Alberta Biodiversity Monitoring Institute

ANNUAL REPORT *16/17*

Contents

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& our Partners and Sponsors."

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Message from the Executive Director

The ABMI is in the business of providing scientifically credible products and services on Alberta's biodiversity and human footprint to government and industry decision-makers. We have generated a comprehensive dataset unrivalled in Canada to support the evaluation and reporting of provincial and regional biodiversity and the impact of human activity on it. This information and associated derived knowledge represent an incredible resource for Alberta, one that is used whenever biodiversity is a consideration. As Alberta's economy continues to grow and diversify, these data will become increasingly valuable.

This year is our tenth anniversary. We have come a long way and have overcome many challenges along that journey. The ABMI's strength is derived from its core monitoring system—collecting, evaluating, and reporting data on Alberta's species, their habitats, and human footprint across the province. During 2016–2017, we implemented another successful field season: 150 terrestrial and wetland sites were surveyed, bringing the total number of terrestrial/wetland site pair visits for the program to 1232 (including revisits). We also continued to monitor biodiversity in many different ways at a variety of scales and across a spectrum of species types. It is the application of ABMI information for the purposes of management that makes it so valuable.

While we have enjoyed great success, we cannot sit on our laurels. Political and economic systems are constantly evolving and we must evolve with them. What was once relevant may need to be modified to meet the demands of a current or emerging market. Such is the case with the ABMI.

While provincial and regional scale monitoring are still important, local monitoring has emerged as a priority. A good example is the local impact of oil sands development on air, land, water, and biodiversity. Other forms of stressors beyond traditional footprint are now becoming increasingly important (e.g., contaminants). This is a new space into which the ABMI has entered and wishes to expand. Doing so will require the development and application of new methodologies.

As we celebrate our 10th year of operations, it is also a time of reflection. This year we are initiating a ten-year review of our science and program. We are setting out to assess how fully we achieved our original goals, if there are new methods that can be employed, if we can be more efficient, and whether we are aligned well with the current market. This is a significant undertaking involving many of our partners and stakeholders and we look forward to working with them in the months ahead.

We look forward to working with Alberta Environment and Parks (AEP), Alberta Agriculture and Forestry, and other governmental departments in the continued delivery of products and services that inform the business of responsible resource development. We have an emerging partnership with AEP's Environmental Monitoring and Science Division, and we remain fully committed to contributing to the build-out of a comprehensive multimedia environmental monitoring system that is the envy of the world.

Kirk Andries
Executive Director,
Alberta Biodiversity Monitoring Institute

“We had another successful year.”

WE COLLECTED DATA AT:

150
CORE TERRESTRIAL SITES

150
CORE WETLAND SITES

Reports from the Centres

Alberta is home to more than 80,000 species including plants, animals, arthropods, bacteria, fungi, and algae.

> *The ABMI painstakingly collects, analyzes and reports on the status of more than 2000 of these species. To do this, the ABMI surveys 1656 site locations systematically located – every 20 km – across the province.*

At each location, we collect data on both terrestrial and aquatic ecosystems. We also track changes in habitat structure and human development.

Over the years the ABMI's values have not changed: we deliver scientifically credible, value-neutral, independent, and publicly accessible data. Our purpose is to inform government, industry, environmental communities, First Nations and the public about what is happening in our environment so that they can make informed decisions and plan for the future.


80,000
SPECIES IN ALBERTA

Executive Office

The Executive Office ensures that the program is being run efficiently and effectively, and is the primary interface between the ABMI, its Board of Directors, and stakeholders. During 2016–17, we ensured operational deliverables met Board expectations. We achieved the following results:

FINANCIAL RESOURCES

Sufficient funds were secured for our targeted operations this fiscal year (e.g., core program grant, JOSM agreement); however, we continue to require additional and secure funding for the ongoing growth and maintenance of the program to achieve full capacity. This remains our number one long-term priority.

PROVINCIAL MONITORING SYSTEM

Early in 2016–17, the Government of Alberta directed that AEMERA would be dissolved, with its operations returned to government control within Alberta Environment and Parks (AEP). We worked with AEMERA to ensure a smooth transition to AEP. Our support for the provincial monitoring system in Alberta will continue via our emerging partnership with the new Environmental Monitoring and Science Division (EMSD), with which we worked to finalize grant agreements for 2016–17, and work plans and related funding for 2017–18.

