *None*

# Total Reduced Sulphur Compounds & Hydrogen Sulphide

Hydrogen sulphide is a colourless gas which has the odour of rotten eggs. Total Reduced Sulphur is a collection of and several sulphur compounds including hydrogen sulphide which often have unpleasant odours like "rotten cabbage" or "skunk". Hydrogen sulphide often occurs naturally in some environments (gas wells, sulfur springs, swamps, etc.). It can also be associated with livestock, oil and gas facilities, and sewage treatment.

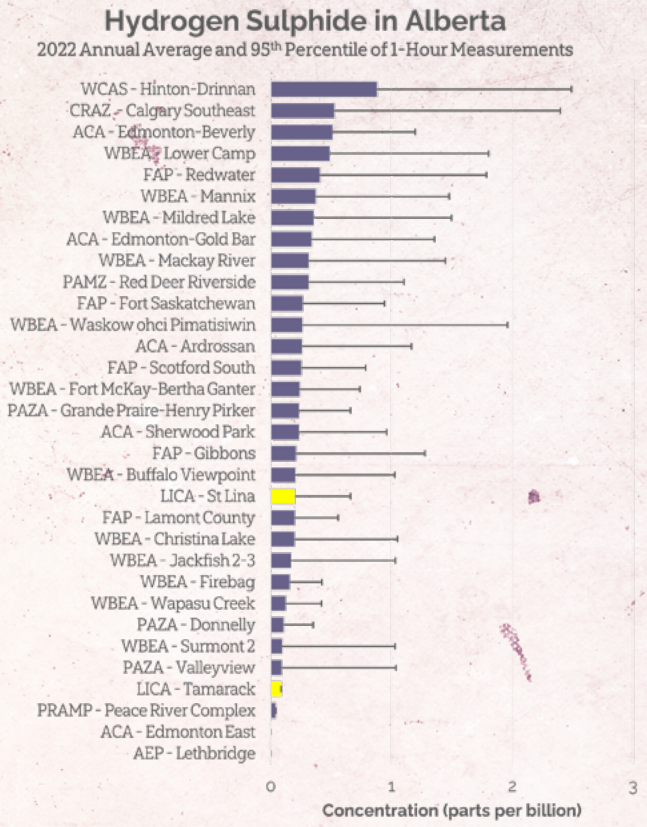
Hydrogen sulphide is considered an odour nuisance at low levels and can result in discomforting physiological symptoms of headache and nausea. Under most weather conditions, hydrogen sulphide and total reduced sulphurs released from different sources are diluted by air movement, so health problems are not expected. Odours may still be noticed because people can smell sulphur-based chemicals, such as total reduced sulphur gases, at extremely low concentrations.

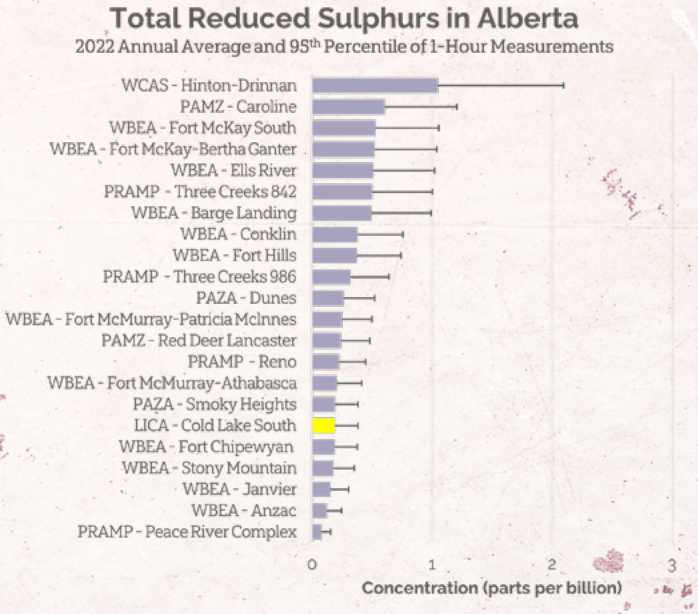
In 2022, LICA's monitoring stations had low overall concentrations of hydrogen sulphide and total reduced sulphurs. Other monitoring locations that had elevated concentrations were Hinton due to pulp mill operations, Caroline due to sour gas production, and the oil sands mining area north of Fort McMurray.

**Alberta Ambient Air Quality Guidelines**

Hydrogen sulphide 1-Hour: 10 parts per billion
Hydrogen sulphide Annual: *None*

Total reduced sulphur 1-Hour: *None*
Total reduced sulphur Annual: *None*



# Air Quality Health Index

Monitoring data can be used to determine the Air Quality Health Index (AQHI). The Air Quality Health Index provides a rating to indicate the level of relative health risk based on local air quality conditions. The higher the number, the greater the health risk and the need to take precautions.

The AQHI represents the relative risk of a mixture of common air pollutants which are known to harm human health. Three pollutants (ozone, particulate matter, nitrogen dioxide) were chosen as indicators of the overall outdoor air mixture and can pose a risk to human health even at low levels of exposure, especially among those with pre-existing health problems.

In 2019, LICA developed AQHI lanterns that visually display the air quality levels being recorded in real time from a specific Air Monitoring System. Lanterns, like the one pictured below, are currently stationed at the Cold Lake Energy Ceter, Bonnyville Public Library, and the Lac La Biche Bold Center for public display.


The AQHI, uses a colour-coded scale with risk values ranging from 1 to 10, and suggests exposure mitigation steps for each risk level.

