

# RANGELAND RESEARCH INSTITUTE (RRI)

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## 2013-2014 Annual Report

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**UNIVERSITY OF ALBERTA**  
**FACULTY OF AGRICULTURAL,  
LIFE & ENVIRONMENTAL SCIENCES**  
Rangeland Research Institute

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## 1. Introduction

Established in 2011 by the University of Alberta's Faculty of Agricultural, Life & Environmental Sciences, the Rangeland Research Institute (RRI) has a mandate to conduct and support research and teaching in support of the long-term sustainability of rangelands. During its third year of operations, the RRI furthered its capacity to meet this mandate by raising the institute's profile amongst local, national, and international audiences, cultivating strategically important intra- and inter-institutional relationships, and approving the establishment of the Rangeland Ecology and Management Endowment Fund to support rangeland research at the University of Alberta over the long term. The RRI also continued to provide financial and logistic support to researchers working at the university's flagship rangeland research facilities; namely, the 5,000-hectare Mattheis Research Ranch, located approximately 40 kilometers north of Brooks, Alberta, and the 4,800-hectare Kinsella Research Ranch, located approximately 150 kilometers southeast of Edmonton, Alberta.

Rangeland ecosystems are vitally important elements of western Canadian landscapes, but they are neither well understood nor well protected from potential threats, including fragmentation and conversion to other land uses. To address these issues, Edwin and Ruth Mattheis took the generous and historic step of donating their ranch to the University of Alberta, which led to the establishment of the RRI. The institute now serves as an important mechanism for heightening the understanding and appreciation of rangeland systems by researchers, students, range users, and society at large. The Mattheis' contribution was made all the more significant in 2013, when it was announced that two Agriculture and Agri-Food Canada rangeland research facilities in Alberta – namely, an approximately 390-hectare facility west of Stavely, and a 16,000-hectare facility at Onefour – would be closing after 64 and 132 years of operation, respectively. Thanks to the vision of Edwin and Ruth Mattheis, and to the continuing efforts of the institute's Director, Strategic Advisory Council, staff, and other stakeholders, described herein, the RRI is well positioned to address the void represented by federal divestment from these two facilities, and to emerge as Canada's foremost centre for rangeland research.

This report summarizes activities undertaken or supported by the RRI during the period April 1, 2013 through March 31, 2014, including meetings and actions of the RRI Strategic Advisory Council, planning and implementation of communications tools and activities, rangeland research being conducted at the U of A research ranches, financial developments, and other steps taken to increase the institute's capacity to meet its overall mandate.

## 2. Strategic Advisory Council

Throughout 2013-2014, the RRI Strategic Advisory Council (SAC) comprised a total of 20 individuals with diverse backgrounds and interests in the sustainable management of rangelands (see Table 1). The insights and contributions of SAC members are fundamental to the formulation and achievement of the institute's objectives, and key developments during the past year were supported by members' wide range of expertise, and commitment to advancing the institute's interests both on council and among their respective networks.

