



Forum Summary
CMI Annual Researchers' Forum

October 18, 2019
Golden Seniors Centre, Golden BC

Every year CMI members get together to provide updates on their projects, catch up on each other's news, learn about what's happening in the different parts of our region, and have a few field trips. It's an informal atmosphere and non-CMI members are always welcome.

This year thirty people gathered at Golden's Senior Centre. We heard nine talks, viewed three posters, and participated in two field trip options.

A big **thank you** to everyone who took the time to share their work with us and for the important work you do. Thank you to Brendan Wilson who volunteered to MC the forum.



PHOTO: Brendan Wilson

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Oral presentations (in order they were presented)

1. Adapting Landscapes to a Changing Climate: Kootenay Carbon-Silviculture Project

Presented by:

Amanda Asay, MSc., PhD Candidate, University of British Columbia.

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Co-Author:

Deb MacKillop, FLNRORD – Kootenay Boundary Region

The Kootenay-Boundary Region is a dominated by forested landscapes. As the climate and societies' values change, natural resource practitioners are challenged to find ways to adapt landscapes to these new realities. This 3-year project funded by FLNRORD and the Forest Carbon Initiative will develop tools for natural resource managers and practitioners to make climate-adapted decisions by:

- Assessing the carbon storage and sequestration potential from various levels of partial cutting
 - This will be done by utilizing long-term growth and yield measures, collection of 25-year growth and yield remeasurements as well as collection of new carbon pool data from woody debris and soil sampling.
- Evaluating trade-offs between management of carbon and other values (timber, wildlife, visuals)
- Assessing different levels of risk associated with loss of carbon and other values across different partial cutting treatments (e.g., high retention, vs low retention, vs clearcut)
 - This includes forest health, wildfire, wind, etc
- Developing guidance, decision support tools, and best management practices that address variability across ecosystems, costs/benefits, risks, and tradeoffs

Integrating the growth and yield data from the existing long-term research projects including the trial at Mount 7 in Golden, BC focused on here as well as a sister trial near Nakusp, BC and a similar partial cutting trial near Cranbrook, BC with the collection of new data from dormant trials, yet to be determined, to expand the climate gradient and management approaches will allow us to address the upcoming need for these management tools.

Observation and previous preliminary results have shown where some of the differences can be found 25 or 15 years post-harvest between different treatment types.

Not only a change in volume, and thus carbon, can be seen but also in the way that volume is distributed in the number of stems (density).

From here we will take the information gathered from all assessments, integrate it for time and per each site and final evaluate how these types of partial cutting address different values. Prioritization of completing values is likely to occur but the goal is to develop guidance and decision support tools to inform best management practices to take into account the variability and help to assess costs/benefits, risks, and tradeoffs.

Biographical notes

Since the forum, Amanda Asay completed her PhD at UBC where she researched communication and below-ground resource exchange between genetically related and unrelated trees. Amanda has continued this work with BCCF and FLNRORD as a silvicultural systems researcher. Deb MacKillop is the Research Ecologist for Kootenay Boundary Region.

2. Assisted Migration Adaptation Trial (AMAT)

Scott King, SSc., RPF, Louisiana Pacific Canada Ltd.
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Approximately 240 million seedlings are planted in British Columbia each year. When those trees are harvested 60 to 80 years after they are planted, the climate could be 3 or 4 degrees warmer than when the seedlings were planted, exposing the trees to maladaptation and health risks. Consequently, government researchers have initiated a large, long-term climate change research study: the Assisted Migration Adaptation Trial (AMAT). The AMAT helps forest managers understand tree species' climate tolerances so they can select seed lots best adapted to current and future climates.

Scott shared the premise and rationale of this government [study](#) and shared his anecdotal experience and observations as long-time silviculture lead for Louisa Pacific.

Biographical notes

Scott King currently works with Louisiana Pacific Canada Ltd. as a silviculture forester, he holds a BSc from U of Toronto, maintains his RPF. He is highly regarded for his many years' experience in the forestry sector and his interest, and for his support of and interest in continuous research to improve industry practices.

