



Measuring Up:



**Reporting our Environmental
Activities to the Community**

**Prepared Jointly by the
Cumulative Environmental
Management Association, the
Regional Aquatics Monitoring
Program, and the Wood Buffalo
Environmental Association**



Table of contents

Everyone in Wood Buffalo has a stake in a healthy environment	4
Coming together to help protect the health and integrity of our environment	6
What does CEMA do?	10
What does RAMP do?	14
What does the WBEA do?	18
Our Membership	22

The Cumulative Environmental Management Association, the Regional Aquatics Monitoring Program, and the Wood Buffalo Environmental Association are committed to the preservation of the environment and its resources.

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EVERYONE IN WOOD BUFFALO HAS A STAKE IN A HEALTHY ENVIRONMENT



Panoramic natural landscapes, an abundance of indigenous wildlife, cold, clean water and plenty of fresh northern air. These are just a few of the natural elements that the Wood Buffalo region has to offer.

A healthy environment not only makes life possible, but enriches our enjoyment of living beyond compare. Now and into the future, for every succeeding generation, we can all agree: it must be sustained.

In one way or another—driving cars, taking showers, using electricity, running businesses and industries—human activity affects our environment. Because we are the economic engine of a province, there are many more people and a much higher level of industrial activity in the Wood Buffalo area than there used to be. It's only natural to ask, can the environment cope? Is it healthy? Can it be restored, if necessary, to its original condition over the long term?

