

**Biodiversity Forum  
2014**



**Biodiversity Working  
Group**

### **BIODIVERSITY FORUM PRESENTATION ABSTRACTS 2014**

#### **Unplanned and unwanted: feral Rainbow Trout (*Oncorhynchus mykiss*) in the Yukon River Basin near Whitehorse.**

Al von Finster, Yukon Fish and Game Association

Aquatic Invasive Species (AIS) are of increasing national and international concern. Rainbow Trout are considered to be an Invasive Species in many countries. It is not native to the Upper Yukon River Basin. In 2013 the YF&WET provided funding to the YF&GA to conduct a project to determine the extent to which feral Rainbow Trout had colonized the Yukon River Basin near Whitehorse. Our literature review indicated that the pathway of introduction was a successful introduction to Jackson Lake in the 1950's. We were able to track the increase in distribution over the ensuing 60 years. Our field investigation included sampling in the Yukon River from the Takhini River to the Lewes River dam at the outlet of Marsh Lake; the inlet, outlet and tributaries of Lake Laberge; and the Ibex River above and below the mouth of Jackson Creek. Three Rainbow Trout were captured in Laurier Creek, confirming the presence of a resident population there. No Rainbows were captured in any other location. This indicates that the rate of colonization by Rainbow Trout over the past half century has been slow. Considerations for future management of Rainbow Trout and other potentially invasive non-native species include more robust Protocols for future stocking if and when the current moratorium is lifted, risk assessments of possible releases from present facilities and stocked lakes, implementation of low cost surveillance programs, and an increase in directed public education programs.

#### **Mayo River Juvenile Chinook Salmon Rearing Channel**

Ben Snow, Environmental Dynamics Inc.

As part of the Yukon Energy Corporation's Mayo B Project, a 1 km long juvenile Chinook salmon rearing channel was constructed downstream of the Mayo B hydroelectric plant, on the Mayo River in 2012. This channel is fed from water from the Mayo B tailrace and is designed to replicate natural side channel areas in the Mayo River, which are key rearing areas for juvenile Chinook salmon. The construction of the channel was completed using an excavator and was designed/overseen by biologists from EDI Environmental Dynamics Inc. Specific features were incorporated into the design and construction of the channel to create high quality rearing habitat for juvenile Chinook salmon, and included adding large woody debris, boulders and alternating areas of slow and fast moving water. Much of the design for the rearing channel was based on a juvenile Chinook salmon channel restoration

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project done by the Nacho Nyak Dun First Nation from 2004-2009, and the lessons learned from this successful project informed the design of the Mayo B tailrace rearing channel. Currently, the channel is well used by juvenile Chinook salmon throughout the year and an interpretive walking trail has been developed to inform community members and visitors to Mayo of this project. Ongoing monitoring of the use of the channel by juvenile Chinook is planned over a 5 year period, which will help ensure that the rearing channel provide high quality habitat for juvenile Chinook salmon in the Mayo River.

### **What's Up with Invasive Species in Yukon?**

Brett Pagacz, President of Yukon Invasive Species Council

The Yukon Invasive Species Council (YISC) is a non-profit organization promoting the education and awareness of invasive species in Yukon. YISC plays a leading role in encouraging early detection and rapid response (EDRR) of plant, animal and fungi species that are considered invasive in Yukon.

Join us in learning what the current status and trends are of invasive species in Yukon. We will look at some new discoveries, as part of EDRR and success stories where local Yukon residents have stepped up to the plate to manage and mitigate invasive species at locations such as the Carcross Desert and Takhini Hot Springs. Over the past year, education programs such as the Spotter's Network have provided public workshops to educate interested individuals on the identification of the "10 Dirty Species" for Yukon to help direct EDRR efforts and to track known populations of those species that are considered the greatest threat to our environmental, economic and social realms. The Spotter's Network encourages voluntary reporting of sightings, which are included in a shared database to help better track confirmed populations of invasive species in Yukon. If you would like to know more, please join us to find out what data we are collecting, what we are doing with the data and how things are working in regards to tracking invasive species populations in Yukon.

