

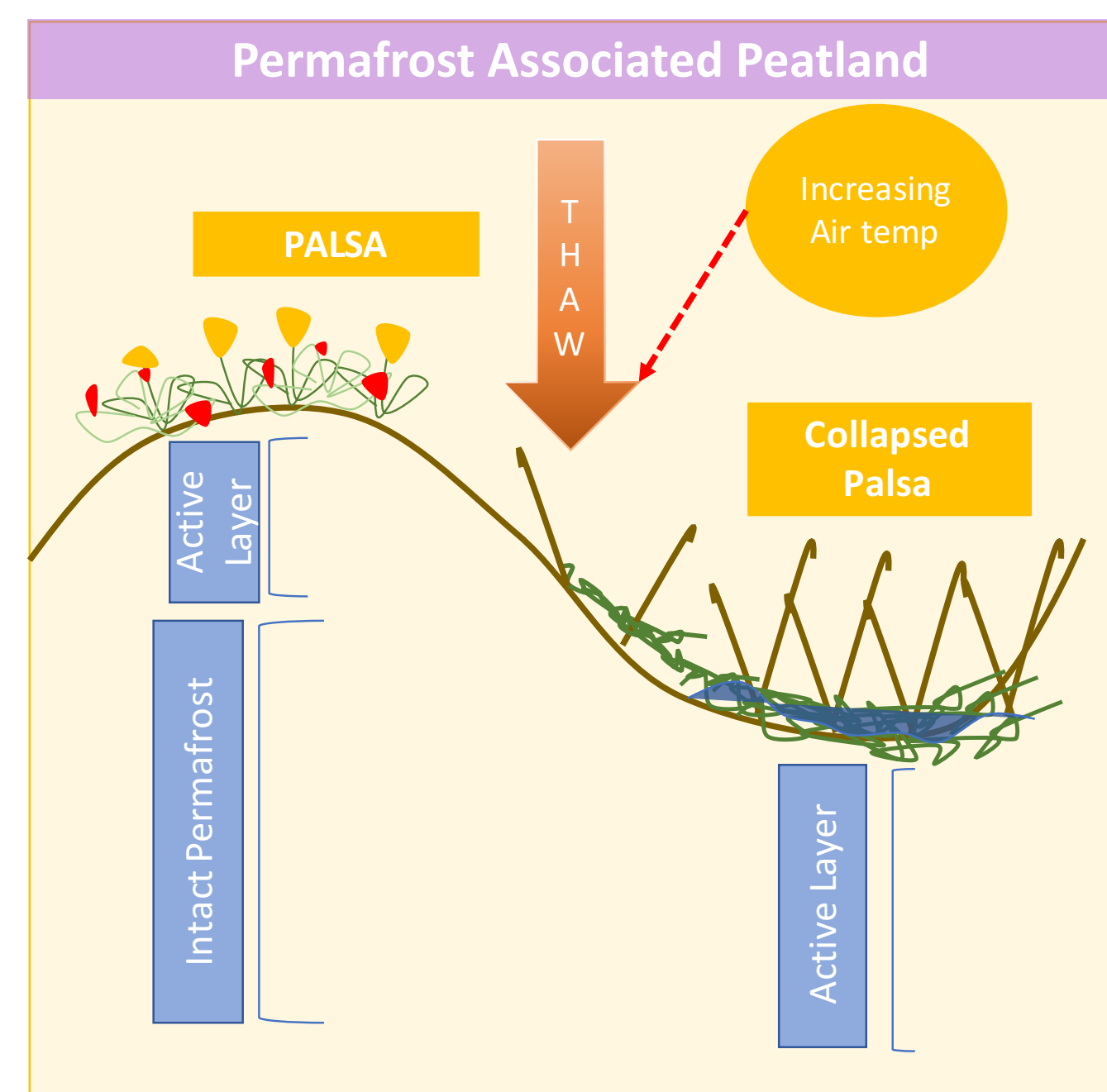
The Vulnerability of Bakeapple Picking in a Changing Physical and Social Landscape

Introduction

- Permafrost thaw has physical, biological, and chemical impacts
- Indigenous communities with land based livelihoods have high adaptive capacity to environmental variability but are more sensitive to the impacts of climate change due to the region they live, their livelihoods, and colonial legacies
- Berry picking is a culturally and nutritionally valuable component of land based livelihoods
- The impact of permafrost thaw on berries, specifically *Rubus chamaemorus* (bakeapple), is unclear