3. Using thinning and prescribed burning to mitigate wildfire risk and improve ecological integrity in the greater Okanagan region

Presenter:

John Davies, MSc, Wildfire Management Specialist, Frontline Operations Group
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Co-Authors:

Becky Miller, BSc., MSc., Frontline Operations Group,
Andy Low, Frontlines Operations Group

Present-day conditions in southern BC's dry forests have been shaped by wildfire suppression, harvest activities, European settlement, insect attack, and shifting climate conditions. These factors cumulatively result in landscapes with significant fuel loading, higher densities of trees, and higher proportions of even-aged stands with fewer fire tolerant tree and vegetation species compared to historical conditions. These altered conditions have broadly led to shifts in fire behaviour across inland dry forests of North America, posing a risk to both ecological integrity and communities situated in the wildland-urban interface. Land managers and restoration practitioners are faced with the challenge of mitigating these risks while also improving ecological integrity. However, historical wildfire regimes of BC's dry southern interior are complex making unilateral management strategies and broad ecological benchmarks inappropriate for local or regional land management. The Frontline Operations Group is engaging in thinning and prescribed burning treatments strategically placed within the wildland-urban interface which are designed to reduce extreme fire behaviour by decreasing tree density and fuel loading to levels consistent with historical conditions. Such treatments are currently being promoted across Western North America as ecologically-grounded management strategies as they have been shown to reduce fire severity to levels in keeping with historical regimes. Frontline Operations Group has been employing these strategies throughout the greater Okanagan area to mitigate effects of wildfire in drinking watersheds, Provincial parks, and critical wildlife habitat. This presentation covered some Frontline's current projects, challenges to implementing wildfire mitigation strategies, pressing needs in wildfire research and opportunities for collaborative forest restoration.

Biographical notes

John started his wildland fire fighting career in 1993 with the BC Wildfire Service Rapattack team and left the Service in 2002 to pursue opportunities working in the field of community wildfire protection, prescribed burning, fuel management and ecosystem restoration. He started Davies Wildfire Management Ltd in 2004 and began pursuing his

passion for finding solutions to wildfire risk; a field in which few consultants were working. He has completed dozens of community wildfire protection plans, over \$3 million in fuel management and ecosystem restoration prescriptions and operations and carved out a niche within the field of wildfire management as one of the few RPFs in the province with extensive operational suppression experience. He has a passion for working collaboratively with multiple stakeholders to develop value-based solutions to complex community protection or habitat restoration problems.

4. Providing insight into current bird research taking place in the Columbia Wetlands

Rachel Darvill, BSc., MSc., RPBio, Goldeneye Ecological Services
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Marsh birds are inconspicuous and difficult to detect, consequently sparse worldwide data exists relating to marsh bird species, including population status. Global reports however do suggest that many marsh bird species population status are in decline. The Columbia Wetlands Marsh Bird Monitoring Project (CMMBMP) used a standardised protocol to conduct repeated point count surveys at 65 survey stations. The protocol uses call-back recordings to elicit a response from marsh bird species in the area, increasing the detection rate for marsh birds. Focal birds for this project are the American bittern (*Botaurus lentiginosus*), Virginia rail (*Rallus limicola*), sora (*Porzana carolina*), pied-billed grebe (*Podilymbus podiceps*), and American coot (*Fulica americana*). This project is has been in operation for four-years (2016-2019) allowing for a compilation of baseline inventory data that is being sequentially used to estimate marsh bird populations in the Columbia Wetlands, as well as assess target species distribution, and identify significant breeding areas or habitat types in the wetlands. Data from the CWMBMP have been used to formulate management recommendations for habitat-based conservation projects including establishment of a Wildlife Habitat Area for an at-risk species, wetland restoration, and the installation of nesting boxes in areas where marsh bird breeding habitat is limited.