**Very High Risk (11+)**
Avoid Strenuous Outdoor Activities

**High Risk (7-10)**
Reduce or Reschedule Strenuous Outdoor Activities

**Moderate Risk (4-6)**
Consider Reducing or rescheduling strenuous outdoor activities

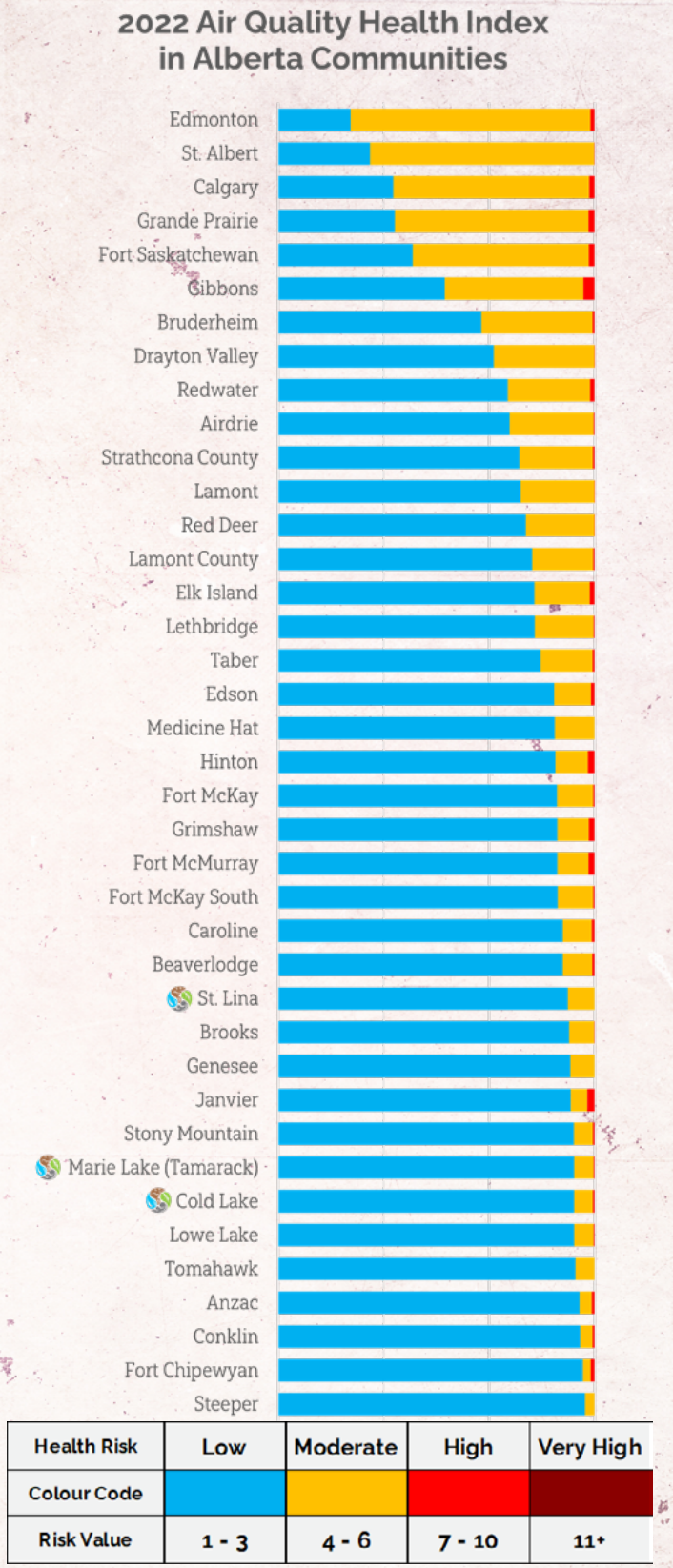
**Low Risk (1-3)**
Enjoy Usual Outdoor Activities

Current AQHIs can be found on LICA's website, and on the WeatherCAN app for mobile devices.

# AQHI
# 2022 Results

In 2022, LICA had three air monitoring stations where the AQHI was determined: Cold Lake, St. Lina, and Tamarack (Marie Lake). AQHI was also determined at LICA's monitoring station in Lac La Biche but it is not presented here since it was commissioned part way through the year; the Lac La Biche site therefore doesn't have enough data for an accurate annual representation of AQHI values.

This diagram helps illustrate the AQHI patterns and observations for different locations across Alberta in 2022, including the three AQHI-capable air quality monitoring stations in the LICA network. Each location on the chart has approximately 8500 hours of AQHI readings.




| Health Risk | Low | Moderate | High | Very High |
|---|---|---|---|---|
| Colour Code | | | | |
| Risk Value | 1 - 3 | 4 - 6 | 7 - 10 | 11+ |