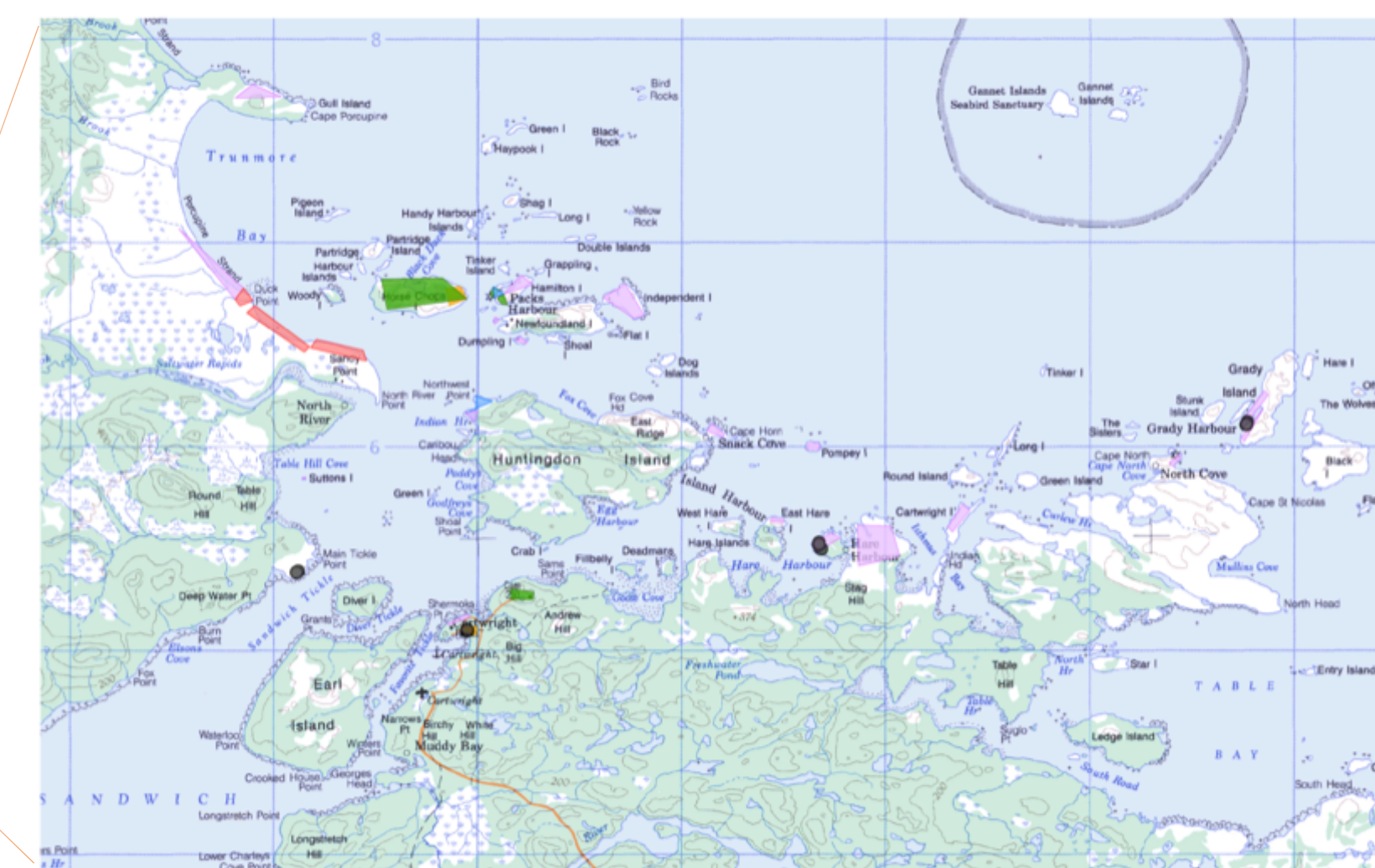
Research Question

What is the vulnerability of bakeapple picking to changes in the physical and social landscape?



