



Parks Canada: Lake Louise, Yoho and Kootenay Field Unit

Research Update – 2009/2010

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Rare Plant and Amphibian Surveys in support of the BC Hydro Beetle Kill Vegetation Management Program Environmental and Socio Impact Assessment, Yoho National Park.



Principal Investigator:
Norma Powell and Tracey Anderson, Stantec

Objectives: “Amphibian, and rare plant surveys along Distribution Powerline 2552 GDN for purposes of assessing potential effects from proposed Beetle Kill Vegetation Management Program. One field team of two biologists will undertake the surveys. Survey protocols will follow recommended standards. No trapping or capture of species will be undertaken. Purpose of the vegetation management program is to remove trees and stems that are dead or dying (from pine beetle) and which pose a safety hazard to both the public and wildlife (i.e., outages in remote areas, energizing fallen trees and surrounding ground, and forest fires triggered when vegetation contacts live power lines).”

Snow and Glacier Ice Spectral Albedo and Snowpack Characteristics



Principal Investigator:
Alex Gardner, University of Alberta

Objectives: “Under most atmospheric conditions, absorption of shortwave radiation provides the largest energy source for melting of snow and ice. The exact amount of shortwave radiation absorbed is dependent on both the angle and spectral distribution of incident radiation and the surface albedo, both of which are highly variable in space and time.” Researchers will collect related

measurements during a 10 day field campaign on the Bow Glacier.

2009 Kootenay National Park Archaeological Survey and Iron Gates Pictograph Project



Principal Investigator:
Brad Himour, Parks Canada

Objectives: In October of 2009, archaeologists from the Cultural Resources Section (Calgary) of Parks Canada visited the ‘Iron Gates’ pictographs located along Sinclair Creek in the southern part of Kootenay National Park (Figure 1). The three member field crew were joined by Dennis Herman, who provided logistical support and labour establishing a safe working platform, in order for the crew to attempt digital photographic recording of several previously known pictograph locations along Sinclair Creek. Due to the challenging environment of the pictograph locations, which were situated directly above the creek on relatively sheer rock faces, only two of the five previously recorded ‘panels’ of rock art were selected for digital recording in 2009.

CP Created Wetland Enhancement



Principal Investigator:
Joe Humbeck, Canadian Pacific Railway

Objectives: “As part of CP's approval to construct a bank stabilization berm adjacent to Mile 15.2 of their Mountain Subdivision, some small seasonal wetlands were infilled. As compensation for the habitat loss a series of new wetlands were dug. This 2009 work will further enhance these constructed wetlands.”





Hydrological Storage and Pathways in Alpine Headwaters



Principal Investigator:
Masaki Hayashi,
University of Calgary

Objectives: "Most of the rivers in western Canada have their headwaters in the alpine region. The hydrology of alpine headwaters is strongly influenced by the processes involving snow and ice, which in turn are sensitive to climate warming. An increase in air temperature is expected to result in more rain and less snow, earlier snowmelt and later freeze-up, and the retreat of alpine glaciers. While the wastage of glaciers and the shift in the timing of snowmelt and freeze-up are well documented, their effects on river flow regime are not well understood." This project will conduct field studies in Lake O'Hara watershed to characterize the storage and routing of glacier melt, snowmelt, and rain water in streams, lakes, and groundwater aquifers. The field data will be used to develop conceptual and mathematical models of hydrological processes. Such models will provide useful tools for assessing the climate change impacts on alpine lakes and streams.

The Effect of Fuel Treatments on Understory Plant Diversity in the Upper Kootenay River Valley, BC.



Principal Investigator:
Bob Gray,
University of Victoria

Objectives: This terrestrial inventory of species diversity on portions of the Mitchell Ridge Prescribed Burn in Kootenay National Park aims to determine the effect of two fuel treatments, thin and burn and burn only, and two levels of burn severity, low severity and high severity, on understory diversity - using species diversity index as the metric. "The goal is to determine the potential effects of wildfire in mountain pine beetle -affected fuels on understory species diversity."