### **Black Guillemot population and nest success at Herschel Island-Qikiqtaruk Territorial Park, Yukon – a 10-year low in 2014**

Cameron D. Eckert, Conservation Biologist, Yukon Parks

The Black Guillemot nesting colony at Herschel Island-Qikiqtaruk Territorial Park is one of the largest in the Western Arctic, and the only one in the Yukon. The colony has been monitored since the mid-1980s and is an integral component of the Park's ecological

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monitoring program, and a key indicator of ecological integrity. The 2014 nesting season was the poorest on record since 2004. The adult population is now at a record low with just 29 adults at the colony in mid-August. The final nest check in late August recorded 17 nests including 10 failed nests, and 7 nests with a total of 7 live chicks. A likely cause of the poor nesting success could have been a lack of prey species, in particular Arctic Cod (*Arctogadus glacialis*), the guillemot's preferred prey. In August, adult guillemots carrying fish at the colony were most often seen with relatively small sculpin (*Myoxocephalus* sp.), a bony fish that is difficult for a guillemot chick to swallow. The few adults feeding chicks were also seen carrying Slender Eelblenny (*Lumpenus fabricii*), and a few Arctic Cod. The low adult population could also be accounted for by low prey abundance around Herschel Island if adults left the area to find better feeding grounds elsewhere. Black Guillemot nesting success has rebounded following poor years in the past; monitoring in 2015 will be critical to determine the current health of the population. Thanks to Herschel Island–Qikiqtaruk park rangers for their ongoing support of the ecological monitoring program.

### **Plant Community Changes in Response to Right-of-Way Management Techniques**

Krystal Isbister, Dr. Eric Lamb, Dr. Katherine Stewart, University of Saskatchewan, Yukon Research Centre.

Electrical utility rights-of-way (ROWs) present unique and demanding challenges for vegetation management. Utility companies are required to provide safe, reliable service which is compromised by trees near or underneath the transmission lines. Forests adjacent to these “tree free” corridors provide ample seeds and suckers to recolonize the ROW which results in a cyclical management regime of tree removal. Shrubland communities have shown resistance to tree invasion in other parts of North America and significantly extended the time between management treatments. The goal of our study is to examine how northern ROW plant communities respond to different treatments with the intent of identifying management options that promote tree-resistance plant assemblages.

In partnership with Yukon Energy Corporation and Environmental Dynamics Inc., a team from the Yukon Research Centre established four study sites in different ecoregions of the territory during the summer of 2014. Vegetation cover surveys were completed to provide a baseline reference and eight different treatments applied to 6 x 6 m plots. The treatments include mechanical and chemical manipulation of the vegetation communities along ROWs. Monitoring of treatments will continue over the next three years.

### **Variation in Takhini Valley tree-ring widths (1850–2013): Preliminary results**

Wayne Strong, Yukon Research Centre

A preliminary ring-width analysis was conducted on 250 of 1000 western white spruce (*Picea albertiana*) and lodgepole pine (*Pinus contorta*) growth-increment cores collected in the Takhini Valley. Core collection focused on older trees that occupied climatic-sensitive sites such as steep south facing slopes and rapidly drained soils. The oldest encountered tree had an origin date of ~1640, with individual years between 1853 and 2013 including  $\geq 30$  cores. After cross-dating and correction of each tree core for individual growth patterns based on cubic spline modeling, the results were combined to create a composite model. From 1850 to 1900, roughly 10 years occurred between each high and low radial growth events. These cycles were replaced by time intervals that were roughly half as long in duration. The latter lasted until ~1950. Post-1950 growth-increment cycles were both longer in duration and more extreme in their variation than previous 50 years. The smallest growth-rings during the 1850–2013 period occurred in 1958, 1998, and 2000; with maximum growth in ~1976. Depressed growth during the first extreme appears to have extended from 1955 to 1960, inclusive. Since the year 2000, growth-ring widths have steadily increased, with 2013 widths near the long-term average maximum. If differences in tree growth-rings reflect variation in climate, the past 60 years have been more variable than the prior 100 years in the Takhini Valley. Analysis of the remaining 750 cores is expected to extend the length of the study timeframe by 50 years (i.e., 1800–2013).

