

Value Report

2012-2013

Prepared for
Achievements Supporting Oil and Gas



This value report is a collection of accomplishments of Foothills
Research Institute (fRI) Programs and Associations

This report is for the period April 1, 2012–March 31, 2013

Published June 1, 2013



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Research Growing Into Practice



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Research projects that provide industry and governments with information to better manage ecological issues of concern are a priority for the oil and gas industry. fRI brings value to the oil and gas industry by ensuring effective, efficient research through collaboration with other sectors on land-use related issues, and by providing knowledge and tools applicable in Alberta and beyond. This report showcases the achievements of our programs and associations from April 2012 to March 2013.





Alberta Land-use Knowledge Network

Launched in 2011, the Alberta Land-use Knowledge Network is an online resource that contributes to effective land-use planning, analysis, and decision making across the province. It provides access to high-quality, relevant, trusted information and resources and sparks conversations about land-use challenges and issues. It also supports the many networks, organizations, and individuals involved in land-use issues and provides them with technologies, resources, and information management.

The Land-use Knowledge Network provides information on a broad range of topics of interest to oil and gas, including tailings pond issues, reclamation, and water and air quality monitoring. By attending conferences and recording presentations that are then posted in video format, arranging events, and sourcing information from the Internet, it delivers insight and emerging ideas about today's challenges.

"We try to cover topics of interest to our stakeholders, such as air-quality monitoring for oil and gas companies and urban agriculture for government. By gathering the information, we provide a source of high-quality knowledge that people can use as a reference when making decisions."

—Terri McHugh, program lead

Achievements

- Developed and launched a Flipboard magazine to give land-use managers an easy way to find online resources
- Information is pulled from thousands of sites and delivered to users in a way that allows them to scan and review important recent news and insights in as little as 10 minutes a day.





Caribou Program

Launched in January 2013, the Caribou Program undertakes research to generate solutions-oriented caribou-related research that can be used to recover this at-risk species. It will provide science-based knowledge to support policy for landscape management and caribou conservation, helping the oil and gas industry by ensuring that all stakeholders are managing an ecological issue of concern. The end value to industry is the ability to maintain the social licence to operate while demonstrating good environmental stewardship.

The program will be using innovative technologies, such as LiDAR, to better understand the landscape from the caribou perspective. Government will be able to use the information in range planning while forestry and oil and gas can use it to inform science-based restoration of caribou habitats across their ranges and minimize disturbance to existing caribou habitat.

Achievements

- Interacted with individuals and groups currently researching caribou in Alberta, met with partners, and attended workshops, meetings, and conferences to determine partner needs, priorities, and questions
- Selected and secured funding for two projects to be done in collaboration with the Grizzly Bear Program to begin in May 2013
 - The first will assess the effect of forest regeneration of seismic lines on animal movements.
 - The second will assess the effect of forest regeneration of cutblocks on animal movements, and initiate non-invasive population monitoring of caribou herds using fecal collections.
- Hired Dr. Laura Finnegan, who has done leading-edge research on caribou and worked with academics, industry, and government, to lead the program





Foothills Growth and Yield Association

The Foothills Growth and Yield Association (FGYA) works to continually improve the assessment of the growth and yield of lodgepole pine in managed stands. Understanding growth and yield is critical for effective management and the long-term sustainability of forests. The FGYA contributes to the creation of healthy ecosystems and the protection of our forest resources, including habitat for species at risk. It generates science-based knowledge about tree growth that can be used to enhance the productivity of the forest to help the oil and gas sector mitigate its impact on the landscape.

The FGYA's main project is the regenerated lodgepole pine trial, which began in 2000 and continues today. It tracks tree growth from harvest and provides the forestry industry with knowledge to help improve the management of Alberta's forests.

Achievements

- Released *Regenerated Lodgepole Pine Trial: 10-Year Crop Performance Report*, prepared by Dick Dempster, research and development associate, FGYA, to provide forestry companies and other interested parties with knowledge about trends in natural regeneration and the mortality of plant seedlings
- Did field work and analyzed data for the ongoing regenerated lodgepole pine trial
- Completed updates to the regenerated lodgepole pine model
- Held a field tour and invited all four of the province's growth and yield associations to talk about the results of the trial and how they can be applied to improve forest management
- Held a workshop with FGYA members that focused on specific questions related to the results of the trial and the implications for best practices in management
- Prepared a draft discussion paper describing suggestions for how the trial results can be applied to forest management
- With the Mountain Pine Beetle Ecology Program, completed a decision support tool to help forest managers make decisions about treating stands that have been attacked by the mountain pine beetle, and monitored 42 permanent sample plots attacked by the beetle



Foothills Landscape Management Forum

An association made up of forestry and oil and gas companies, the Foothills Landscape Management Forum (FLMF) is advancing integrated land management in the province. Through the FLMF, industry and government work together to collectively reduce the impact of resource extraction on values such as recreation, watersheds, woodland caribou, and grizzly bear in order to maintain social licence and access to resources.