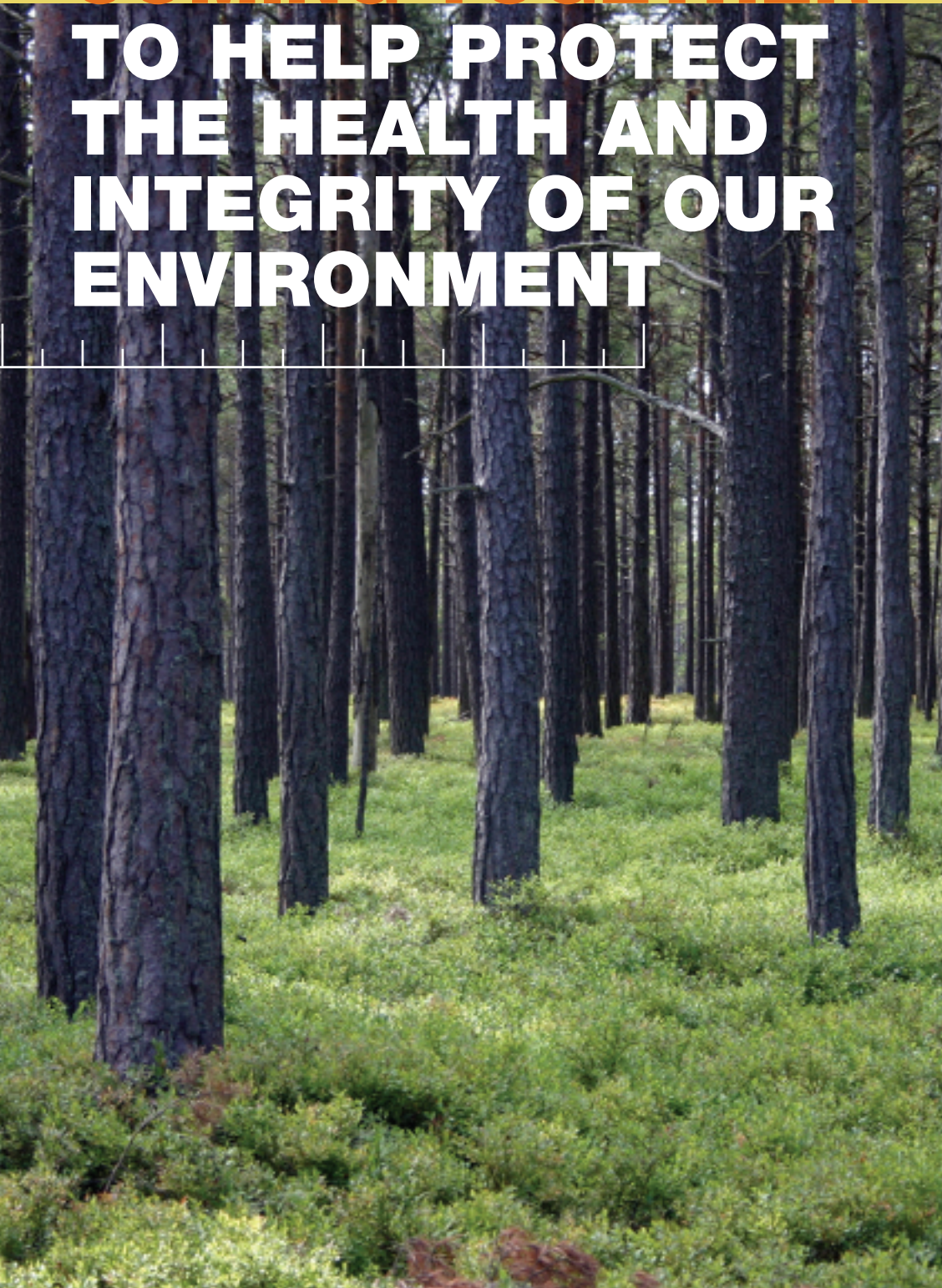
About this report and its authors

Before, during, and after the dawn of a new era of oil sands development in the mid-1990s, various industry, community, and other leaders of the day understood that increased levels of industrial activity would have an added impact on the environment—on the land, water, and air. Those leaders took steps to measure and mitigate that impact, including the local establishment of the Cumulative Environmental Management Association (CEMA), the Regional Aquatics Monitoring Program (RAMP) and the Wood Buffalo Environmental Association (WBEA).

While each of our organization's does unique work, as a group we're similar in the sense that we all specialize in a specific area of environmental stewardship.

This report discusses our organizations, what we did in 2005 and some highlights from this year. It represents our efforts to work together and be accountable to you, the stakeholder.

COMING TOGETHER TO HELP PROTECT THE HEALTH AND INTEGRITY OF OUR ENVIRONMENT



CEMA, RAMP and the WBEA were all established separately and independently of one another to examine and address the environmental impacts of oil sands development on our region. The WBEA started as the Air Quality Task Force in 1985 and was officially re-established as the WBEA in 1997. RAMP was established in 1997 and CEMA in 2000.

To deal with the complexity of environmental monitoring and to effectively do our work, each of our three organizations specializes in a particular area of environmental stewardship.

Our basic purposes are straightforward:

- **CEMA:** develops recommendations on how to best manage cumulative impacts of oil sands development and protect the environment
- **RAMP:** assesses the health of rivers and lakes in the oil sands region
- **WBEA:** monitors and reports regional air quality 24 hours a day

In our day-to-day work we rely on a variety of advanced sciences to produce objective and reliable results. A great deal of what we do—the way we go about gathering data, for example, and some of the reports we publish—is necessarily complex. But we're grass-roots too, and very much dedicated to communicating important matters in an understandable and useful way.



Our members

Each of our organizations are guided by, and accountable to, our members. They are drawn from all walks of life and represent all levels of government, industry, regulatory bodies, environmental groups, Aboriginal groups, the local health authority and other interests.

Our members represent the character and concerns of our region—the people who live and work here. They bring different perspectives, knowledge, skills, and expertise to the table. They work in partnership, based on a common belief in the importance of the environment.

Our memberships are made up of:

- Governments and agencies that regulate and oversee oil sands development
- Aboriginal communities that ensure traditional lifestyle, culture, and environmental knowledge is respected and upheld
- Industry that is committed to corporate responsibility, the orderly development of resources, and economic growth and opportunity
- Health agencies that are focused on promoting public wellness and preserving public safety
- Environmental non-government organizations that are concerned with, guard, and promote environmental sustainability

How do we work?

Each agency has a governing body that makes decisions related to its activities. Each member of the governing bodies has an equal voice and all must agree to and accept decisions before they're acted upon.

In addition to our governing bodies, each of our three organizations has established subgroups to carry out work in specific areas. Salaried staff, contract environmental consultants and member representatives (i.e. employees of member organizations and/or companies) plan and carry out environmental studies and research, the collection and interpretation of data and the reporting of results.

While the work itself is often done in fairly isolated wilderness areas, the results are always shared—whether with regulators, the general public, or a specific group of stakeholders. Openness—making our findings available to anyone and everyone who might care to look at them—is a necessary and indispensable part of our work.

Another essential component of our work is Traditional Environmental Knowledge (TEK). TEK is a body of local environmental knowledge and beliefs transmitted through oral tradition and first hand observation based upon living in close contact with nature.



TEK includes:

- a system of classification
- a set of empirical observations about the local environment
- a system of self-management that governs sustainable resource use
- an understanding of the relationships of living beings (including humans) with one another and the environment
- Aboriginal Elders in the Wood Buffalo region provide CEMA, RAMP and the WBEA with traditional environmental knowledge to guide our work and help us to ensure that the land, forest, air, water and wildlife in our region is protected, sustained and restored over the long term.