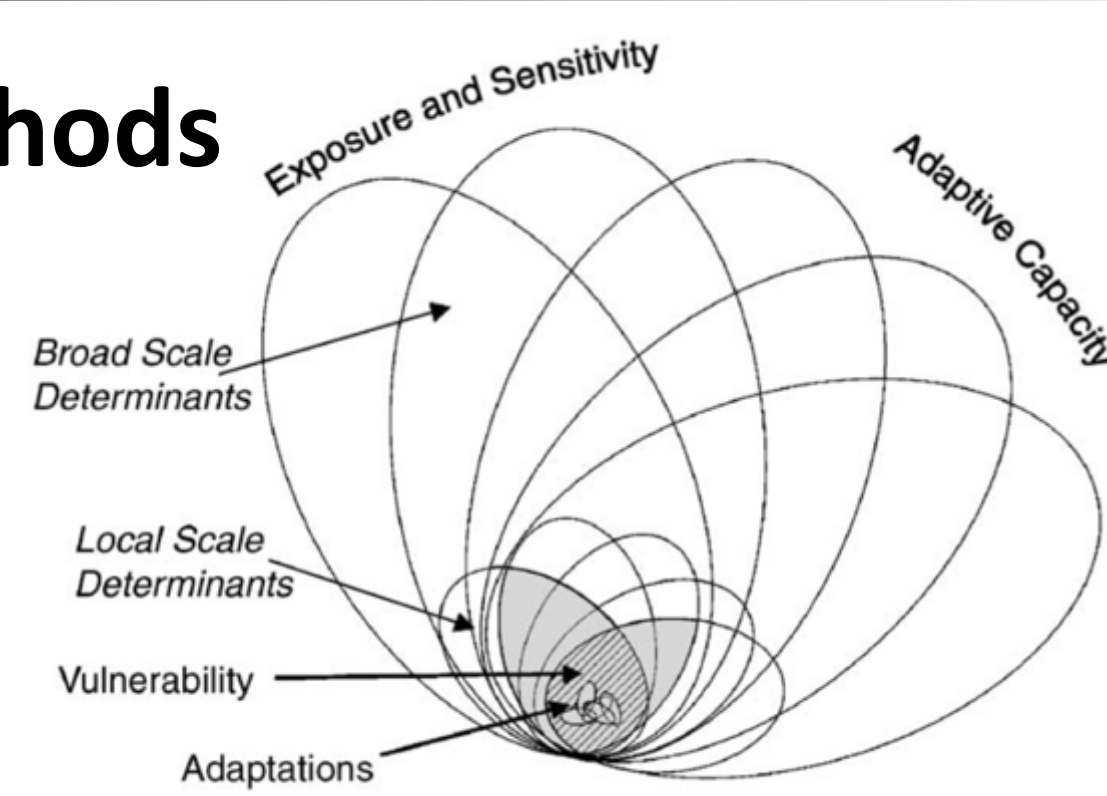
Study Area

- Cartwright, Labrador
- ~500 people
- Indigenous ancestry
- Sub-Arctic
- Sporadic Permafrost