The Columbia Wetlands Waterbird Survey is a coordinated bird count that utilizes citizen-scientists to gather baseline data. There are many important outcomes of this project, including scientific contributions for numerous species at-risk. Beyond data collection, this community-based project aims to enhance and maintain the biodiversity and habitat of the wetlands through increased awareness (e.g. school-aged education programs) of its ecological significance. By providing an active citizen-science role, volunteers are becoming directly engaged with wildlife and local landscapes, making them better informed to make sustainable personal decisions with positive actions in the wetlands. It is our hope that this data will also result in the Columbia Wetlands being designated as an 'Important Bird and Biodiversity Area' (IBA).

Biographical notes

Rachel Darvill has a passion for biodiversity conservation. Rachel completed her Master of Science degree in 2014 and she has been working as a biologist and environmental consultant since graduating in 2000 with a Bachelor of Science degree in Biology (Minor in Environmental Studies) from the University of Victoria. She is the

principle consultant at Goldeneye Ecological Services and by working with or for several agencies such as Canadian Wildlife Service, Parks Canada, multiple universities, and Wildsight, she has had extraordinary opportunities to study and help conserve wildlife. From working on remote seabird research programs on Triangle Island and Haida Gwaii, an elephant project in Tanzania, grizzly bear research in Alaska and Banff, to aquatic plants and waterbird projects in the Columbia Wetlands, her field research skill set is vast. Rachel currently lives in Parson with her family. She is currently the Program Biologist on the Columbia Wetlands Marsh Bird Monitoring Project and the Columbia Wetlands Waterbird Survey, and she sits as a Director on the [Columbia Wetlands Stewardship Partners](#) and [Wildsight Golden](#). She is also a member of the Steering Committee for the [Kootenay Conservation Program](#).

5. Habitat enhancement recommendations following an assessment of ungulate winter range on the Golden District Rod and Gun Club woodlot

Doug Adama, BSc., LGL Limited
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Doug assessed three blocks (North Bench, Frenchman's Ridge, and Leancoil) that comprise the Golden District Rod and Gun Club woodlot for ungulate winter range values. The assessment included (1) winter snow track surveys conducted to determine winter use of ungulates in the various stand types in the blocks, and vegetation surveys to identify forage cover within the blocks.

High numbers of deer tracks were observed on the North Bench and Frenchman's Ridge blocks ($n = 229$, and $n = 412$, respectively). A set of moose tracks was the only ungulate sign seen in the Leancoil block. As expected, deer selected stands with high crown closure (Douglas-fir stand) in both the North Bench block and Frenchman's Ridge. We found the Provincial ungulate winter range mapping to be a poor predictor for winter ungulate use.

In the North Bench block, forage availability was higher in the old Douglas-fir stands (>140 years old) than in either the mature (80 to 140 years old) or recently harvested blocks (<20 years). At Frenchman's Ridge, forage availability was higher in the seral aspen stands and old Douglas-fir stands than in mature Douglas-fir stands.

Stand structure data supported by a comparison of recent and historical aerial photos indicate that high levels of conifer ingress have occurred in both the lower slopes of the North Bench block and in the seral aspen stands on Frenchman's Ridge. To maintain forage availability and biodiversity in these blocks, we recommend slashing conifer in these habitats and pile burning. We also suggest select-cut harvesting with 80% retention (of basal area) in dense stands of mature Douglas-fir stands to enhance winter habitat for deer.

Biographical notes

Doug Adama is both a biologist and a long-time resident of Golden. Doug has and continues to work on a range of wildlife and ecological studies and projects including species at risk conservation, population monitoring, impact assessments, habitat assessments, habitat modeling, habitat enhancement, and ecosystem restoration throughout British Columbia.

