Value Report
2012-2013

fRI foothills
RESEARCH INSTITUTE
Research Growing Into Practice

Contents

Albertans benefit in many ways from the activities of fRI's programs and associations. By providing knowledge and tools to better manage ecological issues of concern and improve environmental stewardship, fRI brings value to government, forestry, oil and gas, and all of those who want to protect our valuable resources. This report showcases the achievements of our programs and associations from April 2012 to March 2013.

Alberta Forest Growth Organization

The Alberta Forest Growth Organization (AFGO) is expediting and coordinating the development of a recognized, secure, well-funded forest growth and yield sector in Alberta. The goal is to be able to effectively and efficiently address emerging issues in all of the province's natural resource management sectors that require growth and yield knowledge and expertise.

AFGO is member-driven, so all its activities are designed to bring value to its forestry partners. It also provides a venue for discussing and solving technical forest management issues.

Achievements

- Re-established priorities and set direction
- Identified two initiatives to focus on
  - The first is a provincial growth and yield initiative that cooperatively collects data that is used for developing growth models and yield cycles. Individual companies save money because they won't have to collect as much data as they have in the past, resulting in cost savings, and data will be available for developing growth and yield models.
  - The second initiative is a strata subcommittee that provides recommendations for how to use data collected through the Reforestation Standards of Alberta in the forest management planning process. This initiative facilitates development of forest management plans by developing procedures and making recommendations to government.

- Began discussions with Alberta's three other growth and yield associations to explore how all the associations might be restructured to allow for a more coordinated and effective approach to managing growth and yield research

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.

"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 government improve the management of Alberta's public lands, forests, fish, and wildlife. For industry, the research done by the Caribou Program provides knowledge that allows for better management of an ecological issue of concern and demonstrates 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 and the many benefits that Albertans receive from them. By helping to ensure that forests in the province and beyond are managed sustainably, the FGYA contributes to the creation of healthy ecosystems and the protection of our forest resources.

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 with silviculture planning. With a better understanding of early growth and mortality, industry is able to make strategic decisions about reforestation.

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 planted seedlings
- Did field work and analyzed data for the ongoing regenerated lodgepole pine trial
- Completed updates to the regenerated lodgepole pine model FRIPSY
- 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 forest 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 dataset of lineal disturbances for the Berland Smoky region so that government and industry 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.
  - This work will also inform Government of Alberta caribou-range planning projects and help forest and wildlife managers determine the natural recovery rates of vegetation on lineal disturbances and the effect on animal behaviour.
  - It will also be used to determine what types of restoration activities should be carried out and where.

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 and government 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.

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 historical context to the challenges facing land managers and those consulting with Aboriginal groups. It also provides park managers and others in tourism with tools and information for enhancing visitor experience and public appreciation.

"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*
- Supported Dr. Peter Murphy's continuing studies of the history of logging and travel up the Whirlpool River
- Produced *A 50-Year History of Silviculture on the Hinton Forest 1955–2005: Adaptive Management in Practice*
- Supported the work of Dr. Murphy, Tom Peterson, and other volunteers who are relocating and mapping the original route of the Columbia Trail used by Express brigades in the 19th century
  - The Columbia Express was recently declared a National Historic Event, so it is important to pin down exactly where it went through Jasper National Park
  - This work is also supported by fRI's Geographic Information Systems Program