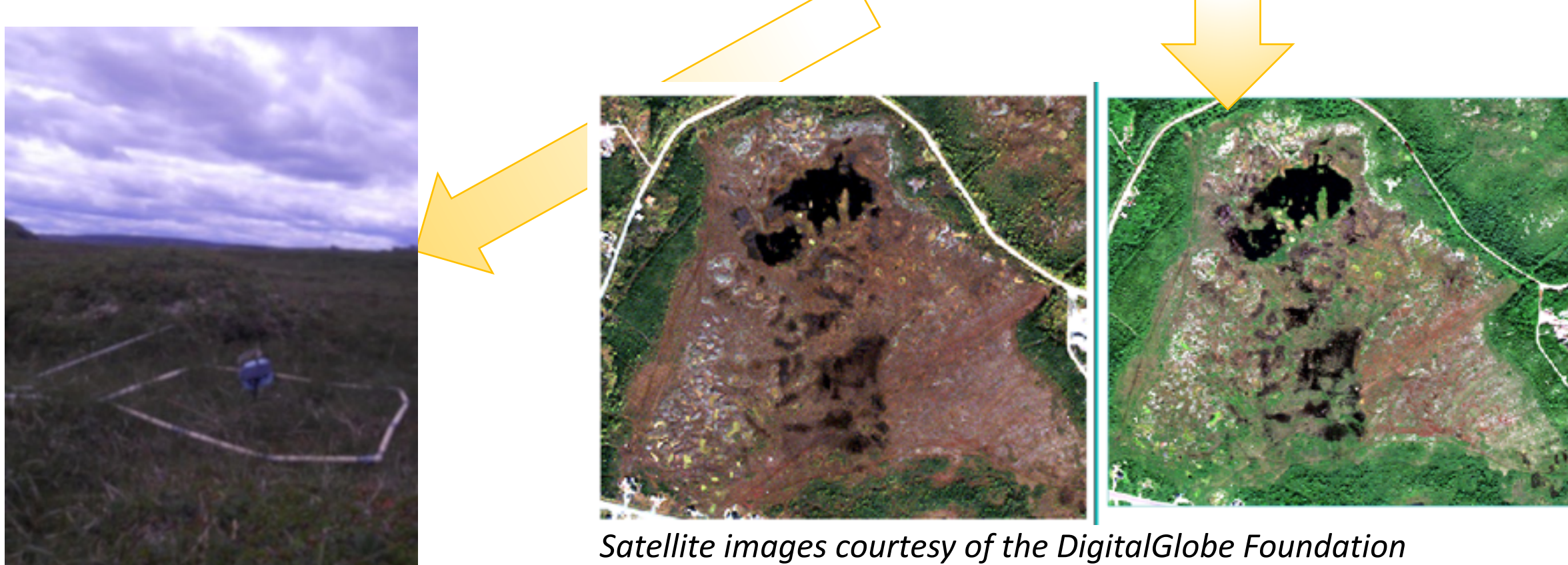
Methods

- Contextual vulnerability approach
- Case study
- Mixed methods



Smit and Wandel, 2006

Methods	Interviews	Focus Groups	Field Surveys	Satellite Imagery	Weather Data
Used to identify	Exposure, Sensitivity, Adaptive Capacity	Exposure, Sensitivity, Adaptive Capacity	Exposure	Exposure	Exposure