### **Biological accumulation of pharmaceuticals and personal care products (PPCPs) in birds and invertebrates at Whitehorse-area sewage lagoons**

Kathryn Aitken and Devon Yacura, School of Science, Yukon College and Dept. of Renewable Resources, University of Alberta.

Sewage lagoons provide important breeding and migratory stop-over habitat to bird communities, but may also be sources of contamination for breeding and foraging animals. Contaminants of particular concern are pharmaceuticals and personal care products (PPCPs), which are derived from prescription and non-prescription drugs, detergents, perfumes, cosmetics, and other domestic products. PPCPs may affect physiology, behaviour, and other processes in wildlife, either through direct ingestion or through consumption of prey. PPCPs may not be fully removed during sewage treatment, resulting in transfer to freshwater systems via effluent, and potentially to humans. The purpose of this study is to examine the occurrence of PPCPs in invertebrates and the potential for transfer to birds breeding and foraging at two northern wastewater treatment facilities (Whitehorse and Crestview sewage lagoons) that are renowned “hotspots” for local bird diversity and abundance. A pilot sampling program in 2013 confirmed that PPCPs are present in the water, sludge and invertebrates, in all stages of treatment, at the Whitehorse sewage lagoon (WSL). From June-Sept 2014, sampling of water, sludge, and invertebrates, and monitoring of waterfowl and songbird breeding continued. The goals for 2014 were

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to: 1) quantify the removal efficiencies of PPCPs between sewage treatment stages; 2) quantify the seasonal variation of PPCPs within treatment stages; 3) quantify the occurrence of PPCPs within invertebrates in the secondary stage of treatment; and 4) compare waterfowl and songbird breeding abundance and success between the sewage lagoons and reference wetlands.

### **Do Trumpeter Swans care about Top Storage on the Yukon Southern Lakes?**

Jim Hawkings, Biologist (Retired), Margaret Campbell, Canadian Wildlife Service

Several shallow wetland areas located on Marsh, Tagish, and Bennett lakes in southern Yukon are well-known important migration areas for Trumpeter Swans, particularly in the early spring. From late March until mid-May thousands of swans consistently gather in the few areas that offer both open water and access to the aquatic plants they need to feed on. These areas, notably Lewes Marsh/M'Clintock Bay, Tagish River, and Nares Lake have special hydrologic conditions that always provide the earliest open water, far in advance of melting in other wetlands. Swans feed in the water by tipping up, and are able to reach perhaps a meter under the water for food, so water depth is an important factor in determining suitable feeding sites. Water levels in these lakes have been increasingly managed for hydroelectric generation since 1957 by means of a succession of dams located on the Yukon River just downstream of Marsh Lake, primarily by storing water during the late summer and fall for use later in the winter and spring. The greatest alteration in water levels from the natural regime has been an increase in levels during late summer through late winter. Spring water levels have also changed, though less drastically. Further changes in the water management regime are under consideration for this system which would increase fall/winter levels up to 30 cm and decrease spring levels by up to 10 cm. The effect of this new regime on swan feeding in spring is difficult to predict because it involves interactions between water level, ice formation and melting, and the response of existing aquatic plant communities.

### **Yukon Conservation Data Centre-Submit Your Data**

Bruce Bennett, Yukon Conservation Data Centre Coordinator

The Yukon Conservation Data Centre (YCDC) keeps lists of all living plants, animals, and lichens, and assesses their conservation status. The Yukon CDC gathers, maintains and distributes information on animals, plants and ecological communities at risk or of conservation concern in Yukon. Highlights of 2014 including new species, and an update on changes on the tracking lists, and an overview of new contributions will be presented.

### **Making Congdon Creek Campground Safer for Bears and Campers**

Scott Gilbert, Renewable Resources Management Program, Yukon College

In late summer, grizzly bears are attracted to rich patches of soapberries in the Congdon Creek area. Human-bear conflicts have been a concern at the Yukon Parks campground for decades. Until the late 1980s bears were attracted to the campground area by access to an open garbage dump (400 m from the campground) as well as open garbage barrels. After these sources of human food were removed bears continued to use the area but were attracted by natural foods.

