

Ecological Monitoring Committee for the Lower Athabasca



Annual Report 2012

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EMCLA
Ecological Monitoring Committee
for the Lower Athabasca

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Introduction

The Ecological Monitoring Committee for the Lower Athabasca (EMCLA) oversees the design, implementation, and management of specific monitoring programs for the Lower Athabasca Planning Region (LAPR). Initiated in 2010, the Committee's focus is on improving the quality and consistency of monitoring that takes place to fulfill selected wildlife and biodiversity clauses in *Environmental Protection and Enhancement Act (EPEA)* approvals for oil sands developments.

The EMCLA enhances the value of regulated monitoring activities in the LAPR by selecting specific aspects of the *EPEA* Approval wildlife and biodiversity monitoring clauses and exploring the feasibility, cost, and utility of developing regional-scale monitoring programs to address these needs. Key priorities include:

- Filling gaps in existing regional monitoring systems
- Coordinating data collection amongst different development projects
- Ensuring that the key principles of transparency, scientific credibility, and relevance form the basis of new monitoring programs.

The regional monitoring program will significantly increase the amount of credible scientific information available to support sound environmental management.

History and Background of the EMCLA

In 2010, the provincial government, the Alberta Biodiversity Monitoring Institute (ABMI), and industry built on the 2008 *Framework for Regional Wildlife and Biodiversity Monitoring in the In Situ Recovery Area of Northeast Alberta* by developing the Regional Terrestrial Monitoring Joint Working Group (RTMJWG). This group was tasked with designing and planning the governance and funding systems that could support a regional monitoring program for the Lower Athabasca Planning Region (LAPR). Their recommendations report, *Report of the Regional Terrestrial Monitoring Joint Working Group*, was released in August 2010. It recommended the creation of a joint government-industry committee to oversee new regional monitoring programs in the LAPR. New monitoring programs would build on the existing strengths and capacity of the ABMI. This committee, which includes members from the provincial and federal governments, as well as industry, met for the first time in December 2010, and is now known as the Ecological Monitoring Committee for the Lower Athabasca (EMCLA).

In 2012, the work of the EMCLA aligned itself with the *Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring*¹ established by the governments of Alberta and Canada for long-term coordinated monitoring in the oil sands region.

Structure and Operations

Members of the EMCLA include companies active in the oil sands industry in the Lower Athabasca, Alberta Environment and Sustainable Resource Development, and Environment Canada. The ABMI is represented in a non-voting capacity to provide unbiased scientific and technical support. The ABMI's Regional Monitoring Coordinator oversees the Committee's administrative functions and serves as Project Manager for the EMCLA's activities.

The EMCLA develops, funds, and implements monitoring and research projects. Most EMCLA projects begin with a scoping year to determine the feasibility and need for monitoring a given species or aspect of a species. Each project operates independently with a specialized team of project participants drawn from academia, government, and the private sector, who are considered experts in their field. Expert review is a cornerstone of the monitoring designs, monitoring activities, and all other scientific work overseen by the EMCLA.

List of EMCLA Members for 2012

Government Members

- Alberta Environment and Sustainable Resource Development
- Environment Canada – Canadian Wildlife Service

Industry Members

- Albian Sands Energy/Shell Canada
- Athabasca Oil
- Canadian Natural Resources Ltd.
- Cenovus Energy
- Connacher
- ConocoPhillips Canada
- Devon Canada
- Dover OC
- Hammerstone

¹ <http://environment.alberta.ca/03902.html>

EMCLA

- Husky Energy Ltd
- Imperial Oil Resources
- Ivanhoe
- JACOS
- Laricina
- MEG Energy
- Nexen Canada Inc.
- Southern Pacific
- Statoil Canada Ltd.
- Suncor Energy
- Sunshine Oilsands Ltd.
- Syncrude Canada Limited
- Teck Resources Limited
- Total E&P Canada

Non-voting members

- Alberta Biodiversity Monitoring Institute

EPEA Approvals and the EMCLA

Each oil sands commercial project has an *EPEA* Approval issued under the *Environmental Protection and Enhancement Act* by Alberta Environment and Sustainable Resource Development, the department that administers *EPEA* legislation on behalf of the Government of Alberta. These approvals contain specific operating conditions that operators must adhere to, including conditions relating to wildlife and biodiversity monitoring and mitigation. These clauses are developed in consultation with the federal government, other regional stakeholders, and affected parties. While the wording of the clauses related to wildlife and biodiversity monitoring and mitigation have changed over time, the desired outcome of the clauses has remained consistent.