**Table 1.** Members of the RRI Strategic Advisory Council, March 2014

Name	Position, Agency	Location
Barry Adams* <sup>††</sup>	Head, Rangeland Resource Management Program, <i>Alberta Environment and Sustainable Resource Development</i>	Lethbridge, AB
Brian Berg	Producer	Duchess, AB
Dr. Edward Bork	Director, Rangeland Research Institute; Professor and Mattheis Chair in Rangeland Ecology & Management, <i>University of Alberta</i>	Edmonton, AB
Dr. Cameron Carlyle	Assistant Professor, <i>University of Alberta</i>	Edmonton, AB
Jordon Christianson	Director, Property Administration, <i>Special Areas Board</i>	Oyen, AB
Cherie Copithorne-Barnes	Producer and Chief Executive Officer, <i>CL Ranches Ltd.</i>	Jumping Pound, AB
Floyd George <sup>‡</sup>	Producer; Director, <i>Eastern Irrigation District</i>	Gem, AB
Joyce Gould <sup>†</sup>	Science Coordinator, <i>Alberta Parks</i>	Edmonton, AB
Joel Heese	Specialist, Environment, <i>Cenovus Energy Inc.</i>	Redcliff, AB
Eddy Isaacs	Chief Executive Officer, <i>Alberta Innovates – Energy &amp; Environment Solutions</i>	Calgary, AB
Dr. John Kennelly	Dean, Faculty of Agricultural, Life & Environmental Sciences, <i>University of Alberta</i>	Edmonton, AB
Edwin Mattheis	Producer (Retired)	Calgary, AB
Ruth Mattheis	Producer (Retired)	Calgary, AB
Karen Raven	Agriculture Land Use Specialist, <i>Alberta Agriculture and Rural Development</i>	Edmonton, AB
Dr. Bill Shotyk	Professor and Bock Chair in Sustainable Agriculture, <i>University of Alberta</i>	Edmonton, AB
Rich Smith	Executive Director, <i>Alberta Beef Producers</i>	Calgary, AB
Dr. Brad Stelfox	Founder and Landscape Ecologist, <i>ALCES Landscape &amp; Land-Use Ltd.</i>	Calgary, AB
Josie Van Lent <sup>‡</sup>	Producer; Dean, Agricultural Sciences & Human Service, <i>Lakeland College</i>	Vermillion, AB
Dr. Walter Willms <sup>‡</sup>	Researcher (Emeritus), <i>Agriculture &amp; Agri-Food Canada</i>	Lethbridge, AB
Dave Zehnder <sup>†</sup>	Producer; Program Coordinator, <i>Ecological Services Initiative</i>	Invermere, BC

\* Chair of RRI Strategic Advisory Council; <sup>†</sup> Member of Communications Subcommittee; <sup>‡</sup> Member of Capacity Building Subcommittee

### 3. Communications

Communicating about the RRI and the significant opportunities it represents is essential to the institute's success. To this end, in December 2013, the SAC endorsed an RRI Communications Strategy prepared by a designated subcommittee that outlines four overarching objectives of communicating with stakeholders. These are to 1) raise the institute's profile, 2) connect researchers working in rangelands (with one another and with existing knowledge), 3) package results into useful information and products, and 4) engage stakeholders in a meaningful and mutually beneficial way.

Key audiences that the RRI aims to engage include researchers, students and educators, range management practitioners, industry professionals, policy makers, and the general public. In 2013-2014, the RRI raised its profile amongst all of these audiences through various outreach activities (see Table 2). Notably, in April 2013, the RRI hosted a "Mattheis Research Update" in Duchess, Alberta. Approximately 70 individuals attended this day-long event to hear updates about the research being conducted at the Mattheis Ranch, and to discuss and share their archaeological finds with experts from the U of A. Future events, including field days at the Mattheis and Kinsella ranches to be held in June and August of 2014, respectively, will help ensure that local stakeholders remain engaged with the work of the RRI. Provincial, national, and international audiences will also continue to be reached through talks by RRI Director Dr. Edward Bork and other representatives of the institute, including staff, SAC members and affiliated researchers, as well as by representation of the RRI at trade shows and other events.

In 2013-2014, the RRI also established an online presence, including a website hosted by the University of Alberta's Faculty of Agricultural, Life & Environmental Sciences at [rri.ualberta.ca](http://rri.ualberta.ca). This site serves as a dynamic source of information about the institute's vision and mission, research and teaching activities, affiliated facilities and key individuals, and provides links to several other online resources of interest to rangeland stakeholders. The RRI has also opened social media pages (including Facebook, Twitter, and Google+ pages, with others planned) that will both draw traffic to the website, and serve as primary tools to communicate with certain key audiences. Future plans for online communications include creating and sharing exclusive multimedia content, including videos, an electronic newsletter, and webcasts of rangeland-related seminars and other events.