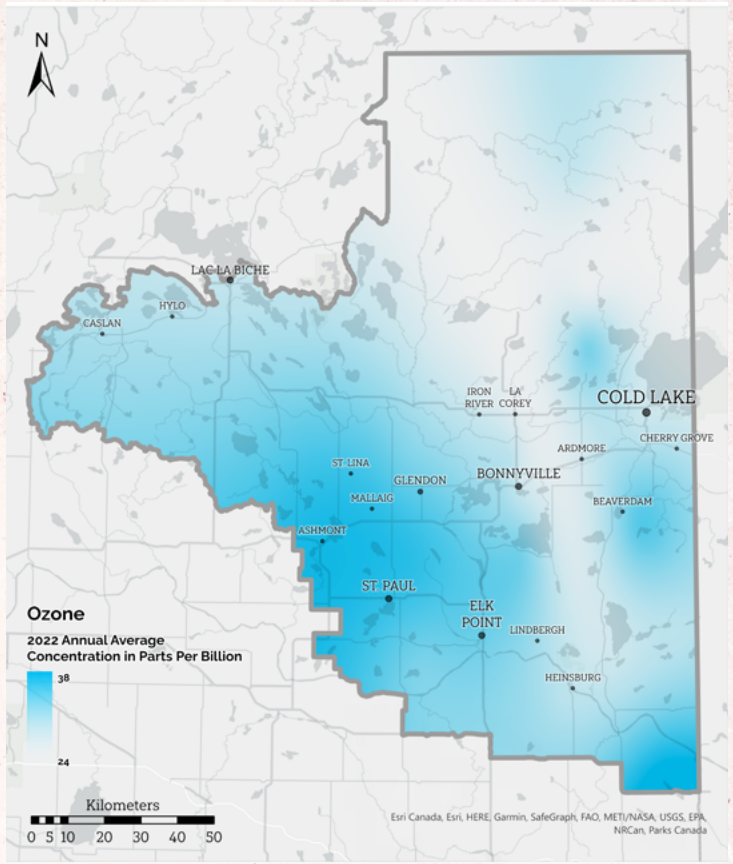
Passive

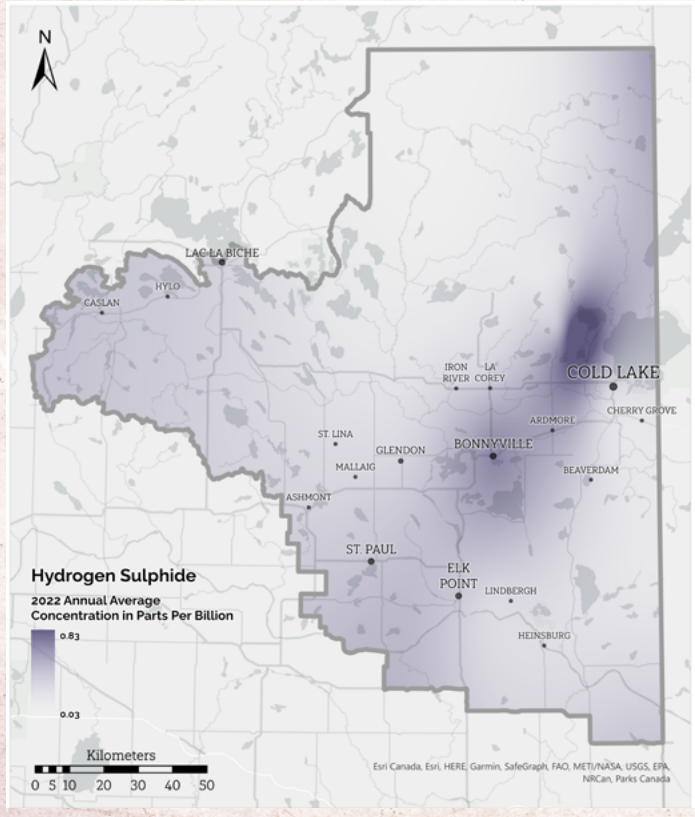
# Monitoring Results

LICA's passive stations are distributed throughout the region and the following maps show the spatial pattern of monitoring results for 2022. On each map, darker shades represent areas where the annual average concentrations of the specified pollutant are higher.

## Ozone

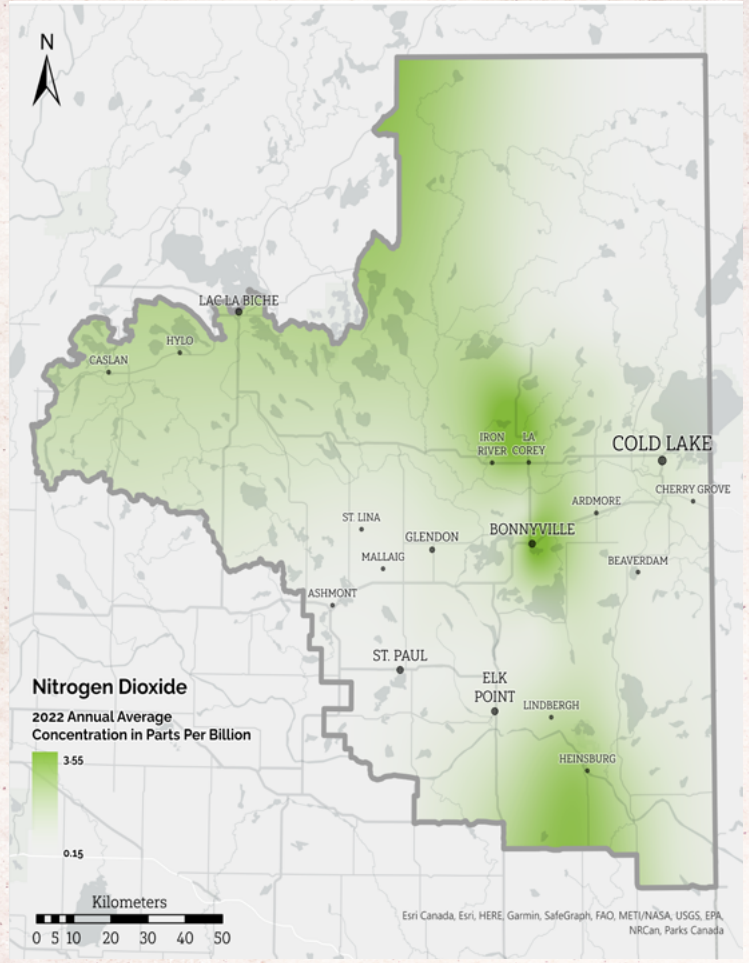
The monitoring sites that have the lowest concentrations are those closest to or downwind from combustion sources, including stations in Bonnyville, Cold Lake, and near Highway 55. This is due to the titration of ozone by nitric oxide which is emitted by vehicles, home and office heating, and other high temperature fossil fuel-burning processes. Higher concentrations were generally observed at rural monitoring stations, particularly along the western boundary of the LICA Airshed Zone. These sites do not have many combustion sources nearby and may be influenced by ozone-forming processes downwind from Edmonton and Fort Saskatchewan. There is no current annual Alberta Ambient Air Quality Objective for ozone.



