Session 6: Symposium of studies funded by BC Parks Living Lab program

Session Moderator: James Quayle

Location: TBC

Date/Time: Tuesday, December 13, 1:30 pm to 3:45 pm

- Lauren Erland - Wildfire impacts on endemic Okanagan plants
- Matthew Csordas - Assessing the distribution of critical blue carbon habitats within the coastal waters of BC Parks around Vancouver Island in the context of climate change
- Sara Mynott - Managing for future change: identifying climate vulnerability, resilience and management options in parks with a marine component
- Stefano Mezzini - How climate change will shape the future of human wildlife conflict in B.C.'s protected areas
- Courtney Collins - Below ground impacts of experimental warming and summer flooding within alpine plant communities in the Nch'kay region (Garibaldi Provincial Park).

Lauren Erland

Agricultural Technology, University of the Fraser Valley, Chilliwack, BC

Wildfire impacts on endemic Okanagan plants

Abstract:

Karrikins are a group of plant growth regulators produced during wildfires as a result of the burning of pine needles. Our previous work found karrikins induce germination of *Balsomorhiza sagittata* and can inhibit germination of some other Okanagan species. Karrikins can also affect how established plants grow. It is important to understand Karrikin mechanisms to more fully understand the impacts of wildfires on plant populations. Skaha Bluffs Provincial Park was impacted by the Christie Mountain Wildfire in 2020. Our current work with BC Parks at Skaha Bluffs Park aims to better understand how endemic Okanagan plants respond to wildfire and smoke exposure to answer questions like which plants recover first after fire? How long does it take for them to germinate and establish? Does use level and fire severity have an effect on this timing? How does this impact plant community composition? And what role does karrikins play in controlling this process? We have conducted soil sampling and vegetation surveys in Spring, Summer and Fall of 2022. Initial results from vegetation surveys examine the

interaction between use level and fire severity on plant community. Ongoing work is characterizing soil seedbank and karrikin concentrations in soil two years post fire.

Contributors:

- Susan Murch, University of British Columbia Okanagan

Acknowledgements:

This work is being conducted on the traditional, ancestral and unceded territory of the Syilx Okanagan nation and particularly the lands of the Penticton Indian Band. We are grateful for guidance from Penticton Indian Band Natural Resources Staff and in particular Ms. Wendy Hawkes for discussions which helped to shape this project. wai' . We are also grateful to PIB community members who have and continue through Fall sampling to be involved in the project as well as student volunteers who have joined us in the field. Planning and logistics support has also been provided by Mr. Kirk Safford, BC Parks & BC Parks Living Labs Grant Fund for which we are grateful.

Matthew Csordas

Department of Biology, University of Victoria

Assessing the distribution of critical blue carbon habitats within the coastal waters of BC Parks around Vancouver Island in the context of climate change

Abstract:

In the coastal waters of British Columbia (BC) kelp forests and eelgrass meadows sustain nearshore biodiversity and productivity by provisioning habitat and food to a variety of ecologically, culturally, and commercially important species. Despite kelp and eelgrass being vulnerable to climate change among other factors, there is a growing interest in these species as a form of blue carbon (i.e. carbon sequestration and storage). Conserving these ecosystems, therefore, could have both biodiversity and climate solution benefits. Supported by the BC Parks Living Lab program, in the summer of 2022, we performed benthic video transects using an underwater remote operated vehicle (ROV) to assess kelp and eelgrass distributions within and around BC Parks near Vancouver Island. Surveys were conducted in >30 BC Parks, including Parks in the Kyuquot, Clayoquot Sound, Victoria, Gulf Islands, Hornby Island and Broughton Archipelago regions (n > 350 transects total). Combining the resulting dataset with spatially associated environmental variables, we are training species distribution models (SDMs) to predict where kelp and eelgrass are likely to occur around all of Vancouver Island. This will allow us to identify areas of high biodiversity and blue carbon potential and assess how well current protected areas encompass these important regions.

Contributors:

- Brian Timmer, Department of Biology, University of Victoria
- Sam Starko, Department of Biology, University of Victoria
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- Julia Baum, Department of Biology, University of Victoria

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I would like to thank the many First Nations on whose traditional territory I was privileged to work including the Namgis, Kwicksutaineuk-ah-kwaw-ah-mish, Mamalilikulla, Ka:'yu:'k't'h'/Che:k:tles7et'h', Hesquiaht, Ahousaht, Tla-o-qui-aht, Huu-ay-aht, Pacheedaht, Songhees, Esquimalt, W̱SÁNEĆ, and Hul'q'umi'num Mustimuhw First Nations. I would specifically like to thank the Namgis, Kwicksutaineuk-ah-kwaw-ah-mish, Mamalilikulla, Ka:'yu:'k't'h'/Che:k:tles7et'h', Hesquiaht, Ahousaht, Tla-o-qui-aht, Huu-ay-aht, Pacheedaht, and Lyackson First Nations for directly supporting our work and the Ka:'yu:'k't'h'/Che:k'tles7et'h' and Ahousaht First Nations who were able to provide on the water support for our field team.