**Table 2.** Outreach and promotional activities undertaken in support of the RRI during 2013-2014.

Event/presentation title	Presenter(s)	Venue	Audience(s)	Date
University of Alberta Mattheis Research Update	Bork, Carlyle, Chang, Gamon, Glasier, Ives, Mollard, Supernant, White	Duchess, AB	Practitioners, professionals, general public	Apr 15, 2013
<i>University of Alberta's Rangeland Research Institute</i>	Bork	Inner Mongolia Agricultural University Hohhot, China	Researchers	Jul 7, 2013
<i>Summary of Research Underway at the RRI</i>	Bork			
<i>Rangeland Research Institute: Introduction and Research Update</i>	Bork	International Mountain Section of the Society for Range Management meeting Medicine Hat, AB	Practitioners, professionals, policy-makers researchers, students	Oct 25, 2013
<i>University of Alberta and the Rangeland Research Institute</i>	Bork	Canadian Forage and Grassland Association meeting Olds, AB	Practitioners, professionals	Dec 10, 2013
SRM 2014 Trade Show	Tastad	67 <sup>th</sup> Society for Range Management Annual International Meeting Orlando, FL, USA	Practitioners, professionals, policy-makers, researchers, educators, students	Feb 9-11, 2014
Living in the Natural Environment Trade Show	Tastad	Cochrane, AB	Practitioners, professionals, educators, general public	Feb 28, 2014
<i>Redefining "home on the range": Can environmental services save the ranching industry?</i>	Bork	University of Alberta Alumni Medicine Hat, AB	Practitioners, professionals, policy-makers, educators, general public	Mar 12, 2014

Communicating specific outcomes of rangeland research to both expert and lay audiences is another key aspect of fulfilling the RRI's mandate. In 2013-2014, RRI-supported students, researchers and staff shared research results via graduate dissertations, in academic journals, and at meetings or conferences (see Table 3).

**Table 3.** Presentations and publications of RRI-supported research during 2013-2014.

Title (Format)	Presenter/Author(s)	Venue/Publication	Date
Is there a unimodal relationship between species richness and biomass in herbaceous communities? A global, multi-scale investigation (Presentation)	Fraser & members of Herbaceous Diversity Network (including Bork, Cahill, Carlyle, Stotz)	56th Annual Symposium of the International Association for Vegetation Science Tartu, Estonia	Jun 26-30, 2013
Mixedgrass prairie plant community productivity and composition under variable clipping and watering: a test of determinate growth and the role of graminoid growth form (PhD Thesis)	Broadbent	Department of Agricultural, Food and Nutritional Science, University of Alberta Edmonton, AB	Nov 20, 2013
Are knowledge gaps limiting the management of rangelands for EG&S? An overview of carbon storage	Bork	Northern Great Plains Section & Prairie-Parkland Chapter of the Society for Range Management workshop on Ecological Goods & Services from Native Rangelands Saskatoon, SK	Dec 5, 2013
Effects of warming, precipitation and grazing on the provision of forage by Western Canadian grasslands	Carlyle		
Water in rangelands: synergies and tradeoffs among EG&S in grasslands managed for multiple use (Presentations)	Tastad		
Impacts of mulch on prairie seedling establishment: facilitative to inhibitory effects (Publication)	Mollard, Naeth, Cohen-Fernandez	<i>Ecological Engineering</i>	January 2014
Ecological and agronomic consequences of Cicer milkvetch ( <i>Astragalus cicer</i> L.) introduction into mixed prairie (Presentation)	Carlyle	67th Society for Range Management Annual International Meeting Orlando, FL.	Feb 8-13, 2014
<i>Sheperdia argentea</i> encroachment alters mixedgrass composition and forage production (Presentation)	Dahl, Bork		
Tracking geographical expansion of an invading native shrub ( <i>Sheperdia argentea</i> ) in the mixed grass prairie using archived aerial photography (Poster)			