“As a result of FLMF activities, we will continue to benefit economically knowing that development is done in a more sustainable manner and in ways that look after other values. Ultimately, integrated land management will contribute to maintaining Albertans’ high quality of life while improving how we manage the forest.”

—Wayne Thorp, managing director

Achievements

- Implemented integrated land management planning to reduce industrial footprint more than can be done when “planning as you go”
- Completed phase one of the Berland Smoky Reclamation Plan, a landscape-level plan that outlines a process to manage access within caribou and grizzly bear ranges over time and space
- Developed a proposal for innovative management of issues (e.g., caribou, grizzly bear, anthropogenic footprint) for one million hectares in west-central Alberta—the Berland Smoky Regional Access Development Plan, which was submitted to Alberta Environment and Sustainable Resource Development in April 2013
- Provided an up-to-date “as built” dataset of lineal disturbances for the Berland Smoky region so that the oil and gas sector and others on the landscape have factual information on which to base decisions
- Developed the methodology and collected a vegetation inventory for all historical lineal disturbances for the A La Peche and Little Smoky caribou range using LiDAR technology
 - The results will be used to demonstrate natural recovery of vegetation and determine where potential restoration can be applied, and the methodology will be used to support research done by other fRI programs to protect at-risk species.

As of 2013, the FLMF has inventoried 45,799 roads in west-central Alberta, giving industry and government factual information for making decisions.



Foothills Stream Crossing Partnership

An independent, industry-driven program, the Foothills Stream Crossing Partnership (FSCP) focuses on improving the management of stream crossings to ensure fish passage. It takes a unique approach that allows crossing owners from the forestry and oil and gas sectors to work together, strategically investing resources to maximize the benefits to the environment and to transportation infrastructure.

The FSCP provides industry with specialized expertise in stream crossing management and trains representatives from member companies to use its inspection protocol. It also maintains an extensive database that member companies use collaboratively to develop watershed management plans so they can prioritize stream crossings for repair based on factors such as fish habitat, fish passage, sedimentation, and government priorities.

The FSCP provides service to member companies anywhere in Alberta, benefiting oil and gas companies that have stream crossings across large sections of the province.

Achievements

- Expanded capacity by training a crew from Aseniwuche Winewak Environmental Services in inspection protocol so they can carry out crossing inspections for companies that are members in the Foothills Landscape Management Forum's Berland Smoky Regional Access Development Plan
- Completed 500 stream crossing inspections between January 2012 and July 2013
- Expanded the partnership's operational area into the Swan Hills region
- Completed a database for creating a tool to show the impact of crossing repair on watershed habitat and risks to fish over time

Forest History Program

Guided by the idea that we can shape our future by learning from our past, the Forest History Program examines landscapes and people's relationship with them from before scientific management began to the present. It has produced four books and a series of reports about the history of forest management in west-central Alberta. The latest is the *TransCanada Ecotours® Northern Rockies Highway Guide*, a well-illustrated driving guide to the landscapes, geology, ecology, culture, people, and history of the Northern Rockies region of Alberta.

The work of the Forest History Program provides well-researched information about ecological issues of concern to oil and gas as it strives to mitigate environmental footprint and maintain its social licence to operate. Most recently, the Northern Rockies Ecotour raises public awareness of ecological issues and how some of these are being addressed by land managers in the Northern Rockies region.

"Our program provides information for policy makers, practitioners, and the general public on historical use and the evolution of adaptive management on the landscape."

—Bob Udell, program lead

Achievements

- Published the *TransCanada Ecotours® Northern Rockies Highway Guide*, which enhances the public's understanding of ecological issues and land management successes





Geographic Information Systems Program

The Geographic Information Systems Program (GISP) works with fRI researchers and partners, applying innovative technologies to store, manipulate, analyze, and communicate data collected by projects. As the spatial scope of some projects now extends beyond the initial land base, the GISP manages ever-larger spatial datasets, including imagery as well as GPS data and general data management. Its work includes data management, spatial analysis, maintaining fRI tools and applications, relational database management, programming, and obtaining data sets for programs and partners.

