Forest Health Risk Mapping Process

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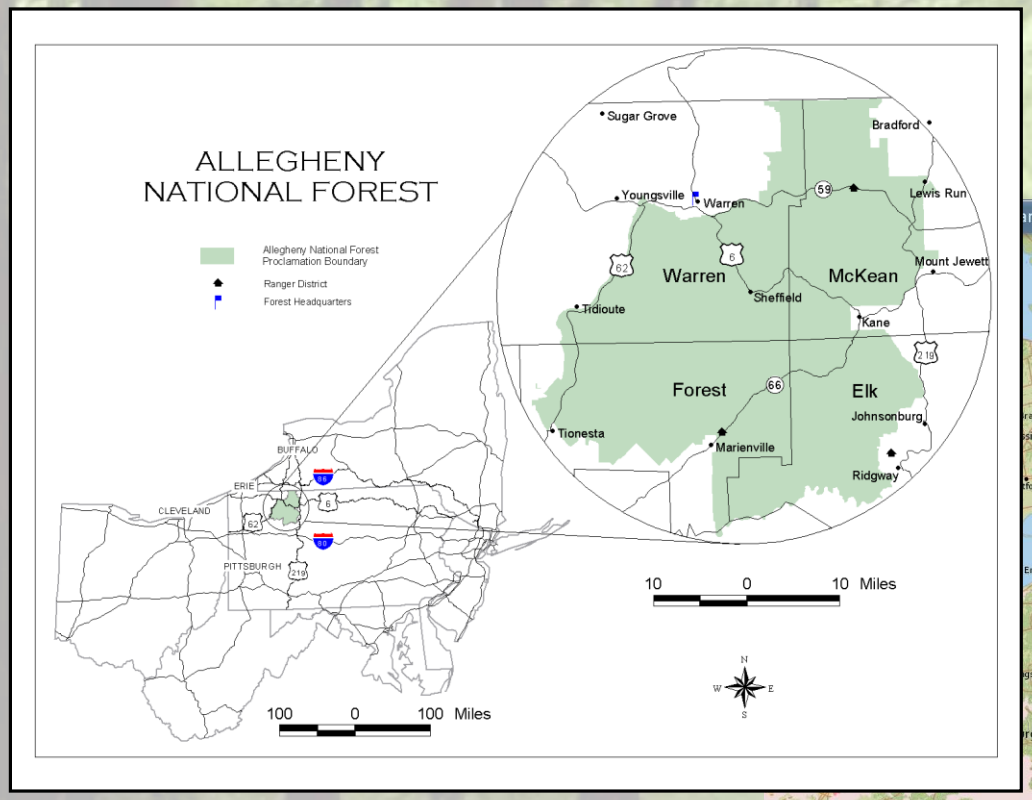
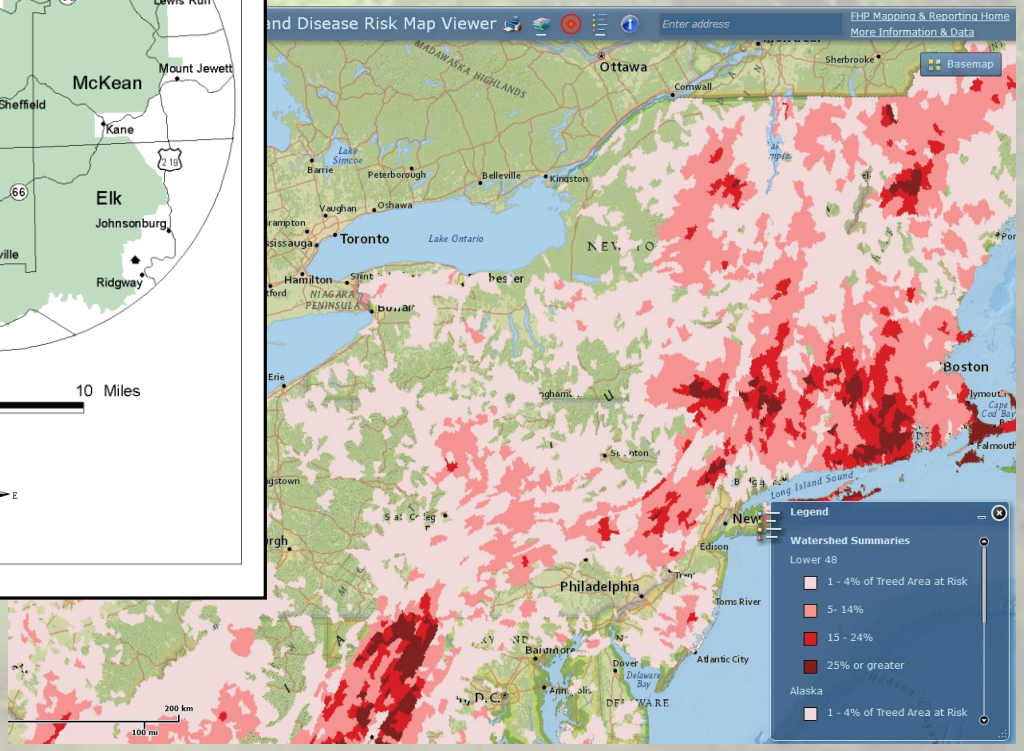