Beyond the presentations and publications detailed above, results of rangeland research conducted by students and faculty that was not directly supported by the RRI, but

nonetheless served to raise the profile of the university's rangeland research program, were presented at a variety of local and international events. These included presentations by Dr. Edward Bork, Dr. Cameron Carlyle, and their collaborators at the U of A Renewable Resources Landscape Seminar Series, Alberta Innovates Bio-Solutions and Alberta Soil Science Workshops, Canadian Society of Soil Science, Soil Science Society of America, Canadian Society for Ecology and Evolution, and North American Agroforestry Conferences, the International Congress for Conservation Biology, and the Society for Range Management Annual International Meeting. Additionally, results of the university's rangeland research were published in numerous peer-reviewed journals, including *Agronomy Journal*, *Applied Animal Behavior Science*, *Canadian Journal of Soil Science*, *Forest Ecology and Management*, *Rangeland Ecology and Management*, and *Oecologia*, and were discussed in lay periodicals, including *Alberta Outdoorsmen*, *Canadian Cattlemen*, the *Brooks Bulletin* and *The Western Producer*. In August 2014, the RRI will play a key role in compiling and publishing the *Beef and Range Report*, which will serve as an outreach tool for U of A researchers to share their rangeland-related research with non-academic audiences, including practitioners, industry professionals, and policy makers.

#### 4. Research

In addition to promoting the value of rangeland research and disseminating research results, the RRI directly supported researchers working at the University of Alberta's Mattheis and Kinsella Research Ranches in 2013-2014. The use of these facilities, and number of faculty engaged in rangeland research, have both increased steadily since the inception of the RRI. In part, these increases have been driven by the institute's Competitive Grants program, which has funded research at the Mattheis Ranch since 2012. However, these facilities are also increasingly being used by researchers from within the university and beyond who are not funded directly by the RRI, reflecting the growing profile of the institute and its facilities. Specifically, more than 60 individuals working on over 20 different research projects accessed the U of A ranches during the past year. Of these, 12 projects were funded by the RRI (see Table 4). Additional projects were carried out by researchers from the Universities of Alberta, Lethbridge, Waterloo, and Aarhus (Denmark), and from government agencies (e.g. Agricultural Financial Services Corporation, Agriculture and Agri-Food Canada, Canadian and US Fish & Wildlife Services), and addressed topics such as forage productivity, wildlife ecology, wetland restoration, climate change, and energy development.

In February 2013, a third round of granting through the RRI Competitive Grants Program was announced, with the program requirements being amended to favour projects that support graduate students and/ or leverage other sources of funding. As a result, one proposal, for a project to be conducted by Dr. Cameron Carlyle and co-investigator Dr. Jessamyn Manson entitled “Grazing effects on the plant-pollinator relationship: a contrast of native legumes with an invasive (*Astragalus cicer* L.)”, was awarded a two-year grant of \$19,600.

**Table 4.** Research activity at the Mattheis and Kinsella Ranches in 2013-2014 funded by the RRI – Competitive Grants program

Project Title	Principle Investigator	Total Award	Duration
Spatial patterns of and management effects on soil carbon in the Mattheis Ranch	Dr. Scott Chang	\$20,000	2012-2014
Baseline carbon monitoring for rangeland carbon sequestration	Dr. John Gamon	\$20,000	2012-2014
Hay mulching for revegetation of Alberta native grasslands	Dr. Anne Naeth	\$20,000	2012-2014
Impact of microsites on reclamation of Alberta native grasslands	Dr. Anne Naeth	\$20,000	2012-2014
Mapping upland songbird distribution and abundance on the Mattheis Ranch	Dr. Scott Nielsen	\$20,000	2012-2014
Ecological and agronomic consequences of Cicer milkvetch introduction into mixed prairie grasslands	Dr. Cameron Carlyle	\$5,400	2013-2014
Mechanisms for smooth brome invasion and the possibility of an invasional meltdown	Dr. James Cahill	\$16,708	2013-2015
Long term monitoring of rangeland ecosystem functions on the Mattheis and Kinsella Research Ranches	Dr. Cameron Carlyle	\$18,700	2013-2015
Effects of grazing on methane production and oxidation in soils of the Mattheis Ranch	Dr. Scott Chang	\$20,000	2013-2015
Oasis on the prairie: quantifying and characterizing water resources on the Mattheis Ranch - preliminary groundwater assessment	Dr. Miles Dyck	\$20,000	2013-2015
A proposal to conduct baseline archaeological research on the Kinsella and Mattheis Ranches	Dr. Jack Ives	\$20,000	2013-2015
Tools to guide management of invasive species in rangeland ecosystems	Dr. Ellen Macdonald	\$20,000	2013-2015

## 5. Financial Overview

In 2013-2014, the Rangeland Ecology and Management Fund (REMF) was approved to be established as an endowment, which will serve as a critical source of long-term funding for rangeland research being conducted at the U of A. The SAC approved an initial contribution of \$700,000 of the institute's 2012-2013 income to this fund; however, growing the endowment through external contributions will be a priority moving forward.

