Impacts of Experimental Warming on Phenology and Growth of *Carex aquatilis-stans* in Northern Alaska

*Tim Botting, Dr. Robert Hollister

NATIONAL SCIENCE FOUNDATION

ARCTIC ECOLOGY

GRAND VALLEY STATE UNIVERSITY

ITEX

Outline

- Background
- Design
- Results
- Implications

Project Background

- Barrow sites established in 1994, Atqasuk in 1996
- Part of the International Tundra Experiment (ITEX)
- Examine tundra vegetation response to temperature
- Aid in modeling and predicting future vegetation change

Study Sites

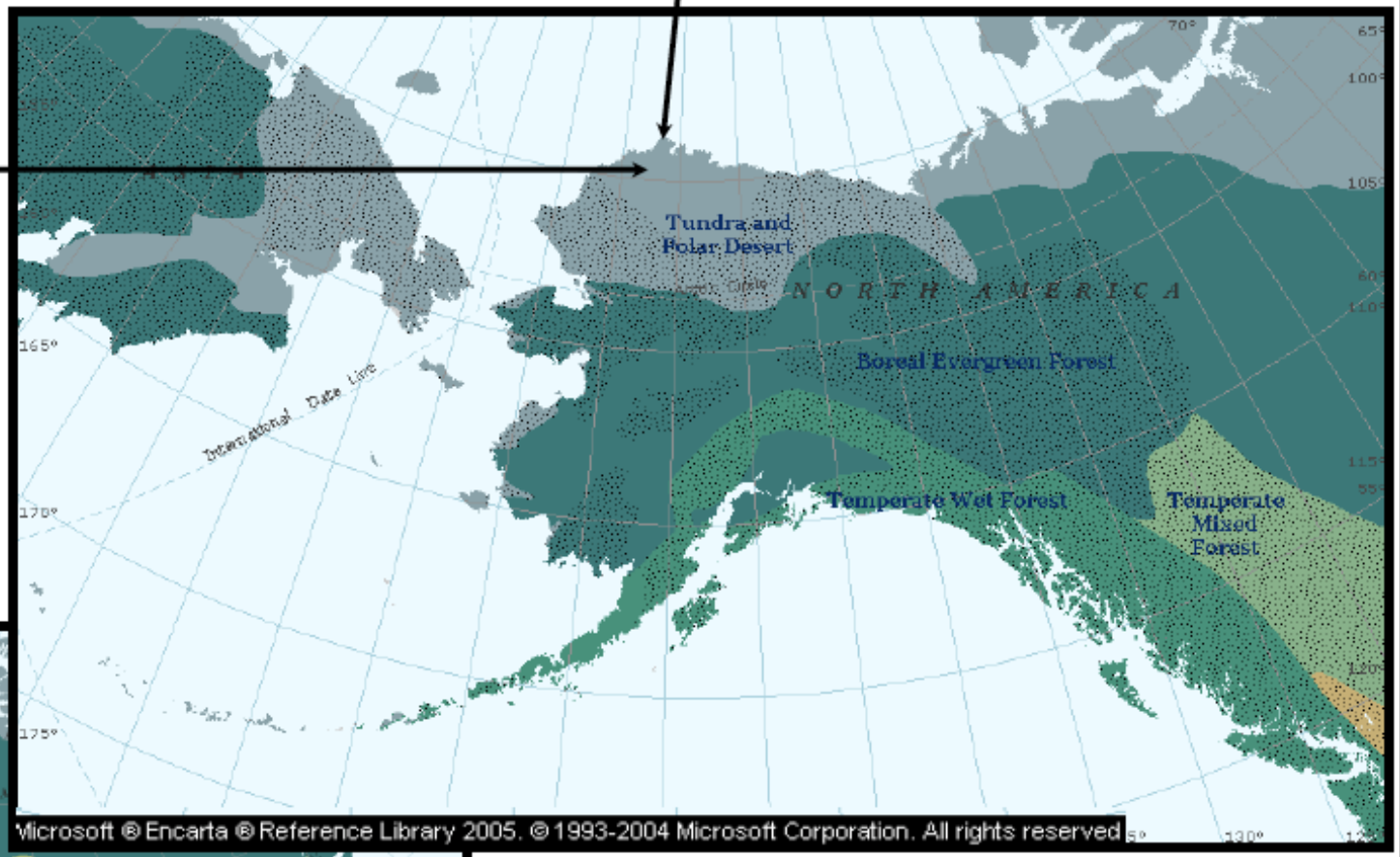
Barrow 71°18’N

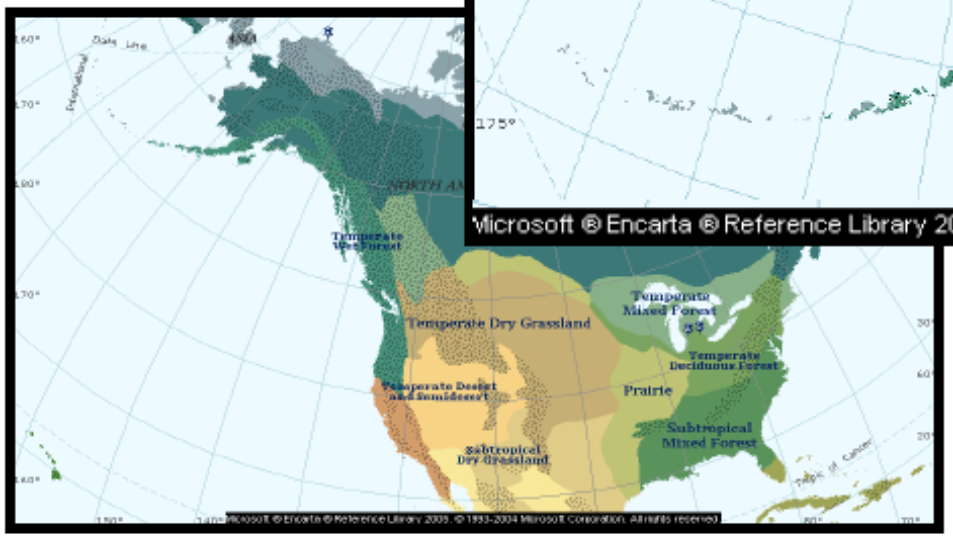
156°40’W

Atqasuk

70°29’N

157°25’W

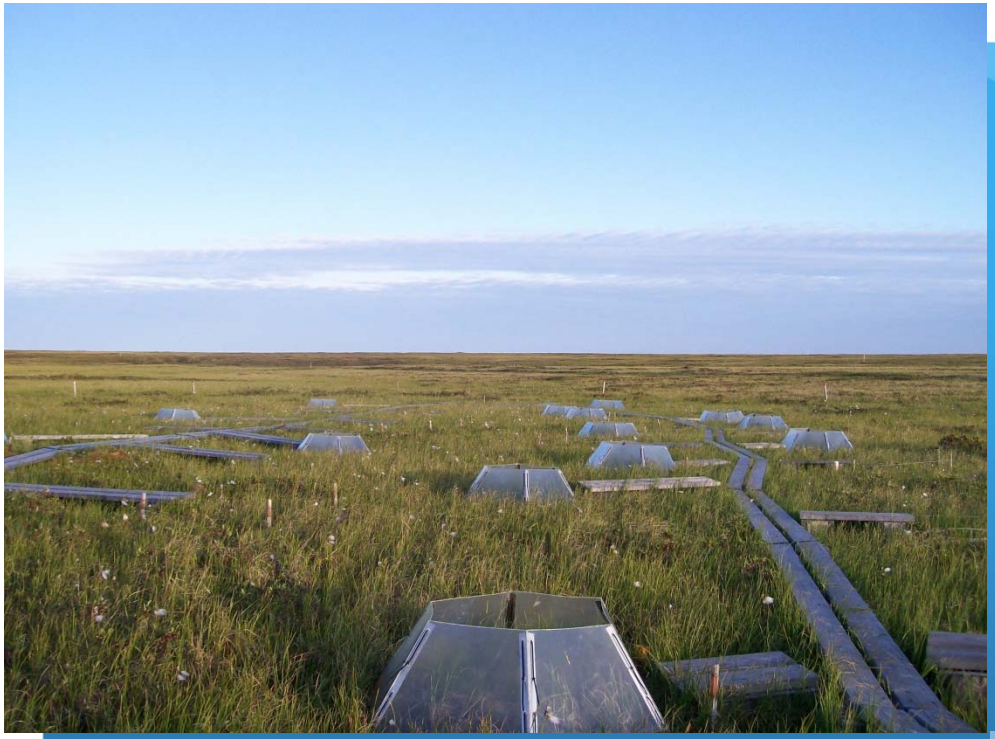




Carex aquatilis-stans

- Dominant sedge
- Found in most wet meadows
- Variable forms (inflorescences)