6. Seeing the unseen: using eDNA to revise Rocky Mountain tailed frog range in British Columbia

Presenter:

Ian Adams, MSc., RPBio, Larix Ecological Consulting
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Co-Author:

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Until recently, the Rocky Mountain tailed frog, *Ascaphus montanus*, a species at risk in Canada, was known from Canada to only occur in 19 tributaries and reaches within the Yahk and west-side Flathead River basins of southeast British Columbia. A five-year environmental DNA (eDNA) survey was undertaken to re-assess tailed frog distribution including new drainages, with search efforts focused on tributaries proximal to known extant occurrences. Using a targeted qPCR-based eDNA approach proved more effective than conventional physical search methods. Thirty of 126 sites tested positive for tailed frog DNA (23.8%) including nine samples collected from known extant populations. Thirteen new tailed frog populations (21 sample sites) were identified in five new watersheds: upper reaches of the Wigwam River drainage, Elder Creek, Elmer Creek, Tepee Creek and Gilnockie Creek. Additional stream reaches previously not documented to support tailed frog were also identified within previously known occurrences. Results were used to delineate, map and propose eight new Wildlife Habitat Areas for Rocky Mountain tailed frog and expand several existing WHAs.

Biographical notes

Adams is a wildlife biologist with over 20 years of experience in the East Kootenay Region in a wide variety of capacities. He work has focused primarily on species at risk including this session's topic Rocky Mountain Tailed Frog as well as badger, Flammulated Owl, Common Nighthawk, Painted Turtle and others. He also led the East Kootenay Urban Deer Translocation Trial and has worked with the Rocky Mountain Trench Ecosystem Restoration Program since 2016. Together with Jared Hobbs, Ian co-led the eDNA-based inventory of Rocky Mountain Tailed Frog since 2014.

7. *Liparis Loeselii*, the yellow wide lip orchid in the Golden area

Bryan Kelly-McArthur, retired
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Bryan Kelly McArthur offered an introduction to a very small and easily overlooked orchid common to Golden BC, but otherwise rare in British Columbia known as *Liparis loeselii*, or the yellow wide lip orchid. He took us through this history of known orchid findings and identification efforts to present status. Bryan shared a number of his high-resolution photographs of the orchid in various stages of growth.

Biographical notes

Brian Kelly-McArthur is not a professionally trained botanist but is very involved in such areas and regularly works with with botanists in the field. He is currently involved in rare plant studies and site protections, as well as in macrophotography of plants with over over 3000 images listed on E-Flora BC. Bryan has similar involvement with insects with over 500 images on E-Fauna BC.

8. Minimizing impact of the Phase 4 Kicking Horse Canyon Highway 1 upgrade on a heard of Bighorn sheep living within the construction zone

Jeremy Ayotte, BSc., Phyla Biological Consulting and BC Sheep Separation Program Coordinator

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The Golden and District Rod and Gun Club recently initiated a collaring project on the local herd of bighorn sheep that live just east of Golden, within the project limits for the Phase 4 Kicking Horse Canyon Highway Construction Project. The objectives of this bighorn sheep project are simple – to identify seasonal movement patterns and use these data to inform scheduling of this \$600 million highway construction project to minimize the inevitable impacts of construction, which is planned to begin next year. GPS collar locations will also be used to identify habitat outside of the construction area and develop future habitat enhancement options.

Biographical notes

Jeremy Ayotte is a biologist with his company Phyla Biological Consulting, based in Salmon Arm where he works with a variety of species and ecological systems. Jeremy completed an MSc through The University of Northern BC, researching the ecological role of mineral licks used by moose, elk, Stone's sheep, and mountain goats in the northern Rockies. Recent work includes 6 years as the provincial coordinator for the BC Sheep Separation Program, working to mitigate the risk of respiratory disease transmitted from domestic sheep to wild sheep across BC. Jeremy is also a volunteer ecological reserve warden for a wetland fen complex near his home in the Larch Hills, which is known for its rare assemblage of orchids.