What does it cost?

We are all non-profit entities working for the environmental integrity of our region. Industry contributes more than \$10 million annually to our three groups for environmental monitoring and research. In 2005 industry funds were provided to CEMA, RAMP and the WBEA as follows:

CEMA	\$ 5.5 million
RAMP	\$ 1.8 million
WBEA	\$ 3.5 million
Total:	\$ 10.8 million

WHAT DOES CEMA DO?

In 1999, the Alberta Government published the Regional Sustainable Development Strategy (RSDS) for the Athabasca Oil Sands area. The RSDS identified various environmental issues that should be studied in light of the growth in the Athabasca Oil Sands Region. The strategy was initiated to provide a framework for balancing development with environmental protection.

CEMA supports this strategy by focusing on the long-term environmental impacts of industrial development within the Regional Municipality of Wood Buffalo. Our mandate is to conduct research and make management recommendations to government on how to best protect the environment.

A great deal of work and collaboration went into determining which issues were most pressing and important to the community and to the environment. Today, CEMA focuses on a number of identified priorities, including acidification (conversion of air pollution into acid substances, i.e. acid rain), biodiversity, surface waters, wild life habitats and land reclamation.

CEMA's vision is that the environment in our region will be protected, sustained and restored over the long term; and that the sum total of industrial activity in the region will not cause any

lasting harm to the environment or risks to the health of the people who live here. We work toward our vision by researching environmental issues and making recommendations to government.

In most respects, the issues we deal with can be broken into broad categories dealing with the impacts of industrial activity on the air, water, and/or land.

- **Air:** We are working to assess the potential impacts of air emissions (i.e. discharges from smoke stacks) on the environment. The research is designed to increase our understanding of the sources of potentially harmful emissions and to recommend actions to government to keep the air clean and minimize the effects of emissions
- **Water:** Work on water issues relates mostly to the health of aquatic ecosystems (rivers, lakes, streams, etc). We recognize that managing water related issues will likely become more of a challenge as additional oil sands projects come online. We aim to understand how the natural environment is likely to respond to increasing development; and to design a system that minimizes the long term environmental impacts on surface water quantity and quality so that our water systems will remain healthy.

- **Land:** Oil sands development has the potential to make significant changes to landscapes, wildlife populations and habitats. The main tasks of the working groups responsible for land-related issues is to determine and recommend the best management tools available to protect, sustain and restore the health of the landscape, vegetation, soil and watersheds in our environment. These tasks are undertaken while continuing to strive for a balance between industrial development and environmental considerations. In areas where reclamation activities need to occur, we look at the best measures and methods available to protect the environment.

Most of our field and research work is carried out through our five working groups, which include:

- Sustainable Ecosystem Working Group
- Reclamation Working Group
- NO_x SO₂ Management Working Group
- Surface Water Working Group
- Trace Metal and Air Contaminants Working Group

A Traditional Environmental Knowledge Standing Committee is also in place to guide the working groups in the collection and use of Aboriginal traditional knowledge.

What did CEMA do in 2005?

Examples of ongoing and completed technical research:

Acid Sensitive Lakes Network, Lake Atlas

Developed for scientists and researchers, the atlas describes basic properties (including size, depth, volume, and climatology) for the 50 lake systems in our region. The atlas is based on fieldwork undertaken during 2003 – 2004.

Estimating Contributions to Ambient Concentrations in Fort McKay

The Trace Metal and Air Contaminants Working Group is conducting ongoing assessments of the effects of air emissions on people living in the region.

Muskeg River Watershed Integrity, Water Management and Mitigation Strategies

The primary goal of water management is to develop practical water handling systems that enable low risk mine operations with minimal environmental impacts.

Nitrogen Sinks in Boreal Ecosystems

Oil sands plants release oxidized nitrogen into the atmosphere, which may be converted to nitric acid, dissolved in rain, and eventually released into surrounding environments. This study examined nitrogen deposition levels in

key areas of the boreal forest to determine how much nitrogen can be deposited before it is considered harmful to the ecosystems in the oil sands region. More information is currently being gathered and research is expected to be complete in 2009.

Pit Lake Work Plan

Pit lakes will be integrated into the reclaimed ecosystems and will provide a reservoir for natural treatment to occur and eventually drain through outflows as natural lakes would to the larger Athabasca basin. The main objective of the Work Plan is to establish design and management guidelines for these lakes.