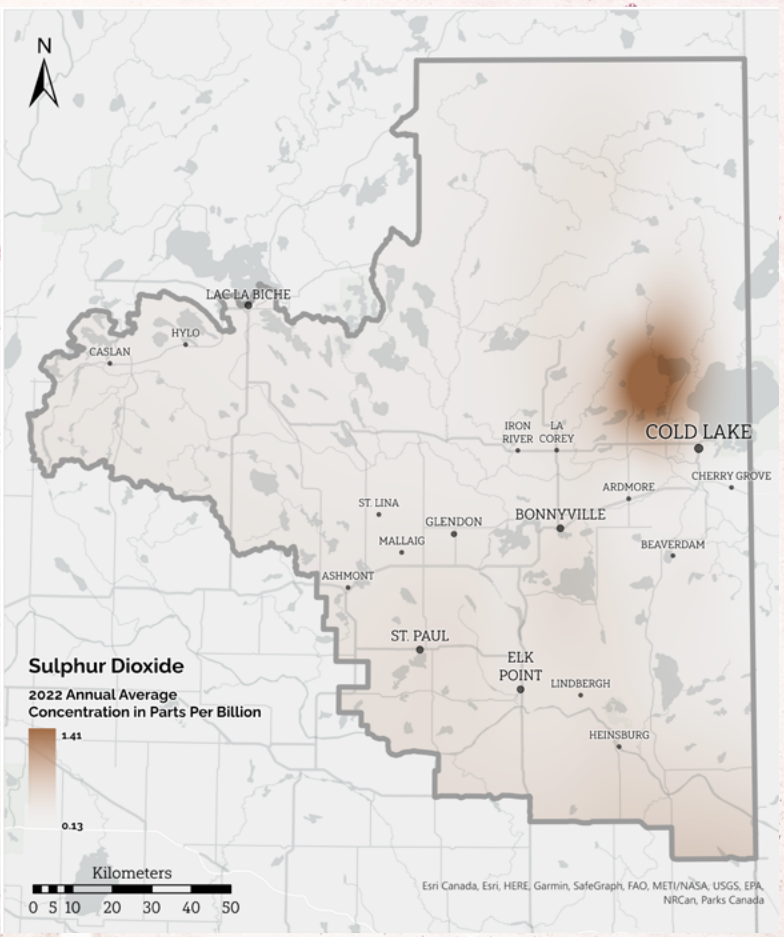

## Hydrogen Sulphide

In the LICA region, the highest concentrations of hydrogen sulphide near oil sands operations north west of Cold Lake and in Bonnyville near Jessie Lake. At the Bonnyville area monitoring stations, waste material in sewage lagoons and the decay of plant material in Jessie Lake are the likely cause for elevated hydrogen sulphide. Elevated concentrations measured at the stations close to large oil sands operations are due to hydrogen sulphide being released from different facility processes. There is no current annual Alberta Ambient Air Quality Objective of for hydrogen sulphide.




## Nitrogen Dioxide

In the LICA region, the highest concentrations of nitrogen dioxide were measured near major highways and in urban or built-up centers. In populated centers such as Bonnyville, the high density of combustion sources near the station (automobiles, home and office heating, trucking) are the likely cause for these elevated concentrations. A cluster of higher readings was also identified near Elk Point because of the prolific upstream oil and gas and associated hauling found throughout southern part of the LICA region. Another hotspot is the busy Highway 55 and Highway 41 intersection near La Corey. All stations had annual average concentrations well below the annual Alberta Ambient Air Quality Objective of 24 ppb.




## Sulphur Dioxide

Sulphur dioxide has a strong pungent odour. In the LICA region, oil sands facilities are the major source of sulphur dioxide. Other sources include gas plant flares, oil refineries, pulp and paper mills, and fertilizer plants. Sulphur dioxide can form acidic compounds which may lead to acid deposition on aquatic and terrestrial ecosystems. In the LICA region, the highest concentrations of sulphur dioxide were measured near the oil sands facilities northwest of Cold Lake. Although elevated, these elevated annual average concentrations were well below the annual Alberta Ambient Air Quality Objective of 8 ppb.

# Environmental Management

## What is a Riparian Area?

Riparian areas are the green zones around surface water of a river, wetland, or lake. They are the transitional area from the water's edge to the upland habitat.

Riparian areas are formed as the result of water, soil, and vegetation interacting with one another. Healthy riparian areas have abundant vegetation, including trees, shrubs, and herbaceous cover.

## Importance of Trees and Other Shoreline Vegetation

Trees play a role in the uptake of nutrients that could otherwise degrade water quality. The canopies of trees and shrubs, protect the soil from erosion and provide shelter to wildlife, while the vegetation resists erosion and traps sediment to build and restore the banks. When the deep-binding roots of shrubs and trees are absent, shallow-rooted grasses cannot withstand erosion forces.

Riparian areas are used by many animals as travel corridors. They are abundant in food for herbivores and provide critical habitat for many species including semi-aquatic mammals, reptiles, amphibians, migratory birds, and other mammals.

Some traditional medicines only grow in water or on the shores or banks of lakes/rivers.

**Keep an eye out for LICA's legacy signage to learn more about riparian areas. They can be found around the LICA region!**

## Functions of a Riparian Area

1. Trap and store sediment
2. Build and maintain banks & shorelines
3. Store water & energy
4. Recharge aquifers
5. Filter & buffer water
6. Reduce & disperse energy
7. Act as an animal travel corridor
8. Maintain biodiversity
9. Create primary productivity
10. Act as a growing medium for many traditional medicinal plants

Thank you to Beaver Lake Cree Nation, Saddle Lake Cree Nation, Cold Lake First Nations, and Elizabeth Metis Settlement, for sharing your knowledge to support the awareness and understanding of the importance of riparian areas and their traditional function.

Riparian Information From: Cows & Fish 2022

# Species at Risk

Our province is home to a diverse population of plants and animals and the LICA region is no exception. Unfortunately, due to habitat loss and other factors, several are assessed as Species at Risk in Alberta. Of these, 4 mammals, 1 amphibian, and 16 birds are currently considered Species as Risk whose habitat includes the LICA region for all or part of their lives.

## Woodland Caribou

currently remain in some parts of west-central Alberta along the Rocky Mountains and nearby foothills and in portions of the boreal forest in northern Alberta. The Cold Lake Air Weapons Range is a Woodland Caribou population range area. Woodland Caribou are currently listed as a Threatened, At-Risk Species in Alberta. These Caribou are medium-sized ungulates with brown bodies, a cream-coloured neck, mane, tail, and rump areas and have large, crescent-shaped hooves and long legs.

## The Piping Plover

is listed as Endangered under Alberta Species at Risk. It is a bluebird-sized shorebird that is occasionally seen on isolated beaches, mudflats and sandflats of lakes and sloughs. It has a white underside, pale brown to grey back, head and wings and a black stripe across the forehead from eye to eye with a single black band across the chest. These distinguishing features allow them to easily camouflage into their surrounding shoreline habitat. Since the late 1990s, Muriel Lake is one of two lakes in Alberta with the greatest population of Piping Plovers. In 2003, a seasonal wildlife sanctuary was created to restrict shoreline use and prevent disturbance to the Plovers.

## Did you Know?

The **Canadian Toad** is data deficient and may be at risk in Alberta. Canadian Toads require wetlands for breeding but much of the year is spent in the adjacent uplands. Sandy soil and upland areas are important winter hibernation sites.