All commercial operators have clauses that require them to prepare lease-specific wildlife and biodiversity monitoring programs. Over time, these clauses have evolved to engage operators in regional programs as a means of carrying out wildlife and biodiversity monitoring. As early as 2004, approval holders have been asked to develop a plan to participate in, and enhance, programs to monitor long-term cumulative effects on biodiversity in the region, in cooperation with other oil sands developers. All commercial operators now have clauses that require them to participate in regional monitoring programs and initiatives, including the ABMI, Cumulative Environmental Management Association (CEMA), Lakeland Industry and Community Association (LICA), Regional Aquatic Monitoring Program (RAMP), and Wood Buffalo Environmental Association (WBEA).

The EMCLA is a natural extension of these efforts to engage operators in regional programs. Its purpose is to address gaps in existing regional monitoring programs, as they relate to the existing *EPEA* wildlife and biodiversity monitoring clauses. These clauses direct approval holders as to which species or aspects of habitat must be monitored, but do not provide clear guidance for *how* operators should conduct this monitoring or an approach to integrate this information at a regional scale.

The EMCLA selects specific aspects of the *EPEA* Approval wildlife and biodiversity monitoring clauses and explores the feasibility, cost, and utility of developing regional-scale monitoring programs to address these monitoring needs. An important outcome of the work of the EMCLA is to develop a monitoring system that can provide a better balance between the local information that is needed to guide and assess the effectiveness of mitigation efforts, and ecosystem level information that is needed to understand and manage cumulative effects. In addition, the system is anticipated to contribute to the coordination of data collection amongst different development projects, building on the key principles of transparency, scientific credibility, and relevance as the basis of all monitoring programs.

2012 Summary of Achievements

The EMCLA's second year of operations was highly successful. Major achievements for the year included:

- Launch of the EMCLA's website (www.emcla.ca)
- First year of field work to test the use of automated recording units (ARU's) as a monitoring tool for uncommon and elusive animal species. Results indicate that ARU's are an effective and efficient tool for monitoring a wide range of vocalizing species simultaneously, and ARU's are now being integrated into existing monitoring systems.
- First year of field work to evaluate new methods for monitoring rare plants in the Lower Athabasca. This included the development of an adaptive sampling model to optimize locations for rare plant detections, and an evaluation of the importance of survey length in the likelihood of detecting a rare species.
- Initiation of a study on the effects of predicted future development on movement of Woodland Caribou. Changes in home range size and step length were modeled under different scenarios, which altered the following factors: spacing between developments, protected areas, and permeability of development.

2012 Project Summaries

In 2012, the EMCLA sponsored three monitoring and research projects:

- Developing a regional monitoring system for rare plants
- Developing new regional monitoring methods for uncommon and elusive animal species (owls, amphibians, and the yellow rail)
- Woodland Caribou and movement

This Annual Report provides summaries of each project's final report. Detailed reporting documents for all three of these projects can be found on the EMCLA's website (www.emcla.ca) or by contacting the EMCLA directly.

Rare Plants: A model-based adaptive rare plant sampling and monitoring design for the Lower Athabasca Region of Alberta

Initiated in 2010, the EMCLA's Rare Plants project continued into 2012 with 3 goals in mind:

- 1) Improve our understanding of rare plant distribution in the Lower Athabasca and contribute updates to the status of rare plants
- 2) Increase efficiency in rare plant monitoring
- 3) Assist with regional and site level land use planning and mitigation

During 2011, the project team developed habitat suitability models for the Lower Athabasca that were prioritized for rare plants. These predictive models identified "rare plant hotspots" and were the basis for 2012 rare plant field work. Fieldwork was conducted as part of an iterative, adaptive model that improves over time with increased data.

Field sampling was focused in habitat with a high potential to support rare plants and followed a spatially balanced sampling design, whereby plots were distributed to maximize spatial representation of different habitat types. Field protocols followed *The Alberta Native Plant Council* guidelines with species absences always noted; surveys involved a time-unlimited search of a ¼ hectare plot using meander "belt" transects. Rare plant surveys were completed by experienced observers in July and August.

The field program resulted in the successful collection of detailed plant inventories at 150 rare plant sites. Rare plant crews collected 6408 total plant observations, comprised of 405 individual species observations. Seventy three of these observations were rare species (S1, S2, or S3). When a rare plant species was observed, a detailed datasheet was completed and submitted to the Alberta Conservation and Information Management System (ACIMS). Initial results indicate a high potential for this project to contribute valuable information not only on the status and distribution of rare plants, but also an evaluation of different methods for sampling vascular plants.