We also worked with AEP and Alberta Agriculture and Forestry to develop a long-term Memorandum of Agreement.

PARTNER AGREEMENTS

Agreement renewals were negotiated with all our partner organizations. The upcoming 2017–18 operating year marks the final year for the existing master agreements with our partners. Discussions began in anticipation of negotiating those new long-term agreements.

REGULATORY EFFICIENCIES

In 2016–17, the Executive Office continued to lead the Ecosite mapping project, and chaired the Ecosite Advisory Committee meetings. This project is exploring the use of a predictive eco-site mapping technology that could provide significant efficiencies. We also initiated discussions on a possible partnership for a comprehensive response to Alberta's footprint needs.

COMMUNICATION AND OUTREACH

We continued to engage with a variety of audiences, including elected officials, industry, and other stakeholder groups, to emphasize the importance of the ABMI as part of Alberta's resource management and monitoring systems. The Executive Office led all government relations activities, and identified and promoted program applications to enhance the ABMI's value. We also reviewed and approved all publicly-directed reports, engaged government in the release of these reports, and provided oversight of all marketing materials.

BOARD OF DIRECTORS

A key element of the Executive Office's work involves supporting our Board of Directors. In 2016–17, we led the development of Terms of Reference for both the Executive and Audit Committees, held four Board meetings and our Annual General Meeting, and facilitated the appointment of two new Board members (Government of Alberta Deputy Ministers). We also prepared for a strategic planning session to be held in the spring of 2017.

OVERVIEW OF THE ABMI'S CENTRES AND BASES OF OPERATION

EXECUTIVE OFFICE

University of Alberta

MONITORING CENTRE

Alberta Innovates

PROCESSING CENTRE

Royal Alberta Museum

INFORMATION CENTRE

University of Alberta

SCIENCE CENTRE

University of Alberta

Alberta Innovates

University of Calgary

GEOSPATIAL CENTRE

University of Alberta

Alberta Innovates

University of Calgary

APPLICATION CENTRE

University of Alberta

Monitoring Centre

The Monitoring Centre is responsible for the ABMI's complex system of biodiversity data collection throughout the province. As the primary function of the ABMI, data collection activities receive the dominant share of program resources. In the field, we implement spring and summer terrestrial surveys, summer wetland surveys, and have completed our transition to new technology for the collection of bird and mammal information. During the 2016–17 season we achieved the following results:

PROJECT MANAGEMENT

InnoTech Alberta's Vegreville location serves as the Monitoring Centre's year-round base of operations. InnoTech provides 2700 sq.ft. of office space, over 500 sq.ft. of heated storage, and 7000 sq.ft. of covered outdoor storage for over 60 ATVs, Argos, snowmobiles, and other field related gear for exclusive use by the ABMI.

In addition to our full time and contract staff, we recruited 32 summer staff.

We continue to roll out new sensor technology to monitor birds and mammals. In February/March 2017, we deployed autonomous recording units (ARUs) to remotely record bird calls, and remote cameras to collect data on mammals, at 198 sites province wide. Each site consists of an array of four units resulting in the total deployment of 792 paired camera and ARU units. This new technology will support the collection of a higher quality and quantity of data for two very important groups of species. This represents full scale deployment to all sites anticipated to be visited in 2017–18.

DATA COLLECTION

2016–17 was another challenging year for field operations. On May 1st, 2016 a wildfire began southwest of Fort McMurray and by May 3rd had swept through the community. The fire spread across approximately 1.5 million acres and resulted in the last-minute implementation of an ABMI contingency plan, as Fort McMurray was designated as an ABMI base of operations. Of the camera and ARU hardware already deployed near Fort McMurray, 7 cameras and 9 ARUs were destroyed. Backup locations were sampled west of the fire and data collection at the fire-affected sites will be completed in 2017–18.

Overall, the Monitoring Centre successfully collected data at 150 core terrestrial and wetland sites in 2016–17.

Finally, post-field-season activities included processing field data, completing quality checks, and preparing for the 2017–18 field season. The ABMI's 2017–18 monitoring operations will include a significant presence in the North Saskatchewan, South Saskatchewan and Red Deer land use planning regions along with the Oil Sands Monitoring (OSM) region.

