YUKON BIODIVERSITY FORUM

Kinnickinnick Cafeteria – Yukon College

Saturday March 4th, 2017

Abstracts

1. Source populations of young-of-year Yukon River juvenile Chinook Salmon utilizing a small stream near the Yukon/Alaska border

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Yukon River Chinook Salmon emerge from redds in natal (birth) streams in spring. Some move downstream and then swim up non-natal streams to rear and overwinter. The following spring survivors feed briefly and migrate directly to the sea. Clinton Creek is a tributary of the Forty Mile River. The abandoned Clinton Creek Mine is in the mid-section of the creek. The lower creek is road accessible, is a low-risk sampling location and is consistently used by juvenile Chinook. Student Stewarts from the Dawson District Renewable Resource Council's Stewardship Program, under supervision, collected DNA samples from juvenile Chinook in 2009, 2012, and 2014. Each Chinook was given a unique alpha-numeric identifier. Fork length (mm) and mass (g) were measured. The sample was a sliver of the leading edge of the anal fin, and was placed in an individual, labelled vial. The vials were submitted to the Federal Contaminated Sites Program of Fisheries and Oceans Canada. Samples were analyzed at the Pacific Biological Station in Nanaimo, BC, against the current (at the time) Yukon River Chinook genetic baseline. There are about 100 Chinook Salmon populations located upstream, and the Chinook genetic baseline is under constant development. Results of sampling to date demonstrate that many upstream populations contributed to the juvenile Chinook Salmon captured in Clinton Creek. Streams distant from Chinook spawning streams may therefore contribute to the long term viability of the upstream populations.

2. Rapid Ecological Change on Herschel Island-Qikiqtaruk, Yukon Territory

Cameron D. Eckert[1] (cameron.eckert@gov.yk.ca), M.M. Grabowski, I. H. Myers-Smith[2], D. Arey[1], R. R. Gordon[1], R. Joe[1], P. Lennie[1], E. McLeod[1], S. McLeod[1]

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Arctic ecosystems are experiencing rapid ecological change in response to climate warming – and among the most striking observed are pronounced shifts in plant phenology. Long-term monitoring at Herschel Island-Qikiqtaruk Territorial Park, located in the Beaufort Sea off the Yukon's north coast, conducted by Park Rangers has been observing and recording

the phonological stages of three tundra plant species (*Eriophorum vaginatum*, *Dryas integrifolia*, and *Salix arctica*) for the past 16 years. Transects comprised of 10-cm^2 plots are visited every two to three days over the growing season, from snow-off in spring to senescence in fall. Using this 16-year dataset, we compared plant phenology measurements including leaf emergence, flower emergence, and senescence through time and found that plant phenology has advanced for all three species, though the magnitude of advance varied. In other words, spring is coming earlier to Qikiqtaruk. Advancing phenology on Qikiqtaruk has been observed by local Inuvialuit for many years, and this monitoring program quantifies the magnitude of change. Notably, this ecological monitoring program is based on collaboration between the Yukon Government, university researchers, and local Inuvialuit people. The results are both compelling to scientists and park managers, as well as informing community-based monitoring in the Inuvialuit Settlement Region.

3. Vegetation change at the top of the world: is the tundra greening?

Team Shrub (School of Geosciences, University of Edinburgh, Scotland)
Myers-Smith, I.H., H. Thomas, S. Angers-Blondin, J. Assmann, M.M. Grabowski, et al.
Contact: M. Grabowski, meagangrabowski@gmail.com

The Arctic is warming more rapidly than the rest of the planet, and as a result the tundra biome is changing in many ways. Recent evidence indicates that widespread expansion of shrubs and other plants is taking place in northern ecosystems – a phenomenon known as the greening of the Arctic.

Climate change in the Arctic is projected to continue to be rapid, with 2-10°C warming this century. Dramatic changes to tundra vegetation can lead to changes in carbon storage, absorption of solar radiation, and snow and permafrost dynamics, creating feedbacks that could accelerate global climate change. However, it is still unclear at what rate vegetation change will continue to respond to the warming climate and to what extent other non-climatic factors may limit future vegetation change.

Our research group uses a combination of ecological monitoring, experiments, and remote sensing to investigate patterns and mechanisms of shrub expansion in the Canadian Arctic. Integrating these different lines of evidence will allow to better project future vegetation change in northern ecosystems and their associated global-scale feedbacks.

Note : Dr. Myers-Smith could skype in or M. Grabowski could present on behalf of Team Shrub.

3. (Combined) The importance of monitoring vegetation change in the boreal forest of southwest Yukon.