## Fun Fact:

A **Barred Owl** belts out a loud, resounding sound that often sounds like... "Who, cooks, for-you? Who, cooks, for-you all?" Barred Owls have been seen in the LICA Region and are currently listed as Sensitive and are a Species of Special Concern in Alberta.

# Winter
# Bird Monitoring

In our area of the world, specifically in Alberta and Saskatchewan, we have world-class birding. Multiple migratory flyways overlap over our provinces – this means that we host a large variety of species during different seasons as birds make their home, or just pass through our region. Birding is great all over the LICA region, but especially in the Cold Lake and Lac La Biche areas!


In 2022, LICA promoted winter bird monitoring as a way to educate the community of birds in our region! To support bird identification, LICA hosted a bird ID workshop where participants learnt how to identify bird families and species by sight and sound. Following the workshop, LICA promoted bird monitoring and added species counts collected into ebird, an online database that houses bird count data from all over the world!

## Bird Species observed in the LICA Region
## February 1 – April 1, 2023

| Bird Species | 2023 Count |
|---|---|
| Bald Eagle | 1 |
| Evening Grosbeak | 8 |
| White-breasted Nuthatch | 5 |
| Hairy Woodpecker | 2 |
| Great Horned Owl | 1 |
| House Sparrow | 76 |
| Black-Capped Chickadee | 73 |
| Common Raven | 9 |
| Black-billed Magpie | 16 |
| Blue Jay | 31 |
| Downy Woodpecker | 7 |
| Rock Pigeon | 10 |

Water Quality Monitoring with

# Alberta Lake Management Society

LICA partnered with the Alberta Lake Management Society (ALMS) to fund water quality monitoring at 10 lakes as part of the 2022 LakeWatch program. Volunteers provided boats used for sampling, operate the boats, and assist the LakeWatch technician with sampling procedures. LakeWatch monitors for metals, water chemistry, water clarity, euphotic depth, and invasive species. The lakes sampled in 2022 included: Amisk, Crane, Laurier, Minnie, Muriel, Moose, Pinehurst, Skeleton North, Skeleton South, and Touchwood.

LakeWatch has several important objectives, one of which is to collect and interpret water quality data on Alberta Lakes. Equally important is educating lake users about their aquatic environment, encouraging public involvement in lake management, and facilitating cooperation and partnerships between government, industry, the scientific community, and lake users (ALMS, 2022).

To view the 2022 LakeWatch Report, click here. More comprehensive water quality reports are available for each individual lake from data collected in the 2022 season and can be accessed on the ALMS website, along with historical reports for those lakes.

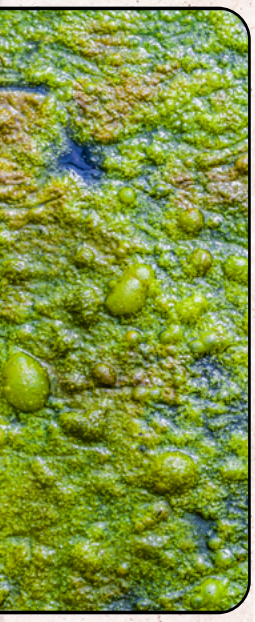
Highlights
# 2022 LakeWatch

## Invasive Species

In 2022, no invasive species such as mussels or spiny water flea were detected in the 10 LICA region lakes sampled. Suspect watermilfoil specimens were collected from Minnie, Touchwood, and Crane lakes sampled through the LakeWatch program in 2022, along with Garner, Kehewin, Floatingstone, Hope, Fork, Elinor, and Beaver lakes through ALMS' other plant monitoring initiatives. All specimens collected were confirmed to be the native Northern watermilfoil (Myriophyllum sibiricum) upon genetic confirmation by the Alberta Plant Health Laboratory.

## Elevated Metals

Arsenic is naturally elevated in the Beaver River Watershed and can be introduced into the aquatic environment through industrial or municipal discharges or from the combustion of fossil fuels. In 2022, arsenic levels in Muriel Lake and Minnie Lake exceeded the CCME guidelines for the Protection of Aquatic Life (5 µg/L).



## Blue Green Algae

Microcystins are toxins produced by cyanobacteria, which is also known as blue-green algae. Average microcystin concentrations ranged from <0.1 µg/L at Crane Lake, Touchwood Lake, and Pinehurst Lake, to 9.48 µg/L at Skeleton Lake North. The only lake to measure higher than the recreational guideline of 10 µg/L during any single sampling event was Skeleton Lake North, during the June 7th and July 12th sampling events, with levels of 15.32 µg/L and 10.20 µg/L respectively.
Please refer to the 2022 LakeWatch Report for more detail.

For more information on blue-green algae provided by Alberta Health Services, please click here.

# Water Quality Monitoring with **Creekwatch 2022**

LICA partnered with the RiverWatch Institute of Alberta for another great season of CreekWatch monitoring. CreekWatch is a community-based water quality monitoring program. LICA staff trained community volunteers on the proper handling of the portable lab kit (donated by RiverWatch) to ensure a safe and successful season of sampling.

Three creeks were sampled in 2022; two flowing into Muriel Lake, and Jackfish Creek, flowing from Tucker Lake to the Beaver River. Muriel Lake Basin Management Society (MLBMS) provided volunteers to conduct the sampling at Muriel Lake, and additional community members volunteered to sample Jackfish Creek.

## Muriel Creeks

Muriel Creek 1 is located on the south side of Muriel Lake and is the largest creek that flows into Muriel Lake. This creek was sampled eight times during the season at one location before flowing into the lake. Muriel Creek 2 is located on the east side of Muriel Lake, flowing north of the Beaumeaux subdivision and is the second largest creek flowing into the Lake. This creek was sampled at one location, but it was only sampled twice during the 2022 season due to low-flow events.

## Jackfish Creek

Jackfish Creek was the third creek monitored by community volunteers in 2022. This creek is approximately 131.4 km long and was sampled at four sites between Tucker Lake and the Beaver River. Jackfish Creek was sampled on 5 dates during the season.

