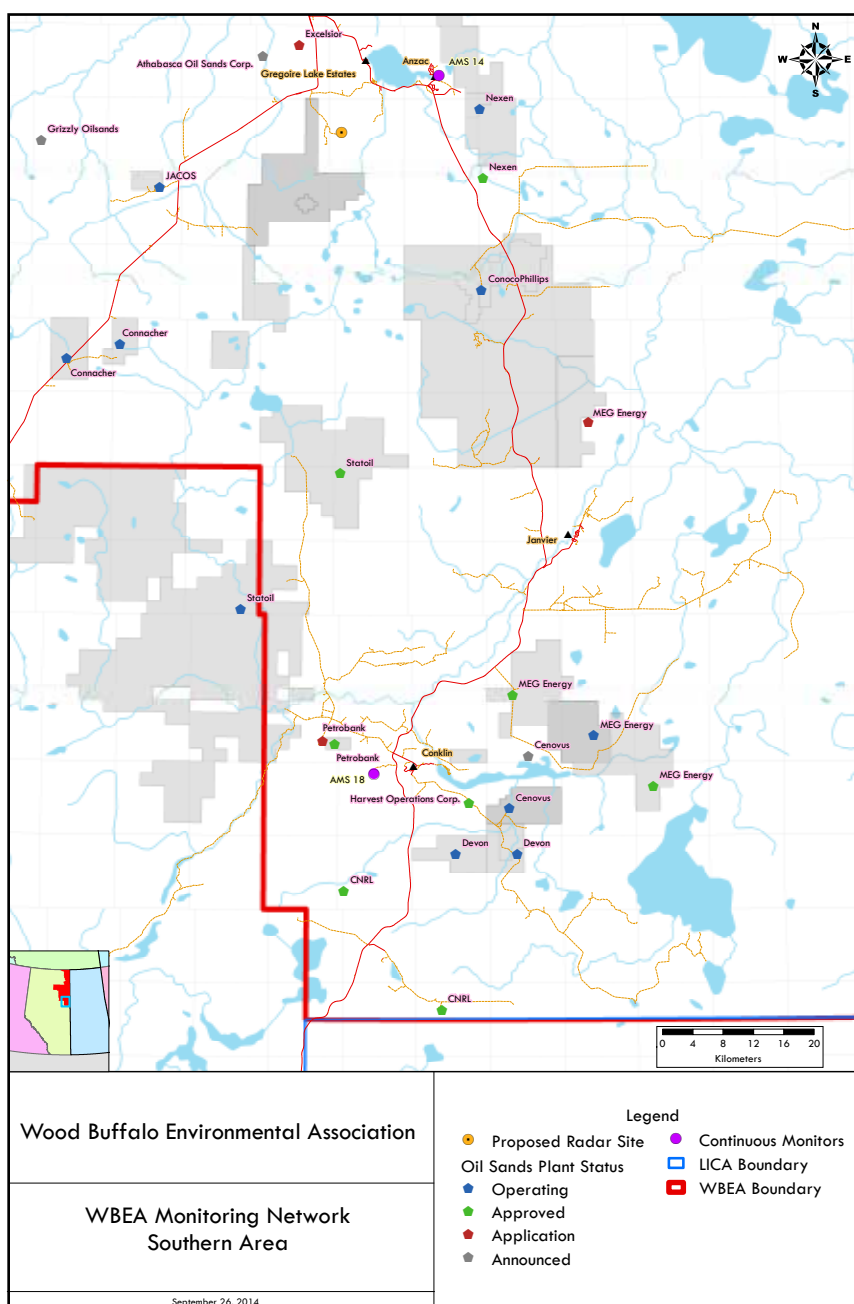


A Proposed Ambient Air Monitoring Plan for the Southern Regional Municipality of Wood Buffalo

Sanjay Prasad, Air Quality Scientist, WBEA

To date, the Wood Buffalo Environmental Association's (WBEA's) monitoring has been largely focused in the resource extraction areas of the northern portion of the Regional Municipality of Wood Buffalo (RMWB). WBEA's air and forest health monitoring programs have been designed to monitor potential environmental effects resulting from these developments. The number of resource extraction developments in the southern portion of the air shed, the area south of Fort McMurray and north of Lac La Biche, are expected to continue to increase over the next several decades. As new projects are approved and commissioned in the southern part of the air shed, air quality and forest health monitoring programs will need to be enhanced. WBEA's long history of monitoring in the region has demonstrated that to be informative and cost-effective, monitoring activities must not only be integrated and well-coordinated, but also meet stakeholder needs.