“We turn data into information that can be used to make better decisions. Having this capability in-house allows us to develop an in-depth understanding of fRI programs and partners, which is very valuable to ensuring knowledge is transferred so it can be used effectively.”

—Deb Mucha, program lead

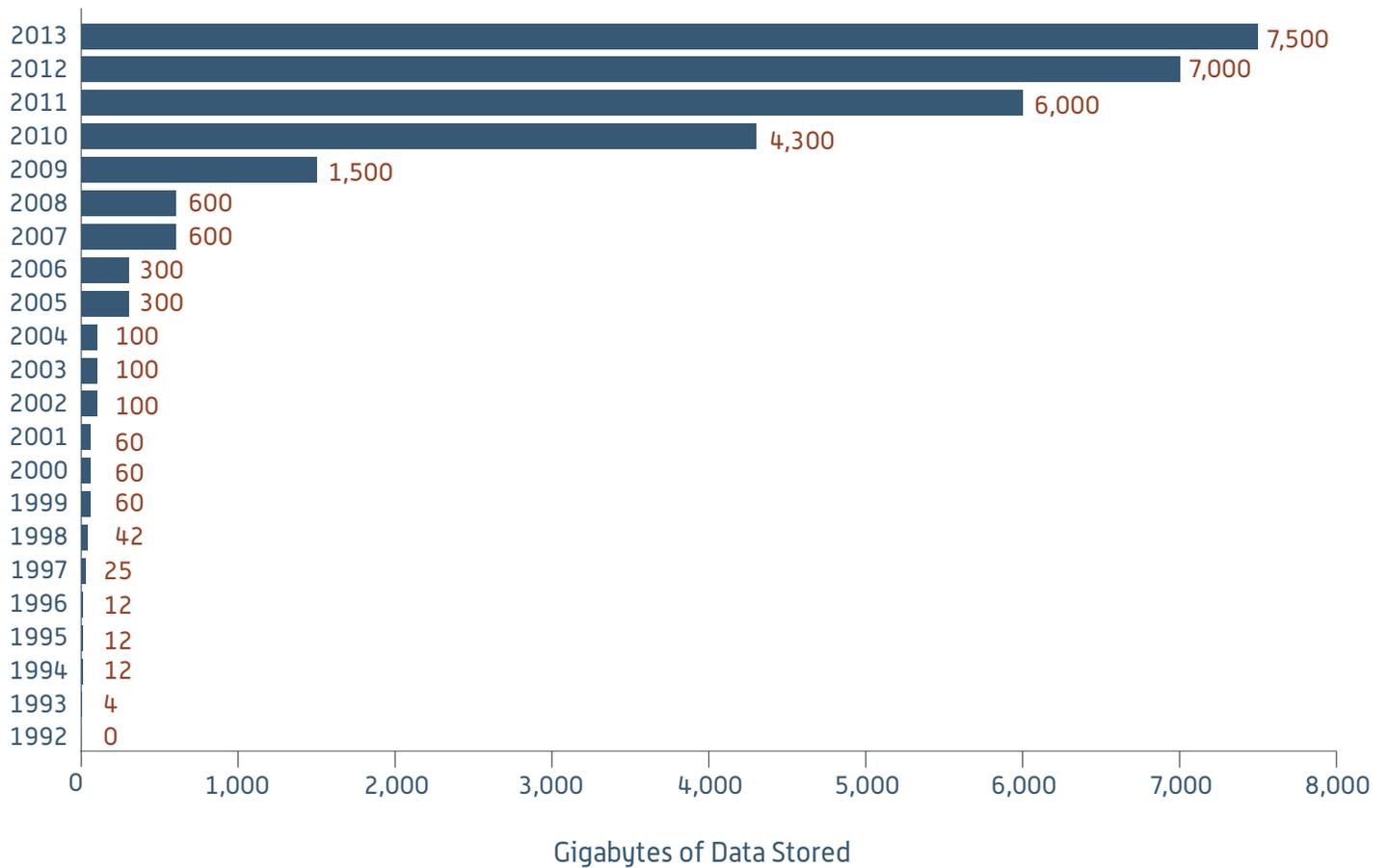
Achievements

- Completed the Grizzly Bear Research Database and worked on the Grizzly Bear Program’s pipeline project using LiDAR technology to support the recovery of grizzly bears in the province with science-based data
- Maintained and updated grizzly bear tools in Python
- Worked closely with the Communications and Extension Program on the Forest History Program’s *TransCanada Ecotours® Northern Rockies Highway Guide* app to raise public awareness of ecological issues and how some of these are being addressed by land managers in the Northern Rockies region
- Assisted the Water Program with the Oldman watershed cumulative environmental assessment to support improved land management and manage issues of ecological concern to industry
- Ensured that the GISP can effectively meet stakeholder needs by hiring a new GIS technician, updating GIS policy and procedures, and implementing a new contract with fRI’s cloud IT provider