Data summarization occurred in early December, including calculation of species accumulation curves and diversity indices. A methodological comparison with the ABMI's vascular plant survey methods has begun and will continue into 2013. Additional analysis will include mapping rarity at a habitat and species level. A second year of field sampling is required to further refine the adaptive model and to investigate the methodological comparison with ABMI's vascular plant surveys.

Project Partners:

- Alberta Biodiversity Monitoring Institute
- Alberta Innovates Technology Futures

- Alberta Tourism, Parks, and Recreation
- Devonian Botanical Garden
- Ducks Unlimited
- Royal Alberta Museum
- University of Alberta

Uncommon and Elusive Animal Species: Recommendations for an Owl, Yellow Rail, and Amphibian Pilot Study in Northeast Alberta

The goal of this project is to design and implement effective, long-term animal monitoring programs for species that are at risk or threatened in the LAPR. Monitoring programs should provide data that can improve management. In 2012, the EMCLA's Rare Animals project involved a field pilot to test new methods for monitoring priority species. The EMCLA previously selected owls, amphibians, and the Yellow Rail as target species because: they are not currently monitored effectively by the ABMI or other regional monitoring programs, are thought to be sensitive to human development, are of conservation significance under federal or provincial legislation, and are included in *EPEA* approvals.

The primary goal of 2012 fieldwork was to evaluate the potential use of automated recording units (ARU's) as a replacement survey method to traditional call-playback methods. Traditional survey methods for both owls and Yellow Rails were conducted along roadways or at wetlands, while ARU's were deployed in sites across the northeast following a control-impact study design. Both traditional methods and ARU deployment began in March for owl surveys and continued into late April. Yellow Rail and amphibian surveys were conducted from May into July.

The units were able to detect all 3 groups of interest to the EMCLA, as well as a wide range of other vocalizing taxa simultaneously. Detection rates for amphibians were comparable between ARU's and human surveys; while detection rates were slightly lower for owls when using ARU's as compared with call-playbacks. However, these differences can be corrected and compensated for by increasing sampling rate, or by attaching a call-playback unit to the recorder.

Detection rates for Yellow Rail were overall quite low. No Yellow Rails were detected using traditional playback methods, while only 3 have been detected thus far using ARU's. A separate study conducted by Bird Studies Canada in Saskatchewan indicates that detection levels for Yellow Rails are comparable between ARU's and call-playback surveys.

Overall, ARU's are capable of collecting an enormous amount of data and reduce the safety and logistical concerns of other survey methods. They present a valuable opportunity to monitor a wide range of taxa simultaneously, including those of interest to the EMCLA. Continued work is needed to test the feasibility of integrating ARU's into existing monitoring systems, and to further refine processing and computing capabilities. Fieldwork will continue into 2013 to explore the potential for integration of ARU's into other programs. In addition, the 2013 field program will refine the survey design to focus on increasing Yellow Rail detections.

Project Partners:

- Alberta Biodiversity Monitoring Institute
- Alberta Conservation Association
- Alberta Innovates Technology Futures
- Beaverhill Bird Observatory
- Bird Studies Canada
- Boreal Avian Monitoring Project
- Ducks Unlimited
- Strix Ecological Consulting
- University of Alberta
- Weyerhaeuser

Woodland Caribou and Movement: Assessing the Influence of Industrial Development on Caribou Movement in the Lower Athabasca Planning Region

The EMCLA initiated this project to address uncertainty over the effects of above-ground pipelines and associated linear features on Caribou movement and the extent to which those effects might limit Caribou populations. The primary objective of the 2012 work was to test the effects of simulated future in situ development patterns on simulated Caribou movements.

The EMCLA's Caribou team simulated predicted industrial development 50 years into the future for a study area in northeastern Alberta near Christina Lake covering 1,796,546 ha. Development predictions occurred in a 477,009 ha subset of the study area. Predictions were generated using existing development footprint to create a fitted spatial logistic regression model to simulate the distribution of well-pads. Well pads were then connected with a linear features network using a Cost Distance/Cost Path operation, and central processing facilities were added along main roads. These predictions were created and validated using expertise from the industry members of the Committee.

Caribou movement was also simulated using existing GPS collar data from Alberta Environment and Sustainable Development using a step-selection function (SSF). The SSF measured the proportion of available vegetation cover types along each caribou step and used conditional logistic regression to compare actual to available steps for each individual. The SSF model was then applied to calculate the relative probability of selecting a simulated step based on underlying habitat conditions, to simulate movements for 25 Caribou over a 1 year time period using Geospatial Modeling Environment.