Processing Centre

The ABMI Processing Centre, located at the Royal Alberta Museum, plays a pivotal role in generating the Institute's species-level datasets while archiving thousands of specimens for verification and future research. Our dedicated team of highly specialized scientists and technicians provides the Institute's support network of laboratory, taxonomic and curatorial expertise. Key responsibilities of the Processing Centre include:

- receiving, tracking and sorting field samples;
- species-level specimen identification and data generation;
- research and advancement of taxonomic expertise;
- training cadres of new taxonomic specialists;
- providing specialized taxonomic training for the ABMI's field technicians;
- developing interactive, user-friendly species identification tools; and
- archiving and curating specimens for long-term verification and future research.

This year, 55,473 vascular plants, soil mites, aquatic invertebrates, lichens and bryophytes underwent detailed taxonomic analysis, for a total of well over 750,000 specimens processed since 2007. The total number of species tracked by the ABMI now exceeds 3000, most in understudied groups such as invertebrates and non-vascular plants. Prior to the ABMI's work, more than 150 of these species were unknown in Alberta, of which ~40 were unknown to science entirely. In addition to the datasets they help to generate, each specimen identified by our taxonomic teams represents a verifiable record of biological information, archived in perpetuity within the museum's natural history collections.

In addition to identifying thousands of specimens, Processing Centre personnel again supported the specialized taxonomic training of the ABMI's field technicians while continuing to advance their own skills though research in areas such as DNA barcoding and thin-layer chromatography. Along with other ABMI Centres, outreach was again a focus for us, particularly with our goal of raising awareness of the strength of the ABMI's taxonomic breadth. Our teams provided numerous public workshops and presentations about their work and during the winter semester, University of Alberta students were treated to the inaugural "Lichens of Alberta" course taught by ABMI Lichenologist, Dr. Diane Haughland. This year, we also made significant strides toward developing user-friendly guides to Alberta's flora and fauna by releasing an update to the "Almanac of Alberta Oribatida" (mites) and developing a soon-to-be completed guide to freshwater snails, tentatively titled "Alberta Gastropods". In recognition of our efforts to support the ABMI initiative and advance taxonomy in Alberta, we secured additional GoA funding for new high-tech equipment, including a bench-top scanning electron microscope.

The new Royal Alberta Museum is nearly complete and the enormous task of packing and moving the museum's exhibits, collections and staff to the new facility is well underway. This fall, all ABMI Processing Centre functions will relocate to the new building and our taxonomic teams are excited to get to work in their new, state-of-the-art laboratories. As an integral part of the museum's Life Sciences department, we are delighted to continue providing the high quality taxonomic support on which the ABMI depends.

Science Centre

The Science Centre is responsible for maintaining and continuously improving scientific excellence in all aspects of the ABMI. The Science Centre works closely with other ABMI Centres to improve data collection, apply quality control, advance data analysis and interpretation, and ensure ABMI's communication products meet needs of decision makers. Our integrated team ensures that the scientific credibility of the Institute remains world class. During 2016–17 we achieved the following:

FIELD DATA COLLECTION PROTOCOLS

In collaboration with other ABMI Centres, we reviewed and updated field protocols for all taxa. ARUs were used for their second year to monitor birds and mammals. Data processing and analysis methods were tested and updated for these changes. We implemented methods to evaluate and report on vegetation in Alberta's wetlands, and are developing methods for aquatic invertebrates.

STATUS AND CUMULATIVE EFFECTS FOR SPECIES

For more than 800 species (including mammals, birds, vascular plants, mosses, lichens and mites), we updated information on habitat associations and distribution maps, predicted abundance under reference and current conditions, determined change between reference and current conditions as a measure of cumulative effects, and evaluated how the major sectors (energy, forestry, agriculture, and urban infrastructure) influenced the species' abundance. New field information collected during 2015 was incorporated, along with updated information about vegetation and human disturbance throughout Alberta.

WEBSITE TO SHARE ABMI ANALYSES AND RESULTS

Information on how species use native and human-created habitats, and how these habitats change over time, are key inputs into resource management in Alberta. To ensure managers and the general public can easily access ABMI information, we augmented the graphics and functionality of the new data portal on the ABMI website. Each species has its own web page describing its unique distribution and habitat associations, along with tabular and GIS summaries that can be downloaded for additional analyses.