During the summers of 2013-14, students and I set up an experiment to test the effect of removing female soapberry bushes from the areas of the campground used by visitors. We predict that over the coming years bears will spend less time foraging in the immediate area used by campers and this should translate into fewer human-bear conflicts.

The ongoing work at the Congdon Creek campground provided an opportunity for two Yukon College students to carry out their own independent studies. Jake Montgomery is measuring the survival rates of soapberry bushes he transplanted in early spring before green-up. His work will tell us if this technique is a viable tool for potential use in habitat restoration. Shayna Kinney collected 60 samples of berries from soapberry bushes at Congdon Ck and two other sites and will be comparing the level of protein in these berries between shrubs and areas.

### **Urban Ecological Restoration in the North**

Annie-Claude Letendre & Katherine Stewart, Yukon Research Centre.

The main goal of the ecological restoration approach is to facilitate the recovery of disturbed ecosystems into resilient and diverse systems. There is a need to develop ecological restoration capacities that are tailored to respond to the specificities of northern environments. Working in partnership with the City of Whitehorse we are examining the use of bioengineering techniques and native plants to increase slope stabilization and revegetation on the clay cliffs and the City's pathway margins.

At the clay cliffs we are using a bioengineering technique known as modified brush layers. The brush layers are a series of benches built into the cliff with local materials including *Salix spp.* and *Populus balsamifera*. We have also seeded the top of each bench and pathway margins with local native plants. In addition, locally harvested Biological Soil Crusts (BSC) have been applied at the sites.

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After one growing season, we found that: (i) *Salix alexensis* live stakes had a higher survival rate than other species; (ii) among the native species seeded, *Elymus trachycaulus* had the best germination and establishment; and (iii) biological soil crust establishment was very marginal. Monitoring is to be conducted in summer 2015 to determine the survival rates over the winter.

### **Local (s. Yukon) and distribution-wide investigation into declines of two aerial insectivores; Olive-sided Flycatcher (*Contopus cooperi*) and Western Wood-Pewee (*C. sordidulus*), utilizing both habitat and climate covariates.**

Tara Stehelin, Fiona Schmiegelow, University of Alberta, Yukon College

Olive-sided Flycatchers and Western Wood-Pewees are declining in abundance across much of North America from combined impacts of habitat loss and degradation, food reduction, environmental toxins, and climate change affecting their populations. Their long migration and aerial insectivorous nature exacerbate vulnerability to these impacts. Individuals breeding in northern regions may be particularly vulnerable to impacts of climate change. Preliminary investigations suggest that Olive-sided Flycatchers have not declined significantly since 1985 in Yukon but Western Wood Pewees have; a different pattern from many other regions. To further explore these patterns, boreal-wide distribution and abundance data from a broad-scale collaborative project (Boreal Avian Modeling, BAM) will be used to enhance and corroborate existing models that utilize habitat, weather (local and indexed), and disturbance (natural and anthropic) covariates. A complementary modeling exercise will incorporate similar variables from overwintering areas. One mechanism for population decline from climate change is mistiming between peak energy demands of breeding and essential insect abundance peaks resulting from warmer temperatures. Regional studies in the Yukon are investigating this hypothesis using canopy arthropod traps placed within breeding territories and monitoring of breeding chronology. Preliminary results suggest that both species time nestling feeding with preferred insect abundance. Investigation of migratory patterns will be conducted using light-level geolocators deployed on Olive-sided Flycatchers breeding in s. Yukon, corroborated with isotopic analyses of primary feathers regionally and examination of patterns at broader scales.