fRI Data Holdings through Time





Grizzly Bear Program

The research conducted by the Grizzly Bear Program and the data generated by the many projects within this program will guide and impact grizzly bear recovery efforts in Alberta. The research team is working on three primary projects that will provide science-based tools, models, and knowledge that can be used by those in land management and policy creation to help recover grizzly bear populations to a sustainable level and minimize the impacts of human activities on this provincially threatened species.

The Grizzly Bear Program brings significant value to the energy sector by providing knowledge and tools that help industry improve environmental stewardship, thereby maintaining its social licence to operate. For example, with continued development and expansion of oil and gas pipeline operations in grizzly bear habitat, it is important to gain an understanding of the potential impacts of pipeline development on grizzly bears and to address possible mitigation strategies where needed.

Achievements

- Completed the first year of a project titled “Grizzly Bears and Pipelines: Response to Unique Linear Features,” funded by the Alberta Upstream Petroleum Research Fund
 - Results will help the energy sector and resource managers understand and predict how grizzly bears may use and respond to pipeline rights-of-way.
 - Research findings will serve to inform those planning and building pipelines of possible mitigation strategies to minimize impacts on grizzly bears and their habitats.
- Completed the first year of a three-year project titled “Research to Support Recovery and Long-Term Conservation of Grizzly Bears in Alberta”
 - Results will allow resource managers to understand the capacity of the current landscape to support grizzly bear populations so science-based recovery targets can be set while recognizing the social components of setting these targets.
 - The project will also result in new tools to assess the reproductive performance of grizzly bear populations, enhance our understanding of the potential impact of long-term stress on reproduction, and lead to new knowledge and models to aid in linking changing landscapes to grizzly bear reproduction, stress, and demographics.





Healthy Landscapes Program

The Healthy Landscapes Program (HLP) proposes that the ultimate high-water mark for ecosystem sustainability, health, and resilience is that provided by Mother Nature. The premise is that by aligning our collective cultural activities with those of Mother Nature, we are less likely to lose valuable ecosystem services, and more likely to maintain a sustainable flow of all values.

The concept is a game-changing natural resource management paradigm. It is a gathering mechanism for all land management activities, including forest management; energy sector management; and water, wetlands, and wildfire management. In the end, it offers a strategic and scientifically defensible baseline for everyone, which translates into a defensible biological foundation, social licence, access to markets, and cost savings.

This innovative concept has thus far attracted 13 industry, government, and NGO partners across four provinces and territories.

“So-called *cumulative effects* are an artifact of our current management policy framework, in which natural resources are allocated to various stakeholders via various disconnected tenure policies. By artificially separating naturally linked ecosystem elements, such as timber, caribou habitat, and water, we created the responsibility to manage cumulative effects. The healthy landscapes approach suggests imposing natural pattern benchmarks as the ultimate measure of sustainability across all jurisdictions and across all managers. Understanding and testing the veracity of natural patterns allows us to do that.”

—Dr. David Andison, program lead

Achievements

- Prepared the first draft of a comprehensive communications and education plan and the first draft of a natural pattern demonstration co-op proposal
 - This work paves the way for HLP activities designed to increase understanding of ecosystem-based management and demonstrate its effectiveness.
- Completed the first full field season for the Fire, Water, and Climate Project to understand historical disturbance dynamics in Alberta’s foothills
 - The hypothesis is that the current forest is vastly different than at any time during its preindustrial state, largely due to fire-control impacts. If so, proactive policies might help mitigate the increasing risks of water quality, wildfire risk, or mountain pine beetle infestation.
- Published papers on subjects that give oil and gas a greater understanding of natural disturbance patterns, which can be used to ensure sustainable reclamation
- Made NEPTUNE available to shareholders online, offering those involved in reclamation the opportunity to see how human disturbance activities compare to natural disturbances that took place in the past
 - NEPTUNE captures and compares disturbance patterns of any spatial input file at any scale with NRV for 10 key metrics.
- Began defining a closer relationship with Ecosystem Management Emulating Natural Disturbance (EMEND)





Mountain Pine Beetle Ecology Program

The Mountain Pine Beetle Ecology Program engages in research, knowledge transfer, and collaboration to better understand emerging aspects of the effects of mountain pine beetle infestations in the pine forest regions of Alberta. The program is guided by an activity team representing government and the forestry sector, but it indirectly brings value to the oil and gas sector by providing science-based knowledge and tools used to better manage ecological concerns.

