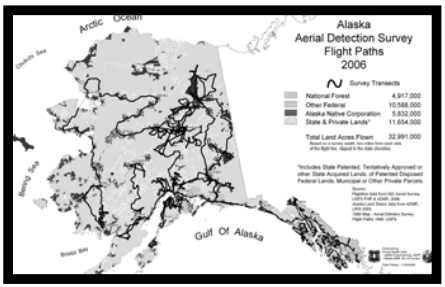
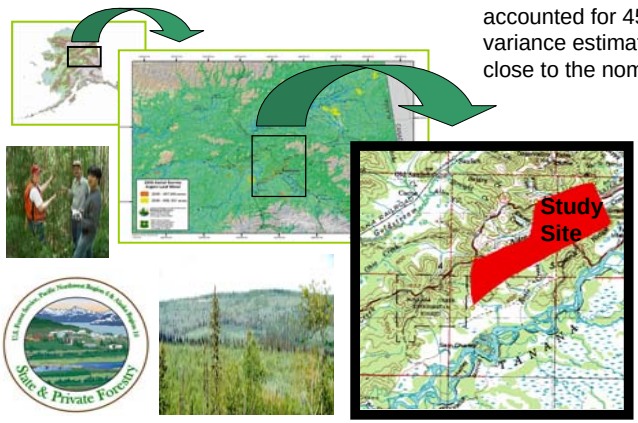
WC-FHM-07-01. Assessment of aspen leaf miner (*Phyllocnistis populiella* Chambers) distribution in Alaska using satellite imagery.

John E. Lundquist[1], Robin M. Reich[5], James Kruse[2], Dustin Wittwer[3], and Eric Johnson[4]. Forest Health Protection, [1]Anchorage, [2]Fairbanks, [3]Juneau; [4]Region 10, Juneau, and [5]Colorado State University, Fort Collins, CO.

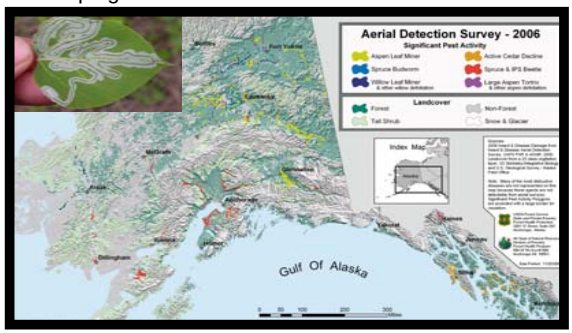
Alaska presents a unique challenge for pest surveyors because of its vast acreage and remote forests. 127 million acres.

Aerial surveys conducted by State and Private Forestry annually cover no more than a small percentage of the total vegetation in Alaska. Values used for total infested acres used in summary statistics represent only a portion of those actually infested. These statistics are nonetheless used in statewide, regional, and national summaries for reporting pest conditions.





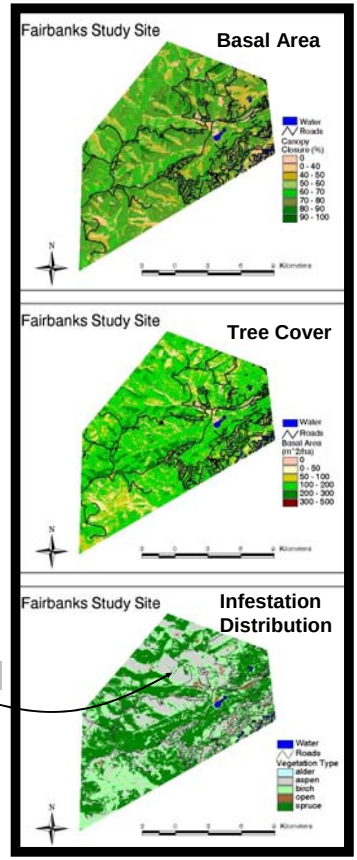
Objective: A way of estimating pest conditions between flight lines would certainly be useful. This study aims at developing such methods.



The aspen leaf miner causes a distinct grayish-silver tone to the canopies of affected trees. This symptom is easily seen from the ground or air and probably also shows up in satellite images.

Methods: 206 ground plots were established in four vegetation types (spruce, birch/non-infested aspen, healthy pure aspen, and open areas).

Models were developed to predict the spatial distribution of aspen leaf miner in the study area by adapting methods we previously developed in studies of bark beetles and root diseases in the Black Hills, South Dakota (Lundquist and Reich (in review)..

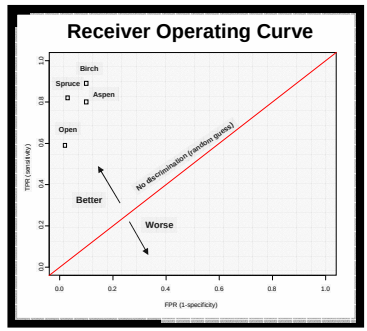


Infected aspen

Results: Models for basal area, canopy closure, and vegetation type were generated. The table below summarizes results for the latter. Aspen infested with leaf miner mapped at an 80% accuracy. Healthy aspen and birch were difficult to differentiate and will need more work. The final model accounted for 45% of the variability in canopy closure, provided unbiased variance estimates, and had prediction and confidence coverage rates close to the nominal 0.95 rate.

Tree Cover	Accuracy	Area Under the Curve	Ranking
Infected Aspen	0.80	0.85	Good
Birch/Non-infected Aspen	0.89	0.89	Good
Spruce	0.82	0.89	Good
Open Areas	0.59	0.78	Fair
Overall	0.81		

AUC = 1-0.90 – excellent; 0.80 – 0.89 – good; 0.70-0.79 – fair; 0.60-0.69 – poor; 0.50 – 0.59 – fail.



References: Lundquist, J.E. and R.M.Reich. Predicting the landscape spatial distribution of fuel-generating insects, diseases and other types of disturbances. Jnl Sustainable Forestry (in review)