Spatial Extent	~115 km	~115 km	62 1 m ² plots across 4 peatlands	~0.5 km ²	1 point in Cartwright
Temporal Extent	Generational	Generational	1 week	2004 to 2016	1934 to 2017



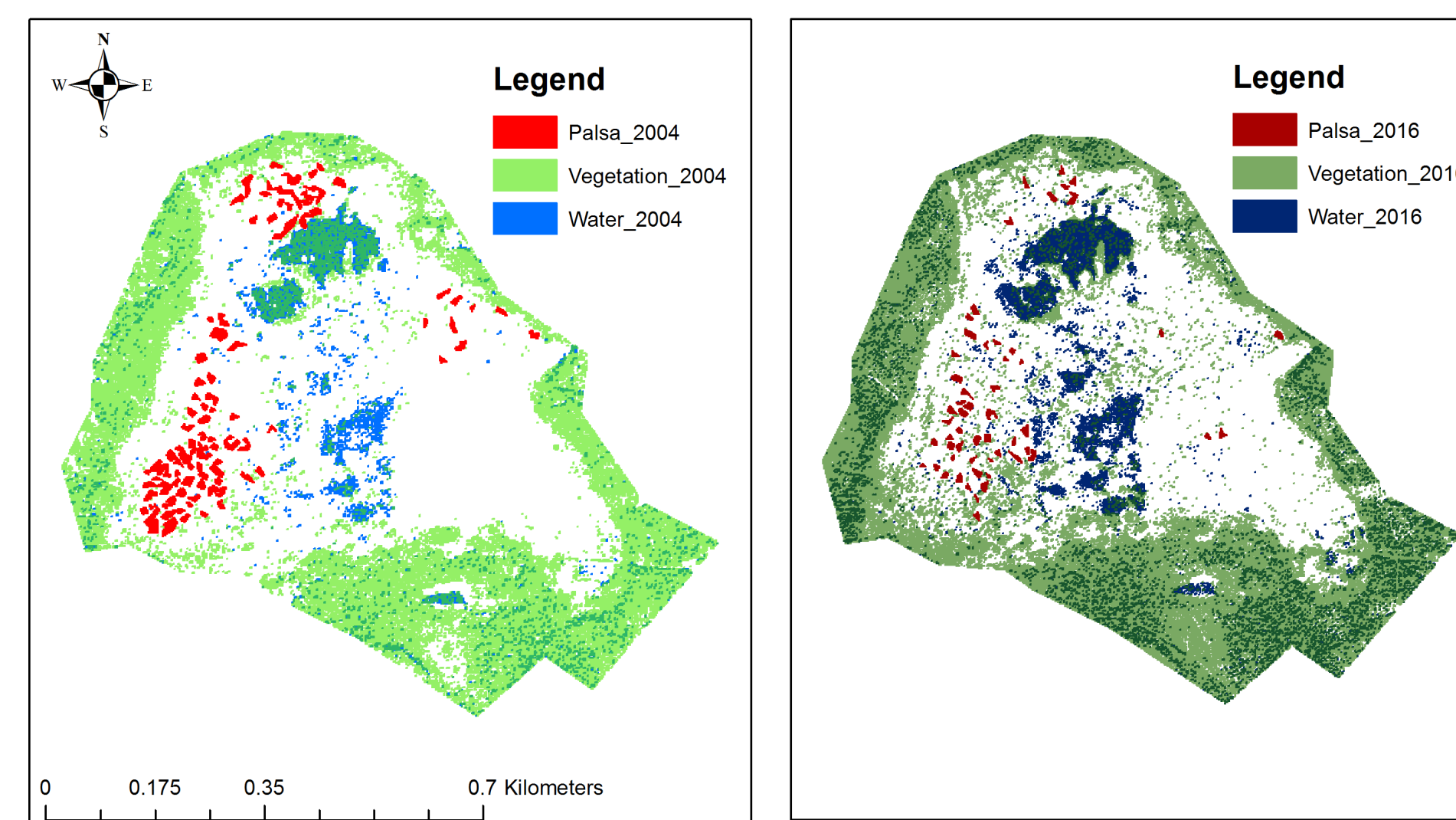
Satellite images courtesy of the DigitalGlobe Foundation