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. Its work includes data management, spatial analysis, maintaining fRI tools and applications, relational database management, programming, and obtaining datasets 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."
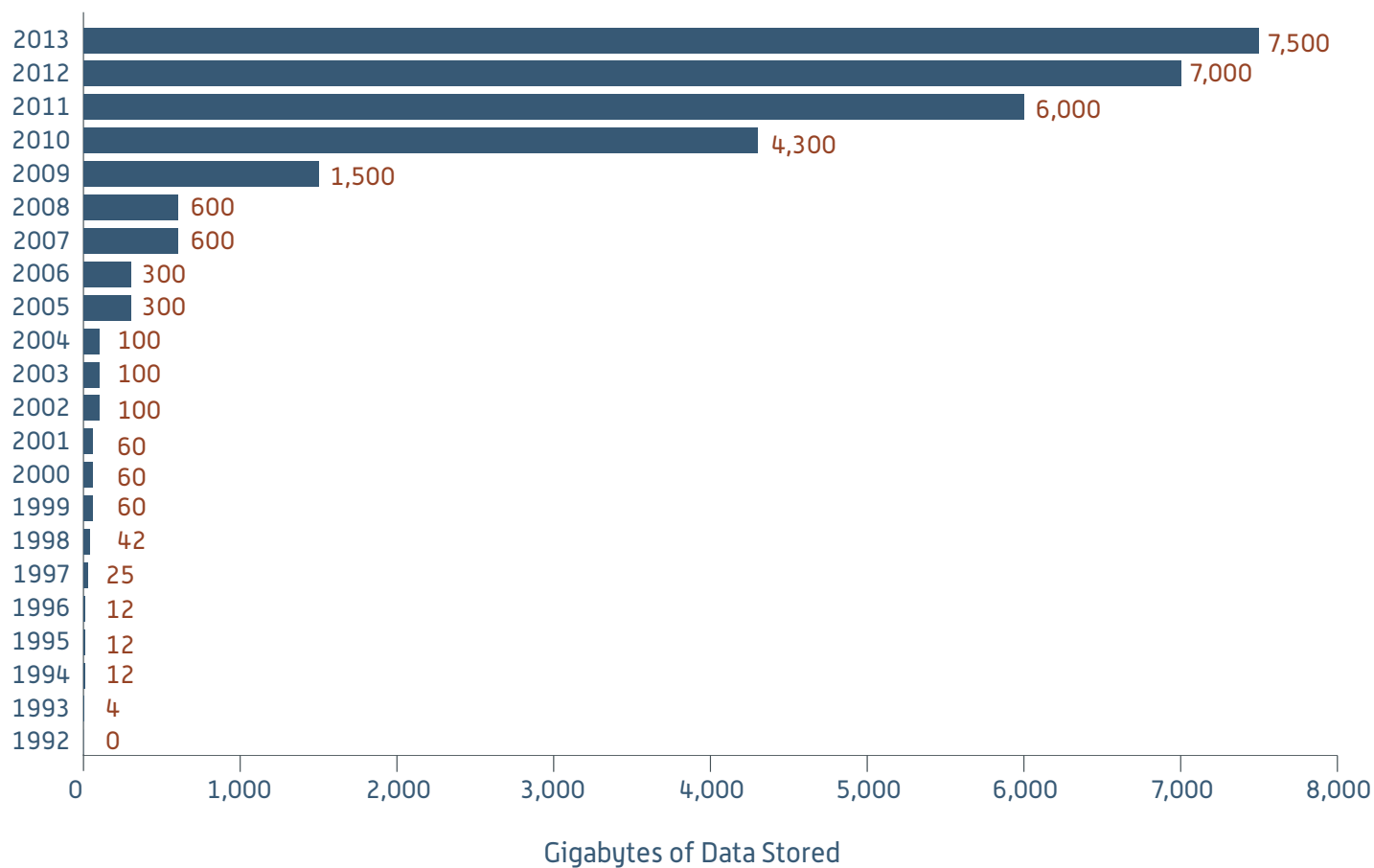
—Deb Mucha, program lead