To understand the factors of development that have the most significant effect on Caribou movement, effects were measured under several different scenarios. Scenarios included variations in:

- Spacing between in situ developments (no buffer, 800 m buffer and 2 km buffer between developments),
- Protected areas (present or absent), and
- Permeability (ranging from impermeable to completely permeable for Caribou crossings).

The project team used t-tests and a generalized linear model to test for the effects of these treatments on Caribou step lengths (i.e., the distance between two successive locations) and annual home ranges (i.e., the space an animal occupies throughout its life), key metrics of small and large spatiotemporal scales of animal movement, respectively. Under each scenario, actual footprint permeability was measured as the average number of crossings per scenario. This allowed the team to test how changes in modeled permeability affected crossing rates.

With few exceptions, permeability across footprint was the main factor affecting Caribou home range size and step length. When simulated permeability was low, the prediction of the model was a reduced home range size and reduced step length. Permeability had a two to five time larger effect on Caribou home range size than protected areas, and lease spacing had little to no effect. Furthermore, the effect of permeability on Caribou home range size became stronger at low permeability levels, suggesting that a minimum threshold of permeability is needed to minimize effects on Caribou home range size. This non-linear relationship is important because it means that only minor improvements in permeability are needed to provide a higher than proportional benefit.

The potential path forward for this study is to test the actual permeability of above-ground pipelines. This can be achieved using existing camera trap and winter tracking data from industrial leaseholders. This data can be used to validate the model and also to determine where current development sits on the permeability scale to determine effects on Caribou movement. Existing data will provide information on actual number

of crossings, while the scenario model will generate an expected number of crossings. Comparison of actual to expected crossings will provide a crossing success rate to evaluate crossing effectiveness.

Project Partners:

- Alberta Biodiversity Monitoring Institute
- Alberta Innovates Technology Futures
- Al-Pac Forest Industries
- Salmo Consulting
- University of Alberta

Plans for 2013

After reviewing the recommendations of the three project teams, the EMCLA determined that all three of these projects should continue into 2013, and possibly beyond (see Figure One). In 2013, the Rare Plants and Uncommon Animals projects will continue into a second year of field work. The Caribou project will continue to build on analyses completed in 2012.

Rare Plants Project:

In 2012, this project completed an initial year of field work to test the efficacy of an adaptive modeling approach to rare plant monitoring. In 2013, this project will move into a second year of field sampling to improve the predictive models for individual species, as well as improve our understanding of the status and distribution of rare species. This fieldwork will also allow for a comparison of survey methods with ABMI.

Uncommon Animals Project:

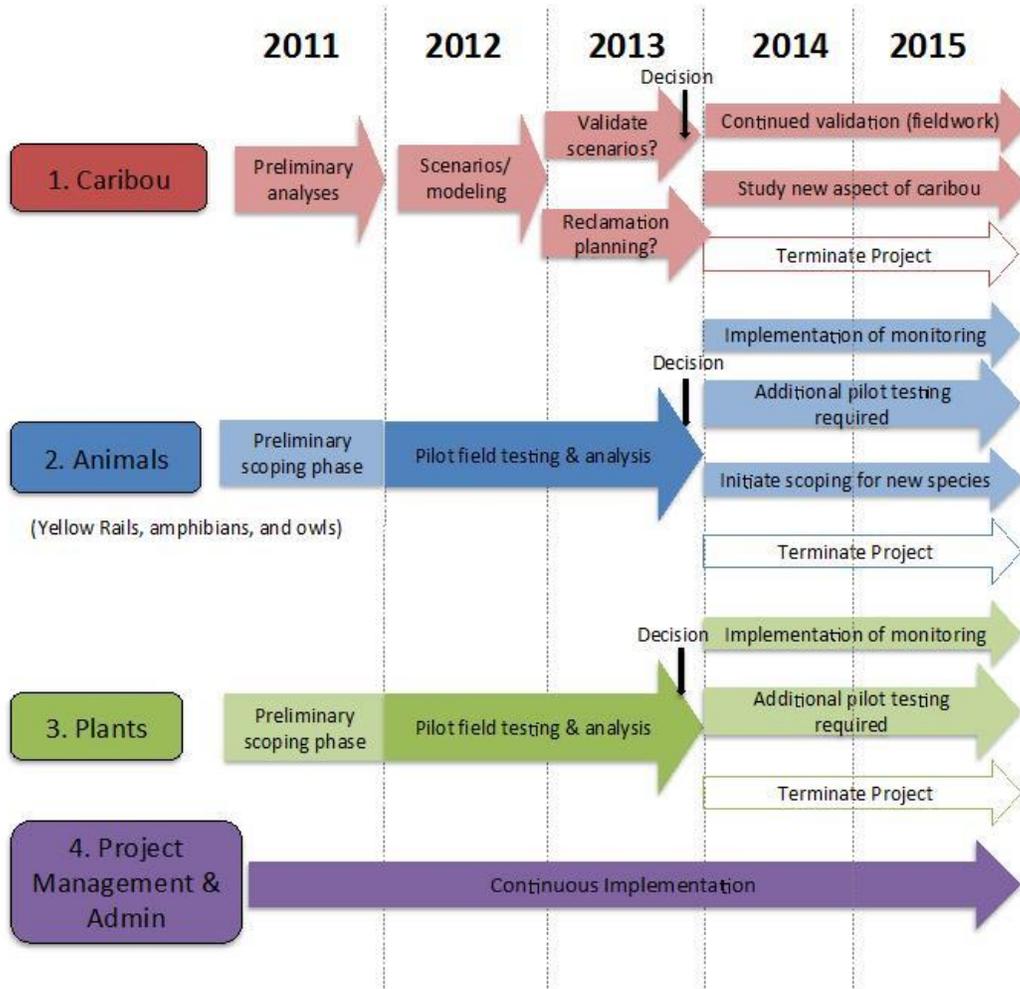
In 2012, the project team tested new acoustic monitoring approaches by placing automatic recording devices at sampling sites using a stratified design in order to test for their ability to accurately and efficiently monitor the presence of amphibians, owls and the yellow rail, as well as other vocalizing species. This field work will continue into 2013 to initiate integration work with other monitoring programs, as well as to refine survey design to improve monitoring of the Yellow Rail.