Quantification of Atmospheric Sulphate and Nitrate Deposition in Western Canadian Mid-latitude Glacier Environments



Principal Investigator:
Vivian Wasuita,
Queens University

Objectives: "The aim of the research is to investigate atmospheric contaminants deposited to Western Canadian mid-latitude glacier environments. The project will focus on atmospheric nitrate and sulphate which have several natural and anthropogenic sources. The aims are to quantify atmospheric deposition; to determine geographic source regions of the contaminants (local or regional point source contaminants vs. long range transported contaminants); and to quantify their main biogeochemical sources. In the Northern Hemisphere atmospheric sulphate is dominated by anthropogenic emissions mainly from fossil fuel combustion and ore smelting. Natural sources include volcanoes, lithogenic dust, wetlands, grass and forest fires, sea salt, as well as emissions from marine and terrestrial animals. Similar to sulphate, fossil fuel combustion and chemical processing are the main anthropogenic sources of atmospheric nitrate. Natural sources include lightning and emanations from surface water, soil, and animal waste. Without quantification of current deposition it is not possible to estimate: the impacts of further urban, industrial, and agricultural development; the impacts of increased development of oil sand and traditional hydrocarbon resources; or the effects of climate change."





Banff National Park Caribou Project



Principal Investigator: *Jesse Whittington, Parks Canada*

Objectives: "Caribou in Banff National Park (BNP) and the Siffleur Wilderness Area represent the southernmost population of Woodland Caribou in Alberta and are listed as threatened under Canada's Species at Risk Act. Historically, 25-40 caribou likely occurred in this area, although less than ten animals have been observed since 1993. In spring 2009, at least four of the five known caribou in BNP were killed in an avalanche. A population of less than ten animals is not self-sustaining and caribou translocations are required if caribou are to persist in BNP. The broad objectives of this study are to further examine likelihood of caribou persistence under several translocation scenarios and to collect baseline ecological information on wolves and primary prey. This baseline information will be used to inform future decisions on translocation and to monitor the effects of wolves and primary prey on caribou survival."

Detecting Range of Natural Variability and Changes in Spatial Patchiness of Forested Landscape in Kootenay National Park



Principal Investigator: *Akira Mori, Simon Fraser University*

Objectives: "It is important to enhance knowledge about natural disturbances in forested landscapes. In Kootenay NP, recent paleological research projects have provided valuable information on vegetation and fire history, and some have suggested a range of natural variability (RNV). Less attention has been paid to vegetation patchiness, such as old-growth forest continuity, and historical changes in such forests due to past fire disturbances in the landscape of Kootenay NP." This project aims to detect how these forest/vegetation spatial attributes were changed due to the severe intensity

fires of 2003, and to check whether the vegetation patchiness changed by the 2003 fires fall within the RNV.

British Columbia Zoonoses Sentinel Animal Health Surveillance



Principal Investigator: *Linda Vrbova, University of BC*

Objectives: "EZ Sentinel Animal Health Surveillance is a public health research project whose aim is to evaluate the potential contribution of animal health practitioners to emerging zoonosis surveillance. Emerging infectious diseases of animal origin that are potential zoonoses are of high importance to human public health. This project will enable the evaluation of animal laboratory data submitted to a publicly-funded provincial laboratory for surveillance, by enabling the calculation of measures such as representativeness, sensitivity, specificity, and timeliness of such laboratory diagnostic data." This surveillance project is limited to the collection of information from birds and mammals from agricultural and large companion animals (poultry, cattle, and swine) as well as from wildlife (deer, raccoons, white-footed mice, bats, beavers and wild birds).