Results: Exposure

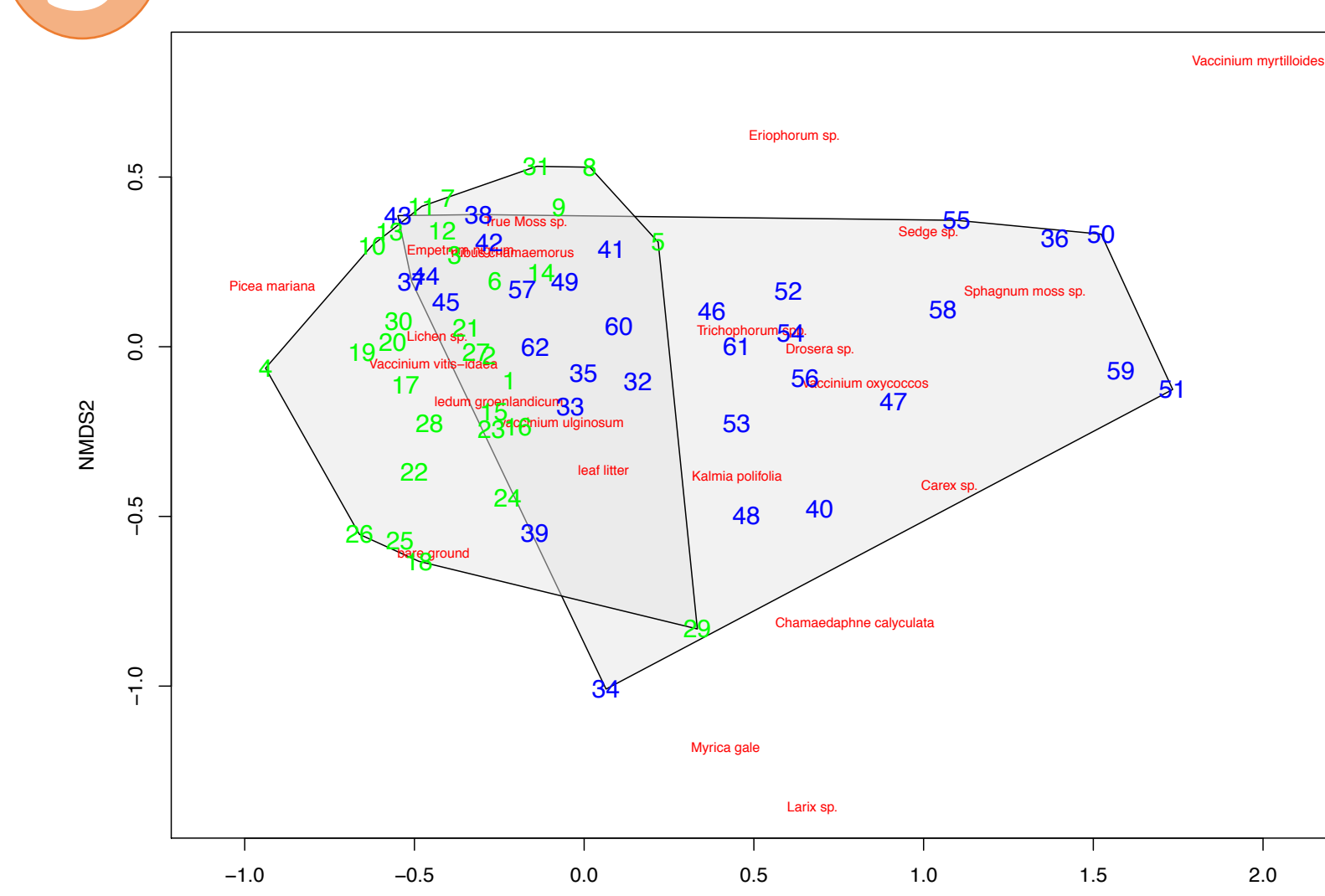
- Community members expect variability in bakeapple growth and have knowledge of the climate and ecological constraints on the growth of bakeapples.
- Traditional ecological knowledge (TEK) and satellite imagery suggest that vegetation is increasing and permafrost is decreasing with possible impacts on bakeapple abundance.
- Field surveys show how permafrost thaw specifically constrains bakeapple growth and this is aligned with community members' observations of fragmentation of bakeapple patches.
- TEK and historical weather data confirm changes in climate that have resulted in bakeapples ripening earlier.

