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A fire-history reconstruction for the southern Northwest Territories

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Working on Indigenous lands

- Akaitcho Territory Government – Fort Resolution main office
 - Deninu K'ue First Nation (FN) – Fort Resolution
- Dehcho First Nations – Fort Simpson main office
 - Pehdzeh Ki FN – Wrigley
 - Lidlii Kue FN – Fort Simpson
 - Jean Marie River FN
 - Deh Gah Got'ie Dene FN – Fort Providence
 - Ka'a'gee Tu FN – Kakisa
 - West Point FN – Hay River
- Northwest Territory Métis Nation – Fort Smith main office
 - Deninu - Fort Resolution
 - Thebacha – Fort Smith
 - Xatlo Dehe – Hay River
- Kátl'odeeche First Nation – Hay River
- Salt River First Nation – Fort Smith
- Smith Landing First Nation – Tthebatthı Dënésułıné - Fort Smith





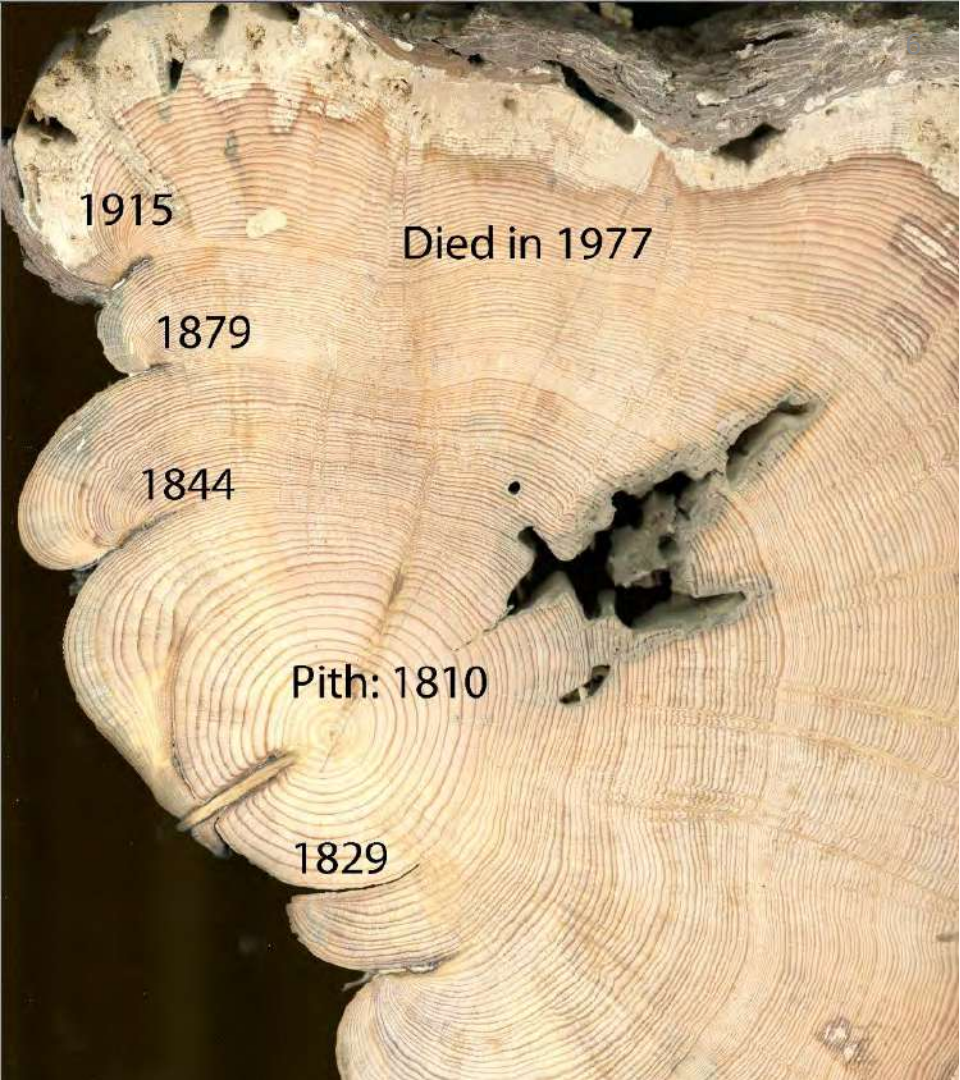
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Photo: NRCan

Goal of the study

**To provide a robust fire-history reconstruction
of the last 200 years for an area of the
southern NWT (Fort Smith to Hay River)**







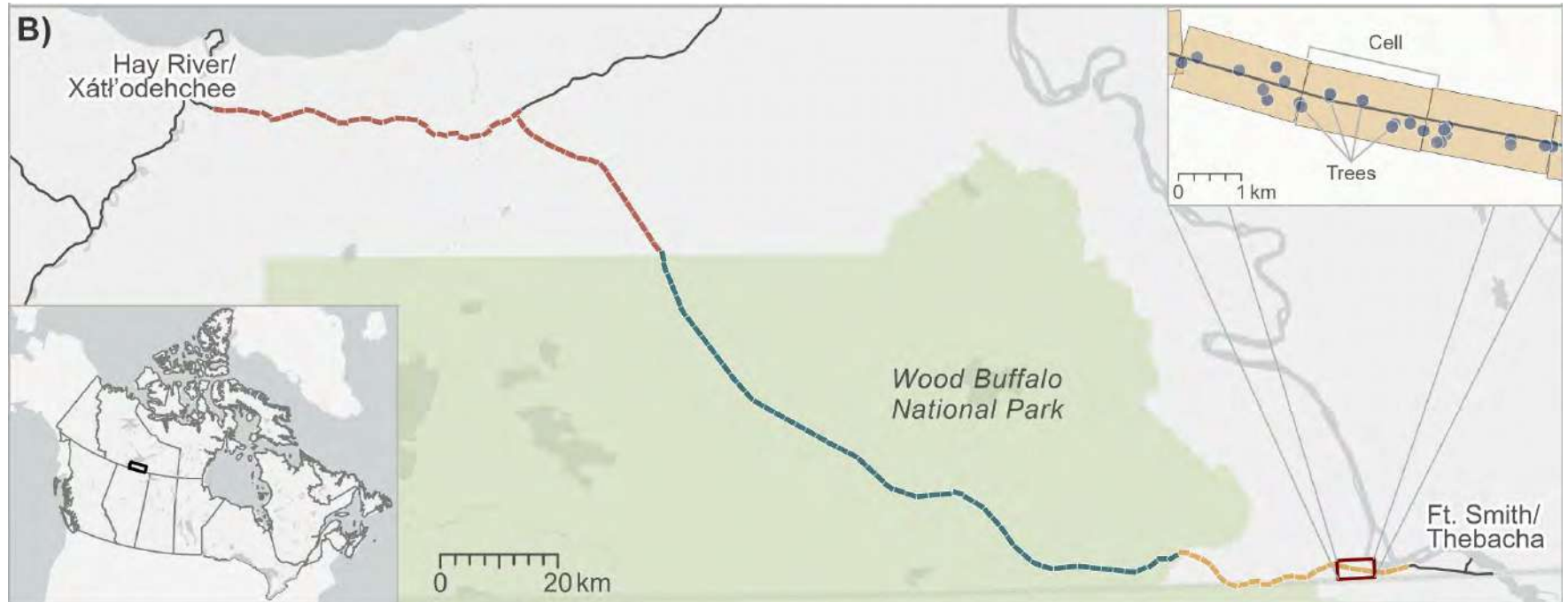
© B. de Groot, Coffee fire, Saskatchewan, 1980