Source: Hulten 1968



Barrow Wet

Atqasuk Wet

Research Design

- 2 Wet Meadows
- 1 x 1 m plots
  - 24 Control
  - 24 Passively Warmed
- Open Top Chambers
  - Warmed 1 – 3° C

Measurements

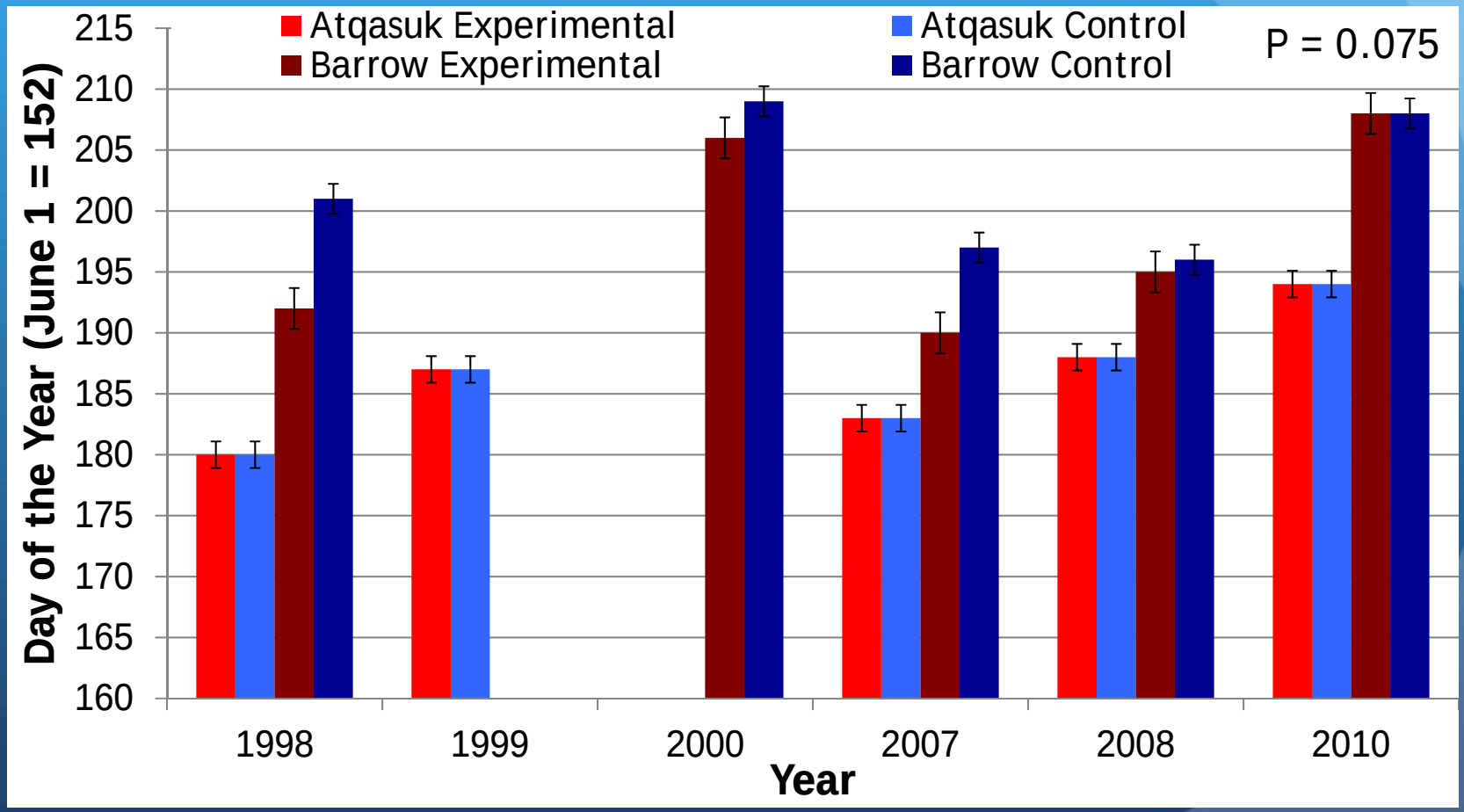
- Phenology (timing of flowering)
- Seasonal Growth (leaf length and inflorescence height)