Wildlife Movement, Traditional Environmental Knowledge (TEK) Workshops

The overall objective of the workshops was to collect information from TEK experts on important wildlife movement in the Wood Buffalo region. For example, identifying seasonal and migrational wildlife movement to determine if this movement is likely to be impacted by oil sands development so that recommendations can be made to protect high risk areas.

The following reports are complete and available on our website (www.cemaonline.ca) under CEMA News:

- SEWG: Ecosystem Management Tools Recommendation (02/04)
- NSMWG: Acid Deposition Management Framework Recommendation (02/04)
- TMAC: Trace Metals Management Recommendation (05/02)
- RWG: Landscape design checklist (05/05)
- Shrub Species Review for Boreal Ecosite Re-Establishment in the Oil Sands Region
- Literature Review of Reclamation Techniques for Wildlife Habitats in the Boreal Forest
- Alberta Forest Biodiversity Monitoring Program: Summary of the 2002 Pilot

2006 Update:

Initiatives are underway in a number of other areas. For example, two key recommendations have recently been submitted to government regulators. The first is a recommendation to manage ground level ozone (a component of smog) to ensure air quality in the Wood Buffalo region meets new, and more strict, Canada-wide standards. This recommendation has been officially accepted by government.

The second recommendation involves revisions to one of our reclamation manuals which is designed to help evaluate land capability in natural and reclaimed forest ecosystems.

WHAT DOES RAMP DO?



Established in 1997, RAMP monitors the health of Wood Buffalo's lakes and rivers. Since 1997, RAMP has continued to grow and adapt to the needs of the community, regulators and industry. We've become more responsive and better able to modify our activities based on past monitoring results, new oil sands developments, technological advances and community concerns.

Through our work we are able to identify long-term trends, regional issues and potential long term effects related to industrial development. Our Regional Study Area encompasses the entire Regional Municipality of Wood Buffalo; including watersheds where oil sands development is presently occurring or planned for the future. We measure water quality and quantity in rivers, streams and lakes, we monitor fish populations and benthic invertebrate communities and we assess habitat quality.

More specifically, we:

- Monitor aquatic environments in the oil sands area for potential effects of all activities on the region's rivers and lakes
- Collect environmental data so that we can better understand the nature and impact of oil sands operations
- Compare actual data with predictions and commitments made in environmental impact assessments compiled by industry
- Incorporate traditional environmental knowledge into our monitoring activities

Through our work we aim to discover what's normal, identify what's abnormal and inform our stakeholders about our findings.





What were the results of RAMP's 2005 monitoring activities?

Monitoring activity suggests that changes in the condition of the Athabasca River up to and including 2005 have been minor. In other water bodies studied, there were no significant changes to surface water compared to what would be expected if there were no oil sands development in the region.

By studying the organisms that live at the bottom of water bodies (benthic invertebrates), we can determine the health of a lake or river. In 2005, there was no difference in benthic invertebrate communities between areas of oil sands activity and other parts of the region.

Water quality measurements provide a snapshot of the conditions when the sample is taken. Sediment quality measurements show how chemicals accumulate over time. Based on observations made during 2005, we concluded that there was no difference in water quality

between the areas that had been exposed to oil sands development and those that had not. Overall, there is no difference in sediment quality between watersheds.

Our fish programs monitor things such as the presence and relative abundance of fish species, as well as the amount of metal and tainting compounds (sources of abnormal odour and flavour) in fish tissue. While inventory results from the Athabasca and Clearwater rivers indicated some annual fluctuations since 1997, there are no consistent trends in fish populations that could be attributed to increasing oil sands development. Concentrations of metals and tainting compounds in fish from the Athabasca River have remained fairly consistent over time and are similar to those found in fish from the Muskeg River and other water bodies in the region.

RAMP has documented no significant changes in the overall chemistry of the 50 lakes sampled during 2005 when compared to observations from previous years.

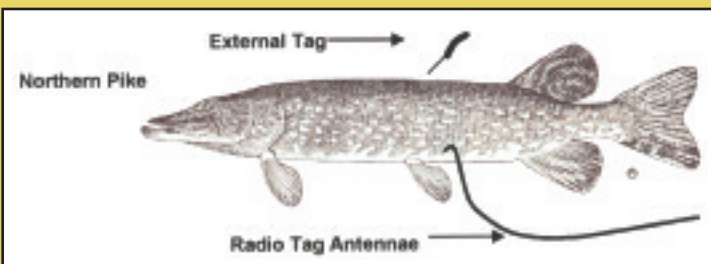
How you can help

There are several ways that members of the public can help RAMP in monitoring that health of our region's lakes, rivers and fish populations:

Fish Tagging Program

If you catch a fish that has been tagged, please report the tag number, tag colour, type of fish and (if possible) its length and weight to **Alberta Sustainable Resource Development** at **(780) 743-7200**. If you intend to release the fish, please do not remove the tag.