9. Spatial distribution of biodiversity knowledge, and species reintroduction opinions in the United Kingdom

Rajdeep Grewal, MSc

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Natural landscapes are becoming increasingly altered, and conservation science has focused its attention on how habitat alteration is affecting local ecologies, and the species that inhabit them. However, explored less is the effect of natural land alteration on human perception. Within regions of Northern England many species like the hen harrier are facing local extinction, from human avian wildlife conflict, while simultaneously programs to reintroduce extinct species like the pine marten are being established. In this study biodiversity knowledge of local residents within England was assessed, alongside their opinions on species reintroductions, data was then spatially distributed to identify geographical differences in opinions, and areas of biodiversity knowledge gaps. To further understand reintroduction opinions qualitative data was concurrently collected, and assessed using natural language processing techniques, and analysis.

Biographical notes

After completing an Associate's Degree in Creative Writing from Langara College, and her BA in Psychology from Simon Fraser University Rajdeep Grewal moved to England to pursue an MSc in Bird Conservation from Manchester Metropolitan University. During her program Rajdeep was a delegate at the Cambridge Conservation Forum, completed a field study in Tanzania, then travelled to Kenya, where she volunteered with Nature Kenya.

Posters

10. Upper Columbia Basin Groundwater Monitoring Program

Carol Luttmer, Living Lakes Canada

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Groundwater provides many ecological and human services in the Upper Columbia Basin. For example, many residents in the Basin rely on groundwater as a potable (drinking) water source and groundwater discharges to rivers, lakes, streams and wetlands and therefore plays a role in controlling the quantity, quality, and temperature of rivers that aquatic ecosystems depend on. However, we know very little about the distribution and flow of groundwater in the Upper Columbia Basin and how it will be impacted by changing climate conditions. The BC provincial government maintains a Provincial Groundwater Observation Well Network which collects long term data on groundwater levels. Of the 213 active Network Observation Wells in the province of British Columbia, only six are in Upper Columbia Basin. Living Lakes Canada (LLC) is co-ordinating a community-based Groundwater Monitoring Program to increase the availability of groundwater level data in the Upper Columbia Basin. Living Lakes Canada collaborates with stewardships groups, First Nations, local, regional and provincial governments, consultants, academia, and private land owners to identify priority areas and existing wells that can be used for continuous long-term monitoring of groundwater levels. Once a potential well is identified it is assessed to ensure it is in good condition and is appropriate for long-term water level monitoring. Data loggers are then installed to collect hourly groundwater level measurements. Living Lakes Canada staff, contractors, volunteers, or the landowner download the data loggers and collect manual water levels for calibration purposes, following established protocols, at each well approximately four times per year. The data are reviewed and analyzed by LLC and stored in LLC's database where they are analyzed alongside other variables (e.g. precipitation). The data are also currently uploaded to the [BC Real Time Data Tool](#)¹ where they can be accessed by the public. If you know of an important area for groundwater monitoring or the location of a potential well for monitoring, contact groundwater@livinglakescanada.ca.

¹ <https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-science-data/water-data-tools/real-time-water-data-reporting>

Carol Luttmmer Background

Carol Luttmmer is a consultant specializing in water monitoring and management. She has a Bachelor of Science in Water Resources Engineering and Masters of Science in physical geography. Carol has over 20 years of experience working in private, government, academic and non-profit sectors. She has worked on diverse and complex projects including the distribution and bioaccumulation of contaminants in Arctic ecosystems, groundwater infiltration in fractured bedrock to assess the feasibility of deep geological disposal of nuclear waste, and wind erosion and air quality in arid environments.