Geography of the Southern RMWB

The southern area of the WBEA air shed is defined as the area south of Fort McMurray and north of Lac La Biche, an area of approximately 16,000 square kilometers.

The area is located in the Boreal Forest Natural Region of Alberta and is vegetated by deciduous, mixed wood and coniferous forest.

The area topography is characterized by undulating to hummocky uplands with extensive wetlands and numerous lakes. The Stony Mountains, located along the northwestern portion of the Christina River watershed, represent the largest hill complex in the area. Elevations range from 740 meters above sea level (masl) in the upper plateaus of the region to about 245 masl at the confluence of the Christina and Clearwater Rivers.

Land use consists mainly of forestry, oil and gas, recreation and subsistence (Natural Regions Committee 2006). Prominent features include Highway 881 and the Canadian National Railway (CN), both of which traverse north to south through the area (MEG Surmont EIA Application, 2012). The map to the left shows the communities, oil sands plant status and WBEA continuous air monitoring sites in the southern area of the RMWB.



There are two dominant communities in the region with scattered primary dwellings and seasonal cabins. The population of Conklin in 2012 was 318, according to a municipal census conducted by the RMWB. The population of Janvier, also known as Janvier South or Chard was 171 in 2012, according to a municipal census conducted by the RMWB.

CONTINUED ON **PAGE 4**

The topography of the southern area of the RMWB is characterized by undulating to hummocky uplands with extensive wetlands and numerous lakes.

WBEA's Proposed Southern Air Monitoring Plan

WBEA has created a plan which proposes timely and appropriate integrated air and terrestrial monitoring for the southern RMWB, based upon current and future resource extraction plans. The Southern Air Monitoring Plan proposes a science-based enhancement of monitoring that meets regional stakeholder needs. In developing the Plan, consideration was given to monitoring objectives and local geographical features such as terrain, meteorology, site characteristics, emissions sources and supporting infrastructure, including power and road access.

Specifically, the Plan was developed in consideration of a number of policy instruments and regulatory guidelines including:

- The Alberta Air Monitoring Directive (AMD, February, 2014)
- Alberta Ambient Air Quality Objectives (AAAQO)
- The 2009 Ambient Air Monitoring Strategy for Alberta
- Management Frameworks
- The Lower Athabasca Regional Plan (LARP)
- Regulatory approvals to facility operators issued under the Environmental Protection and Enhancement Act (EPEA)
- Industrial dispersion modeling and site monitoring

A subcommittee of the WBEA Ambient Air Technical Committee (AATC) met regularly to consider monitoring requirements in the southern RMWB and to develop and review the proposed plan. The resulting Southern Air Monitoring Plan was the outcome of the consensus-based deliberations of WBEA members, WBEA technical staff and WBEA science advisors. Comments received from WBEA members were addressed during the review process and the final plan was endorsed by WBEA members.

WBEA's Southern Regional Air Monitoring Plan was created to address the following objectives:

1. To provide air quality data in support of environment and human health exposure assessments.
2. Address identified gaps in air quality and deposition monitoring in the southern region of WBEA's air shed.
3. Determine air quality relative to the Alberta Ambient Air Quality Objectives (AAAQO), the Canada-Wide Standards (CWS) or other criteria.
4. Support the monitoring and reporting requirements associated with air quality or deposition management frameworks and EPEA regulatory approvals.
5. Characterize background and trans-boundary air quality in the region.
6. Detect poor air quality events so the public may be notified.
7. Provide chemical profiles of pollution sources for source apportionment work.
8. Determine long-term air quality trends.



As part of the Southern Air Monitoring Plan, WBEA will conduct enhanced air quality monitoring in the southern region of the air shed.

Proposed Southern Air Monitoring Plan - Next Steps

If the Southern Air Monitoring Plan is approved for funding by the Alberta Environmental Monitoring, Evaluation and Reporting Agency (AEMERA) in 2015/16, WBEA members propose to phase in implementation of the plan over the next five years. These phases are proposed in consideration of existing and future development and monitoring in the region. Some of the milestones would include:

