



Monitoring of Native and Exotic Invasive Forest Pests and Pathogens

Importance

Monitoring native and exotic invasive insect forest pests and pathogens (IFP) is an important addition to the Cumberland Piedmont Network's (CUPN) suite of monitoring protocols. IFPs pose a serious, and likely permanent, threat to CUPN's 14 mostly forested park units. In the short-term, i.e., years, IFPs can alter forest light regimes, microclimate, and nutrient cycling. In the long-term, i.e., decades, they can alter tree species composition and so their effects may ramify through the entire forest ecosystem and beyond.

The environmental and economic damage caused by IFPs are a cause of deep concern among many public and private institutions. Indeed, new and established IFPs are monitored by numerous federal and state agencies, universities, and non-governmental organizations. These entities gather extensive data on IFPs' current range, model future outbreaks, and monitor the major pathways through which they enter and move about within the United States. Thus, CUPN will use these existing data as a cost-effective way to monitor IFPs among its 14 park units.

CUPN's IFP monitoring efforts will combine data mining with collection of field data from its 14 park units. Data mining efforts will utilize web-based tools to efficiently monitor/gather existing data administered by external sources. Gaps in existing data, such as park-specific sources of IFP transport (e.g., roadways), will be filled by limited collection of field data during vegetation monitoring events at each CUPN park unit. In addition, as a further cost-saving measure future collection of additional field data may also utilize trained volunteers. These disparate data will then be synthesized and results delivered as annual reports to resource management officials at all 14 CUPN parks.

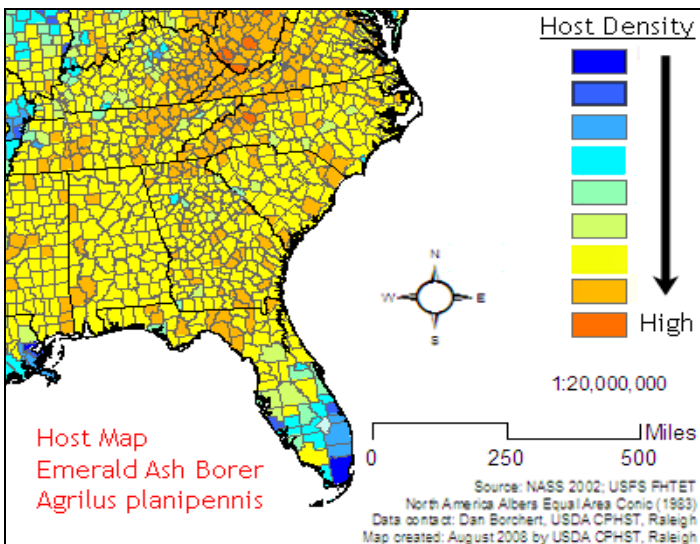


Figure 1. Relative risk by density to host trees in CUPN states from Emerald Ash Borer infestation (Total Acreage Per County)

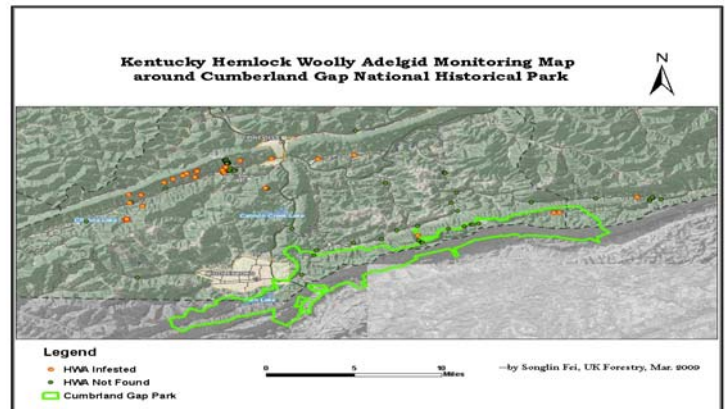


Figure 2. Presence/absence of Hemlock Woolly Adelgid infestations outside and inside Cumberland Gap National Historic Park. Map provided by Songlin Fei, University of Kentucky Department of Forestry

In addition to annual reports, frequent updates will be posted on the CUPN Forest Pest website as they are received. Urgent updates, such as detection of rapidly spreading new forest pests or virulent pathogens, will be emailed to respective park officials.

Monitoring Objectives

- Web-based mining of state and county level data on presence/absence of new and established IFPs.
- Estimate current infestation levels (e.g., number and percent of infested trees) and distribution of IFPs in conjunction with vegetation monitoring protocol at CUPN park units.

Potential Measures

- Relative risk to host trees at state and county level (Figure 1).
- Presence/absence of new and established IFPs at CUPN park units.
- Stand density of tree species infested by IFPs at CUPN park units.
- Infestation level and distribution trends of selected IFPs at CUPN park units.
- Number/percent of trees infested by IFPs at CUPN park units.

Management Applications

- Access up to date information on new and established IFPs for better informed management decisions.
- Access up to date information on new and established IFPs for public education efforts.
- Access up to date treatment options, regulations, and cooperating officials.
- Plan targeted treatment using data on IFP distribution inside and outside CUPN park units (Figure 2).
- Guidance on prioritizing mitigation efforts among potentially numerous IFP infestations.

Contact

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