

Utilizing forest inventory permanent plots for boreal forest disease detection and quantification: aspen running canker

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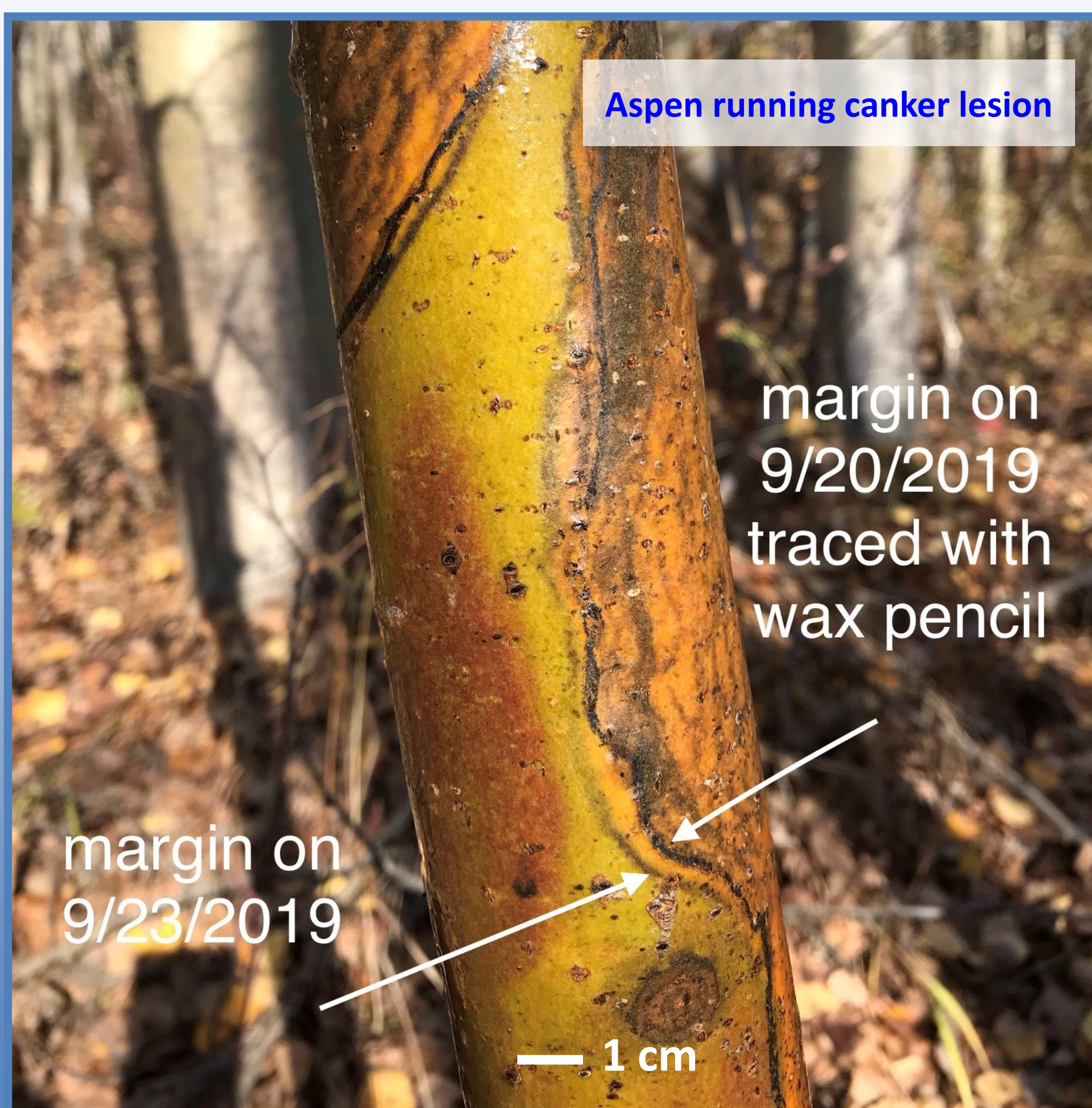
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Objective

Collect baseline data on the distribution and impacts of Alaskan boreal forest tree diseases through a partnership with the permanent plot networks administered by the University of Alaska Fairbanks (UAF).