- Prepare a draft work plan for implementation of the Southern Air Monitoring Plan.
 - Complete monitoring site construction and commission the Conklin Enhanced Deposition Station (AMS 18), in support of JOSM.
 - Begin planning and site selection for the network of meteorological towers at all Steam-Assisted Gravity Drainage (SAGD) facilities.
 - Identify facilities, with production greater than 100,000 barrels per day (bpd), which will require fixed air monitoring stations.
 - Identify facilities, with production less than 100,000 bpd which will require portable air monitoring stations and site selection to meet AMD criteria.
- 2014**
- Install community monitoring stations in Janvier and Conklin.
 - Begin planning and site selection for the southern boundary background/ trans-boundary air monitoring station.
 - Finalize site selection for monitoring activities in the region.
 - Finalize an implementation plan for operations and data management for the Southern Air Monitoring Plan.
 - Construction of sites for specified monitoring activities, at the facilities.
 - Deployment of meteorological towers and passive or new technology monitoring network as required.
 - Incorporation of any existing air monitoring station into the Southern Air Monitoring Plan.
- 2015**
- Begin planning and site selection for the network of passive or new technology monitoring at all SAGD facilities.
- 2016**
- Deployment of the southern boundary fixed air monitoring station.
 - Complete implementation of Southern Air Monitoring Plan field activities.
- 2017**
- Initial review of the Southern Air Monitoring Plan.
- 2019**
- Conduct dispersion modelling of emissions from the facilities in the region for cumulative effects; perform ambient air and meteorological data analysis for identification of monitoring gaps, elimination of redundancies and opportunities for efficiency.

WBEA has now entered into a period of follow-on engagement on future planning with members in the southern area of the RMWB. In parallel, the Southern Air Monitoring Plan is being proposed to the AEMERA, for funding in the 2015/16 fiscal year.

Historical Continuous Ambient Monitoring Data

WBEA has conducted a number of ambient air monitoring studies in the region using mobile and portable air monitoring stations. Observed values published in reports are presented in the table below. WBEA's Southern Air Monitoring Plan Subcommittee considered these data, and many other datasets, in the formulation of the proposed monitoring plan.

Parameter	Location			Conklin	ConocoPhillips Surmont	Cenovus Christina Lake	Statoil Leismer	ConocoPhillips Surmont	Fort Chipewyan	Global Background	AAAQO/G*
	Period	units	Statistical Value	May 5 - Oct 10, 2012	Oct 2011 - Mar 2012	Oct 15, 2012 - Jan 23, 2013	May 23 - Aug 31, 2013	Jul 3 - Oct 31, 2013	Jan - Dec 2013	1-hour	
Sulphur Dioxide	1-hour	ppb	Maximum	3.1	52	14	7	27	19	0.04 -0.53	172
	24-hour	ppb	Maximum	1.1	26	1.7	2	9	4		48
	Annual	ppb	Average	-	-	-	-	-	0.3		8
Hydrogen Sulphide	1-hour	ppb	Maximum	5.9	60	2	2	6	-	0.03 - 0.84	10
	24-hour	ppb	Maximum	0.5	9	1	1	1	-		3
Nitrogen Dioxide	1-hour	ppb	Maximum	7.7	96	21	76	38	28	0.1 - 0.5	159
	24-hour	ppb	Maximum	2.8	26	11	22	12	14		-
	Annual	ppb	Average	-	-	-	-	-	0.8		24
Ozone	1-hour	ppb	Maximum	65	-	43	-	-	65	30 - 40	82
	24-hour	ppb	Maximum	50	-	37	-	-	47		-
	Annual	ppb	Average	-	-	-	-	-	27.6		-
Fine Particulate Matter	1-hour	ug/m ³	Maximum	268	-	50	-	-	133.2		80
	24-hour	ug/m ³	Maximum	85	-	15	-	-	56.3		30
	Annual	ug/m ³	Average	-	-	-	-	-	3.8		-
Total Hydrocarbon	1-hour	ppmc	Maximum	3.6	-	3.5	3.2	4.4	-	1.9 - 2.0	-
	24-hour	ppmc	Maximum	2.5	-	2.5	2.4	2.4	-		-
	Annual	ppmc	Average	-	-	-	-	-	-		-

*AAAQO/G - Hourly Alberta Ambient Air Quality Objectives for air pollutants.