Grabowski, M.M. (1), C.J. Krebs (1), I.H. Myers-Smith (2)

Department of Zoology, University of British Columbia, Vancouver
School of Geosciences, University of Edinburgh, Scotland

There has been a scientific focus on shifts in the phenology and composition of plants in the tundra ecosystem, but the boreal forest is also undergoing change. Based at Kluane Lake Research Station in southwest Yukon, we studied the increase in boreal shrub biomass, factors influencing the radial growth of shrubs, and monitored several other boreal plant types and species. There is an increase in shrub biomass, that is happening regardless of canopy cover by White Spruce, that could have impacts on tree regeneration and other ground plants. We have determined some shrub species are responding to temperature increases, and may respond to potential future increases in nitrogen via longer and warmer summers bringing increased decomposition rates. Remaining questions for research include if this shift will result in a shrub-dominated rather than tree-dominated boreal forest ecosystem. Impacts on habitat include potential positive responses for moose and other shrub feeding animals, but negative responses for arctic ground squirrels who require shrub-less habitat to detect predators. To further understand these changes requires continued support of long-term monitoring in the boreal forest, particularly continuation and expansion of the CEMP program in the southern Yukon.

4. Wild and safe: reducing conflicts between carnivores and people

Alberto Suarez-Esteban, Katie Aitken, Annie-Claude Letendre and Fiona Schmiegelow

Large carnivores play essential roles in maintaining healthy and functional ecosystems. Yet, they are often persecuted because of their conflicts with human interests (e.g. farming, recreation). Reducing human-carnivore conflicts has proven to be one of the most effective conservation measures for large carnivores worldwide.
In the summer of 2014, we set 15 trail cameras within the Whitehorse trail network to understand how carnivores and people use these trails, and to quantify chances for conflicts. We have detected 9 species of carnivores that often use trails. Most carnivores do not seem to avoid people, even using trails close to residential or frequently-used recreational areas. However, some species such as lynx and marten usually avoid trails when people are most likely to use them. Species such as bears and coyotes use trails at any time, including when people may be using them.
Our results highlight the importance of preventive measures, such as wearing bells or making sound, carrying pepper spray, and walking dogs on leash to avoid conflicts with carnivores at the wildland interface. This project is ongoing and we hope it will help identify practices to support coexistence of Yukon citizens and wild carnivores. We also plan to develop species-habitat relationship models to better understand how carnivores use different habitats, in order to further reduce potential conflicts.

5. Teslin Lake Trout Spawning Site Identification and Mixed Stock Genetics Analysis

Ben Schonewille, B.Sc., R.P. Bio.
Fish & Wildlife Biologist
EDI Environmental Dynamics Inc.

Lake trout (*Salvelinus namaycush*) provide the basis of important recreational and subsistence fisheries throughout the Yukon. Due to the relatively low productivity of most Yukon lakes and the slow growth and maturation rate of lake trout, the conservation of lake trout stocks is of utmost importance for regional fisheries managers. In Teslin Lake, there has been a long standing concern for the status of the lake trout population and the amount of harvest has remained very near or above sustainable limits for many years despite more proactive restrictions on harvest. During 2016, EDI partnered with the Teslin Renewable Resources Council to undertake a multi-year research project on lake trout in Teslin Lake to identify spawning areas and using genetics, understand how the various subpopulations in the lake are represented in the recreational and subsistence fishery. Spawning areas were located through a combination of beach seining for young-of-the-year during the early summer and targeted small mesh netting for spawners during the fall. All spawning lake trout were tagged with different colored tags corresponding to different areas of the lake and in future years, will provide information on lake trout movements in the lake. Based upon the field investigations, over 10 spawning sites were identified throughout Teslin Lake. Genetic samples were collected from lake trout at all spawning sites to develop a genetic baseline throughout the lake and to determine the geographic extent of different subpopulations. Through the genetic analysis which is ongoing, the genetic profile of harvested lake trout will be compared to the genetic baseline to determine which subpopulations are represented in the local harvest.

6. Re-invigorating botanical research in the Yukon: establishing the Yukon Herbarium is a critical step

Jen Line – Botanist

What is an herbarium and how are herbaria useful? Why are herbaria fundamental to the conservation of biodiversity? This presentation will address these questions and will build a case for the formal establishment of a Yukon Herbarium at Yukon College. Examples of past use of the government herbarium for land use planning and management decisions will be discussed. Potential applications of a fully functioning herbarium are enormous. This initiative will require community-wide support to reach fruition. How can you help us?