The project has also worked to integrate regional and lease-specific monitoring. Testing is being done to determine how ARU technology can be better integrated into ABMI while lease-specific monitoring using the same standards and technology is being developed. A data management system for the recordings and processed information is being developed to provide a management structure that coordinates all acoustic monitoring in the region to a common standard.

Woodland Caribou Project:

In 2013, the project team will finalize the permeability study by calculating actual permeability levels of above-ground pipelines using existing camera trap and winter tracking data from industry partners in the study area. This will be achieved by using the model to generate an expected number of crossings and existing data to generate the actual number of crossings in order to calculate the crossing rate. The crossing rate will indicate where current development sits on the permeability scale.

Figure One. Timeline for EMCLA projects (2011-2015)



Integration with the Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring and a provincial monitoring system

The governments of Alberta and Canada have established a *Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring*. This plan outlines how the federal and provincial governments will work together to implement improved monitoring of air, water, land, and biodiversity in the Alberta Oil Sands. This plan builds on earlier work carried out by both governments, including the *Alberta Environmental Monitoring Panel Report*, as well as the *Integrated Monitoring Plan for the Oil Sands* released by Environment Canada in July 2011.

The *Implementation Plan for Oil Sands Monitoring* outlines a three-year phased approach to implementing a monitoring system for the Oil Sands region. The plan incorporates existing monitoring efforts, including EMCLA, RAMP, WBEA's air monitoring program, and land and biodiversity monitoring currently carried out by the ABMI.

While the *Implementation Plan* outlines the general funding structure and administration, specifics on governance, funding and how the joint plan will be integrated with the new, arms-length provincial monitoring agency announced in fall 2012 are still forthcoming.

As the Oil Sands monitoring system fully develops, the EMCLA will move ahead with its current activities, ensuring that its activities are integrated with and complementary to other activities undertaken on terrestrial biodiversity monitoring.

Financial Report

Total Revenues	\$778,138
Expenditures - Caribou	\$57,004.19
Expenditures - Rare Animals	\$330,640.62
Expenditures - Rare Plants	\$218,859.37
Expenditures - Administration and Project Management	\$96,224.69
Expenditures - ABMI Support	\$36,375.00
Total Expenditures	\$739,103.87
Total Funds Remaining	\$39,034.04

Funding for the EMCLA comes from industry through the *Joint Canada-Alberta Implementation Plan for Oil Sands Monitoring*. The majority of funds were spent directly on the EMCLA's three 2012 projects. Administration funds support the full-time EMCLA Regional Monitoring Coordinator (salary, benefits, and travel expenses while representing the EMCLA), running EMCLA monthly meetings, networking and communications costs, and basic infrastructure (phone line, computer) for the Coordinator. The EMCLA provides 5% of its annual budget to the ABMI, because the ABMI manages all of the EMCLA's finances, contracts with service providers, and supports the EMCLA's communications and administration. The ABMI also provides the EMCLA with office space.

Unspent funds from 2012 are to be kept in a contingency fund that will be used as needed in 2013.

The EMCLA is committed to financial transparency; further records are available upon request.