SUPPORT FOR ENVIRONMENTAL MANAGEMENT IN ALBERTA

A wide variety of ABMI information on species and landscapes was incorporated into the Biodiversity Management Framework, and used to describe how Alberta's environments are changing. In addition, we developed a framework for monitoring wetlands throughout Alberta as part of a multi-organizational collaboration.

SCIENTIFIC PROFILE

During the past year Science Centre staff, and associated researchers, published seven papers in peer reviewed journals (one more is submitted), as well as four ABMI Science Letters, helped to produce more than 10 ABMI reports, presented results at three international conferences, and participated in dozens of management workshops across Alberta. Two research collaborations were initiated, and six continued from previous years.

Geospatial Centre

The ABMI's Geospatial Centre is responsible for supporting and continuously improving operational and integrated applications of geospatial technologies for use by the ABMI and other resource managers and planners in Alberta. These efforts include creating province-wide and sample-based information and data products on human footprint and vegetation, developing and maintaining GIS layers for use by the ABMI and the public, and collaborating on geospatial research and development with various partner and stakeholder organizations. During 2016–17 we achieved the following:

HUMAN FOOTPRINT MAPPING

We released the updated 2014 wall-to-wall Human Footprint Inventory in December of 2016. We also mapped detailed sample-based human footprint information for each of the ABMI's 1656 3 × 7-km sites for 2015 conditions. This information was added to the ABMI's time-series (now standing at 1999–2015 and available on abmi.ca) of human footprint in Alberta, which is used to assess change over time. Human footprint features were also mapped for the ABMI's 2015 wetland and terrestrial site locations. Linear human footprint features (cutlines, roads, pipelines, etc.) in the Oil Sands region of northern Alberta were continually updated and added to the Alberta base features layer. In addition, we finished GIS-based Least-Cost-Path (LCP)-adjusted seismic lines for the Caribou ranges in Boreal Alberta.

DETAILED VEGETATION MAPPING

We updated a GIS layer describing detailed Landcover (vegetation) on the ABMI's sample sites by mapping vegetation information for 100 sites, 18 of which were visited for ground-truthing. These highly-detailed (98.9% accurate based on two external audits) vegetation cover layers (available on abmi.ca) are used to validate mapping outputs for Alberta's Land-use Framework regions to support regional and sub-regional planning in the province; for example, 66 photo-plot sites were interpreted for the North Saskatchewan Region alone. In addition, the data have been successfully applied to various research areas, including boreal bird studies and vegetation responses to well-pad restoration. To further advance application and awareness of this dataset, we delivered the updated 2016–17 information to the National Forestry Inventory.

SUPPORT FOR LAND-USE PLANNING

During the past year, our staff directly supported methods development to analyze human footprint and land cover information in support of regional and sub-regional planning, as well as reporting against regional land-use targets established by government (e.g., Biodiversity Management Framework). Several new geospatial initiatives were prototyped and operationalized in 2016–17.

They include: 1) an AB-wide Hydro Temporal Variability layer; 2) a Current Surface Water layer for the Lower Athabasca Region (LAR); 3) a Probability of Wet Area layer for the LAR; 4) and AB-wide seamless terrain models with 15-m spatial resolution (Digital Surface Model and Digital Terrain Model) based on radar data.

In addition, the Centre's staff supported the delivery of mapping outputs for the Regional Industry Caribou Collaboration (RICC) and the ABMI's Caribou Monitoring Unit. Specifically, the Centre's staff has been directly involved in developing methods to assess and map cumulative impacts of human disturbance on Boreal Caribou in Alberta.

Information Centre

The Information Centre is responsible for communication and information management at the ABMI. This includes managing data and access to information products, developing publications, building stakeholder relationships, and ensuring the ABMI has access to private and public lands to conduct surveys. During 2016–17 we achieved the following results:

PUBLICATIONS

2016–17 was a transitional year for ABMI reporting. ABMI staff were engaged in developing several new reporting products; the public release of those products, however, is anticipated for 2017–18. Key efforts included:

In the fall of 2016, a preliminary report synthesizing the results of the ABMI's Indigenous Knowledge and Biodiversity Project was completed and shared with the project sponsor (Environmental Monitoring and Science Division, Alberta Environment and Parks). The project sought to work collaboratively with First Nations peoples to learn about and report on a variety of biodiversity-related issues central to each community's identity and cultural activity on their traditional territory. For example, which species are of key importance to each community and how do community members describe changes in the distribution and abundance of these species? Public release of the report is planned for late 2017.

