

# Shrub expansion in alpine and Arctic tundra of the Yukon Territory

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## Are willows increasing?

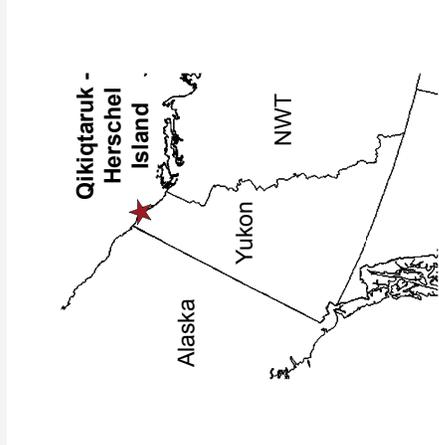
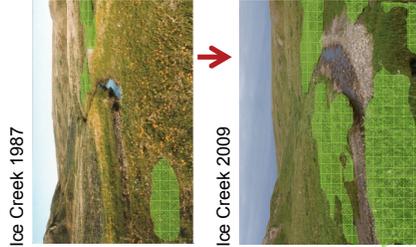


Figure 1. Map of the study location Qikiqtaruk – Herschel Island in the Western Canadian Arctic.

## Willow shrub change on Qikiqtaruk - Herschel Island

Willow patches have increased over 22 years in this photo pair comparison.



## Long-term Plots

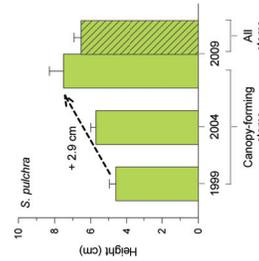


Figure 2. Increase in canopy height (cm).

- Data from long-term plots show an increase in height of *Salix pulchra* or diamond-leaf willow.
- The height increase over a 10 year period is ~ 3 cm, which is a 40% in the total height for the individuals growing in these plots.
- This species grows on the top of Herschel Island between the cotton grass tussocks. Farther south in the NWT and Yukon this willow can grow to be meters tall.

## Mortality

We observed little evidence of dead willow branches on Qikiqtaruk – Herschel Island. We constructed fences to keep out herbivores such as caribou and musk oxen, and looked for evidence animal feeding. Our results suggest that these herbivores are not eating much willow.



Sampling herbivore exclosures

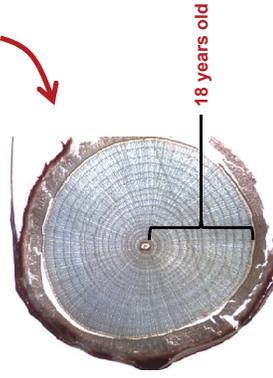


Lemming trapping

## Recruitment

We repeated vegetation surveys conducted during the establishment of the territorial park. We also counted the growth rings of willow stems. These data indicate that most willow patches began growing between 1920 and 1980.

If you collect a section of a willow stem, make a thin slice and look under magnification, you can see annual growth rings.



Willows and other woody species slow their growth in the winter each year. This makes a ring in the wood. You can count these rings to determine the age of the stem.

## Findings

- Willows are increasing on Qikiqtaruk – Herschel Island
  - Repeat photos = greater willow cover
  - Long-term plots = ~40% height increase in 10 years
  - Repeat surveys = 10 – 20 % increase in cover in ~ 20 years
- We found little evidence of herbivory or mortality
- Willows will likely continue to increase in this region



*Salix pulchra* from Qikiqtaruk – Herschel Island (left, height < 30 cm) and Kluane (right, height > 1 m).

## Acknowledgements and Funding

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