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

Authors: Loretta Winton, USDA Forest Service, Forest Health Protection, Fairbanks, Alaska, lmwinton@fs.fed.us; Roger Ruess, University of Alaska Fairbanks, Fairbanks, Alaska, rwruess@alaska.edu; Gerard Adams, University of Nebraska-Lincoln, Lincoln, Nebraska, gadams3@unl.edu

Conclusions

Forest inventory programs are an effective means to gather baseline data on endemic and emerging tree diseases in Alaska. We found an aggressive canker disease of trembling aspen that has the potential to profoundly change stand dynamics in Alaska's boreal forest.

Partnerships between long term monitoring programs and FHP professionals are enabling the construction of distribution maps for this and many more of Alaska's forest pathogens. These are now available at https://www.fs.usda.gov/detailfull/r10/forestgrasslandhealth/. This data is compatible with the Forest Health Mapping and Reporting portal.

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).

Results

LTER and CAFI crews have evaluated over 50,000 trees from the Brooks Range to the Kenai Peninsula since 2014. The most significant finding is a very aggressive, diffuse running canker disease of unknown etiology on trembling aspen. First found in 2014 at a CAFI site, we have now documented it at over 140 locations in the boreal forests of Interior and Southcentral Alaska.

We found canker on 81% of the 78 sites measured in 2017. Among ecoregions, disease is significantly higher north of the Alaska Range compared to the two ecoregions south of the Alaska Range. The highest levels of disease are found in the Tanana-Kuskokwim Lowlands, with significantly lower infection rates in each of the other four ecoregions.

- None of the trees with canker were dead at 17 of the 78 sites
- More than 50% of the trees with canker were dead at 53 of the 78 sites.
- More than 90% of the trees with canker were dead at 33 of the 78 sites.
- 100% of the trees with canker were dead at 17 sites.

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 da-ta 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.