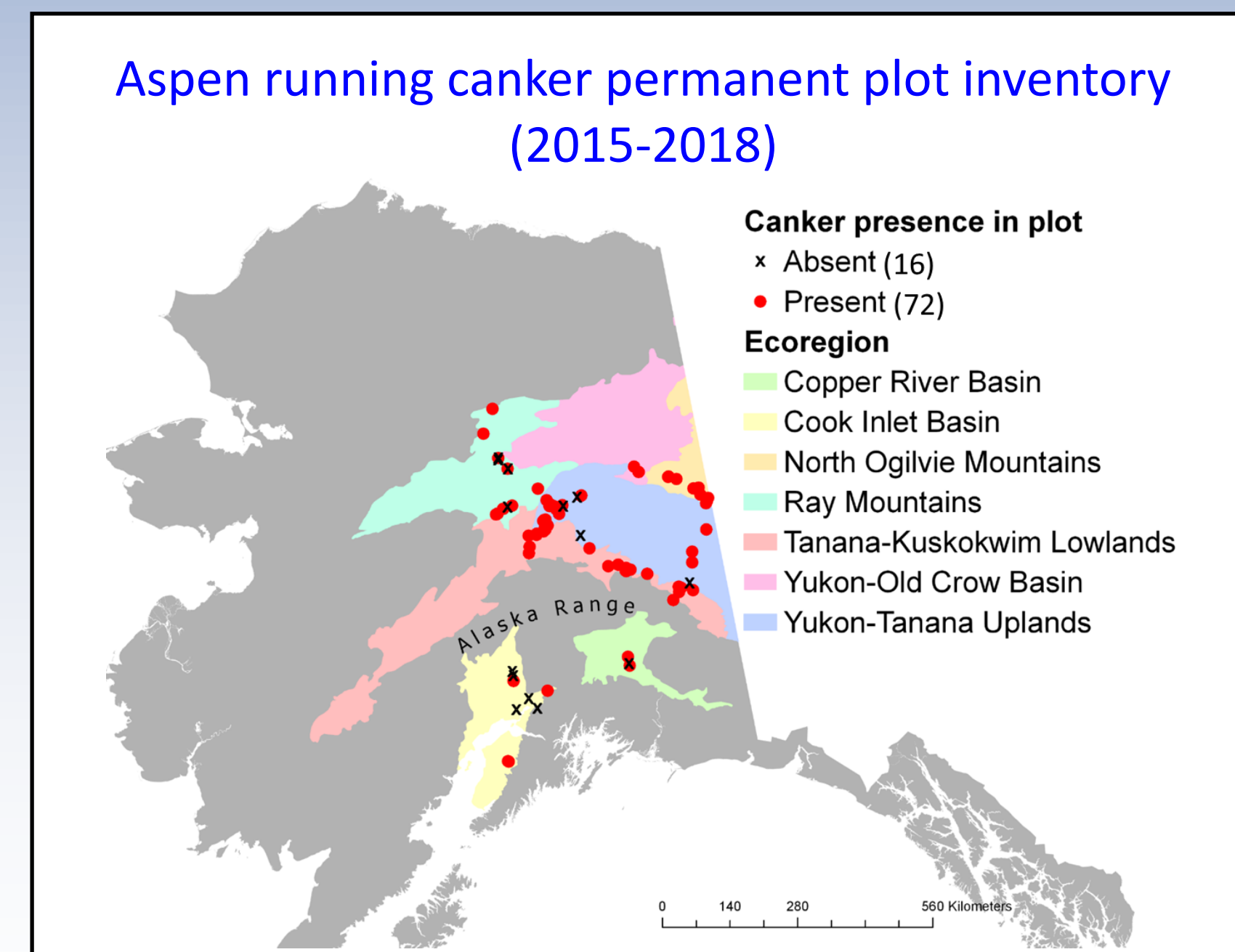
Key Findings

- We found an aggressive canker disease of trembling aspen that has the potential to profoundly change stand dynamics in Alaska's boreal forest.
- Forest inventory programs are an effective means to gather baseline data on endemic and emerging tree diseases in Alaska and evaluate potentially related environmental factors.
- Partnerships between long term monitoring programs and FHP professionals are enabling the construction of distribution maps for many of Alaska's forest pathogens. These are now available [at the Region 10 FHP website](#). This data is compatible with the Forest Health Mapping and Reporting portal.