Results

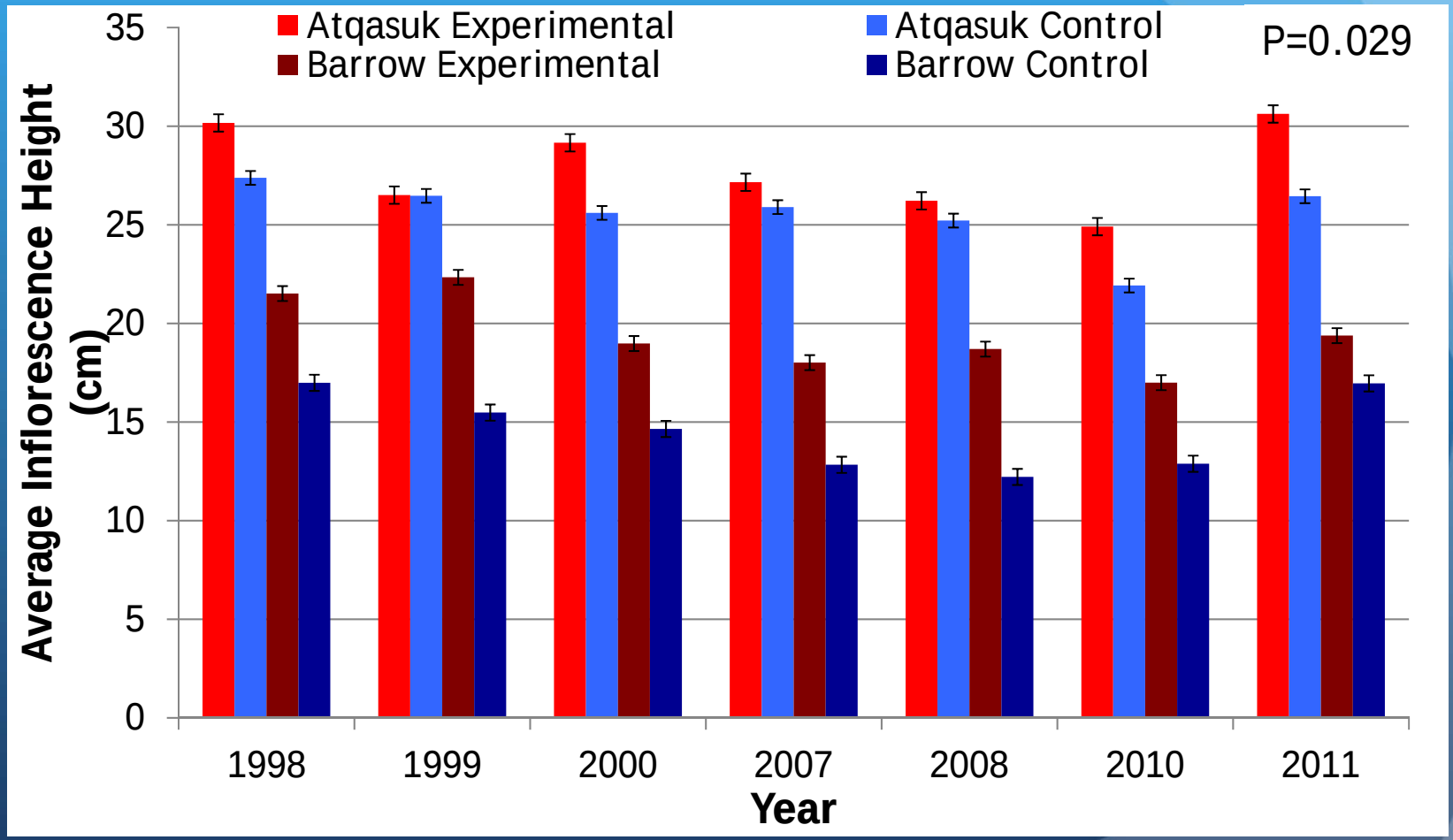
Statistics

- Used R version 2.15.0
- Software for statistical computing and graphics
- 2 way ANOVAS
  - Treatment x Year
  - $P < 0.05$