In the spring of 2017, we developed an online report template to move ABMI reporting from a print format to a web-based platform. Online reports will facilitate frequent content updates and provide users with opportunities to interact with content in a variety of ways. In fall 2017, the ABMI will release its first online report, The Status of Human Footprint in Alberta.

In an effort to broadly share its quality management system, the ABMI updated and publicly released its Quality Management Plan in December 2016. The Plan is intended to be a living document and will be updated annually.

SURVEY SITE ACCESS

The ABMI successfully gained access to 150 survey sites, including both terrestrial and wetland site locations, plus a further 17 sites that were held over from the previous year due to access issues. Of the 2016–17 terrestrial sites, 6 were new and 144 were revisits (i.e., the site had been surveyed previously in the ABMI's survey cycle). Of the wetland sites, 9 were new and 141 were revisits. Over 120 physical information packages were distributed to landowners and disposition holders visited in the previous field season, providing them with information about the ABMI's findings on their land, with the remaining packages sent by email. The ABMI access team worked closely with numerous representatives from national, provincial and municipal jurisdictions to negotiate long-term access to Alberta's land bases.

To support the 2017 field season, the ABMI must gain access to around 180 survey sites. This will be our third year of revisits, and we will continue to deploy camera traps and bioacoustic recorders. These technologies have been well received by all landholders, and we look forward to providing landowners with access to the photos captured on their land. By March 31, 2017, approximately 80% of the required access work was complete.

WEBSITE AND DATA ACCESSIBILITY

After being developed throughout 2016, on April 20, 2017 the ABMI released its Data and Analytics Portal, a one-stop shop for ABMI data and information products. The ABMI Data & Analytics portal comprises three modules: Data Download, Biodiversity Browser, and Mapping Portal. From the Data Download module users can continue to access ABMI raw data, as well as GIS data layers on human footprint and land cover. Newly available for download are GIS Biogeoclimatic Layers, satellite and aerial data, and a range of species-level data sets. On the Biodiversity Browser, users can browse over 300 complete species profiles, with information on species-habitat associations, impacts of human footprint, and relative abundance maps. Hundreds of additional profiles are available with partial information, with still more slated for future roll-out. Finally, the Mapping Portal allows users to display various ABMI data layers (e.g., Total Human Footprint) and then obtain summary information (when available) related to the data layer for a variety of administrative areas (e.g., natural regions) within Alberta. This is the first instance where users can interact with ABMI data layers within a web-based platform.

The ABMI's 2016–17 field-collected habitat and species data will be made publicly available in September 2017 via the Data and Analytics portal.

DATA MANAGEMENT

Throughout 2016–17, we continued to build out the functionality of several data management systems:

» New functions were added to the ABMI camera trap website that is used to manage camera trap data and facilitate image tagging. For example, user features were modified to make processing more efficient, and administrative users can now download summary reports derived from raw data.

» In collaboration with the Bioacoustic Unit at the University of Alberta, in 2016 we began to build the Bioacoustic Information System to manage and analyze acoustic data collected through our field program.

» We also began to develop WildTrax, an environmental sensor network that will centralize the functions associated with the ABMI camera trap website and the Bioacoustic Information System (described above) and make them available for use by partners, stakeholders, and citizens.

CITIZEN SCIENCE

The Information Centre continued development of a web-based ABMI-branded citizen science application tool called NatureLynx™ for both desktop and mobile computing platforms. The tool will allow users to upload their photographs of local flora and fauna and pin their sightings to a Google Map-like responsive mapping program. Users will be able to create their own profiles, join user groups, compete in "missions" and interact with rich biodiversity content. An initial public rollout with selected partners is planned for summer 2017.

As part of a pilot "Adopt-a-Camera" program, the ABMI also worked with partners and citizens to deploy 23 cameras/ARU pairs in terrestrial habitats and 25 camera/ARU pairs in wetlands. The hope is that by working with partners and citizens, the ABMI can expand the deployment of these sensors each year and engage these parties in image tagging and/or sound file identification as well.