11. Canadian Columbia Basin *Aquatic* Invasive Species Partnerships and Collaboration

Robyn Hooper, Columbia Shuswap Invasive Species Society
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The Columbia Basin invasive species organizations have become increasingly informed about the seriousness of the threat of invasive mussels and the risks to our aquatic ecosystems and economy. Our water quality, fish habitat, infrastructure, water utilities, beaches, and property value are at risk. If zebra and quagga mussels establish here, its conservatively estimated that it will cost \$43M to British Columbians, and \$500M to the Pacific NorthWest Economic Region to deal with the impacts. These numbers surely do not represent the social and cultural losses should invasive mussels impact salmon stocks. In light of our concern, in the past 5 years, with the support of CBT and provincial funding, the regional invasive species organizations have increased regional education, outreach, and monitoring for zebra and quagga mussels in the Columbia Basin. The four organizations worked closely to deliver these programs within the Columbia Basin (particularly throughout the Canadian Columbia River system), using a variety of communication mediums, in-person boat launch outreach, marina outreach, lake monitoring, and advocating for policy changes at the federal and provincial level. The groups have also worked with a multi-stakeholder Aquatic Invasive Species Steering Committee, which created a Canadian Columbia Basin Aquatic Invasive Species Framework to help guide regional prevention and collaborative efforts. The objective of the poster at the Transboundary conference is to share the successes and challenges of the collaborative, regional, on-the-ground aquatic invasive species prevention strategies for zebra quagga mussels and other aquatic invasive species.

Biographical notes

The Central Kootenay Invasive Species Society (CKISS), East Kootenay Invasive Species Council (EKISC), Columbia Shuswap Invasive Species Society (CSISS) and the Northwest Invasive Plant Council (NWIPC) are regional groups that work in collaboration to address invasive species issues within the Columbia Basin. Each group represents a variety of stakeholders within their jurisdictions that include all levels of governments, non-profits, industry and local residents.

12. Canadian Columbia Basin *Terrestrial* Invasive Species Partnerships and Collaboration

Invasive species are plants and animals not native to B.C. or are outside their natural distribution area. They can spread rapidly, outcompete and predate on native species, dominate natural and managed areas, and alter biological communities. Invasive species can negatively impact B.C.'s environment, people and economy. In the past 5 years, with the support of CBT and provincial funding, the regional invasive species organizations have increased and enhanced regional education, outreach, and monitoring for terrestrial invasive species in the Columbia Basin. The four organizations worked closely to deliver these programs within the Columbia Basin, using a variety of communication mediums, and using a variety of behaviour change programs, such as PlantWise and PlayCleanGo. The objective of the poster at the Transboundary conference is to share the successes and challenges of the collaborative, regional, on-the-ground terrestrial invasive species prevention strategies and education programs.

Biographical notes

The Central Kootenay Invasive Species Society (CKISS), East Kootenay Invasive Species Council (EKISC), Columbia Shuswap Invasive Species Society (CSISS) and the Northwest Invasive Plant Council (NWIPC) are regional groups that work in collaboration to address invasive species issues within the Columbia Basin. Each group represents a variety of stakeholders within their jurisdictions that include all levels of governments, non-profits, industry and local residents.

Field trips

13. Moberly Marsh bird walk

Hosted by: Rachel Darvill, RPBio, Goldeneye Ecological Services (~2.5hr round trip from the Golden Seniors Centre)



Photo credit: Ian Adams

Rachel Darvill and Verena Shaw lead a field trip along the dike at Moberly Marsh to see what birds can be found at Moberly Marsh/Burgess and James Gadsden Provincial Park. Moberly Marsh is an eBird hotspot and birds can be found with high diversity during fall migration, including rare birds such as the Surf Scoter and Short-eared Owl. Rachel highlighted two bird research programs that she has been running in the Columbia Wetlands for the past 4-5 years, the Marsh Bird Monitoring Project and the Columbia Wetlands Waterbird Survey.



14. Mustelid habitat creation

Hosted by: Scott King, BSc, RPF, Louisiana Pacific Canada Ltd.



Photo credit: Hailey Ross

Mammalian response to windrows of woody debris within clear cuts/Planting forests adapted to climate change (Assisted Migration Adaptation Trial). Forest harvesting that leaves woody debris on the forest floor could be piled to create habitat for small mammals and mustelid predators. The hypothesis that woody debris arranged in windrows or small connecting piles increases the abundance of the major vole species and the total abundance, species richness and species diversity of the forest floor small mammal community. Field trip will take place in the Blaeberry area. [Here](#) is a link to the study paper associated with this research by Thomas Sullivan and Druscilla Sullivan.