Sara Mynott

University of Victoria / Centre for Marine Socioecology

Below ground impacts of experimental warming and summer flooding within alpine plant communities in the Nch'kay region (Garibaldi Provincial Park).

Abstract:

The effects of climate change permeate across all aspects of our environment, so our approach to protecting it must take climate change into account. This presentation explores the challenges and needs of practitioners seeking to manage and mitigate the impacts of climate change in protected areas in Canada. Drawing on the experience of park managers in British Columbia, we highlight climate scenarios of greatest concern in parks with a marine component, and show how these scenarios can be used to identify areas of vulnerability and resilience in the BC Parks network. In doing so, we illustrate how co-design and close researcher-practitioner partnerships can leverage the application of

complex ecosystem models to climate challenges on the ground. By understanding how the effects of climate change on individual species play out across the ecosystem, and over time, it is possible to determine which parts of the protected area network require stronger protection and which can withstand warming, heatwaves and other sources of stress. These insights offer opportunities to guide management decisions and build upon current practice to better protect ecosystems under threat from climate change.

Contributors:

- Natalie Ban, University of Victoria
- Raisha Lovindeer, University of British Columbia
- Jess Melbourne-Thomas, CSIRO / Centre for Marine Socioecology
- Susan Allen, University of British Columbia

Acknowledgements:

We acknowledge with deep respect the peoples on whose territory this work is conducted; the Lekwungen peoples on whose traditional territory the University of Victoria stands, and the Songhees, Esquimalt and W̱SÁNEĆ peoples whose historical relationships with the land continue to this day. We gratefully acknowledge the financial support of the Province of British Columbia through the Ministry of Environment and Climate Change Strategy. This work was funded by BC Parks Living Lab for Climate Change and Conservation, with additional support from Fisheries and Oceans Canada Multi-Partner Research Initiative.

Stefano Mezzini

University of British Columbia (Okanagan Campus)

How climate change will shape the future of human wildlife conflict in B.C.'s protected areas

Abstract:

British Columbia's protected areas play a key role in conserving the province's natural environments, but park managers often find themselves on the front lines of Human-Wildlife Conflict (HWC) issues. A core driver of HWC is the amount of time animals spend in close proximity to humans and human-related activities, which, in turn, is a function of their movement ecology. However, while it is well recognized that anthropogenic climate change is exposing species to rapid changes and novel stressors, there is only a limited understanding as to how species' movement ecology will respond to the conditions expected under future climate change. Using GPS location data on BC's terrestrial mammals, we show how home-range areas, daily movement, circadian rhythms, and patterns in resource selection are shaped by proximate weather conditions. By pairing

these models with predictions from the IPCC's climate change scenarios, the mechanistic responses are projected into the future based on the weather conditions expected within BC for the rest of the century. Given that movement underpins nearly every aspect of animal ecology, these results can help inform the effective management one of some of BC's most iconic species.

Contributors:

- Michael J. Noonan, University of British Columbia Okanagan

Acknowledgements:

This work was carried out on the UBC Okanagan campus, which is situated on the traditional, ancestral and unceded territory of the Syilx Okanagan Nation and their peoples, who have used this site for millennia to pass on in their culture, history, and traditions from one generation to the next. The work was supported by a BC Parks Living Lab grant, the MITACS accelerate program, an NSERC Discovery Grant RGPIN-2021-02758, and the University of British Columbia, Okanagan.

Courtney Collins

Biodiversity Research Centre, University of British Columbia

Alpine plant responses to increases human trampling disturbance in the Nch'kay region.

Abstract:

Mountains are warming faster than other regions of the globe, causing changes in the structure and function of alpine ecosystems. While we know that warming temperatures are shifting alpine plant growth and reproduction aboveground, we know much less about the impacts of warming belowground, including root growth and phenology, soil microbial community dynamics and soil moisture. In addition to warming, extreme events such as flooding are becoming more common with climate change, and we need to understand how these types of events influence alpine ecosystems. Here we present results from a warming experiment established in the Nch'kay region (Garibaldi Provincial Park, British Columbia), as part of the International Tundra Experiment (ITEX). In Summer 2022, we established 12 open top warming chambers (OTC) with paired control plots across heather, sedge, and willow dominated alpine plant communities. Due to extreme heat and high snowpack, ⅓ of our plots flooded post OTC set up. We sampled soils and calculated soil microbial biomass C and fungal:bacterial ratios using the onsite microBIOMETER soil testing kit and measured continuous soil moisture in all plots using

TOMST climate loggers. We show the striking effects of warming, flooding and their interaction on key biotic and abiotic components belowground.

Contributors:

- Cassandra Elphinstone, University of British Columbia
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