JAMES RENNIE BEQUEST

REPORT ON EXPEDITION/PROJECT/CONFERENCE

Expedition/Project/ Conference Title:	The effects of changing growing locations and conditions on *Salix pulchra* in the Yukon territory, Canada
Travel Dates:	29th July – 22nd August 2017
Location:	Kluane Lake research station, Yukon Territory, Canada
Group member(s):	Matthew Little
Aims:	1) Identify differences in growth rate and phenology between Northern and Southern S.pulchra grown in the common garden and maintained by humans. 2) Identify differences in growth rate and phenology between Northern and Southern S.pulchra grown in the wild. 3) Use these differences to make predictions about how S.pulchra will adapt to changes in climate and how it may then affect the tundra landscape it occupies in the wild.

OUTCOME (not less than 300 words):-

How plant species will interact and change with the current rates of climate change is a question of the upmost importance. Feedback effects of arctic greening is increasing the albedo of the surface of the earth on a large scale, leading to potential runaway climate change. It is important to know how and on what timescale these changes in plant phenology are likely to occur.

In the summer of 2017 I was fortunate enough to travel to the Kluane Lake research station in the Yukon Territory of northern Canada. I was worked as a research assistant with Team Shrub, a research team from the University of Edinburgh focusing on arctic tundra change. My time was spent collecting data for various projects Team shrub was conducting or contributing to. Most notably the continuing monitoring of plant traits and phenology of wild *Salix spp.* on which I focused my report.

Data collection was carried out in the upland areas surrounding the research station and in the common garden experiment located at the research station itself. I was able to carry out trait collection in all locations Team Shrub worked at Kluane. After spending four days at ~1800m a.s.l. during which we were snowed on while collecting data! There was even time for a short road-trip to see more of the surrounding country.

Unfortunately I was unable to display data collected for *S.pulchra* in Kluane as the data set was not complete and analyses were infeasible with the dataset in its current state. However, I managed to obtain the data for vegetation height measured in *S.pulchra* at the second Team Shrub experimental site on Herschel Island in the northern Yukon Territory (69.5795° N, 139.0762° W). Figure 1 shows the relationship of increasing height in vegetation from 1999 to 2017 allowing me to make some inferences on growth in southern Yukon plants (Kluane plants).

Figure 1 shows a general trend of increasing vegetation height over 18 years of monitoring on Hershel Island. Unfortunately, I cannot answer questions 1 and 2 set out in the aims

above. However, we can see from these data that wild plants are on average growing taller. This we can likely attribute to the increase in average temperatures in the arctic over the past few decades (Oechel et al., 1993; NSIDC, 2017). This increase in temperatures allows plants to start growing earlier as conditions become tolerable for growth earlier in the year. With more time to grow it is feasible for plants to then grow larger.

Due to lack of useable data I was not able to answer two of my questions set out in the aims. However, thanks to your funding I was able to travel to the Kluane National Park and collect data for the research team and be able to make a prediction about the projected heights of *S.pulchra* in the northern Yukon. That in the coming years, if annual temperatures continue to increase as they are currently doing, then we will see an increase in the heights of *S.pulchra*.

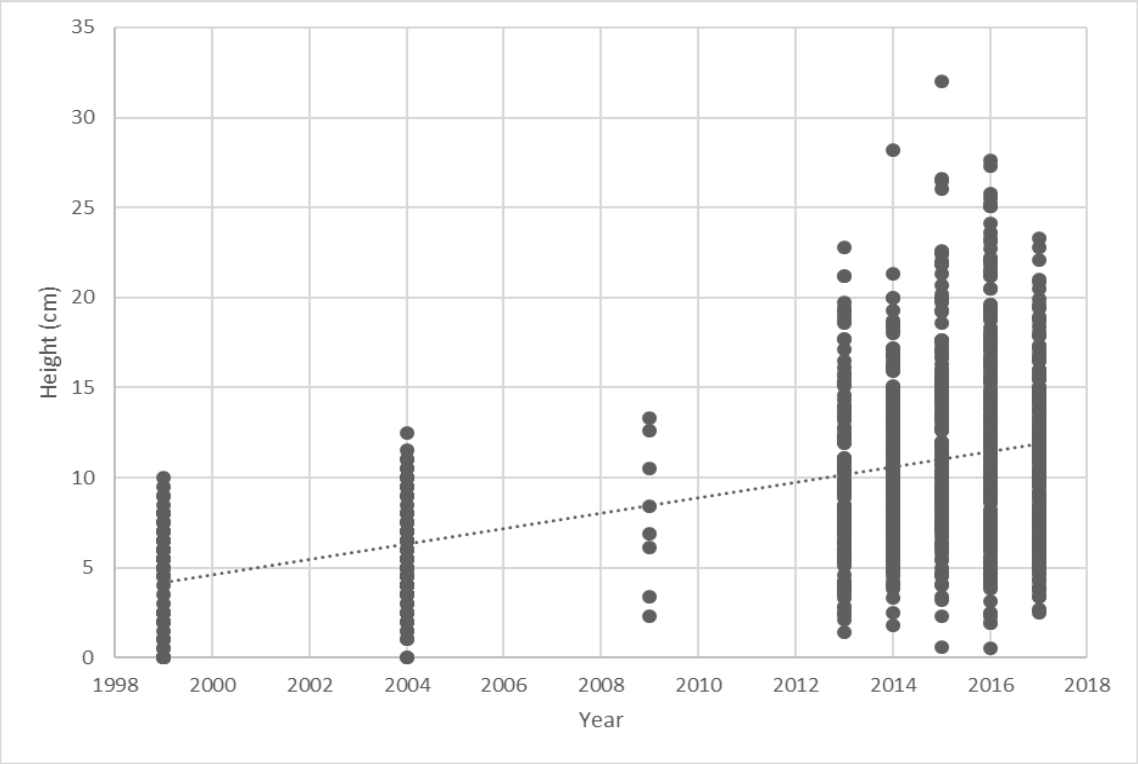

Figure 1: The heights of *S.pulchra* plants measured on Hershel island, Yukon Territory during July. Heights were measured of wild plants, the general trend in plant height is shown by the thin dotted line.