Please carefully release radio tagged (wire extending from the fishes belly) fish alive after recording the tag number and fish information to allow the study to continue.



Fish Abnormalities Program

If you catch a fish with an abnormality (lesions, growths, or physical abnormalities such as missing fins, curved spines or blindness) please release the fish and report it by contacting **Hatfield Consultants Ltd.** in Fort McMurray at **(780) 743-4290**.

River Response Network

Please report any occurrences of spills, foam, scum, turbidity and other events (which may or may not be due to natural causes) to **Alberta Environment** by calling **1-800-222-6514 (toll-free)**.

WHAT DOES THE WBEA DO?



Although the first WBEA operated air monitoring station opened in 1997, the WBEA was originally established as the Air Quality Task Force in 1985 to address environmental concerns raised by the Fort McKay First Nation.

Today, as an independent, community-based, not-for-profit association, we monitor the air in the Regional Municipality of Wood Buffalo, 24 hours a day, 365 days a year. We do this through a variety of air, land, and human monitoring programs. The information collected is openly and continuously shared with stakeholders and the public.

Ambient air refers to the air we breathe, and our work is supported by the most extensive ambient air monitoring network in Alberta. Data is collected at 14 monitoring stations between Anzac and Fort Chipewyan, with most located at or near oil sands plants.

The data we collect can ultimately be used to assess the impact of air emissions on the health of both humans and the environmental ecosystem.

Land Monitoring:

The Terrestrial Environmental Effects Monitoring (TEEM) program monitors the long term effects of air emissions on land ecosystems and plant life. TEEM collects data and issues reports on the effects of various air emissions on plants and soils.


Human Monitoring:

At home, at work, or outdoors, the Human Exposure Monitoring Program (HEMP) studies the indoor and outdoor air contaminants that people are exposed to in their everyday environments. Operated in partnership with Alberta Health and Wellness, the monitoring program focuses on a different area of the Wood Buffalo region each year. In 2005 the study focused on the communities of Fort McMurray and Fort Chipewyan, and in 2006 it will focus on the Fort McKay and Fort McMurray First Nations areas. Results for the 2005 study are expected to be released later this year and will be made available on WBEA's website at: www.wbea.org.

Air Monitoring:

The WBEA's Air Quality Index allows the non-scientist to easily gauge air quality. The measurement is made up of several different compounds in the air, including carbon monoxide, nitrogen dioxide, sulphur dioxide, ozone and fine particulate matter. We transmit raw data, in real time, to Alberta Environment who then use it to calculate the index value. If there is a problem, Alberta Environment is immediately alerted and has the authority to take action if necessary; this includes notification to the Regional Health Authority. The Air Quality Index is calculated every hour for five key locations in Wood Buffalo: Athabasca Valley, Fort Chipewyan, Fort McKay, Patricia McInnes and Syncrude UE-1.

All WBEA air monitoring data is sent to the Clean Air Strategic Alliance (CASA) Data Warehouse (www.casadata.org), an on-line database for all of Alberta's air monitoring data. This information is both quality controlled and quality assured.



What are the results of the WBEA's 2005 monitoring activities?

Data collected in 2005 were similar to previous years. All readings were well below safe exposure levels determined by Alberta Environment. If you're interested in seeing more detailed results of 2005 data, please contact the WBEA office for a copy of the 2005 Annual Report, or visit the WBEA website to view an electronic version.

Data collected through the Human Exposure Monitoring and Terrestrial Environmental Effects Monitoring programs are currently being analyzed by independent experts and will be reported to the public and posted on our website as soon as possible.

2006 Updates and Improvements

Independent Audit

In May of this year the WBEA experienced a pump failure at the Wood Buffalo Viewpoint Air Monitoring Station. The sulphur dioxide (SO₂) pump stopped unexpectedly, causing inaccurate SO₂ readings for a short period of time. The pump has since been replaced and a full, independent audit of our entire Air Monitoring Network has been conducted. Independent auditing is just one of the tools we use to ensure our data is accurate and reliable.