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Study area: 270 km-long transect



Planning our site visits





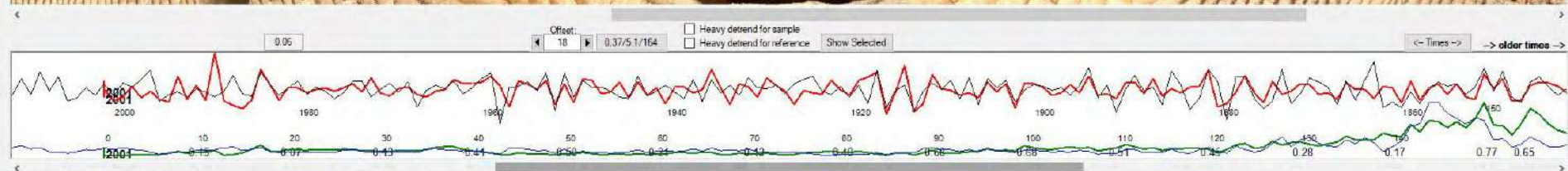
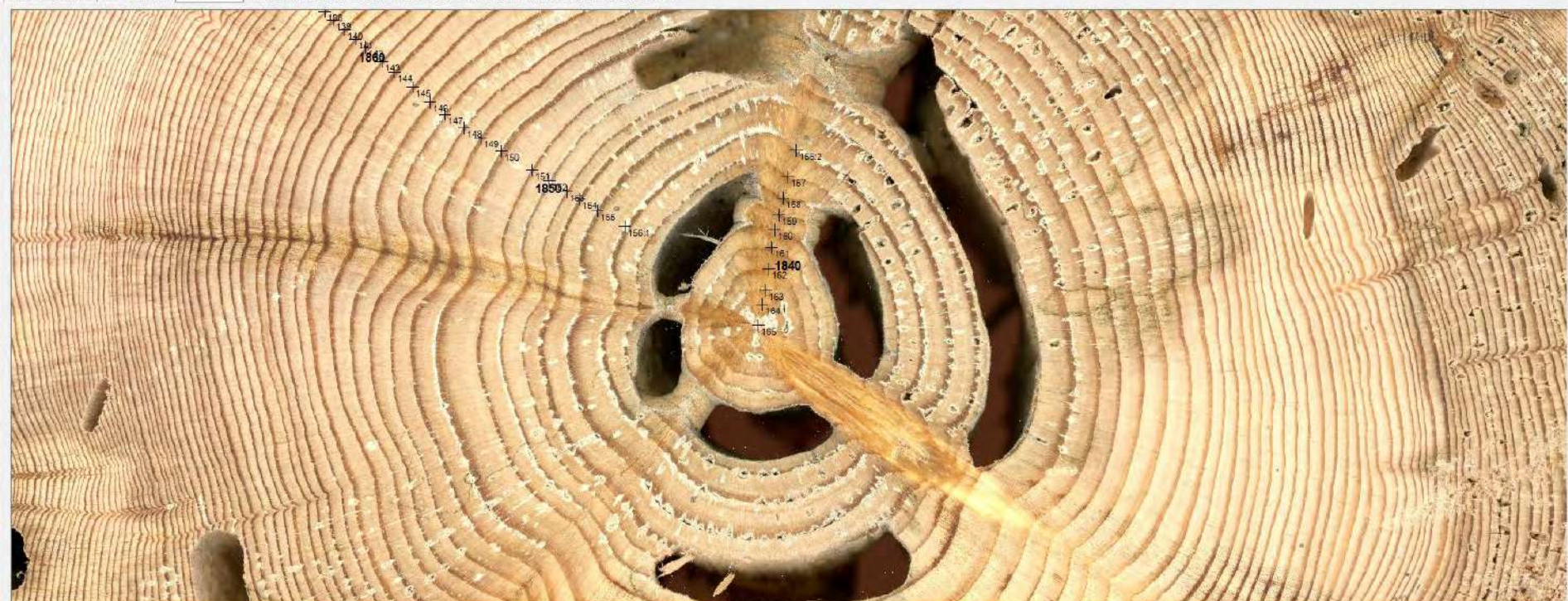