A summary 2013-2014 financial statement for the RRI is provided in Appendix I. This statement includes a review of income, primarily surface lease revenue from oil and gas activity and utility development, as well as expenses. Expenses include costs associated with communications and the administrative operations of the RRI, research support, and the direct cost associated with the RRI Competitive Grants Program.

## 6. Capacity Building

Given the broad mandate of the RRI, and the significant opportunities represented by the institute's large land base and by the creation of the REMF, the institute is in a position to become the foremost centre for rangeland research in Canada. However, to effectively meet this goal, the RRI must continue to strategically prioritize the areas in which it wishes to build capacity. According to the SAC-designated subcommittee, critical elements of the institute's capacity to achieve its mandate include the physical land base and complementary infrastructure that the RRI has regular access to, the scientific and technical expertise of RRI-affiliated researchers, and the institute's ability to translate research results into best management practices and to deliver effective extension programs.

In 2013-2014, the RRI focused on opportunities for building and ensuring the integrity of its physical land base. Specifically, opportunities are being explored to 1) place a conservation easement on the Mattheis Research Ranch, and 2) re-designate the former Agriculture and Agri-food Canada (AAFC) facilities at Stavely and Onefour, Alberta, as collaborative Agricultural Research Stations under the joint responsibility of the University of Alberta (RRI) and the Province of Alberta (Alberta Environment and Sustainable Resource Development). A conservation easement would insure that the institute's flagship property is doubly protected from future development and is consistent with the vision to maintain a working cattle ranch supporting research, teaching and outreach activities, while providing the RRI with significant financial

resources to support ongoing activities of the RRI in the long-term. Similarly, maintaining a research presence at the former AAFC research stations would allow the perpetuation of an outstanding legacy of rangeland research being conducted in western Canada, and would significantly expand the RRI network of facilities, allowing researchers to test questions in an even wider range of environments.

Moving forward, the RRI aims to develop connections with more individuals from more research units at the U of A and elsewhere to extend their research programs to rangeland ecosystems. Additionally, the RRI will explore opportunities to build the institute's expertise and activities related to cow-calf production systems, rangeland hydrology, reclamation, and the quantification and policy implications of the provisioning of ecological goods and services from rangelands. Finally, given the importance of transferring research results to rangeland professionals and practitioners, opportunities to expand the institute's capacity to deliver extension programming, either through the hiring of a dedicated extension professional, or through collaboration with other agencies, will be explored.

## Appendix I. RRI Financial Statement of Actuals, April 1, 2013 to March 31, 2014

	Actuals
<b>Opening Balance</b>	\$ 1,065,722
<b>Revenue</b>	
Lease Revenue/Other	\$ 515,579
Utility Right of Way	\$ 68,317
<b>Total Revenue</b>	<b>\$ 583,896</b>
<b>Expenditures</b>	
Academic Assistant	\$ 61,206
Temp Support Staff	\$ 15,148
Benefits <sup>1</sup>	\$ 1,066
Lease Consultant	\$ 7,585
Supplies	\$ 11,589
Hospitality	\$ 2,422
Property Taxes	\$ 2,126
Travel Expenses	\$ 7,996
Rentals and Leases	\$ 17,205
Equipment	\$ 1,192
Research Projects	\$ 55,400
<b>Total Expenditures</b>	<b>\$ 182,936</b>
<b>Net</b>	<b>\$ 1,466,682</b>
<b>Net Adjusted Benefits</b>	<b>\$ 1,467,748</b>

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<sup>1</sup> University adjusts for benefit variance at year end

*Note: This summary excludes U of A (in-kind) support to the RRI through academic staffing, which is currently valued at over \$250,000 annually*