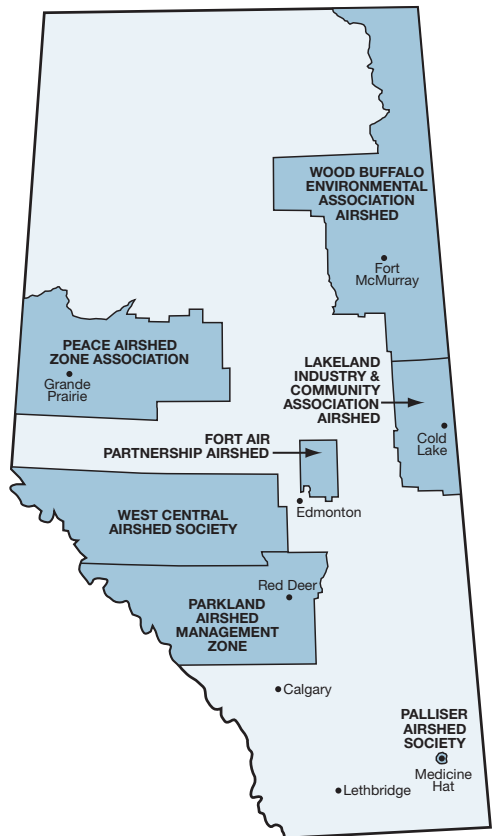
The WBEA Governance Committee is currently in the process of reviewing the final results and recommendations of the audit.

Website Update

During the odour incident that took place in our region in May we experienced problems with the capacity of our website (www.wbea.org). The website has since been upgraded in order to handle more traffic and more data queries. More upgrades and improvements are being made in order to ensure that the problem does not reoccur. If you experience any difficulties with our website please contact us at wbea.ed@shawlink.ca. We want to improve how we deliver information to you and we welcome your input.

Alberta's Airshed Management Zones

Airshed zones are established by local stakeholders to deal with air quality issues in a specific region. The Clean Air Strategic Alliance (CASA) provides the framework within which an airshed zone functions, but each operates independently as a non-profit society. The WBEA airshed is the largest in the province, covering approximately 70,000 square kilometers.



Our Membership

	CEMA	RAMP	WBEA
Alberta Aboriginal Affairs and Northern Development	●		
Alberta Department of Energy	●		
Alberta Energy and Utilities Board	●	●	●
Alberta Environment	●	●	●
Alberta Pacific Forest Industries Ltd.	●	●	
Alberta Sustainable Resource Development	●	●	●
Albian Sands Energy/Shell Canada	●	●	●
Athabasca Chipewyan First Nation		●	●
Athabasca Tribal Council	●	●	●
Birch Mountain Resources	●	●	
Canadian Environmental Assessment Agency	●		
Canadian Natural Resources Limited	●	●	●
Chipewyan Prairie Dene First Nation	●	●	●
Conklin Métis Local #193	●		
ConocoPhillips Canada	●		
Department of Fisheries and Oceans	●	●	
Devon Canada	●	●	
EnCana Corporation	●		
Environment Canada	●	●	
Fort Chipewyan Métis Local #125	●	●	
Fort McKay First Nation	●	●	●
Fort McKay Métis Local #63	●		●
Fort McMurray #468 First Nation	●		●
Fort McMurray Environmental Association	●		●
Fort McMurray Field Naturalists	●		
Fort McMurray Métis Local #2020	●		
Health Canada	●		
Husky Energy	●	●	●
Imperial Oil Resources	●	●	●
Japan Canada Oilsands Ltd.	●		
Mikisew Cree First Nation	●	●	●
Natural Resources Canada	●		
Northern Lights Health Region	●		●
Nunee Health Authority	●		●
Oil Sands Environmental Coalition		●	
OPTI/Nexen Canada Inc.	●	●	●
Pembina Institute for Appropriate Development	●		●
Petro-Canada Oil and Gas	●	●	●
Regional Municipality of Wood Buffalo	●	●	●
Saskatchewan Environment	●		●
Suncor Energy Inc.	●	●	●
Syncrude Canada Inc.	●	●	●
Synenco Canada Inc.	●	●	
Total E & P Canada	●	●	●
Toxics Watch Society of Alberta	●		●
UTS Energy Corporation	●		●
Williams Energy Canada Inc.			●
Wood Buffalo National Park	●		





RAMP
Regional Aquatics
Monitoring Program



This report was produced by the Cumulative Environmental Management Association, the Regional Aquatics Monitoring Program, and the Wood Buffalo Environmental Association.

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