

Living Lab Program for Climate Change and Conservation - Final Report



Project title: Assessments of biodiversity elements across B.C.'s bog orchid range

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Research findings

- A total of 1,955 observations were made across four Provincial Parks (Duffey Lake, Mt. Robson, Crooked River, Stone Mountain)
- Duffey Lake
 - 174 species were observed; 111 were plant species
 - 4 *Platanthera* orchid species were observed in the area – *P. dilatata*, *P. stricta*, *P. huronensis*, *P. unalascensis*.
 - The area is very difficult to access. Access toward the northeastern end of the park is easier but is maintained and somewhat regulated by a local guardian.
 - The boat launch area is heavily trafficked and increasingly polluted by tourists/visitors.
- Mt. Robson
 - 226 species were observed; 134 of these were plant species
 - Trail signs are not always obvious within the park as you move east to some of the less visited trails
 - Many of these trails had fallen trees over them
 - We had 3 black bear encounters; one of which was in the Robson Meadows campground (all were safe encounters where the bears moved on).
 - 5 *Platanthera* species were observed – *P. orbiculata*, *P. dilatata*, *P. huronensis*, *P. aquilonis*, *P. unalascensis*.
 - 8 camera traps were set up to observe insects visiting *Platanthera* flowers – Geometrid moths, *Bombus* bumblebees and *Autographa gamma* (moth) were common visitors to *P. huronensis*.
- Crooked River
 - 243 species were observed; 153 were plant species
 - 3 *Platanthera* species were observed – *P. orbiculata*, *P. stricta*, *P. dilatata*
 - The population of *P. dilatata* and *P. stricta* occurs within the campground and had been mown – it occurs on the verge/bank of the main road going around the campground
 - One yellow-listed species, western toad, was observed
 - Lots of the plants had an orange rust present
- Stone Mountain

- 266 species were observed; 145 were plant species
- 3 blue-listed species were observed – stone sheep, *Oxytropis campestris* var. *jordallii* (Fabaceae), woodland caribou population 15
- 1 *Platanthera* species was observed – *P. aquilonis*
- One grizzly bear encounter – we moved on once the bear seemed intent on staying in the area. We believe this bear is a resident to the area and is often sighted moving through the campground.
- Overall, plant species assemblages are most similar among Duffey and Robson, although the climatic variables are most similar among Robson and Crooked.
- We plan to continue working on creating a climate model that can help to explain the distribution of the orchids in these areas – orchids are often used as biodiversity indicators
- Three students were employed and conducted research projects under this award.

Methods summary

- General survey methods
 - 50 m transects were used to survey vegetation and fungi approximately every 2 km along trails within each park.
 - Animal observations were made opportunistically at these transects.
 - Representative photographs were taken of species.
- Insect sampling
 - 3 sets of 4 coloured pan traps were set out each morning and insects collected from them in the afternoon
 - Insects have been identified to Order but further DNA barcoding work is underway
- Camera traps
 - We used customized Raspberry Pi camera units with Pikrell Cam software for motion-detected video recording of insects visiting orchid flowers. Video files are downloaded and viewed to obtain the species of insects interacting with flowers, and their associated behaviours

Key outcomes for BC Parks

- Our data provides a baseline for biodiversity within some of the lesser visited parks in central and northern BC.
- Orchid data contribute to building climate envelope models which can inform future species and ecosystem management. Orchids are particularly vulnerable species given their dependence on mutualistic relationships with insect pollinators and mycorrhizae. Thus, under changing climates, orchids can be used as biodiversity and ecosystem health indicators.
- This data adds to the growing body of knowledge about BC's flora and fauna, and the relationships among taxonomic groups (e.g., plant-insect interactions).

Relevance to BC Parks management

- These data could be incorporated into any active or future monitoring programs to determine if species richness appears to be stable/increasing/declining.
- These data may assist in tracking the spread of non-native species.
- Photos of species identified during our work could be used to create educational signs and displays for these parks, and to promote these areas for tourism and recreation. Several of the parks had little in the way of information regarding the biodiversity present or how to protect it.

Project's challenges/opportunities

- The summer of 2023 was particularly bad for wildfire – our surveys were cut short in Robson, Crooked River and Stone Mountain due to severe smoke and fire-associated thunderstorms.
- Access into the Duffey Lake area was harder than we anticipated. We did not expect to find a local guardian living in the area but when we explained our work and reason for being there, we were given the all-clear to continue.
- During our identification work it became apparent that there are very few records or up-to-date keys that are suitable for northern BC. This highlighted a knowledge gap (also present in other areas) – we know very little about the plant-insect associations in these areas. This information is vital for maintaining healthy functioning ecosystems into the future.

Conclusions/next steps

- We plan to continue working on creating a climate model that can help to explain the distribution of the orchids in these areas – orchids are often used as biodiversity indicators
- Representative insect samples will be sent for DNA barcoding to provide further identification
- Data will be entered into iNaturalist under the plat-19 account

References and links

- Pictures from the work were regularly posted to the Instagram account @viu_orchids
- Vancouver Island University published a blog on the work, from the perspective of the student employees, on 18th October 2023 (<https://www.viu.ca/blog/surveying-plants-remote-bc-parks>)