Mount Royal College Collection of Rocks and Construction of a 3D Representation



Principal Investigator:
Katherine Boggs,
Mount Royal College

Objectives: As part of Mount Royal College’s newly incepted Bachelor of Science in Geology program; an instructor will collect a representative suite of rocks for a teaching collection. Future students will benefit from these samples. Additionally the instructor will construct a 3D model of the intersection between the Trans Canada Highway and the Ice Fields Parkway. This intersection is currently under construction as part of the TCH twinning expansion. As layers are removed by blasting for construction, a three dimensional model of this outcrop will be constructed. This will include samples from the different layers and completion of a field description with map and cross sections for the various layers. Results will be presented at various conferences and published in a geological journal. Some of these rocks will also be used for the instructional collection outlined above.

dramatic retreat of glaciers from the Rocky Mountains reflects the earlier loss of the annual snowpack that is the main source of runoff in western Canada. Scientists have projected mean states of future climate and surface water supplies, but there remains a critical research and knowledge gap: the characteristics and causes of short-term variability in surface water balances. The proposed project addresses this knowledge gap by modeling past, recent and future flows of the North Saskatchewan River using methods that capture the natural short-term variability that will underlie the trend imposed by global warming. The purpose of this research project is to develop a 600 year (1500 to 2100 A.D.) record of the hydroclimate of the North Saskatchewan River basin above Edmonton, Alberta. The resulting database and our interpretation of the hydrological cycles and their causes will assist with preparation for the impacts of climate change on water supplies.”

Sedimentology, ichnology and sequence stratigraphy of the Lower Cambrian Gog Group, southern rocky Mountains, western Canada



Principal Investigator:
Brian R. Pratt,
University of Saskatchewan

Past, Recent and Future Hydroclimatic Variability, North Saskatchewan River



Principal Investigator:
Dave Sauchyn,
University of Regina

Objectives: “The major risk from climate warming in Canada's western interior is a change in the availability of water resources, including the timing of supplies and distribution among basins. The

Objectives: “The Lower Cambrian Gog Group of the southern Rocky Mountains of western Canada offers an opportunity to explore animal-sediment relationships in a high-energy setting, during the early phase of Phanerozoic diversification. The aim of this project is to characterize the 500 million year old sedimentary environment in which this enormously thick sandstone unit was deposited.”



Additional research conducted within Lake Louise, Yoho, and Kootenay Field Unit but permitted through other Parks include:

Pollinator Diversity in Canada's National Parks: Native Bees and Flower Flies

Principal Investigator: Laurence Packer, York University

The Archaeology of Interment in Canadian National Parks

Principal Investigator: Adrian Myers, Stanford University

Factors Influencing the Geographic Distributions of Divergent Lineages and the Outcome of Secondary Contact in the Long-toed Salamander

Principal Investigator: Dr. Darren Irwin and Ms. Julie Lee-Yaw, University of British Columbia

(De) Constructing Environmental Education in Canada's Mountain Parks

Principal Investigator: Karen Petkau, York University

Contaminant Concentrations in Loons near Local Sources of Mercury Contamination

Principal Investigator: Dr. David Schindler, and Sarah Lord, University of Alberta

Investigating the relationship among Whitebark Pine, Red Squirrels and Grizzly Bears in Alberta

Principal Investigator: Karen Graham, Foothills Research Institute Grizzly Bear Program

Adopt-A-Plant Alberta: A Volunteer-Based Program Designed to Identify and Record Observations of Rare Native Plants across Alberta

Principal Investigator: Dana Bush, Adopt-A-Plant Alberta; University of Alberta; Alberta Sustainable Resource Development; Alberta Natural heritage Information Centre

Assessing and Appreciating the Mass Balance and Dynamics of Alberta Glaciers: Research training for Undergraduates

Principal Investigator: Dr. Robert Hawley & Dr. Erich Osterberg, Dartmouth College

Geological Mapping and Metallogenic Evaluation of Alberta Formations

Principal Investigator: Dr. Alexei Rukhlov, Alberta Geological Survey; Energy Resources Conservation Board

Alberta Biodiversity Institute-Long-term, Broad-scale monitoring of Alberta's Formations

Principal Investigator: Colin Twitchell, University of Alberta; Alberta Research Council; Alberta Conservation Association; Royal Alberta Museum

Assessing the Distribution, Abundance and Genetic Affiliation of *Didymo* in Canada's Rocky Mountain National Parks

Principal Investigator: Barb Johnson, Waterton Lakes National Parks

