

## FOCUSED STUDY ACTIVITY WORK PLAN

### General Information

<b>Work Plan Unique Identifier:</b>	A-MD-1-1718
<b>Focused Study Activity Title:</b>	Method Comparison of Wet Precipitation (NADP vs AB)
<b>Focused Study Category:</b>	Monitoring Design and Method Improvement
<b>Geographic Location</b> ( <i>choose from drop-down menu. If Project Location is in more than one area choose from second drop-down</i> )	Regional Municipality of Wood Buffalo
<b>Monitoring Site(s) Coordinates</b> ( <i>latitude and longitude</i> )	Fort McKay – Bertha Ganter (-111.640583, 57.189428)
<b>Project Leader:</b>	Sanjay Prasad
<b>Organization and contact information:</b>	Wood Buffalo Environmental Association
<b>Date Study initiated:</b>	<b>December 31, 2016</b>
<b>Monitoring Category:</b> ( <i>From OSM long-term plan; choose from drop-down menu</i> )	Atmospheric Monitoring
<b>Strategic Objective of Focused Study:</b> ( <i>From OSM long-term plan; choose from drop-down menu</i> )	Objective A1: Detect and report concentration levels and trends of atmospheric substances that are likely to cause adverse human and/or environmental health effects.
<b>Hypotheses:</b> ( <i>Briefly outline the specific hypotheses that your focused study is aiming to address</i> )	Precipitation samples collected and chemical analysis conducted using NADP protocol and Alberta Air Monitoring Directive will result in significantly different ion concentrations.
<b>Deliverables:</b> <i>What tangible goal (s) and/or product(s) will the monitoring produce and when?</i>	Ion concentrations from the co-located samples at one site.  A report outlining the statistical comparison on the co-located samples testing the stated hypothesis.

## Detailed Study Plan

(Please provide detailed information on the specifics of your focused study including – **(keywords, hypothesis and the assumptions and constraints behind your hypothesis)**)

Provide a maximum of 10 key words that describe this project. Use commas to separate them:

Precipitation chemistry, Ion concentration, wet deposition, Wood Buffalo Region, method comparison

Describe how you will test your hypothesis:

WBEA's current precipitation chemistry monitoring program is not operated using a mature and standardized protocol. The US National Atmospheric Deposition Program's (NADP) National Trends Network (NTN) is a network of sites located away from urban areas and large sources. The program is operated using a defined set of standard operating procedures. The samples are analyzed at The Central Analytical Laboratory in Illinois U.S. The program including siting requirement, sample collection and analysis is designed ensure between site comparability and regional representativeness. The program also provides a long-term record of precipitation chemistry across the United States and parts of Canada; participating in NADP provides the opportunity for continent-wide comparability of AOSR precipitation data with over 365 sites across North America. While this will allow comparison to areas outside of the region, it may not allow comparison with future or historically collected data at other sites within the oil sands region or in Alberta. To identify potential differences between the NADP program and the currently used provincial method, co-located precipitation samples will be collected weekly at Bertha-Ganter-Fort McKay Air Monitoring Station (AMS), an active long term monitoring station. One of the co-located sample will be collected using the NADP protocol and sent to the NADP Central Laboratory for analysis. The other will be collected in accordance with Alberta's Air Monitoring Directive and sent to Alberta Innovates and Technologies futures (AITF) for analysis. The co-located sampling will compile with the respective sampling protocol and will be deployed no further than 3 metres from each other. The co-located samples will be collected and shipped in accordance with the respective monitoring protocol. The field notes will be kept by the operating technician in accordance with the respective monitoring protocols. Results from the paired sample will be analyzed using a non-parametric tool to test the stated hypothesis by Alberta Environment and Parks. In addition, the two sample collection protocols and reporting practices of the two programs will be reviewed to better understand improvement(s) gained by joining the NADP program.

Assumptions and Constraints behind the hypothesis and the testing method:

There will be sufficient samples collected to test the hypothesis

The analysis results of ion concentrations will be available in a timely manner from the two laboratories

Continuity in funding and trained specialists and technical support to collect samples.

Co-located sample at the one site can be successfully collected using two independent sampling protocols.



## References:

National Atmospheric Deposition Program. (2014). National Trends Network. Retrieved November 08, 2016, from <http://nadp.sws.uiuc.edu/ntn/>

## Data Management

If this work generates data please summarize your project-level data management plan.

Deliverables	Timeframe
Data Collection Period:  <i>Field work</i>	Start : 2017-04-01      End: 2018-03-31
Data Analysis Period:  <i>Laboratory analysis and QA/QC of data</i>	Start : 2017-04-10      End: 2018-04-14
Data Release Date:  <i>Metadata and data consistent, complete and meet basic standard format for publication in Open Data; on or linked to JOSM portal</i>	2018-03-31

## Reporting and Publications

Provide information on the anticipated reports / publications. (Insert additional rows if needed)

Expected Subject/Titles of Publications or Reports	Short Description of Publication or Report	Expected Year of Publication
Summary of precipitation chemistry monitoring program comparison	Report outlining the findings of statistical comparison of paired samples and sample collection protocols. This product may be an internal report summarizing the comparability of the two monitoring programs as well as identifying advantages or disadvantages of these programs. This will be completed by Alberta Environment and Parks.	2018

## Technical / Professional Roles and Responsibilities

Identify members of the monitoring team/organization, their roles and responsibilities. Identify monitoring organization leads if different from overall monitoring activity lead. (Insert additional rows if needed)

Role	Responsibilities	Resource Name/Organization
Field Technician	Sample collection, field notes and sample shipment	Wood Buffalo Environmental Association
Laboratory	Sample chemical analysis and reporting	National Atmospheric Deposition Program and Alberta Innovates Technology Futures
Air specialist	Data analysis and synthesis report generation	Alberta Environment and Parks

**Deliverables (Year 1)** If your Focus Study is longer than 1 year then complete **Appendix 3** for multi-year deliverables breakdown

Provide a summary of tangible quarterly deliverables. Identify major project areas (deliverables) and results that can be identified as a tangible goal. This could include: field work, lab work/ analysis, evaluation, data, reports, publications, SOPs etc. Do not define process as your Deliverable e.g. ‘fly to Ft. McMurray to conduct fieldwork’ or ‘seek Director approval for report’.