7. Willow Ptarmigan Invading Boreal Forest Burned Habitat

D.H. Mossop
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Continuing long-term survey of willow ptarmigan has suggested population anomalies correlated with climate change stressors. Distressing changes in northern Canadian ecology has involved a number of controversial features not the least of which is the advent of unusually huge forest fires. One large burn in the south central Yukon Territory, now 19 years in regeneration has recently been found to be supporting territorial willow ptarmigan. The current field work is mostly descriptive in nature to gain an impression of the extent and nature of this un-heard-of event. Males are displaying and becking, well-spaced at a density estimated at about 2 territories per sq. km. Our survey of becking has covered about 10 km linearly and no broods have been observed to date. The area occupied is at least 20 km from the nearest tundra habitat where the birds are normally found. The habitat should be within 4-5 years of forming a closed shrub and spruce canopy. Our work in the upcoming seasons will be to explore the breeding success and other demographic features of these birds. I am particularly interested in the agonistic behavior of these birds compared to birds on our tundra study areas.
Format: Oral
Special needs: none(p-point)

8. Benchmarks for Northern Sustainability and Transboundary Datasets to Support Co-operative Land-Use Planning in the Yukon and Alaska

Kim Lisgo, Alberto Suarez-Esteban and Fiona Schmiegelow
BEACONs Project www.beaconsproject.ca
University of Alberta and Yukon College

The BEACONs Project is working in partnership with the Northwest Boreal Landscape Conservation Cooperative (www.nwblcc.org) to identify ecological benchmark network options to support proactive conservation planning and the identification of sustainable land-use practices. Ecological benchmarks are reference sites to monitor and understand the natural dynamics of ecosystems and the response of these systems to climate change and human activities. Without benchmarks, communities, resource managers and public-policy makers are ill-equipped to make informed decisions regarding northern sustainability, given rapid, unprecedented changes in the north, and our limited understanding of the response of northern systems to the individual and cumulative effects of resource development and climate change. The planning region for this project includes the boreal region of Alaska, Yukon, and portions of the NWT and BC. To support the analysis, we assembled and developed US-Canada transboundary datasets that include measures of landscape intactness, environmental variation, hydrology, fire, climate change, as well as focal species.

All datasets and analyses will be available on a public website for exploration via interactive maps and tables, as well as for download.

9. Who Knew You's New

Bruce Bennett – Yukon Conservation Data Centre

Plant species newly discovered in Yukon over the last year. Newly described or reported vascular plant species are highlighted.

10. Range Expansion – Invaders or Residents

Bruce Bennett – Yukon Conservation Data Centre

Plants and animals ranges are constantly in flux. Animals are typically the focus of studies. Northward expansion of Mule Deer, Coyotes, and Moose are well documented, but what happens if the range expansion is a plant? The Yukon Conservation Data Centre gathers information on the changing ranges of plants and animals. The presentation will highlight some of the species undergoing rapid range expansion and what it means to communities in the north

11. The Significance of Wild Herbs and Spices for Survival
Let food be your medicine and medicine be your food (Hippocrates)

Jacqueline Clancy - Teacher, herbalist

Rose hips, rich in vitamin C, grow everywhere!
In this 15-minute talk, participants will be introduced to the significance of wild herbs and food plants to our very survival. Based on the work of Claire Loewenfeld and her outstanding wild herb intervention during WWII, it is clear that a world without wild herbs/food is one where we will not survive well should disaster strike. This has never been more prevalent than now. Climate change, GMOs, globalization, destruction of habitat, overexploitation, dependence on synthetic nutrients, pharmaceuticals and imported foods have left us vulnerable to disease and starvation. Yet, the very nutrition and medicine we need is everywhere, if only we learn to recognize and utilize it. It all begins with microbes.

Food Security - wild herbs and food plants for health and survival
Why wild herbs and wild food sustain health at a microbial level
Microbe health and diversity in the north
Utilizing Nature's Larder and Medicine Chest - Claire Loewenfeld WWII and Rose hips
Signatures - how plants talk to us
Pondering - the implications of a world without microbes. What would happen to all the birds, insects, fish, plants, animals and people, if our wild plants and herbs disappeared?