### **In and out of water: an overview of ongoing river otter studies in southern Yukon.**

Don Reid, Wildlife Conservation Society Canada, Whitehorse  
René Rivard, Kim Melton, Miléna Georgeault, Private contractors

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The river otter (*Lontra canadensis*) is a relatively uncommon but widespread semi-aquatic mammal in the northern boreal mountains. Relying on water for food, and land for den, resting and communication sites, they are an animal of shorelines and near-shore habitats. Otters do not use shorelines and near-shore habitats randomly; they choose particular sites for defecation (latrines), overland (above-ground) travel, denning, and feeding. Working primarily in the Agay Mene area, our first question is: what rules or features do otters use in choosing above-ground travel routes and latrines? In the ice-free seasons, overland trails used by otters (and other semi-aquatic mammals) follow the shortest distances between un-connected water bodies, or are shortcuts less than one-half the travel distance in water. When most water bodies are frozen, otters orient above-ground movements in fairly restricted corridors between sites where they can access water (i.e. permanent open water, some beaver lodges and bank burrows). These patterns offer direction for avoiding removal, blockage or loss of overland travel routes (key habitats) during operational scale land management. Approximately one-third of latrines are directly associated with trails. We are now investigating the role of site conditions (vegetation structure, proximity to dens) in otters' selection of other kinds of latrines. Our second question is: is the frequency of scat deposition a reasonable measure of relative abundance? This work has involved remote cameras which are also giving us insights into otter social groupings.

### **Revegetation and Remediation of Mine Sites in the Keno Area**

Lisa Knight, Access Consulting

Elsa Reclamation and Development Company Ltd. (ERDC) is a unit of Alexco Resource Corporation (Alexco), and responsible, under a funding agreement with the governments of Canada and Yukon, for the care and maintenance and the eventual closure of the former United Keno Hill Mine (UKHM) properties (Yukon Government, 2009). Reclamation planning and implementation has been ongoing since the old UKHM claim properties were transferred to ERDC in 2009. Numerous investigative projects have been initiated to assess the extent and degree of remediation required to stabilize and reduce past mining impacts. The ecosystem mapping project is part of the investigative program. Its main purpose is to inventory the vegetative communities and growth conditions that currently exist in the Galena Hill area within the ERDC lands. The information this study provides will guide revegetation plans by integrating local ecological conditions into reclamation efforts.

One of the methods for reducing impact and dispersal of heavy metals from historic mine sites is to cover waste rock piles and tailings with overburden and seed the cover surface. However, revegetation of these areas is challenging, as the northern climate permits only a short growing season, overburden soil is nutrient deficient, and mine waste is often contaminated by phytotoxic heavy metals. As a result agronomical plant species supplied by southern producers often do not thrive. In an attempt to accelerate vegetation



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establishment and succession, the ecosystem mapping project provides information about the local plant communities, where they are and the types of conditions needed to ensure germination and growth. The ecosystem mapping will also identify plants that are capable of pioneering disturbed areas and exhibit a tolerance to highly mineralized soils. Locally sourced plants when grown on soil covers have the phenotypic traits that encourage other local biological agents to utilize the reclamation grounds. The ecosystem mapping and site descriptions are a means to inventory vegetation communities that thrive in the local environment, identify early successional ecosystems to use for revegetation templates and native pioneering plants. Knowledge gain from this project will be used to better design and prepare for revegetation of disturbed sites and covers anticipated during the reclamation phase of ERDC lands.

The presentation will include the Ecosystem Map produced for the Keno area, the type of data collected, how this information is used in planning and designing revegetation projects to be implemented in the near future. Also, discuss using natural ecosystems as means of monitoring the success of revegetation efforts.

### **Ptarmigan and Gyrfalcon telling us about a changing Tundra**

Sunday, October 26, 2014

7:30pm, Beringia Centre, Whitehorse

Dave Mossop

Professor Emeritus, Yukon Research Centre

With

Norm Barichello

Dave Mossop has spent over 40 years chasing Gyrfalcon and Ptarmigan across the Yukon tundra. Through his collaborative decades-long research, he has had the opportunity to observe the amazing survival strategies these two species have developed for dealing with the harsh realities of the tundra ecosystem. How intimately they are interconnected, not only with each other, but also with environmental conditions, is a key element in their survival. Recently he has seen disruptions in the functioning of this intricate species complex. Join Dave as he leads us to examine how these two species, dependent on environmental predictability, are faring under changing climatic conditions.

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