The CreekWatch program monitors water quality by assessing chemical, physics, and biological indicators. Chemical parameters included dissolved oxygen, ammonia, nitrogen, phosphorus, pH, and chloride. Physical parameters include water temperature and turbidity. The biological indicator is benthic invertebrate identification.

To review the results of the 2022 CreekWatch Citizen Science monitoring program, click here.

Thank you to all our volunteers for another great season of CreekWatch Citizen Science!

Beaver River Watershed

# Integrated Watershed Management Plan (IWMP)

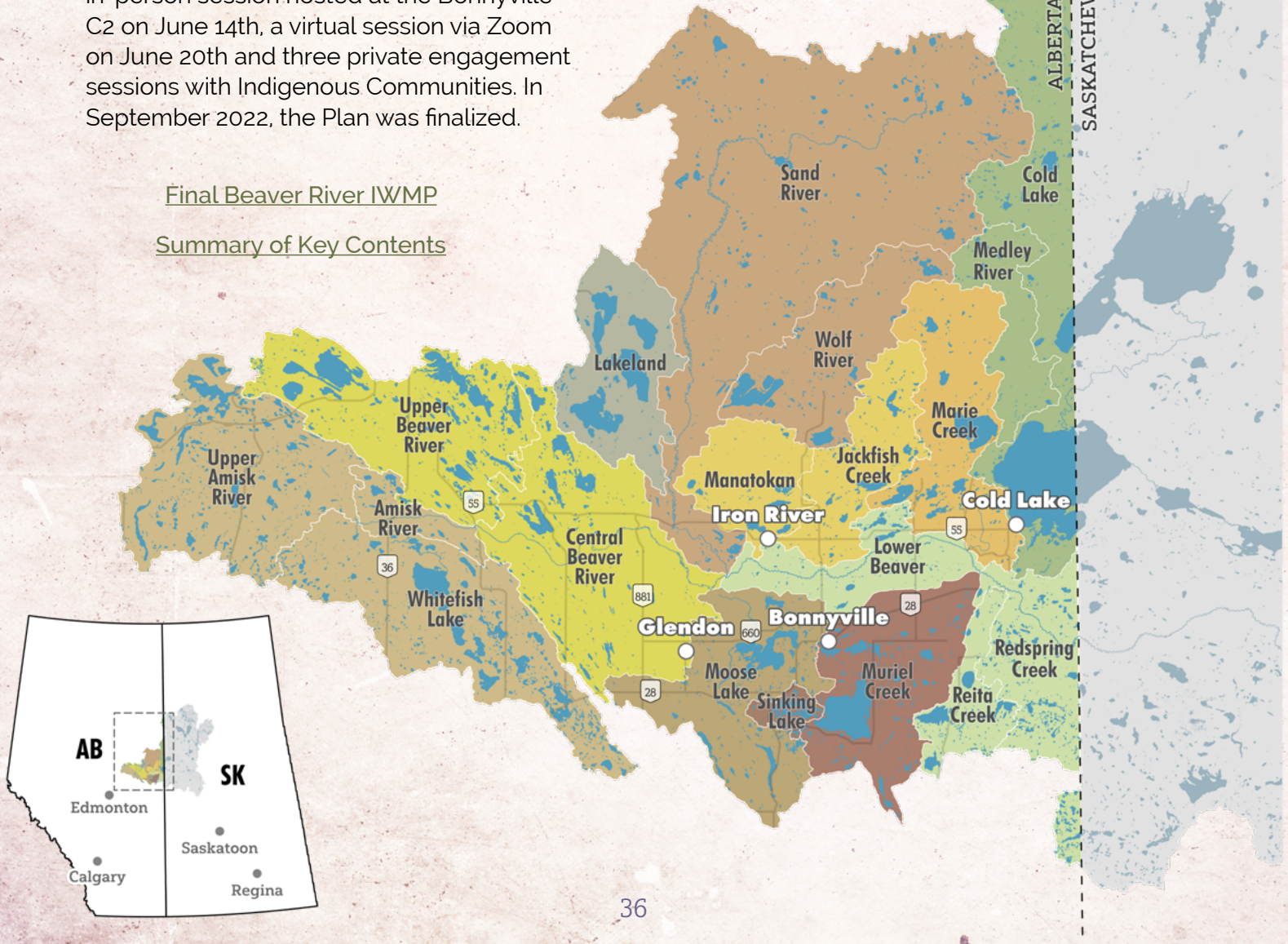
LICA- Environmental Stewards led the development of the Integrated Watershed Management Plan (IWMP), for the Beaver River watershed. This was done collaboratively with the input provided by stakeholders, and rightsholders in the region.

An IWMP is a guidance document and planning tool for resource managers, including governments, planners, Indigenous communities, other stakeholders, and landowners who manage water and land resources. The plan identifies goals for improving and/or maintaining watershed health and makes recommendations on how to reach those goals.

To support the development of the Plan, LICA contracted Palliser Environmental Services Ltd. (PESL). In June 2022, the third and final round of engagement sessions took place. This consisted of one in-person session hosted at the Bonnyville C2 on June 14th, a virtual session via Zoom on June 20th and three private engagement sessions with Indigenous Communities. In September 2022, the Plan was finalized.

Final Beaver River IWMP

Summary of Key Contents



IWMP

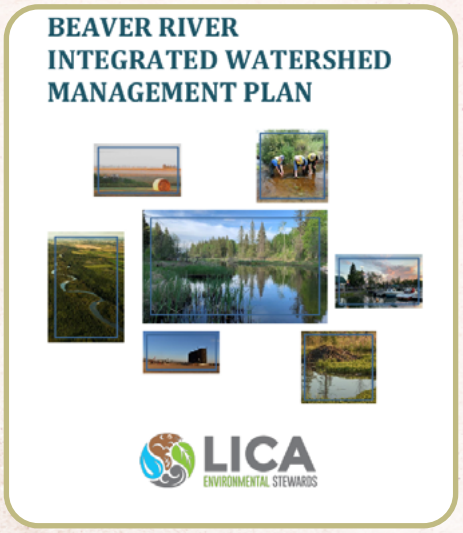
# Implementation Priorities

The IWMP Committee identified five implementation priorities for the recommendations. The priorities listed below have multiple benefits for all stakeholders, First Nations, and the Métis:

1. Prioritize the completion of floodplain maps for watercourses and high-water marks for lakes to support implementation and enforcement of urban development setbacks through policy and planning.
2. Develop and implement a long-term surface water quality monitoring program in collaboration with all stakeholders to leverage resources and achieve mutual goals.
3. Collaborate to implement best management practices and land use strategies to protect water quality and riparian health, particularly where riparian intactness scores are below the target and threshold and water quality is a concern.
4. Seek opportunities to support riparian restoration where assessments indicated health condition does not achieve targets and/or thresholds.
5. Collaborate with stakeholders to prioritize and develop a fishery monitoring program, including key habitats. Update fisheries management objectives prior to tourism and recreation planning.