“The knowledge we generate will allow for more effective management and protection of habitat for species at risk, such as grizzly bear and caribou, by helping land managers restore stands in ways that provide key habitat requirements.”

—Keith McClain, program lead

Achievements

- Identified four research themes and specific questions to answer under each theme, which will ensure that the program is providing highly relevant information and tools
- Completed a study and two research projects to gain a better understanding of mountain pine beetle biology and impact in Alberta
- Held the 2012–13 Research–Practitioner Information Exchange Forum, giving practitioners and scientists an opportunity to discuss their respective questions and leading-edge research relative to the control and management of the mountain pine beetle





Tree Improvement Alberta

Tree Improvement Alberta (TIA) brings together the provincial government and forest companies involved in forest genetics and tree improvement to deliver the Tree Species Adaptation Risk Management Project funded by the Climate Change and Emissions Management (CCEMC) Corporation. TIA is determined to address climate change adaptation in Alberta's forest management policies and practical work on the ground to maintain healthy forests. By doing so, the project will help ensure the sustainability of fish and wildlife, tourism and recreation, biodiversity, and water, and help ensure the long-term success of industries that rely on these values.

"The oil and gas sector needs tree seeds that are adapted to the climate of the future to successfully reclaim the oil sands and other energy-developed areas. Climate change will not only reduce forest productivity but also the survival and successful regeneration of planted trees and shrubs. TIA's project will help oil and gas companies find seed and clones that are likely to succeed in reclamation, helping them maintain social licence."

—Daniel Chicoine, program lead

Achievements

- Consolidated regional field-test growth data into a provincial database and did preliminary data analyses from the perspective of climate change and climatic adaptation
 - Results will inform policy related to deployment of material for reclamation and reforestation, determine the appropriateness of current breeding regions, and inform government of the potential need for revised breeding-region boundaries.
- Developed a risk assessment template and applied it to evaluate the climate change risk exposure of 25 tree improvement programs; completed 23 of the 25 programs
- Identified and began developing four new provincial test sites for assessment of species survival, health, and growth in drier and colder environments than previously tested
- Through TIA, the CCEMC project hosted an annual workshop and a field tour, strengthening relationships with the University of Alberta, the Alberta Biodiversity Monitoring Institute, Alberta Innovates Bio Solutions, and the novaNAIT Boreal Research Institute to create awareness of the potential economic and environmental consequences of climate change
- Conserved genetic material of species that might be threatened by climate change
- Provided information to inform policy, allowing for consideration of assisted migration to speed up movement of genetic material into the north and to higher elevations



Water Program

The Water Program is improving the sustainable management of Alberta’s land, water, and resources. Through research, communication, and partnerships, it develops and delivers science-based tools and knowledge to help the oil and gas sector better manage ecological issues of concern, protect our water resources, maintain social licence, and meet commitments related to environmental sustainability.

“The value that the Water Program brings to our partners and to all Albertans is that we are providing the knowledge to improve management collectively on a watershed for all the watershed values Albertans enjoy. It doesn’t matter that everyone is working on a particular land base. By taking a cumulative effects approach, we can address management challenges.”

—Dr. Axel Anderson, program lead

Achievements

- Gained the implementation of a watershed assessment procedure to address cumulative impacts and developed base data for the headwaters of the Oldman watershed to test the usefulness of the NetMap tool for watershed assessments, providing tools to proactively manage those watersheds with a high industrial footprint so industry can continue to operate
- Completed analysis and produced a paper on changes to water flow in the Eastern Slopes as a result of climate change scenarios, providing science-based knowledge to support effective cumulative effects management in the future
- Led a special session at the 2013 Joint Scientific Congress: Bridging Environmental Science, Policy and Resource Management in Saskatoon, held three workshops, and published five papers to share knowledge and best practices
- Worked closely with the Foothills Stream Crossing Partnership, University of Alberta, and Grande Prairie government to investigate the effect of culverts on fish communities and provide industry with innovative ways of prioritizing culverts for removal