REGIONAL PLANNING SUPPORT AND CARIBOU MONITORING UNIT

Information on the ABMI's support for regional planning and the Caribou Monitoring Unit is now located in the Application Centre section of the Annual Report.

Application Centre

The Application Centre demonstrates the value of the ABMI's biodiversity data, scientific approaches, and know-how.

Through applied research and development funded by numerous sponsors, Albertans are increasingly able to manage biodiversity in a changing climate, apply market forces to promote biodiversity conservation and stewardship, and monitor rare plants and animals in the oil sands region.

BIOACOUSTIC UNIT

The Bioacoustic Unit (BU) at the University of Alberta supports research and development to monitor wildlife populations using autonomous recording units (ARUs). A collaboration between the University of Alberta and the ABMI, the BU has developed protocols for ARU deployment and data processing. A significant focus in 2016–17 was the development of a Bioacoustic Information System, an open source web application for the management, analysis and dissemination of bioacoustic data. In addition, the BU continued to provide data processing services to a variety of ARU users, including the ABMI's regional monitoring program and government, industry, and NGO programs. The BU processed over 12,000 recordings across multiple projects. Going forward, our emphasis is on automating species identification through machine learning.

Core funding for development of the Bioacoustic Information System is provided by the Canadian Oil Sands Innovation Alliance.

RARE ANIMALS AND RARE PLANTS PROJECTS

The Rare Animals project, led by Dr. Erin Bayne at the University of Alberta, has deployed ARUs at local, intermediate, and regional scales in a standardized and centralized fashion to enhance their value for monitoring and research. Over 3,000 sites in the Oil Sands Region have been sampled since 2012. Field work in the last few years has focused on monitoring Species at Risk like the Yellow Rail, Rusty Blackbird, Olive-sided Flycatcher, Canada Warbler, and Common Nighthawk to understand the potential impacts of industrial activity. In 2016–17, we surveyed 289 stations in wetland complexes and released several publications and reports" addressing a range of biological and methodological research areas.

The Rare Plants Project, led by Dr. Scott Nielsen at the University of Alberta, has developed and implemented a survey protocol and adaptive sampling model to improve the effectiveness of rare plant monitoring activities in Alberta's Oil Sands Region. The protocol represents a "bridge" between broad-scale monitoring conducted by the ABMI, and rare plant surveys completed by oil sands companies to support their regulatory requirements for baseline inventories, pre-disturbance assessments, and environmental impact assessments. Since 2012, 614 sites in the Oil Sands Region have been sampled. In addition, in 2016–17, the team began re-visiting historical rare plant populations to determine persistence over time, and continued monitoring translocated plants to determine the success of this mitigation technique. Results from seven areas of rare plant monitoring and research were summarized and released in the report Terrestrial Vascular Plant Monitoring Project for the Lower Athabasca (2012–2016).

Core funding for these projects was provided by the Alberta Environmental Monitoring Evaluation and Reporting Agency (AEMERA). Note: in April 2016, AEMERA was dissolved and its functions moved to the Environmental Monitoring and Science Division of Alberta Environment and Parks.

ECOSYSTEM SERVICES ASSESSMENT PROGRAM

The ABMI is developing tools to assess ecosystem services across Alberta, as part of the Ecosystem Services and Biodiversity Network. The project develops and applies simulation models to map and measure ecosystem services on a provincial scale, including forage production, timber production, carbon storage, pollination, water purification, and biodiversity.

Key achievements in 2016–17 include publishing a scientific report: Impacts of land-use management on ecosystem services and biodiversity: an agent-based modelling approach (Habib, TJ. et al. 2016). Another ABMI report, Pigeon Lake Phosphorus Runoff Modelling: Current Conditions, Development and Restoration Scenarios, was also developed to assist the Pigeon Lake Watershed Association with management decisions. Other scientific work included evaluating impacts of beneficial management practices on agricultural lands for carbon-related ecosystem services, characterizing land-use drivers of multi-scale landscape connectivity in Alberta, investigating the relationship between grizzly bear habitat quality, ecosystem services and biodiversity, and evaluating subjective valuation as revealed by outdoor recreational choices.

The core sponsor for the Ecosystem Services Assessment program is Alberta Innovates.