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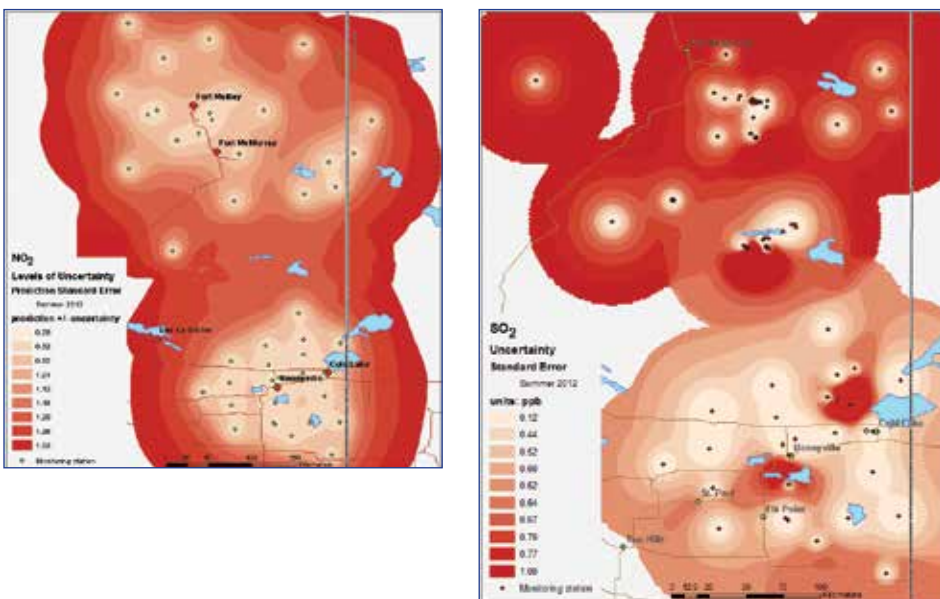


WBEA has conducted short-term air monitoring surveys in southern RMWB communities. Portable Air Monitoring Station 101 monitored in Conklin, at the home of Wendy Tremblay and family, for five months in 2012.

Passive Monitoring Data

WBEA has established a series of passive monitoring stations in the region which monitor sulphur dioxide, nitrogen dioxide, ozone, nitric acid and ammonia. The passive samplers provide monthly average measurements. Passive data from WBEA, industry and the Lakeland Industry & Community Association (LICA) were considered in the preparation of the Southern Air Monitoring Plan.

For instance, geostatistical methods were used to generate uncertainty concentration maps of sulphur dioxide and nitrogen dioxide concentrations in the region using 2011-2012 passive monitoring data. The purpose of these maps is to represent regional trends in concentration and deposition data.



Southern Air Monitoring Plan Operations and Data Management

Data generated by the proposed Southern Air Monitoring Plan would become part of WBEA's existing data and information management system which has been developed over the last 17 years to meet user data and operational needs, as well as regulatory requirements. Generating timely, accurate, accessible, high-quality data is a fundamental principle of WBEA's monitoring programs.

WBEA's proposed Southern Air Monitoring Plan will ensure that as resource extraction projects are initiated in the southern portion of the RMWB, appropriate monitoring exists to provide all stakeholders with the data they require to make informed environmental decisions. ■ ■ ■ ■ ■

WBEA's Governance Committee

Jane Percy, WBEA Communications

During the 16th Annual General Meeting, WBEA members elected new Directors to the Governance Committee (GC).

The GC is a group of seven individuals elected by the Association Board members. The GC constitutes the Officers of the Association and ensures quality leadership in management of the Association. The GC meets monthly and works to ensure that bylaws, policies and procedures adopted by the Board are followed.

In 2014 and 2015, Diane Phillips will continue as President and Michael Aiton as a Director. Peter Fortna, formerly a Director, was elected Vice-President. Four new member representatives were elected to join Diane, Michael and Peter. The full GC membership includes:

- Diane Phillips**, Syncrude Canada Ltd., President
- Peter Fortna**, Conklin Resource Development Advisory Board, Vice President
- Doug Johnson**, Athabasca Oil Corp., Secretary-Treasurer
- Linda Aidnell**, Chipewyan Prairie Dene First Nation, Director
- Michael Aiton**, Alberta Environment & Sustainable Resource Development, Director
- Andrew Read**, Pembina Institute for Appropriate Development, Director
- Natasha Rowden**, MEG Energy, Director

WBEA's new Governance Committee includes representatives from Aboriginal, Environmental Non-Government, Government and Industry sectors, thus ensuring a voice for all regional stakeholders in the planning and execution of environmental monitoring in the Athabasca Oil Sands Region. ■ ■ ■ ■ ■



WBEA's Governance Committee (l to r) Director Andrew Read, Vice-President Peter Fortna, President Diane Phillips, Director Linda Aidnell, Secretary-Treasurer Doug Johnson and Director Natasha Rowden. Missing from the photo is Director Michael Aiton.

DID YOU KNOW...

With the proclamation of the *Protecting Alberta's Environment Act* in April 2014, the Government of Alberta formally established the Alberta Environmental Monitoring, Evaluation and Reporting Agency (AEMERA) as an arm's length organization responsible for providing credible, scientific data and relevant information on the condition of Alberta's environment.