<b>Deliverable(s)</b> (please provide enough information to support status reporting)
<b>Q1 – April to June</b>
Collect weekly precipitation samples at Bertha Ganter – Fort McKay AMS
<b>Q2 – July to September</b>
sample collection
Receive ion concentration laboratory results from co located monitoring at Bertha-Ganter Fort McKay AMS from Q1
<b>Q3 – October to December</b>
sample collection
Receive ion concentration laboratory results from co located monitoring at Bertha-Ganter Fort McKay AMS from Q2
<b>Q4 – January to March</b>
sample collection
Receive ion concentration laboratory results from co located monitoring at Bertha Ganter Fort McKay AMS from Q3

## Detailed Financial Breakdown – Year 1 of 3 (2017-2020)

Also complete **Appendix 2** for the multi-year financial breakdown

Budget requirements – List areas that require budget expenditures: (ADD OR DELETE BUDGET CATEGORIES AS REQUIRED)	OS Funding	External Funding (outside JOSM)
<b>O&amp;M - Operations and Maintenance:</b>		
Helicopter Costs	\$	\$
Field Costs	\$	\$
Data Management	\$	\$
Internal Lab Analysis	\$	\$
Consumable Materials & Supplies	\$	\$
<b>Sub-Total</b>	\$	\$
<b>O&amp;M - Travel</b>		
Field Work	\$	\$
Conferences ( <i>identify conference</i> )	\$	\$
Meeting ( <i>identify meeting</i> )	\$	\$
<b>Sub-Total</b>	\$	\$
<b>O&amp;M - External Contracts :</b>		
Goods and Services Contract ( <i>see Appendix 4</i> )	\$24,000 (WBEA)	\$
External Lab Analysis	\$	\$
<b>Sub-Total</b>	\$24,000	\$
<b>Salaries:</b>		
Principal Investigator	0.01 FTE (\$1000)	\$
Technical / Professional Assistants	\$	\$
Field Staff	\$	\$
<b>Sub-Total</b>	0.01 FTE (\$1000)	\$
<b>Total Salaries</b>	0.01 FTE (\$1000)	\$
<b>Total O&amp;M</b>	\$24,000	\$
<b>2017-2018 GRAND TOTAL*</b>	\$25,000	\$

## Appendix 1 - Approvals

<b>Project Submitted by:</b>		
Name:		
Organization:	Signature:	Date:
<b>Project Approved by:</b>		
Dr. Monique Dubé (AEP)		Dr. Kevin Cash (ECCC)
Signature		Signature
		
Date		Date



**APPENDIX 2 – Detailed Multi-year Financial Breakdown** (Complete the following detailed financial breakdown; add or delete categories as required)

Budget requirements	Year 1 (2017- 2018)		Year 2 (2018- 2019)		Year 3 (2019- 2020)	
	Cash	In-kind	Cash	In-kind	Cash	In-kind
1) Salaries and benefits						
a) Investigators	0.01 FTE (\$1000)		0.01 FTE (\$1000)			
b) Technical/professional assistants			0.05 FTE (\$5000)			
c) Field Staff						
d)						
2) Operations and maintenance						
a) Facilities						
b) Equipment						
c) Lab analysis						
d) Data management						
e) Field work						
3) Consumable Materials and supplies						
a)						
b)						
4) Travel						
a) Conferences and meetings						

b) Field work						
c) Project-related travel						
5) Dissemination & Engagement						
a) Publications/Reports						
b) Translation (if required)						
c) Communications						
d) Stakeholder Engagement						
e) Indigenous Peoples Engagement						
6) External Contracts						
a) WBEA	\$24,000		\$34,000			
<b>Grand Total</b>	\$25,000	0.01 FTE (\$1000)	\$40,000			

**APPENDIX C –Years 2 and 3 Deliverables** (Complete the following detailed breakdown. Provide a summary of tangible quarterly deliverables and your anticipated expenditures. Identify major project areas (deliverables) and results that can be identified as a tangible goal.)

<b>Year 2 (2018- 2019)</b>	
<b>Deliverable(s)</b> (please provide enough information to support status reporting)	<b>Budget</b>
<b>Q1 – April to June</b>	
sample collection using NADP protocol only	\$1500
Ion concentration from monitoring at Bertha Ganter – Fort McKay AMS from Q1	\$7000
Draft report showing method comparison	\$4000
<b>Q2 – July to September</b>	
sample collection using NADP protocol only	\$1500
Ion concentration from monitoring at Bertha Ganter – Fort McKay AMS from Q2	\$7000
Final report showing method comparison	\$2000
<b>Q3 – October to December</b>	
sample collection using NADP protocol only	\$1500
Ion concentration from monitoring at Bertha Ganter – Fort McKay AMS from Q3	\$7000
<b>Q4 – January to March</b>	
sample collection using NADP protocol only	\$1500
Ion concentration from monitoring at Bertha Ganter – Fort McKay AMS from Q4	\$7000
<b>Total Annual Budget</b>	<b>\$40,000</b>