12. A Guide to Yukon Bat Calls: Some Acoustic Survey Results

Brian Slough - Independent Consultant/Researcher, slough@northwestel.net

Bats use sonar, or echolocation, to detect and capture prey, and for navigation. Modified ultrasound is used for intraspecific communication. The sound frequencies that bats use are determined by the physics of sound and the size of their prey. Our local bats primarily use a broadband frequency-modulated (FM) sweep, useful for determining the range of a target insect. Some of our larger bats have a constant frequency (CF) component, to obtain information on the velocity of a target and the fluttering of a target's wings. We sample bat calls using ultrasonic detectors, to determine bat presence/absence, habitat use, relative abundance, daily and seasonal activity patterns and for species identification. Using echolocation call recordings, we have confirmed new species in Yukon (other than the ubiquitous Little Brown Myotis), including the Northern Myotis, Long-legged Myotis, Hoary Bat, and the Silver-haired Bat and/or Big Brown Bat. We have made incidental recordings of non-bat ultrasound, some of which are believed to be Northern Flying Squirrel phrases.

13. The Buzz on Yukon Bees

Saleem Dar and Syd Cannings - Canadian Wildlife Service

Amid the growing concern for the fate of bees, I have begun several studies on bees in northern British Columbia and the Yukon, collaborating with colleagues at the Natural History Museum (UK) and the Royal Saskatchewan Museum. Over the past six years, these studies have revolved around focused collecting with nets and traps in the various ecosystems of the north; at least 5000 specimens have been deposited in the Royal BC Museum.

In general, bumblebee species that have declined dramatically in the south (e.g. the Western Bumblebee and Yellow-banded Bumblebee) are still common in the southern Yukon. However, the Gypsy Cuckoo Bumblebee (Endangered in Canada) seems to be much sparser than it was in the 1980s. We did, however, find this species near Stewart Crossing in 2014 and at Kluane in 2016; these are the only detections of this species in North America in the past five years!

Mitochondrial DNA analysis of some of the bumblebees we've collected has revealed a new species of subarctic bumblebee, now named *Bombus kluanensis*. This is apparently a Beringian counterpart to the North American arctic species, *Bombus neoboreus.* Even though we now have a better idea of the status of most northern bees, we do not have good data on ongoing trends. To tackle that issue, we are planning to institute a repeatable monitoring plan for bumblebees in the Yukon and northern BC, modeled after the North American Breeding Bird Survey.

14. Results of the 2016 Invasive Plant Survey of Yukon Highways

Maxine White – Yukon Conservation Data Centre

A survey of 14 priority invasive species present in Yukon was carried out during the summer of 2016 for the Yukon Invasive Species Council. The survey included highways, gravel pits, rest areas, pullouts, watercourses, and other disturbed sites. All numbered highway with the exception of the North Canol Road and the Dempster Highway was surveyed. Portions of highways within municipal boundaries were excluded. Results will be presented.

Posters (2017)

1. Wildlife ID Project

Isobel Ness

Identification of individual animals of a population can allow for the estimation of population size, demography and habitat use. Traditional approaches of tracking individuals use invasive and costly methods such as tagging and radio-collaring. Non-invasive methods such as genetic sampling and photograph-based identification are being developed to monitor and study populations while reducing disturbance to animals and costs to researchers and managers. Merkle and Fortin (2013) outline a method of likelihood-based photograph identification that uses a suite of characteristics that can be modified depending on the species in question. I propose to test likelihood-based photograph identification on six species of northern ungulates: muskox, elk, mule deer, woodland caribou, Dall sheep, and mountain goat. All are important northern game species that are subject to intensive management and monitoring. Testing the method on three horned and three antlered species also has the potential to expand the applicability of the method. The project will focus on captive populations of these species at the Yukon Wildlife Preserve (YWP), where known populations and accessible animals allow for method development and evaluation. Once a methodology for identification of individuals from photographs is developed, camera trapping techniques will be tested. Different methods of setting up cameras or arrays of cameras will be evaluated for optimal collection of photographic identification data. This research will advance new methods for non-invasive sampling of northern wildlife that are both quantitatively and qualitatively robust and hold promise for addressing First Nation cultural sensitivities to more invasive sampling methods.

2. YCS

YCS will have a booth with a volunteer present.

3. Biodiversity Program: 2016 Projects

Thomas Jung, Piia Kukka, Katherina Egli and Todd Powell

Summary of ongoing projects in Yukon Environment's Biodiversity program during 2016, including Bison (*Bison bison*) monitoring and management, Collared Pika (*Ochotona collaris*) monitoring, Little Brown Bat (*Myotis lucifugus*) monitoring, Wolverine (*Gulo gulo*) harvest monitoring, and Arctic Ground Squirrel (*Urocitellus parryii*) occurrence study.

4. Canadian Wildlife Service – Rare Plant Work

Saleem Dar and Syd Cannings