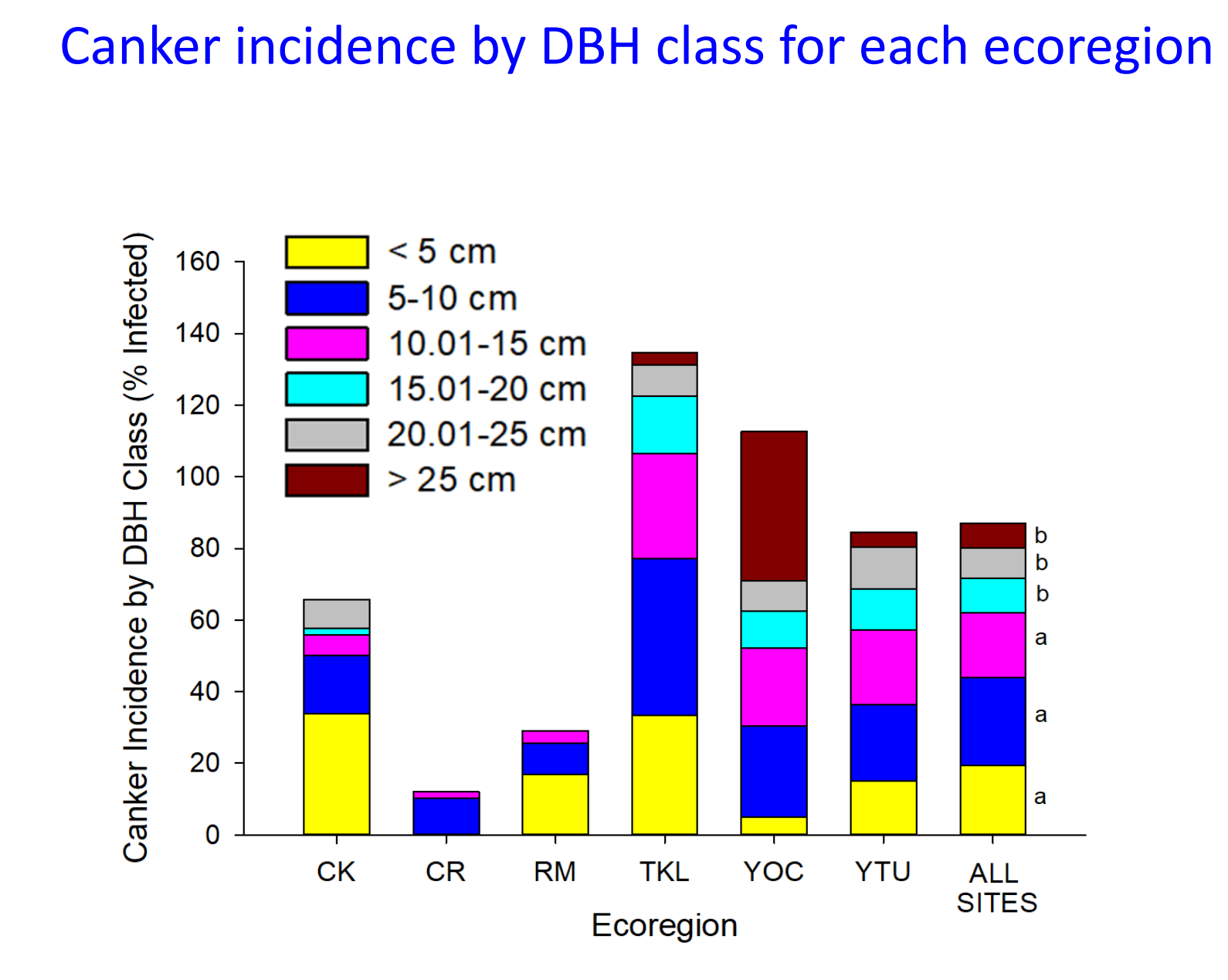


Results

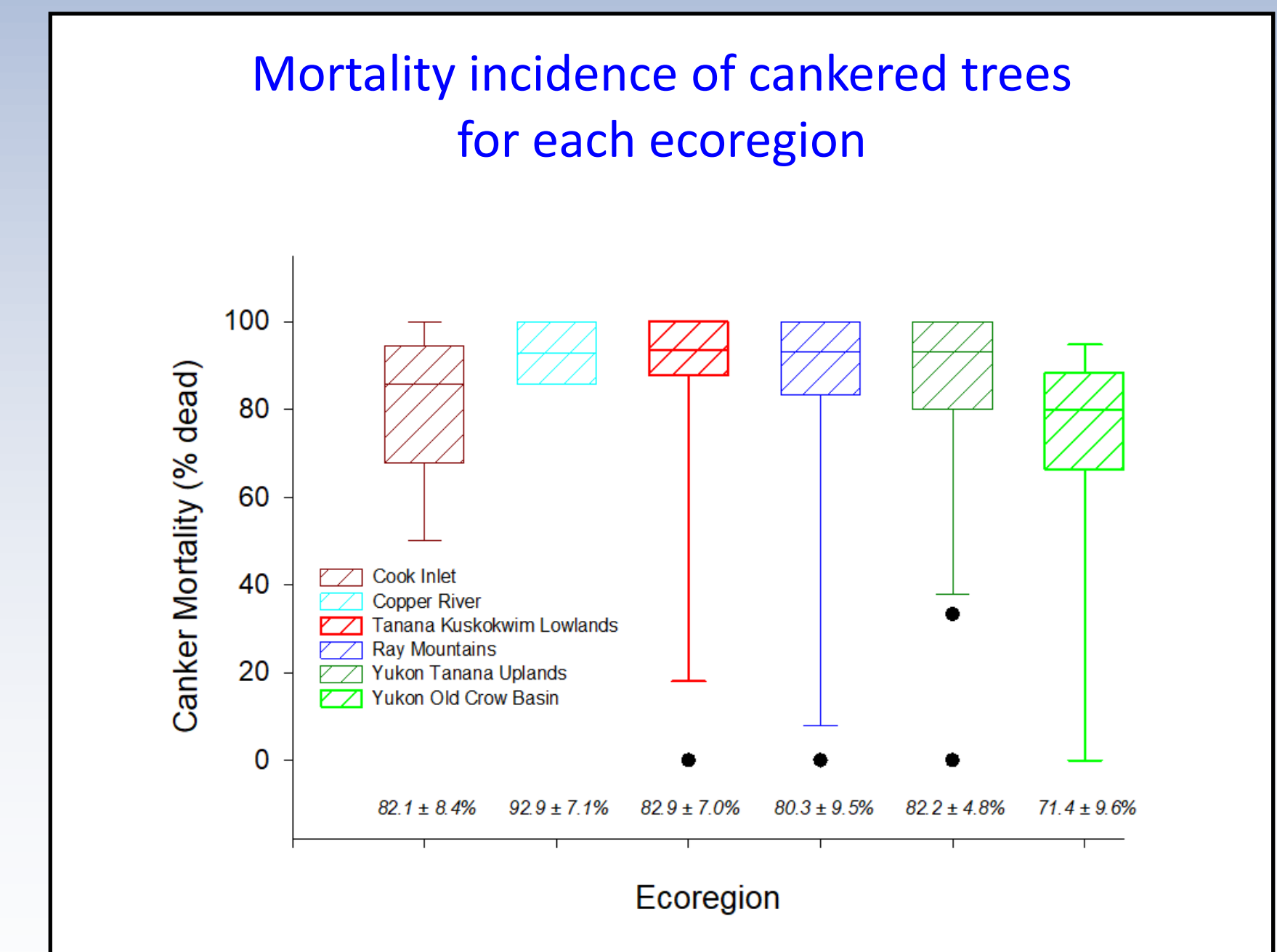
LTER and CAFI crews have evaluated over 50,000 trees from the Brooks Range to the Kenai Peninsula since 2015. The most significant finding was a very aggressive, diffuse running canker disease of unknown etiology on trembling aspen. First found in 2014 at a CAFI site, we have evaluated over 18,035 aspen trees at 88 inventory sites in 7 ecoregions. Furthermore, reconnaissance surveys have found the disease almost 300 locations in the boreal forests of Interior and Southcentral Alaska.