LICA is eager to continue IWMP implementation with a vision of:

"A Healthy Beaver River Watershed for the Future."




# Individual **Membership**

Membership is available to anyone over the age of seventeen who resides, owns property, or works in the LICA region for six months or more, as defined in the LICA bylaws.

**Who:** General members of the public, First Nations, Metis, Provincial and Federal Governments, and Non-Government Organizations (NGOs).

## Membership cost: **Free**

## Benefits:

- Promote your support for LICA's work and contribute to environmental stewardship
- Develop collaborative relationship/connections with multi-stakeholder groups
- Access to LICA's monitoring data for non-commercial use
- Receive quarterly newsletters
- Stay informed of upcoming LICA events, meetings, and volunteer opportunities
- Eligibility to vote and run for LICA's Board of Directors annually
- Eligibility to be appointed to LICA's working committees annually by LICA's Board of Directors

Click here to become a LICA Member

In 2022 LICA's membership count was **288**

# Industry
# Membership

**Who:** Oil & gas producers.

**Full Status Membership Cost:** Industry Funding Partners shall pay a portion of costs associated to LICA's operations, monitoring, projects, and studies according to a funding formula agreed upon by LICA and industry members within the LICA region annually. Industry members are subject to participate in and adhere to the Funding Formula Agreement, including its principles, metrics, and conditions, as mandated within the project's AER approval.

## Benefits:

- Promote your support for LICA's work and contribute to environmental stewardship
- Develop collaborative relationship/connections with multi-stakeholder groups
- Provide technical and directional support to LICA on regional environmental projects and programs
- Advertisement of logo on LICA's website under Our Supporters
- Access to LICA's monitoring data for commercial use
- Receive quarterly newsletters
- Stay informed of upcoming LICA events, meetings, and volunteer opportunities
- A minimum of one representative from each company will be appointed to LICA's Industry Steering Committee (LISC)
- One representative from each company is eligible to vote annually for LICA's Board of Directors
- Currently three industry representatives are appointed to LICA's Board of Directors by the LISC annually
- Currently two industry representatives are appointed to each of LICA's working committees annually

Click here to become an Industry Member

## Associate Membership:

Industry Members not wishing to become Full Status Members shall be Associate Members with restricted benefits, such as having an observer status only and not having access to monitoring data for commercial use. Should an industry member wish to access monitoring data for commercial use, they may pay an annual 'Commercial Use of Data' fee.

# Corporate **Membership**

**Who:** Businesses, organizations, associations, and oil & gas non-producers.

**Membership cost:** Determined by number of employees.

## Benefits:

- Promote your support for LICA's work and contribute to environmental stewardship
- Provide financial support towards LICA's initiatives and presence within the region
- Develop collaborative relationship/connections with multi-stakeholder groups
- Advertisement of logo on LICA's website under Our Supporters
- Access to LICA's monitoring data for non-commercial use
- Receive quarterly newsletters
- Stay informed of upcoming events, meetings, and volunteer opportunities
- One representative from each company is eligible to vote annually for LICA's Board of Directors

Click here to become a Corporate Member

# Municipal **Membership**

**Who:** Municipal Governments (i.e., cities, towns, villages, hamlets, municipalities, etc.).

**Membership cost:** Determined by population size as per current Statistics Canada figures.

## Benefits:

- Promote your support for LICA's work and contribute to environmental stewardship
- Provide financial support towards LICA's initiatives and presence within the region
- Opportunity to increase LICA's presence within your area; tailored to your needs
- Develop collaborative relationship/connections with multi-stakeholder groups
- Advertisement of logo on LICA's website under Our Supporters
- Access to LICA's monitoring data for non-commercial use
- Receive quarterly newsletters
- Stay informed of upcoming events, meetings, and volunteer opportunities
- One representative from each municipal government is eligible to vote annually for LICA's Board of Directors
- Currently four local municipal government representatives are appointed to LICA's Board of Directors annually
- Appointed municipalities may assign one representative to LICA committees, if interested

Click here to become a Municipal Member

LICA is always looking for opportunities to enhance our programming and expand our outreach. We are open to new ideas and feedback related to how we may best serve the Lakeland region and make a positive environmental impact.

Become an Environmental Steward today!