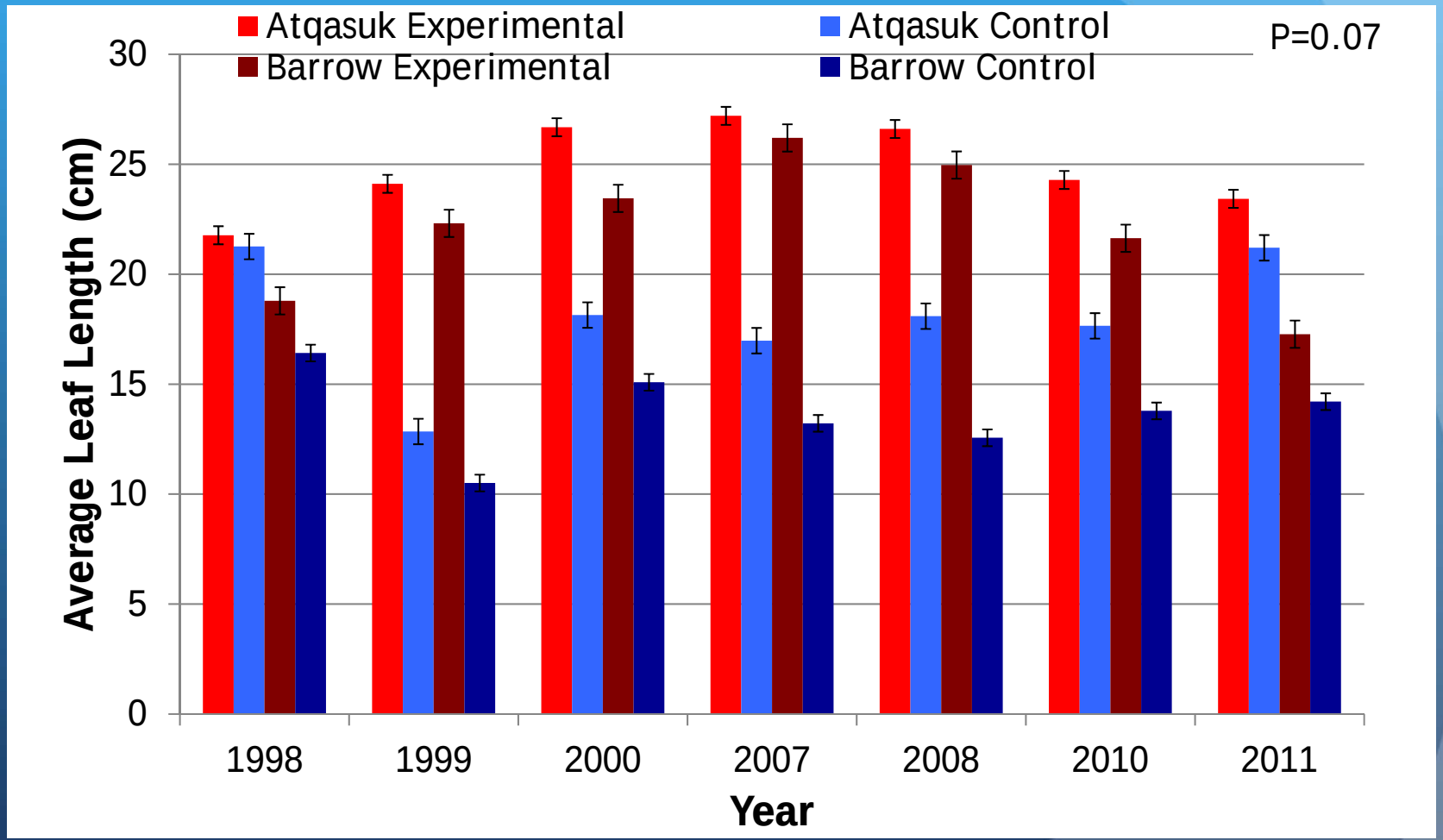
Phenology Data – First Flower



Average Inflorescence Height



Average Leaf Length



Discussion

- Altered phenology in Barrow, no change in Atqasuk
- Taller inflorescences and longer leaves at both sites
- Implications

Acknowledgements

- National Science Foundation
- ITEX members
- GVSU Arctic Ecology Program
- UMIAQ
- Barrow Alaska Science Consortium

Questions?