BIODIVERSITY ASSESSMENT OF ALBERTA'S BEEF INDUSTRY

The Application Centre is leading research to assess the relationship between beef production and biodiversity using biodiversity data from the ABMI and other sources. Key achievements in 2016–17 include a peer-reviewed journal article, A Review of Sustainability Enhancements in the Beef Value Chain: State-of-the-Art and Recommendations for Future Improvements (Maia De Souza, D. et al. 2017). Scientific progress includes completion of 157 rapid range health assessments to be used to correlate biodiversity data such as species richness, species accumulating curves, and rank abundance. In addition, we completed a series of management practice surveys for grassland, pasture, and native range (beef producing lands), the results of which will be used to explore the response of biodiversity to different grazing regimes.

The core sponsor of this project is Alberta Agriculture and Forestry, with collaborators from the University of Alberta, Agriculture and Agri-Food Canada, and the Government of Alberta.

CARIBOU MONITORING UNIT

Increasing human disturbance and changes in climate are driving declines in Woodland Caribou populations in Alberta and British Columbia. The ABMI's Caribou Monitoring Unit (CMU) was developed to support Woodland Caribou recovery in western Canada. The CMU works with academics, industry, and government to facilitate meaningful research and provide scientific expertise to evaluate and monitor caribou recovery options and provide decision-makers with tools necessary to make ecologically-informed land use decisions.

Current CMU programs focus on research testing Woodland Caribou recovery options and research prioritizing areas for habitat restoration. Specific sub-projects include assessing the effectiveness of regional management strategies, defining criteria for Woodland Caribou restoration guidelines and prioritization, and understanding the relationships among natural habitat, human disturbance, predators and prey. The CMU continues to develop relationships with stakeholder groups and support efforts to increase the collective understanding of issues facing Woodland Caribou in Western Canada.

ECOLOGICAL RECOVERY MONITORING

Recovery of ecological conditions at reclaimed wellsites, pipelines, and other oil and gas infrastructure in Alberta may continue long after the reclamation certificate has been issued. However, the effectiveness of reclamation after site certification in Alberta's cropland, native prairie, and forest lands is not currently monitored.

Since 2012, this project has run pilot field programs in grassland, boreal, and cultivated lands to develop protocols for long-term monitoring of ecological recovery. This has included sampling soil and vegetation properties on

Application Centre (continued)

both reclaimed wellsites and adjacent reference areas. Throughout these pilots, various state of the art methods have been tested, including precision yield data, multispectral sensors on unmanned aerial vehicles, and soil proximal sensors. In collaboration with the Bioacoustic Unit, many of these wellsites have also been studied to assess when they are recovered from the perspective of songbirds. Work in 2016–17 focused on summarizing results, and the development of an implementation plan to begin operationalizing this program.

Project collaborators include InnoTech Alberta, the University of Alberta, University of Calgary, and private sector service providers. The core sponsor in 2016–17 was AEMERA. Note: in April 2016, AEMERA was dissolved and its functions moved to the Environmental Monitoring and Science Division of Alberta Environment and Parks.

BIODIVERSITY MANAGEMENT AND CLIMATE CHANGE ADAPTATION

The Biodiversity Management and Climate Change Adaptation project, led by the ABMI, was completed in 2015, but ongoing publications are expected as student-led research projects wrap up. One such publication was produced in 2016 (Projected responses of North American grassland songbirds to climate change and habitat availability at their northern range limits in Alberta, Canada; Nixon, A.E. et al., 2016).

Core funding for this project was provided by the Climate Change and Emissions Management Corporation (now called Emissions Reduction Alberta).

SUPPORT FOR REGIONAL PLANNING

In 2016–17, the ABMI provided scientific and logistical support for the development of the Biodiversity Management Frameworks (part of Alberta's Land-use Framework) for the Lower Athabasca, South Saskatchewan, and North Saskatchewan Regions. Working closely with the Government of Alberta, the ABMI helped identify and develop key biodiversity indicators that will be used to measure if and how Alberta's species and their habitats are changing in each of these regions. Each indicator must be measurable, cost-effective, and relevant to the diverse needs of stakeholders in both northern and southern Alberta. Through these efforts, Albertans will have the tools to evaluate our collective performance as stewards of Alberta's land and water.