Old snags often have many fire scars

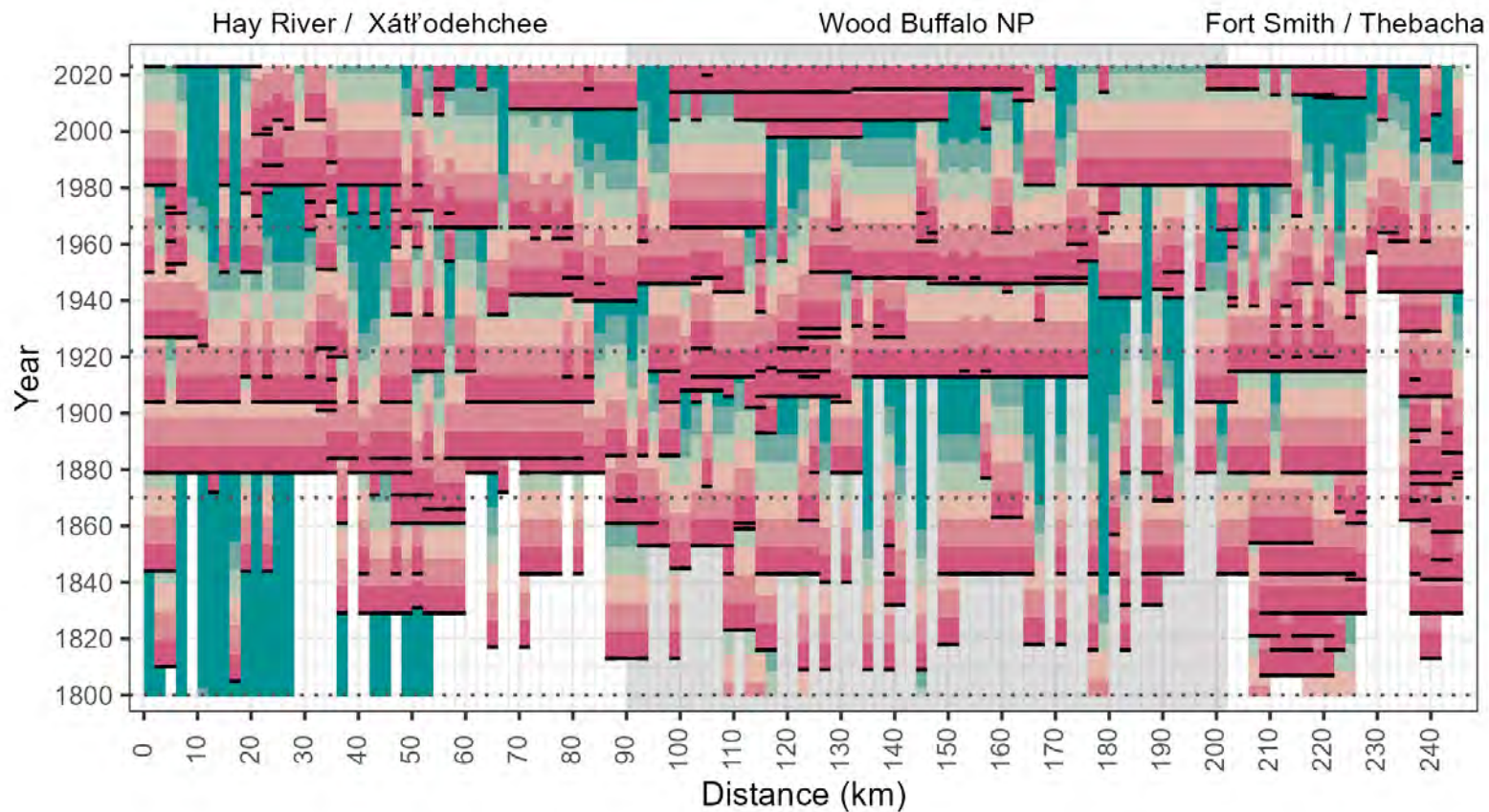




~1300 wood samples

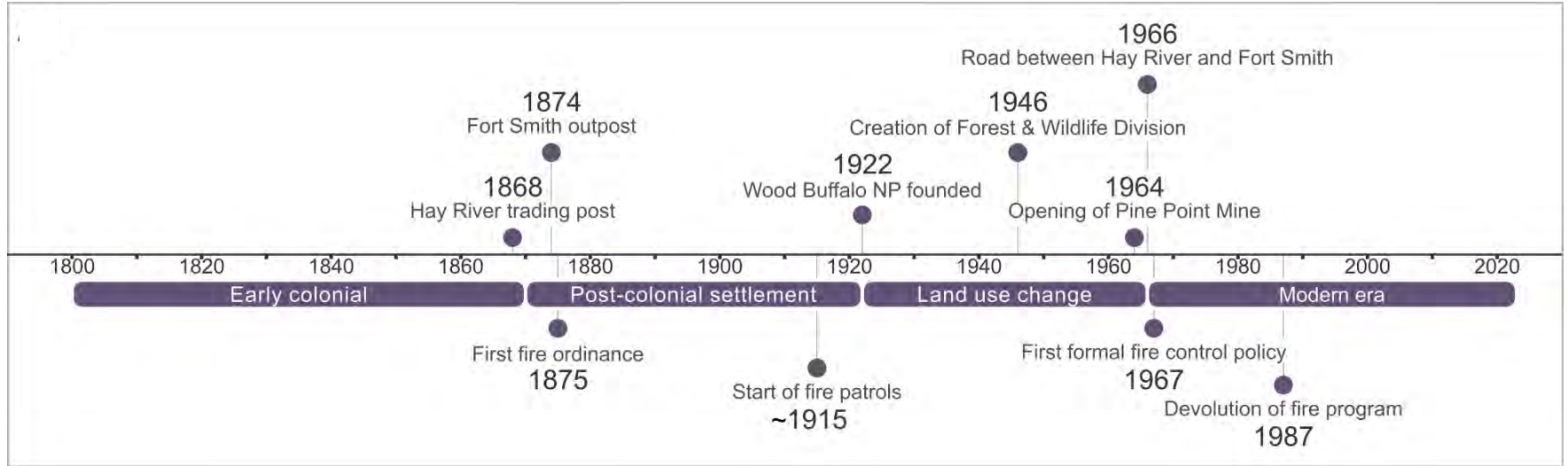


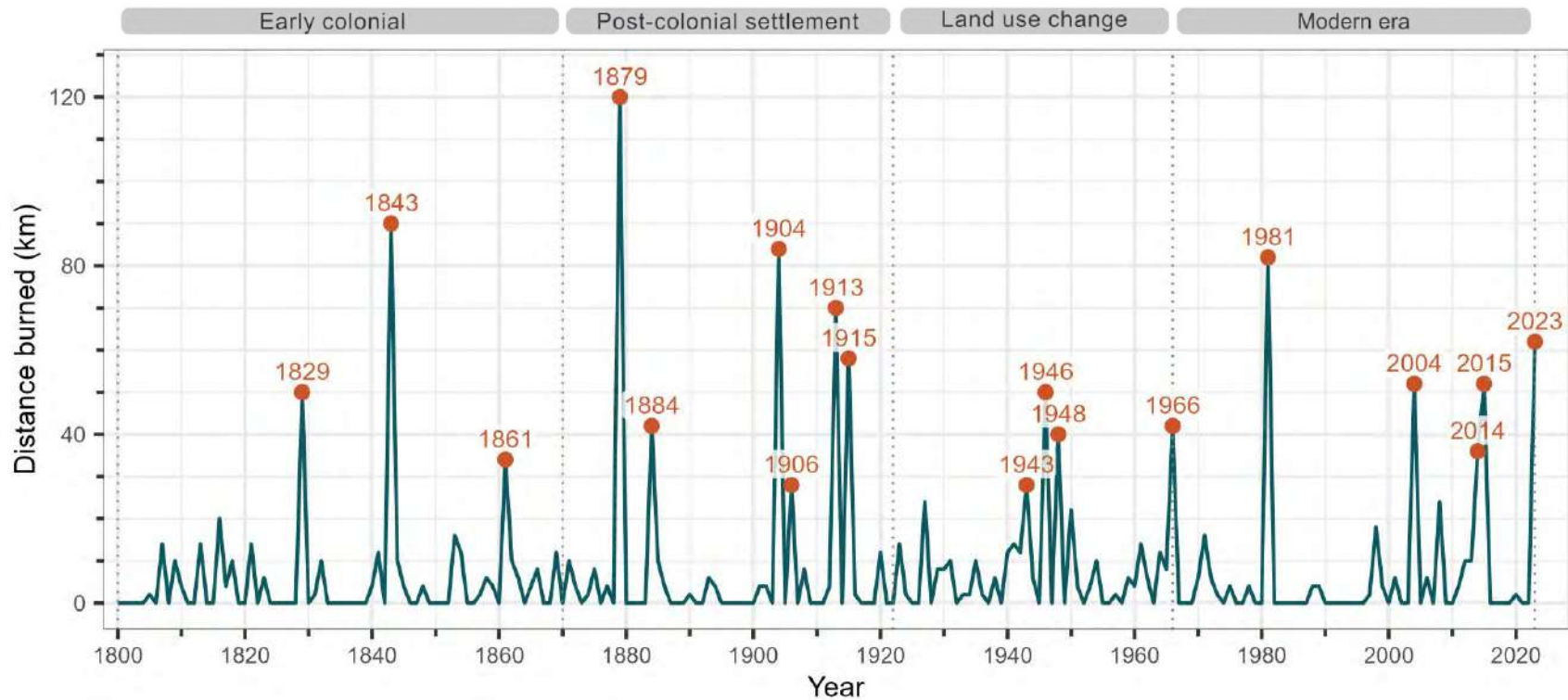


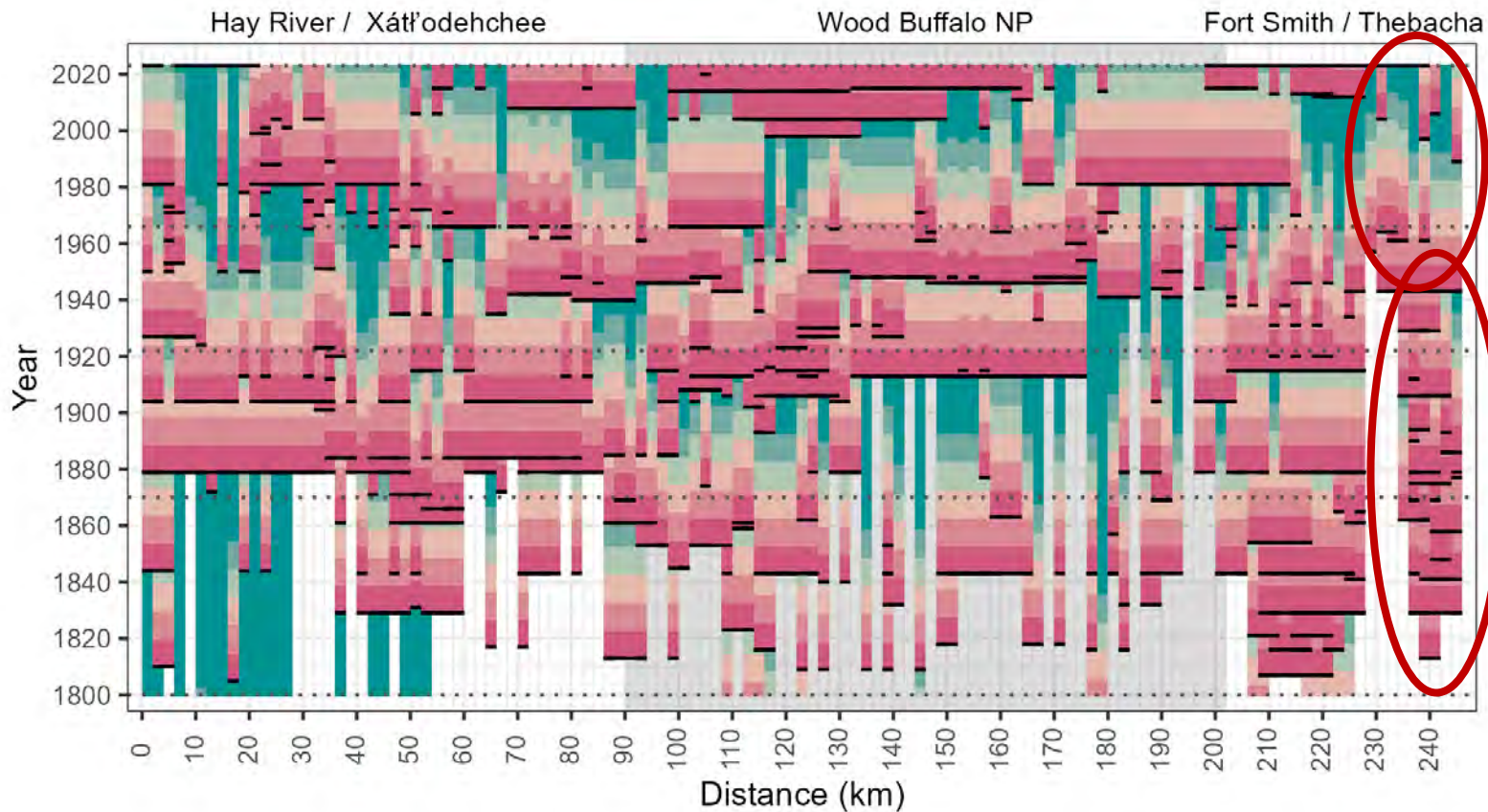


Age class 0 - 9 10 - 19 20 - 29 30 - 39 40 - 49 > 50