Aspect of Change (described by interview participants)	Determinates of Expected Vulnerability	Factors Contributing to Long Term Change
Abundance	<ul style="list-style-type: none"> The abundance of bakeapples is susceptible to high winds and/or rains starting in the spring through the summer of the year. 	<ul style="list-style-type: none"> The landscape is drying and the vegetation is growing up resulting in fewer bakeapples. The bakeapples are not growing as big or as abundant due to warming temperatures.
Quality	<ul style="list-style-type: none"> Extreme temperatures can spoil the bakeapple in the spring and summer of the year. 	<ul style="list-style-type: none"> More extreme weather is spoiling the bakeapples.
Timing	<ul style="list-style-type: none"> The temperatures during the spring and summer will determine when the bakeapples are ripe. Bakeapples in cooler places, including more distant islands and sheltered spots, will ripen later. 	<ul style="list-style-type: none"> The bakeapples are ripening earlier because the spring and summers are coming earlier.
Geographic Context	<ul style="list-style-type: none"> The best spots are out by boat, but some bakeapples will grow in town. The densest berry patches are in sheltered and moist areas. 	<ul style="list-style-type: none"> There is fragmentation of bakeapples patches.

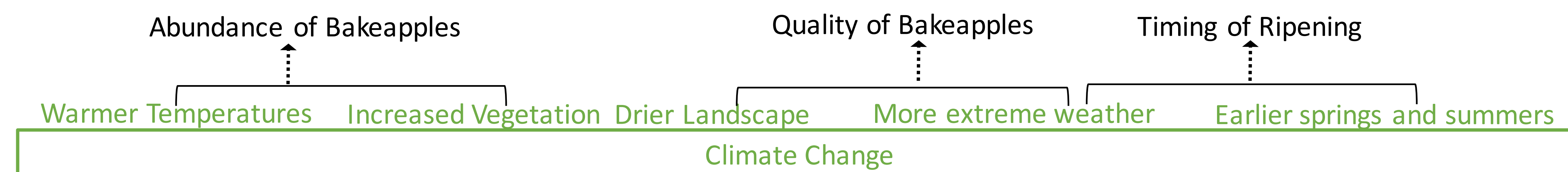
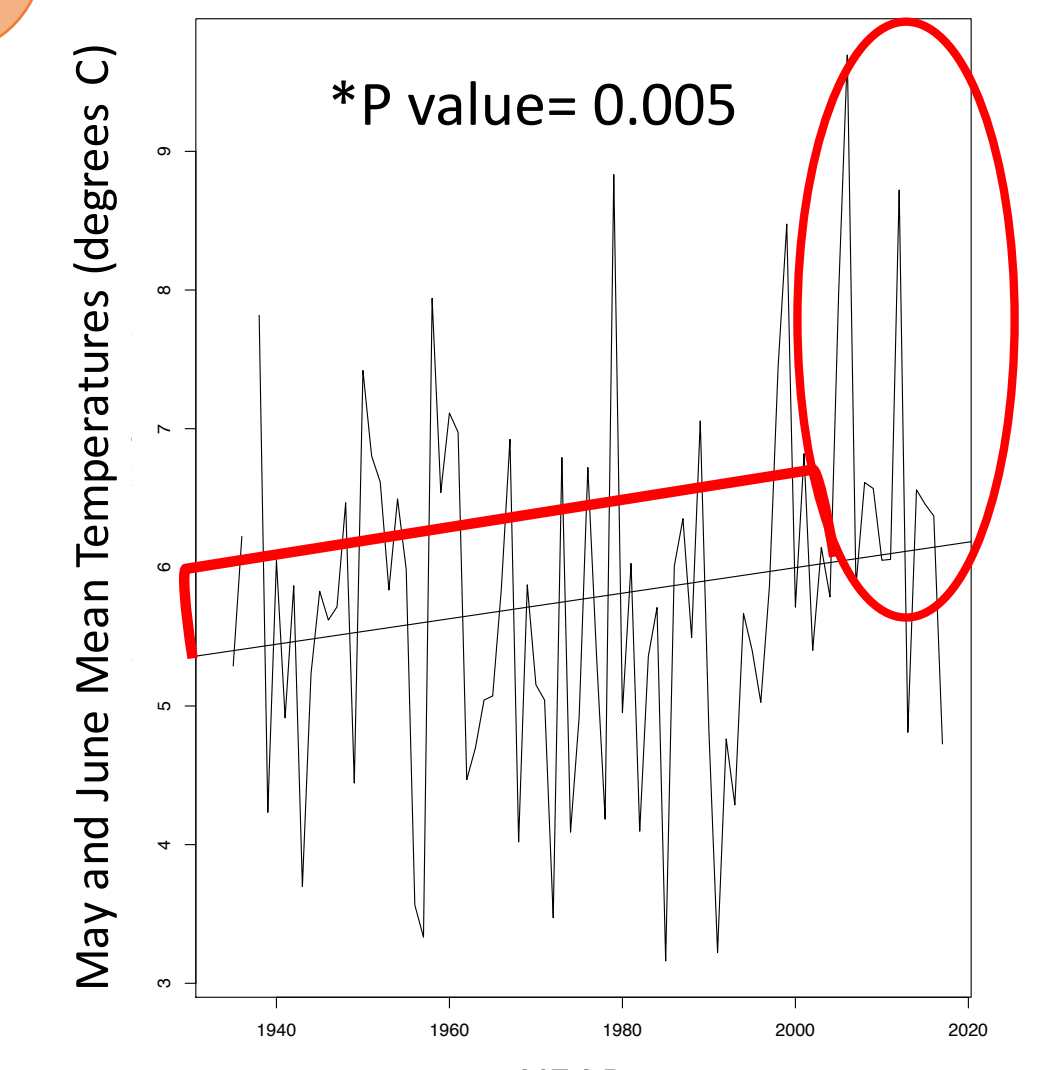
Satellite Imagery Analysis of Change Over 12 Years