Summarized Financial Statements

OF THE ALBERTA BIODIVERSITY MONITORING INSTITUTE

C&Co | COYLE & COMPANY
CHARTERED ACCOUNTANTS

ROBERT L. COYLE, CPA, CA *
LIANA L. COYLE, CPA, CA
STEPHANIE N. BACON, CPA, CA

Report of the Independent Auditor on the Summary Financial Statements

To the Board of Directors
Alberta Biodiversity Monitoring Institute

The accompanying summary financial statements, which comprise the summary statement of financial position as at March 31, 2017, the summary statements of operations and net assets for the year then ended, are derived from the audited financial statements of Alberta Biodiversity Monitoring Institute for the year ended March 31, 2017. We expressed an unqualified opinion on those financial statements in our report dated September 14, 2017. Those financial statements, and the summary financial statements, do not reflect the effects of events that occurred subsequent to the date of our report on those financial statements.

The summary financial statements do not contain all the disclosures required by Canadian Accounting Standards for Not-for-Profit Organizations. Reading the summary financial statements, therefore, is not a substitute for reading the audited financial statements of Alberta Biodiversity Monitoring Institute.

Management's Responsibility for the Summary Financial Statements

Management is responsible for the preparation of a summary of the audited financial statements in accordance with Canadian Audit Standard (CAS) 810.

Auditor's Responsibility

Our responsibility is to express an opinion on the summary financial statements based on our procedures, which were conducted in accordance with Canadian Audit Standard (CAS) 810, "Engagements to Report on Summary Financial Statements."

Opinion

In our opinion, the summary financial statements derived from the audited financial statements of Alberta Biodiversity Monitoring Institute for the year ended March 31, 2017 are a fair summary of those financial statements, in accordance with Canadian Audit Standard (CAS) 810.

Coyle & Company

Coyle & Company
Chartered Accountants

September 14, 2017
Edmonton, Alberta

ALBERTA BIODIVERSITY MONITORING INSTITUTE

Summarized Financial Statements

As at and for the year ended March 31, 2017

RESULTS FROM OPERATIONS	2017	2016
REVENUE		
Oil Sands Monitoring	$ 6,400,451	$ 5,654,828
Government of Alberta	3,915,847	3,278,446
Application Centre	1,845,885	3,220,461
Private Sector	520,650	861,680
Government of Canada	26,000	-
Interest Income	16,133	17,878
	12,724,966	13,033,293
STAFFING		
Executive Office	396,540	377,642
Science Centre	586,396	532,454
Information Centre	1,065,385	927,982
Data Collection Centre	1,773,346	1,910,526
Lab Processing and Identification Centre	947,089	825,412
Application Centre	295,831	470,787
Geospatial Centre	907,791	809,514
	5,972,378	5,854,317
PROGRAM EXPENDITURES		
Executive Office	217,947	207,396
Science Centre	216,679	276,624
Information Centre	1,230,993	1,120,744
Data Collection Centre	2,736,811	2,660,064
Lab Processing and Identification Centre	132,084	147,303
Application Centre	1,734,489	2,136,612
Geospatial Centre	421,463	357,954
Expense Recoveries and Other	(102,872)	(5,090)
	6,587,594	6,901,607
EXCESS (DEFICIENCY) OF REVENUE OVER EXPENDITURES	164,994	277,369
NET ASSETS - BEGINNING OF YEAR	1,240,147	962,778
NET ASSETS - END OF YEAR	$ 1,405,141	$ 1,240,147

FINANCIAL POSITION	2017	2016
ASSETS		
Cash	$ 3,652,567	$ 1,269,263
Accounts Receivable	825,787	3,062,023
Prepaid Expenses	6,471	6,471
	4,484,825	4,337,757
Capital Assets	223,446	182,177
	$ 4,708,271	$ 4,519,934
LIABILITIES AND NET ASSETS		
Accounts Payable and Accrued Liabilities	$ 1,955,589	$ 2,204,543
Deferred Revenue	1,347,541	1,075,244
NET ASSETS		
Unrestricted	1,405,141	1,240,147
	$ 4,708,271	$ 4,519,934

ON BEHALF OF THE BOARD

Director

Director

C&Co

Alberta Biodiversity
Monitoring Institute

Edmonton Office

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