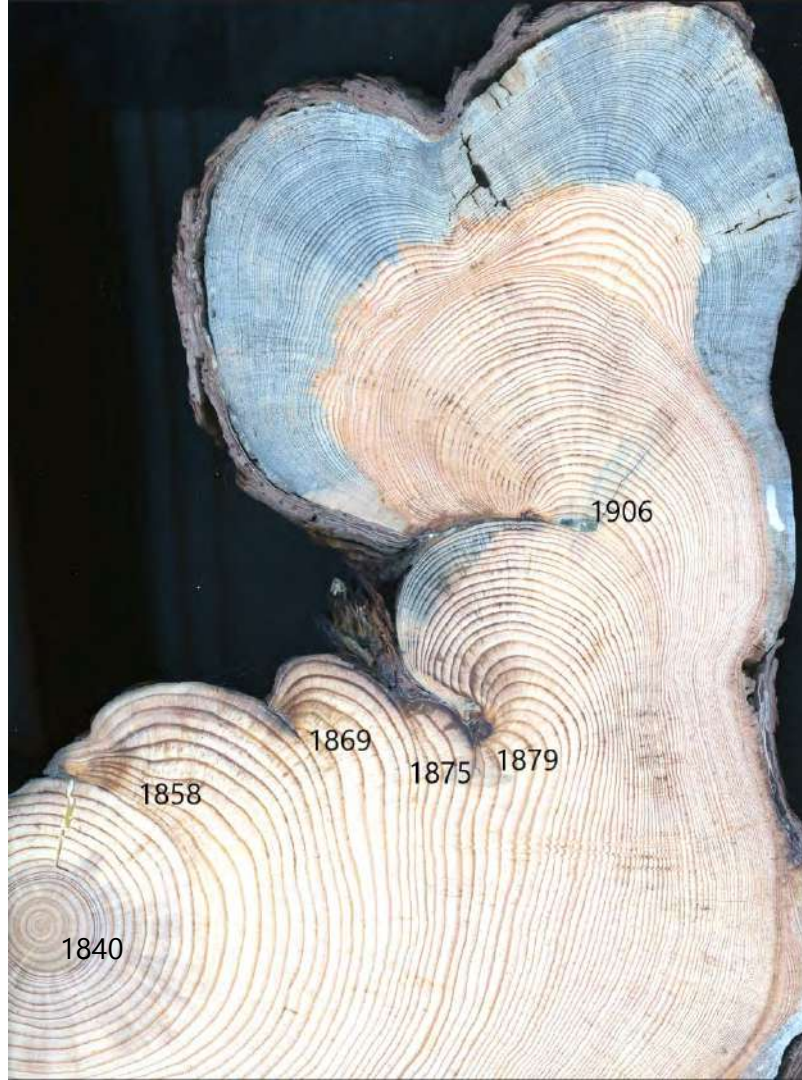
Timeline: 1800 to today







Age class 0 - 9 10 - 19 20 - 29 30 - 39 40 - 49 > 50



1840

1858

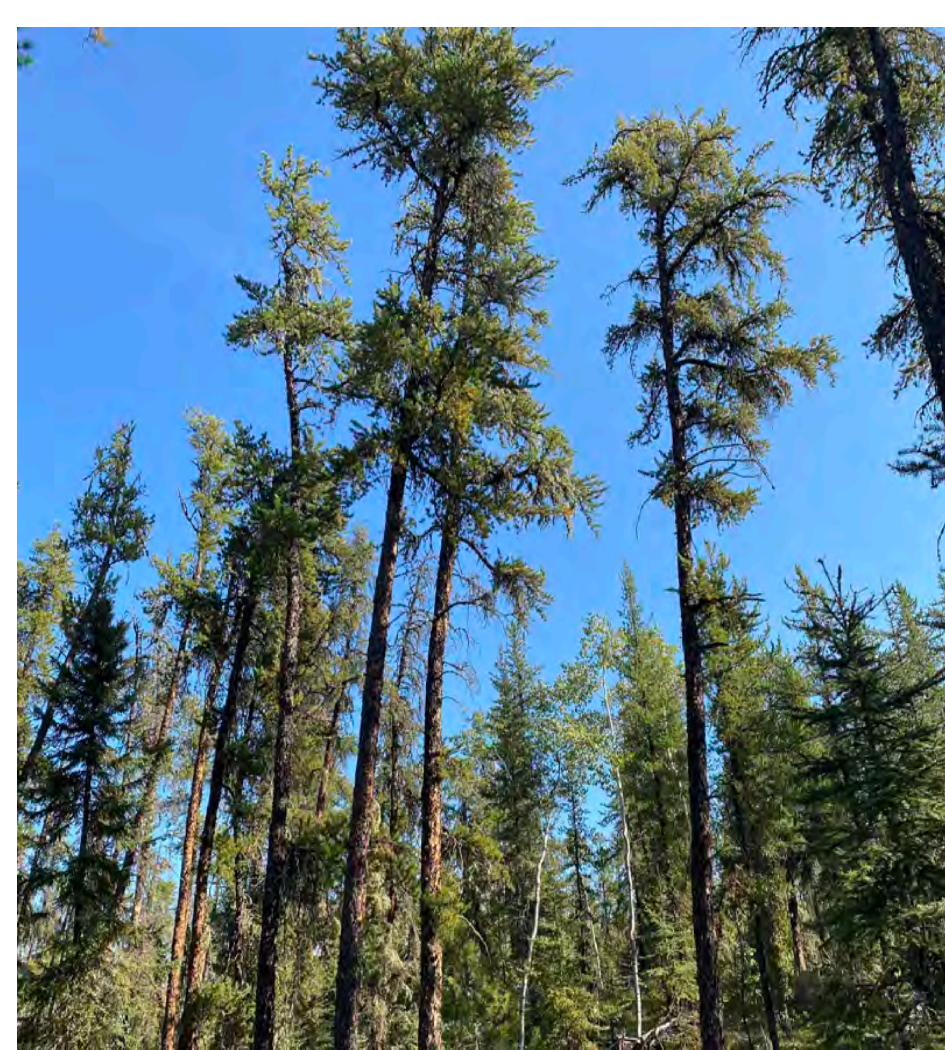
1869

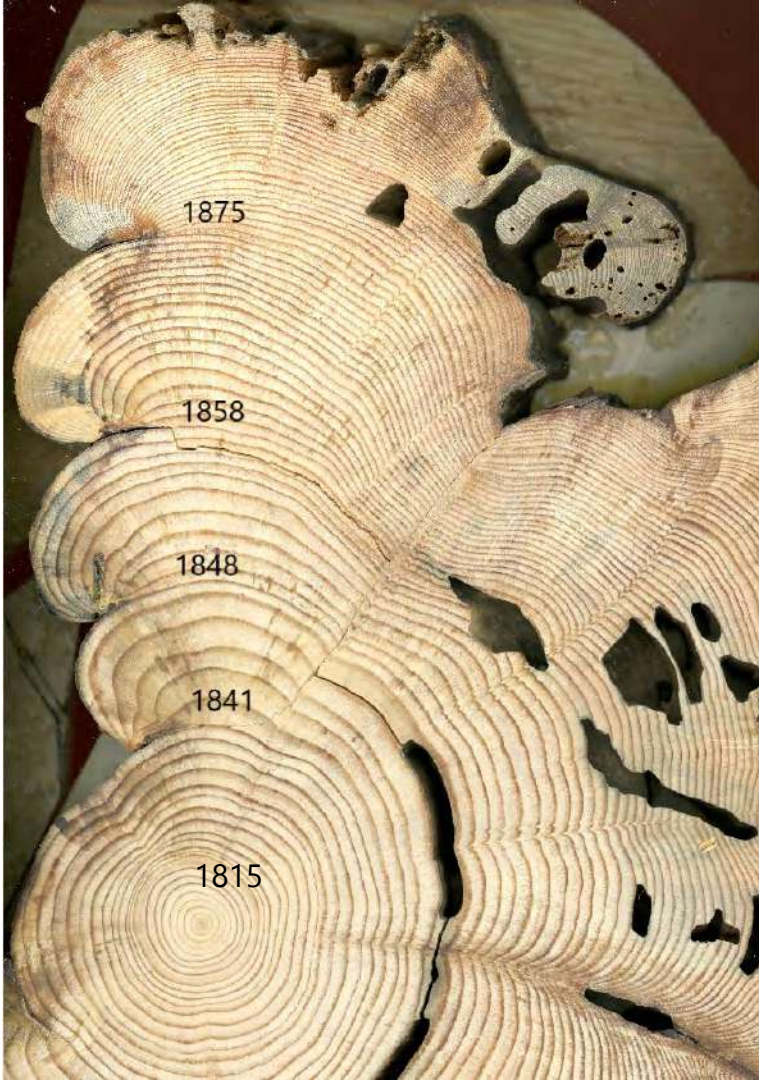
1875

1879

1906







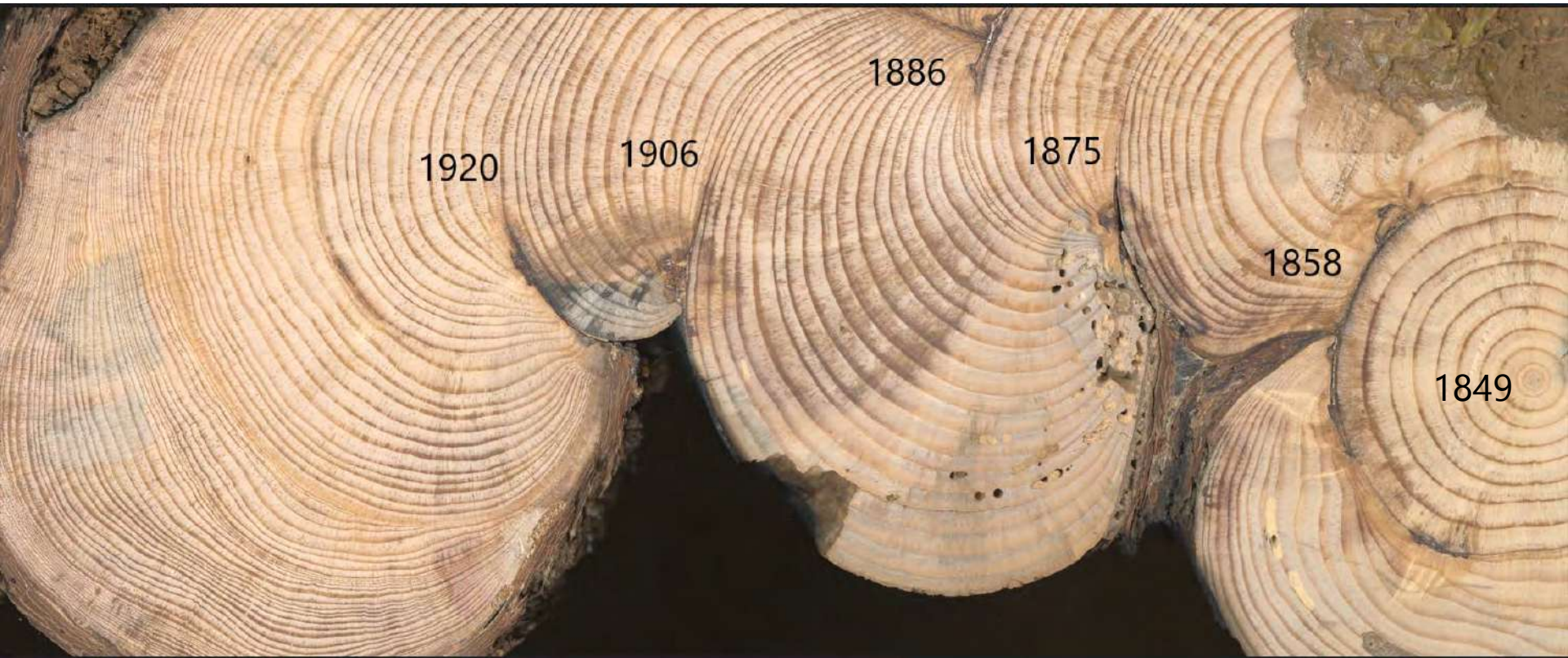
1875

1858

1848

1841

1815



1920

1906

1886

1875

1858

1849

Take-home messages

- **Very high frequency of fire throughout the last two centuries**
 - Many big fire years (e.g., 1829, 1843, 1879, 1904, 1913, 1915, so on...)
 - More surface fires than expected
- **Fire regimes have changed through time**
 - Likely mix of human- and lightning-caused fire
- **Fire controls vegetation, which in turn controls flammability**
 - Records of large grassland areas in the 19th century
 - Area around Fort Smith was likely a mix of prairie, broadleaf forest, and open conifer forests