Achievements

- Completed *Acquiring an Improved Understanding of Willmore Wilderness Park Visitors*, a three-year project sponsored by Alberta Tourism, Parks and Recreation
  - The project gives the government a better understanding of Willmore Wilderness Park visitors and of innovative, emerging technologies that can be used in outdoor recreation areas across Alberta and around the world
- Completed the Grizzly Bear Research Database and worked on the Grizzly Bear Program's pipeline project using LiDAR technology
- Worked closely with the Communications and Extension Program on the Forest History Program's *TransCanada Ecotours® Northern Rockies Highway Guide* app
- Assisted the Water Program with the Oldman watershed cumulative environmental assessment
- Provided data management and reporting to the Foothills Landscape Management Forum
- Filled numerous data requests and data-sharing agreements
- Adapted and organized LiDAR imagery for fRI and created various Internet mapping tools for fRI's new website and the ecotour.
- Updated fRImap data layers and metadata
- 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
- Provided exceptional day-to-day GIS and data management support for FRI staff and researchers

fRI Data Holdings through Time

Year	Gigabytes
2013	7,500
2012	7,000
2011	6,000
2010	4,300
2009	1,500
2008	600
2007	600
2006	300
2005	300
2004	100
2003	100
2002	100
2001	60
2000	60
1999	60
1998	42
1997	25
1996	12
1995	12
1994	12
1993	4
1992	0

Gigabytes of Data Stored

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.

Achievements

- 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.
- Completed the first year of a two-year project titled "Research and Applied Tools to Enhance Forest Management Linkages to Grizzly Bear Conservation and Recovery in Alberta," which is exploring how bears use forest cutblock edges and retention patches
  - The results will help direct the design and planning of cutblocks and retention patches to enhance grizzly bear habitat and potentially reduce human-caused mortality for population recovery, and aid in forest management and planning in Alberta's grizzly bear range.

- 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.

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 defendable baseline for everyone, which translates into a defendable 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
- Published papers on subjects that give partners a greater understanding of natural disturbance patterns, which is being used to inform policy related to issues such as integrated planning, cumulative effects, and ecosystem health and can be used by industry to improve land management practices
- Made NEPTUNE available to shareholders online so land managers can see how human disturbance activities compare to natural disturbances that took place in the past
- 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 throughout Alberta. Government and the forestry sector use the science-based knowledge and tools it generates to inform decision making and support policy development to better manage the impact of the beetle and to find solutions to the challenges created by infestation. Benefits to the oil and gas sector are indirect and reflect the value the program brings to all Albertans—protecting the health of our forests today and for future generations.

"The spread of mountain pine beetle is happening very quickly. Being dedicated to research in this area, we stay on top of emerging issues to help government and industry proactively manage the accompanying challenges. We're also able to bring the right people together to address the problems and find answers to our partners' pressing questions."

—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
- Worked with the Foothills Growth and Yield Association and industry to enhance a decision support tool for forest land managers

- Completed a series of comprehensive studies on mountain pine beetle biology and its impact on the landscape, producing information that demonstrates how hydrology and vegetation change following impact, to assist in developing appropriate strategies to rehabilitate affected pine stands
- 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, benefiting all Albertans.

"There is tremendous value in achieving our long-term goals of sustaining fibre productivity, maintaining healthy forest ecosystems, and conserving species and populations that may be threatened by climate change."

—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
- 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

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 ensure healthy ecosystems, better manage ecological issues of concern, and protect our water resources, as well as to help government and industry 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
- Developed base data for the headwaters of the Oldman watershed to test the usefulness of the NetMap tool for watershed assessments
- Completed analysis and produced a paper on changes to water flow in the Eastern Slopes as a result of climate change scenarios
- Developed a procedure for using watershed value when prioritizing stands for silviculture treatment for reforestation
- Communicated information to practitioners through a special session at the 2013 Joint Scientific Congress: Bridging Environmental Science, Policy and Resource Management in Saskatoon; three workshops; and articles in the journal *Streamline*

- Worked closely with the Foothills Stream Crossing Partnership, University of Alberta, and Grande Prairie government to investigate the effect of culverts on fish communities
- Was part of an academic team that wrote a successful Alberta Innovates proposal that will bring together researchers from Ontario, the U.K., and Alberta to investigate the costs/benefits of forestry on a comprehensive range of watershed values in the Eastern Slopes