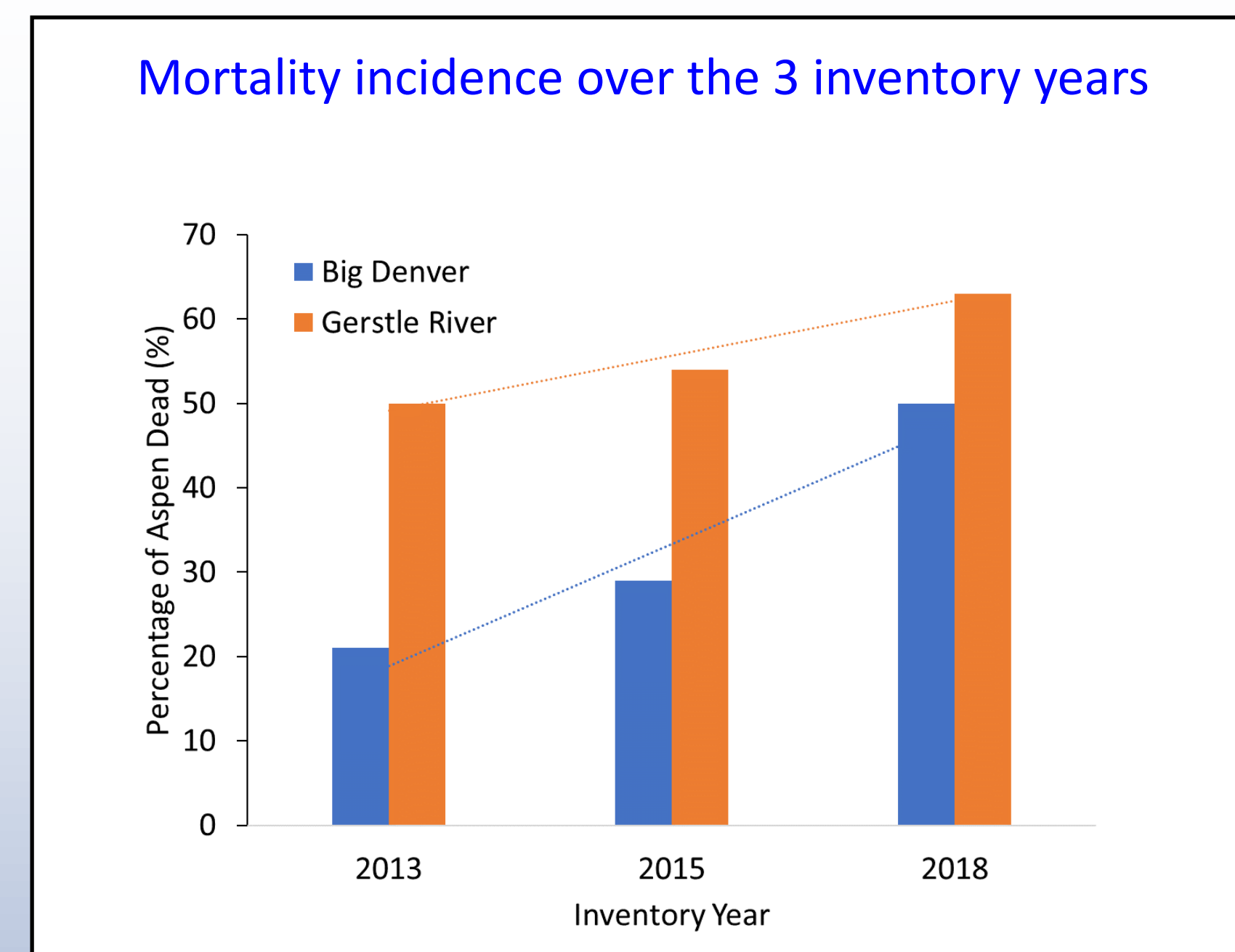
We found canker on 82% of the 88 sites measured in 2015-2018. Among ecoregions, disease was significantly higher north of the Alaska Range, especially in the Tanana-Kuskokwim Lowlands.