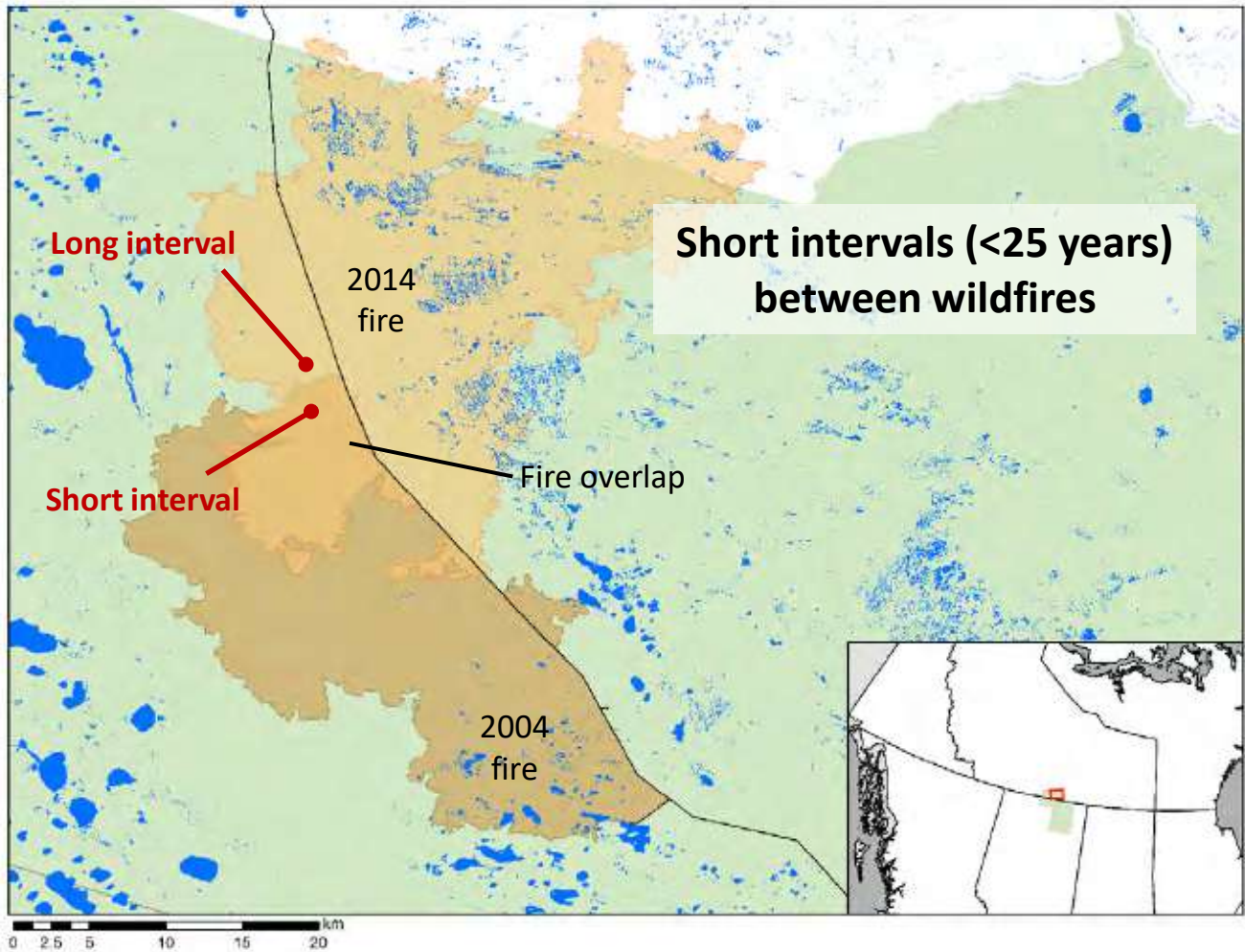


An aerial photograph of a vast wetland landscape. The foreground and middle ground are dominated by a dense network of small, irregular islands and water channels, creating a complex, maze-like pattern. The islands are covered in lush green vegetation, likely forested, while the water channels are a deep blue. The background shows a vast, flat expanse of water extending to the horizon under a bright blue sky with scattered white clouds. The overall scene is a beautiful representation of a natural wetland ecosystem.

Thank you

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Photo: Xinli Cai



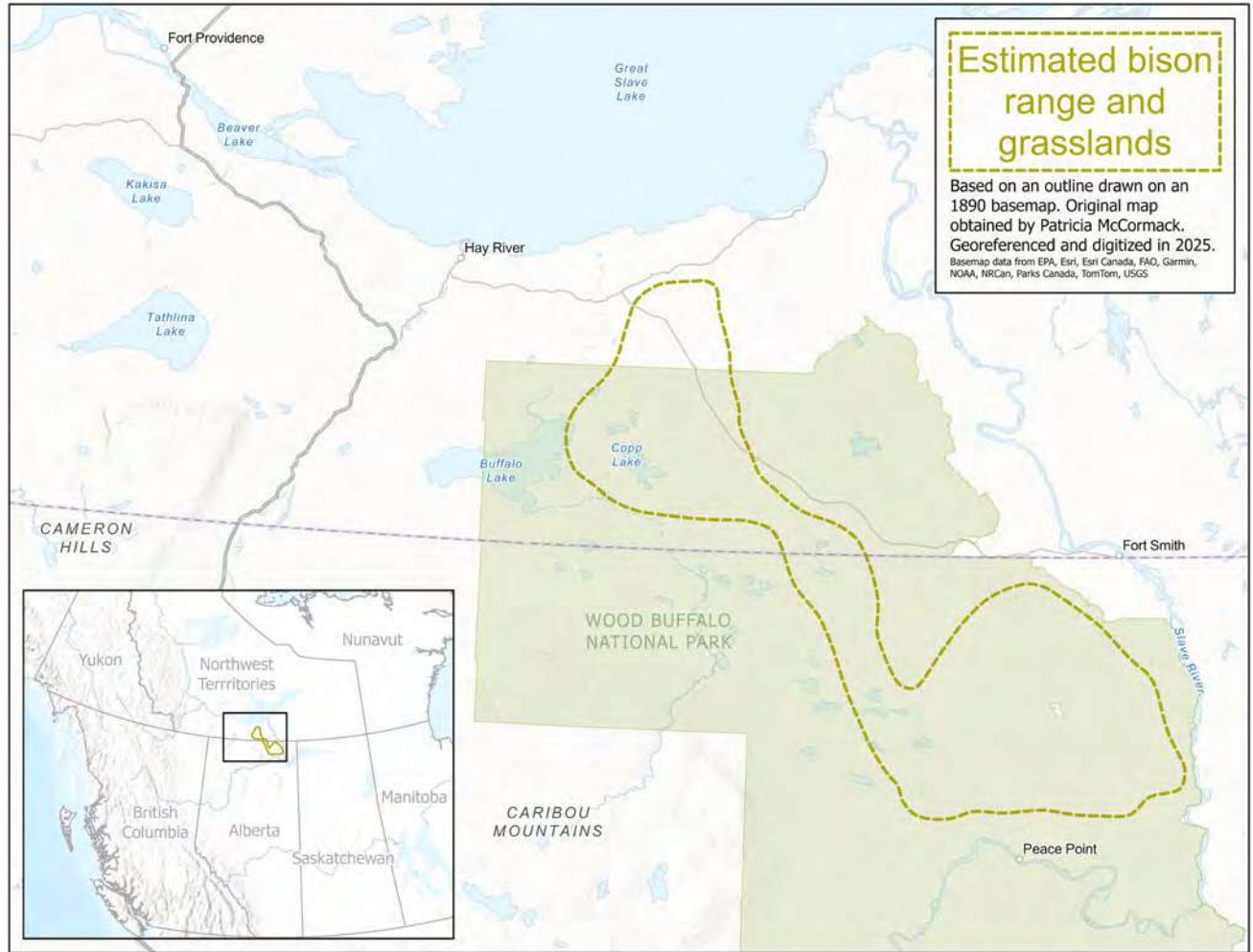


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Map of estimated grassland-dominated area