LICA

# Volunteers

**1157.5** hours were volunteered in 2022-2023

| | | | |
|---|---|---|---|
| Melanie Alexander | David Hartog | Tina Martin | Jennifer Vermillion |
| Salim Abboud | Eveline Hartog | Brent McGarry | Barb Walsh |
| Nikole Andres | Alyssa Hellum | Sean Mercer | Xiaofeng (Will) Wang |
| Amanda Avery Bibo | Carrie Hirtle | Brenda Midgely | Greg Wentworth |
| Wayne Bamber | Jeff Hlewka | Don Midgely | Gabrielle Whiskeyjack |
| Jason Barrie | Annette Hobart | Evelyn Mondares | Louise White-Gibbs |
| Kristen Berezanski | Lonna Hoggan | Monty Moore | Beverly Wilson |
| Kayla Blanchette | Craig Holder | Bob Myrick | Andrea Woods |
| Marie Bouegeois | John Ilchuk | Kellie Nichiporik | Colin Woods |
| Richard Bourgeois | Justin Inman | Jennifer O'Brien | Ron Young |
| Denise Bowen | Scott Iron | Jennifer Pachett | Jeff Zalaski |
| Keatyn Bowen | Shawn Jacula | Donna Padlesky | Duane Zaraska |
| Roxanne Bretzlaff | Marley Johnson | Leo Paquin | Miranda Zuk |
| Christine Campbell | Max Johnson | Clem Parenteau | Beaver Lake Cree Nation |
| Cassie Carswell | Sharon Johnson | Desiree Parenteau | Cold Lake First Nations |
| Cindy Connolly | Salum Katala | Randy Parenteau | County of Smoky Lake |
| Peter Cordingley | Jausen Kelly | Bill Parker | County of Two Hills |
| Colin Cote | Sabastian Kelly | Amanda Peardon | County of Vermilion River |
| Paige Coutts | Garry Kissel | Murray Phillips | Davey Drug Mart |
| Kelly Dion-McFeeters | Nadine Kissel | Wally Qiu | Drake Contracting |
| Randi Dupras | Orest Kitt | Amelia Runzer | Elizabeth Metis Settlement |
| Nolan Ekberg | Phil Kushnir | Christen Runzer | Lac La Biche County |
| Shawn Elgert | Terri Kutt | Clara Runzer | M.D. of Bonnyville |
| Cody Fedun | Melanie Kwiatkowski | Trevor Schaffrick | Saddle Lake Cree Nation |
| Grant Ferbey | Jeanine Laramee | Julia Shapka | Town of Bonnyville |
| Kim Foisy | Nikita Lattery | Abdi Siad-Omar | Village of Glendon |
| Kurt Franklin | Vicky Lefebvre | Silke Skinner | |
| Tina Gladu | Findlay MacDermid | Paul St. Amant | |
| Kevin Glowa | Robert Machatis | Emma Tidd | |
| Heather Harms | Clarence Makowecki | Rick Tiedemann | |
| Parker Harrison | Rob Marshall | Lorin Tkachuk | |

**THANK-YOU to all of our volunteers!**

We could not do it without you!

Monetary & In-Kind

# Our Supporters

Canadian Natural

wholesale club
everything foodservice

SLR

Imperial

ATCO Electric

cenovus ENERGY

Smoky Lake COUNTY

**THANK-YOU to all of our Supporters!**

Métis Nation of Alberta

BAYTEX ENERGY CORP.

Alberta

Alberta Health Services

COLD LAKE FIRST NATIONS

AAC
ALBERTA AIRSHEDS COUNCIL

CANADIAN TIRE

Bonnyville Municipal LIBRARY
internet access

Bonnyville & District Centennial Centre

DRAKE CONTRACTING LTD.

West Coast Seeds

MUNICIPAL DISTRICT BONNYVILLE NO. 87

CO-OP Lakeland

Lac La Biche County welcoming by nature.

Baby Cherry Greenhouse

COUNTY OF TWO HILLS

MACHINING PRECISION & MFG

# THANK-YOU to all of our Supporters!

Town of Bonnyville "It's Multi-Natural"

City of Cold Lake

Cold Lake Energy Centre

PEVACH CORP

UNIVERSITY nuxełhot'ine thaa?ehots'i nistameyimâkanak BLUE QUILLS

STRATHCONA RESOURCES LTD

VILLAGE OF Glendon

PORTAGE COLLEGE

County of VERMILION River

# Financial Statements

Period Ended
March 31, 2023
(Unaudited)

| REVENUES | 2022 | 2023 |
|---|---|---|
| Amortization of Capital Allocations | $1,093 | $865 |
| Government Contract Funding | $864,292 | $1,150,793 |
| Grant funding | $594,053 | $266,512 |
| Industry & Municipality Funding | $137,441 | $181,611 |
| Interest Income | $1,013 | $2387 |
| Memberships | $37,125 | $30,500 |
| **Total** | **$1,635,017** | **$1,410,697** |

| EXPENSES | 2022 | 2023 |
|---|---|---|
| Amortization | $95,999 | $106,623 |
| Bad Debt | $1,000 | $(1,000) |
| Board & Committee | $24,320 | $20,700 |
| Community Garden | $12,586 | $19,520 |
| Contracted Services | $420,905 | $124,523 |
| Environmental Monitoring | $601,857 | $700,542 |
| Insurance | $12,297 | $14,596 |
| Meetings | $5,023 | $7,831 |
| Occupancy Costs | $49,737 | $50,010 |
| Office | $22,700 | $22,484 |
| Professional Fees | $7,180 | $7,180 |
| Property Taxes | $4,335 | $4,403 |
| Public Relations | $54,199 | $27,089 |
| Training & Development | $5,895 | $7,631 |
| Travel | $3,001 | $9,234 |
| Wages & Benefits | $300,772 | $293,343 |
| Watershed Projects | $37,300 | $32,777 |
| **Total** | **$1,659,106** | **$1,447,486** |

| | 2022 | 2023 |
|---|---|---|
| DEFICIENCY OF REVENUE OVER EXPENSES FROM OPERATIONS | $(24,089) | $185,182 |
| **DEFICIENCY OF REVENUE OVER EXPENSES** | **$(24,089)** | **$185,182** |

Annual Report

# Acknowledgments

| | Photographer |
|---|---|
| 13 | Emma Tidd |
| 14 | Claudette Popowich |
| 16 | Mike Bisaga |
| 17 | Mike Bisaga |
| 30 | Debbie Wooldridge |
| 30 | Kayla Hellum |
| 32 | Christen Runzer |
| 32 | Darwin Stupka |
| 37 | Jeannine Delisle |
| 37 | Sarah Chileen |
| 38 | Debbie Wooldridge |
| 39 | Charles Hallett |
| 41 | Darwin Stupka |
| 45 | Allyus Janot |
| 46 | Matthew Maclellan |

**Layout & Design:**
Kayla Hellum
Stephanie Sampson

**Editors & Contributors:**
Michael Bisaga
Maria Cueva
Eveline Hartog
Kayla Hellum
Lori Jodoin
Lily Lin
Kristina Morris
Stephanie Sampson

# LICA
## ENVIRONMENTAL STEWARDS


**Phone:** 780.812.2182
**Toll Free:** 1.877.737.2182
**Fax:** 780.812.2186

**Email:** lica2@lica.ca
**Website:** www.lica.ca

5107 W - 50th Street
P.O. Box 8237
Bonnyville, Alberta
T9N 2J5


**Follow Us on Social Media**

@infolica

@infolica

@licaenviro