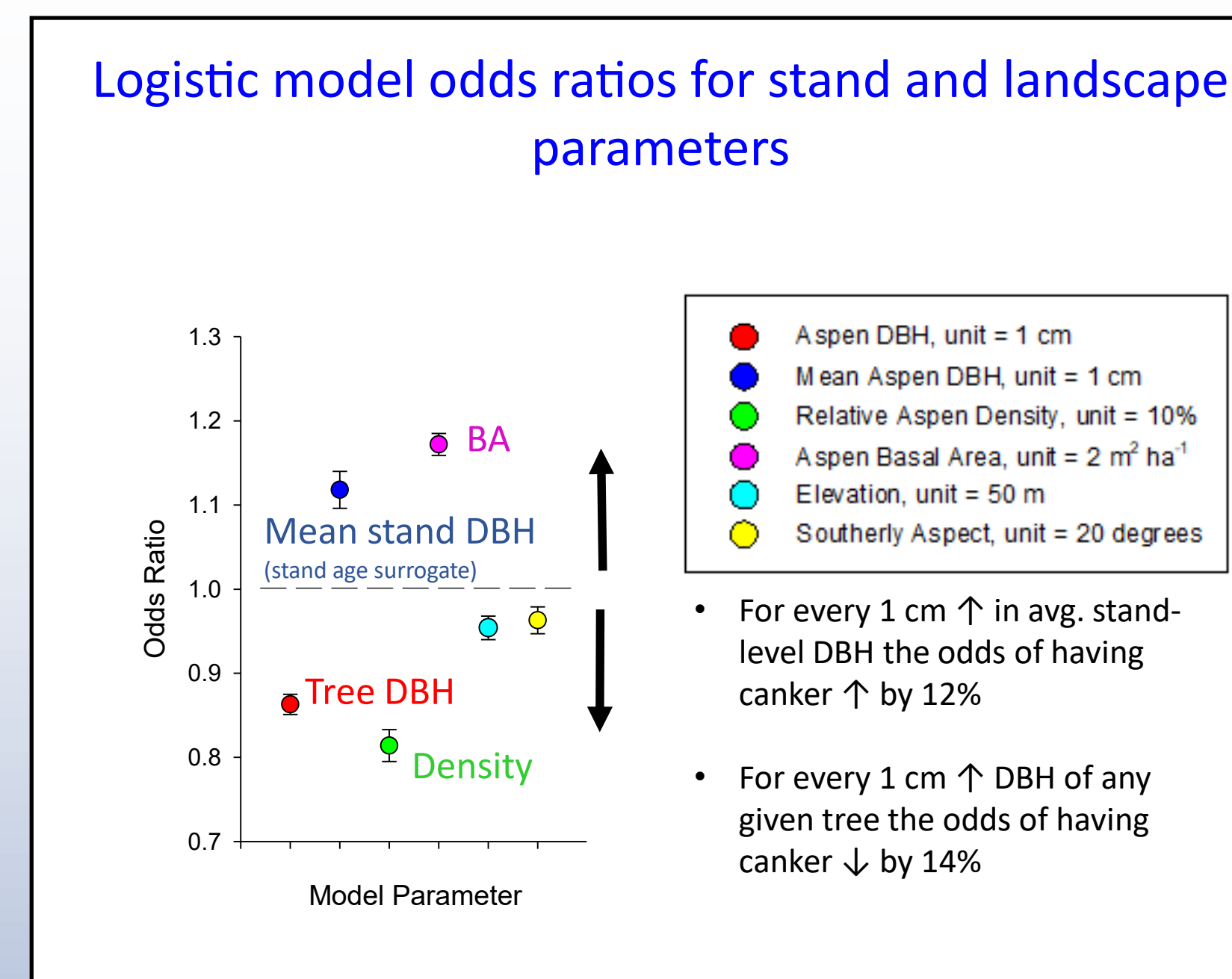
Canker was more prevalent in smaller trees across ecoregions. However, it was only found on the biggest trees in stands that had high disease incidence.



Most trees that had canker were dead at plot installation or had died by re-measurement.



The disease was well underway when first noticed in 2014.



Stands with older and larger aspen trees have better odds of having canker. However, for any given tree the odds of getting canker decrease as it gets bigger. Landscape factors had small effects.



The causal agent has been identified but is as yet unnamed. 13 different fungi were isolated from diseased trees. These were then inoculated onto healthy trees to reproduce symptoms.

Background

The boreal forest comprises 91% of the 126 million acres of forest land in Alaska. Basic information on forest disease presence and damage in this region is lacking. Disease data from Forest Service programs such as the Aerial Detection Survey, Forest Inventory and Analysis, and applications on the Forest Health Protection Mapping and Reporting portal are almost entirely limited to Alaska's coastal forest. The Bonanza Creek Long Term Ecological Research (LTER) site and Cooperative Alaska Forest Inventory (CAFI) program have been collecting data on individual trees through long term monitoring of permanent plots throughout Alaska's road accessible boreal forest since 1984. Inventory programs also collect a variety of useful stand, site, and climate data.