Field Survey Analysis of Vegetation Change with Thaw

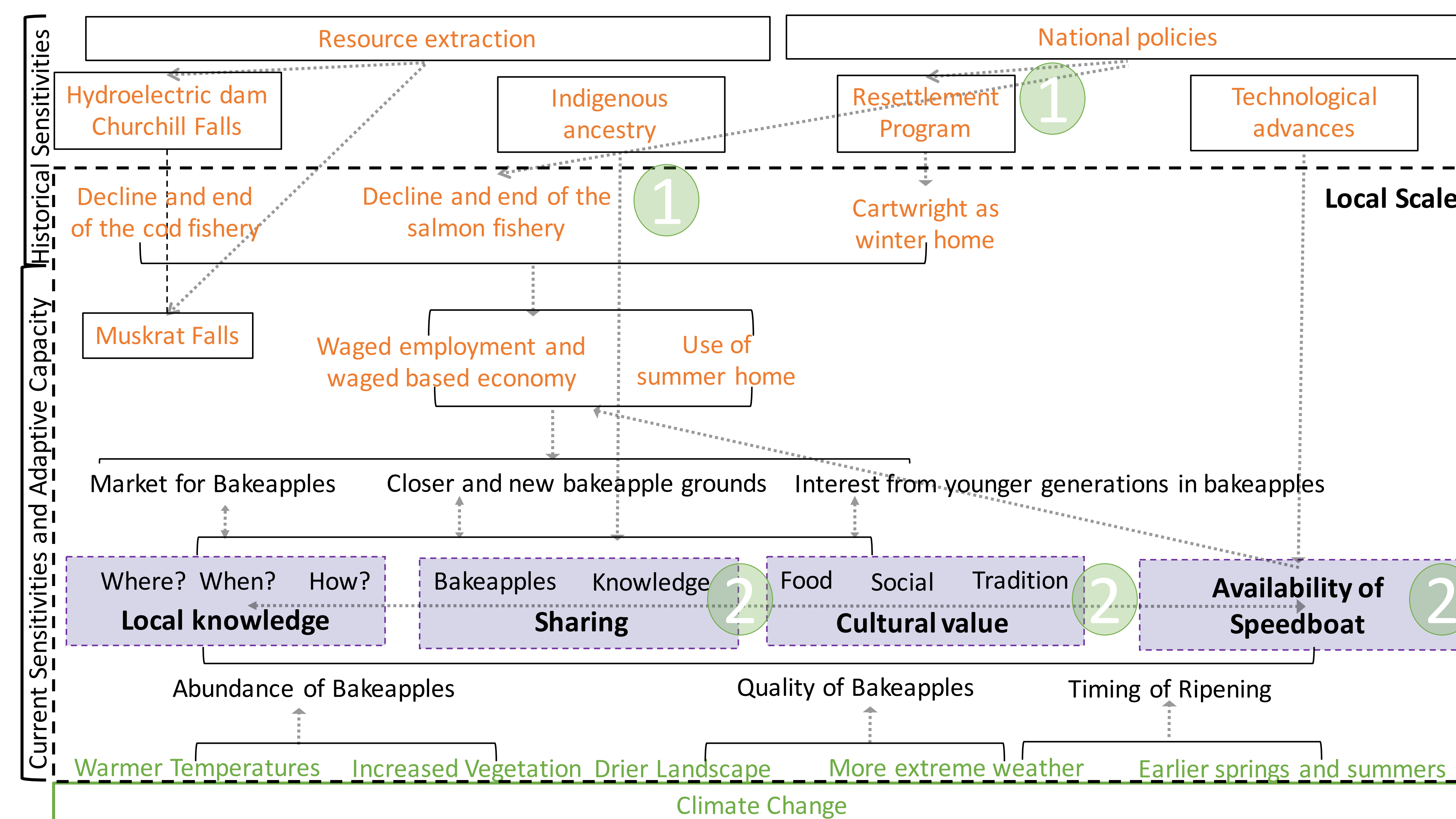


Climate data Analysis of Temperature Change Over 83 years



Results: Sensitivity and Adaptive Capacity

- Both the close of the fishery and resettlement emerged as key components of sensitivity because these events moved families further from their traditional summer homes and bakeapple picking grounds. "There is no longer a fishery that is inland. The fishery is off shore. Where it used to be at the summer fishing places. So there are less people frequenting the berry areas. Far far less people frequenting the berry areas" –Rosetta Howell
 - The value placed on bakeapples, the speedboat, and the market for bakeapples emerged as important components of adaptive capacity. "Well you can get more and you got more time and what not. Just out there poking along in a little old slow boat, are we ever gonna get there? Jump in a speed boat and sit in the chair. Goodness gracious. This is comfortable." –Sam Pardy
- "Whatever is in the grocery stores doesn't matter. We are still going to get bakeapples if we can get them because they were something that we really liked to have right?" –Male elder



Conclusions

- Indigenous communities in the Canadian North have significant adaptive capacity to environmental variability.
- Climate change impacts on traditional subsistence are exacerbated by colonial legacies and economic development.
- The future vulnerability of traditional subsistence is unclear due to projections of heightened climate change and the younger generation spending less time out on the land.

Questions? Contact darya.anderson@mail.mcgill.ca

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