Drawn on 1890 base map



Compiling the fire scar data

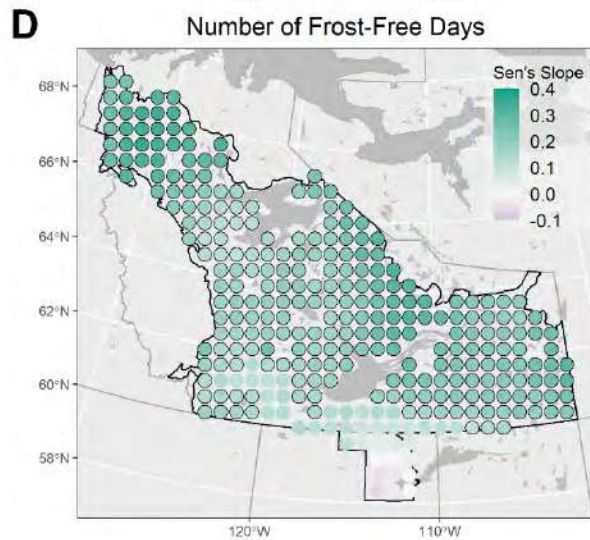
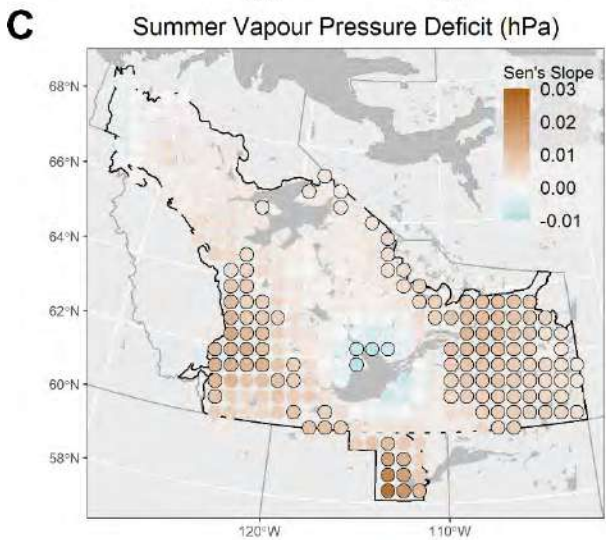
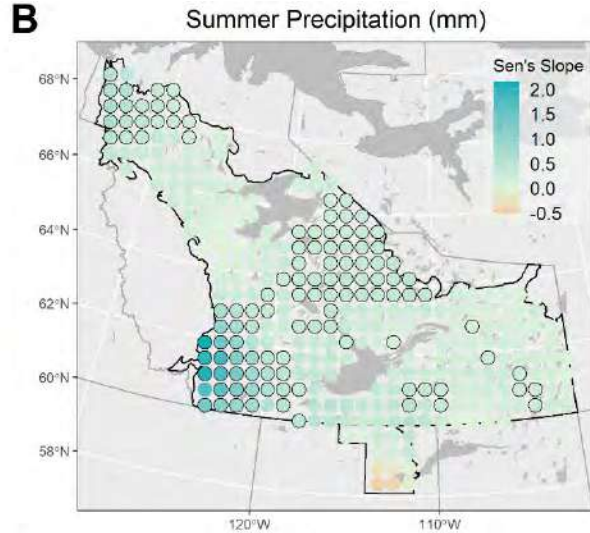
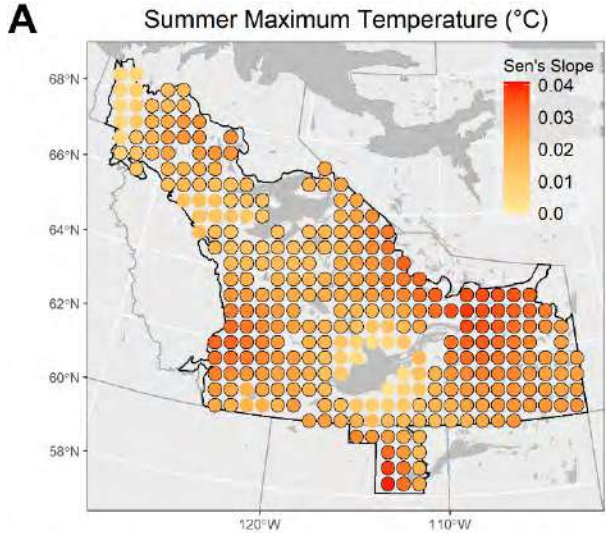
1. A **'fire'** can be inferred from:
 - i. A fire scar (most common)
 - ii. The origin year of a pine (i.e., the pith)
 - iii. The death year, if killed by a fire (less common)
2. Every fire **must be replicated** to be “confirmed” as a fire
3. This is a **multi-pass process**: the more fires we accurately date, the more we can “confirm”

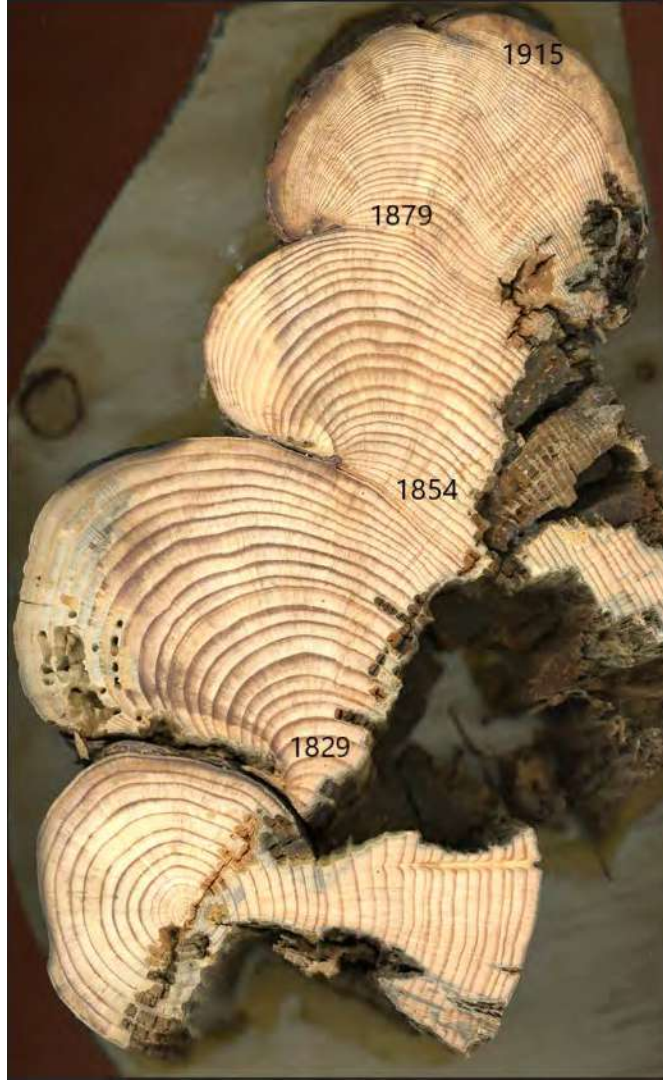


Advantages of the transect method

- **Fire history:** provides an exhaustive and systematic inventory of fire sizes and fire intervals across a large area
- **Fire-fuels feedbacks:** tells us how previous burns affects the occurrence of subsequent fires
- **Fire hazard:** More accurate mapping of wildfire likelihood







1915

1879

1854

1829