National Insect and Disease Forest Risk Assessment

USDA Forest Service Forest Health Technology Enterprise Team (FHTET-14-01)

- Nationwide
- Strategic
- Assessment and database of the potential hazard for tree mortality due to major forest insects and diseases.

National Insect and Disease Forest Risk Assessment

- Landscape level summary
  - severity and extent of insect and disease activity
- 2013 – 2027 timeframe
- A tool for allocating pest-management resources across geographic regions
- Expert input from all Forest Service regions and nearly 50 States.

National Insect and Disease Forest Risk Assessment

Risk is attributed to a combination of:

- Susceptibility- probability of a host species being infested/attacked by a pest
- Vulnerability- probability of tree mortality for a host species
- The Risk Model represents potential for mortality -hazard assessment

National Insect and Disease Forest Risk Assessment

- Standardization- Allows for Comparison of Different Data Sets
- Experts assign common scale (0-10) to each criteria:
  - 0= little to no risk
  - 10= highest potential risk

National Insect and Disease Forest Risk Assessment

Risk (Hazard) is defined as the potential that, ***without remediation***, 25 percent or more of the standing live basal area (BA) of trees greater than 1 inch in diameter will die over the next 15 years due to insects and diseases.

Risk (Hazard) is modeled across all *treed* areas within the U.S. (about 1.2 billion acres).

240 meter modeled host tree species distribution and abundance.

Insect and Disease Risk Maps

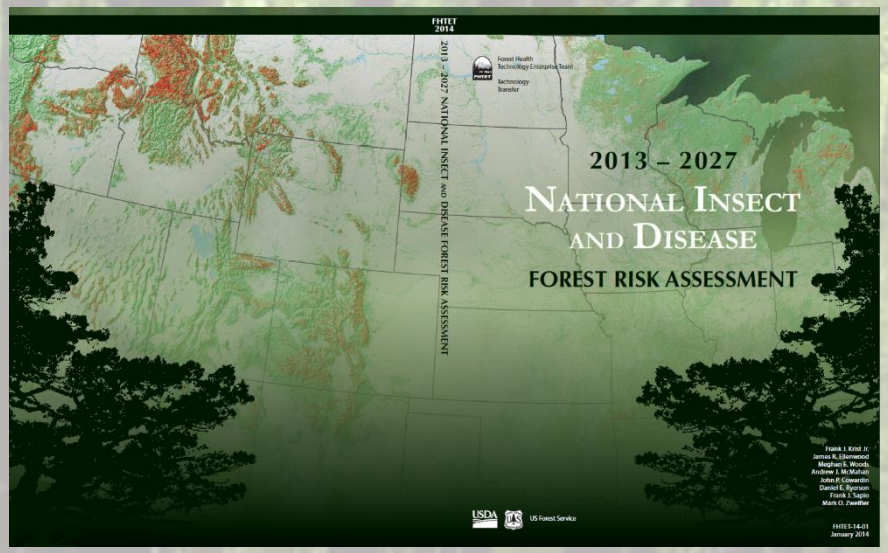
More than a Single Map:

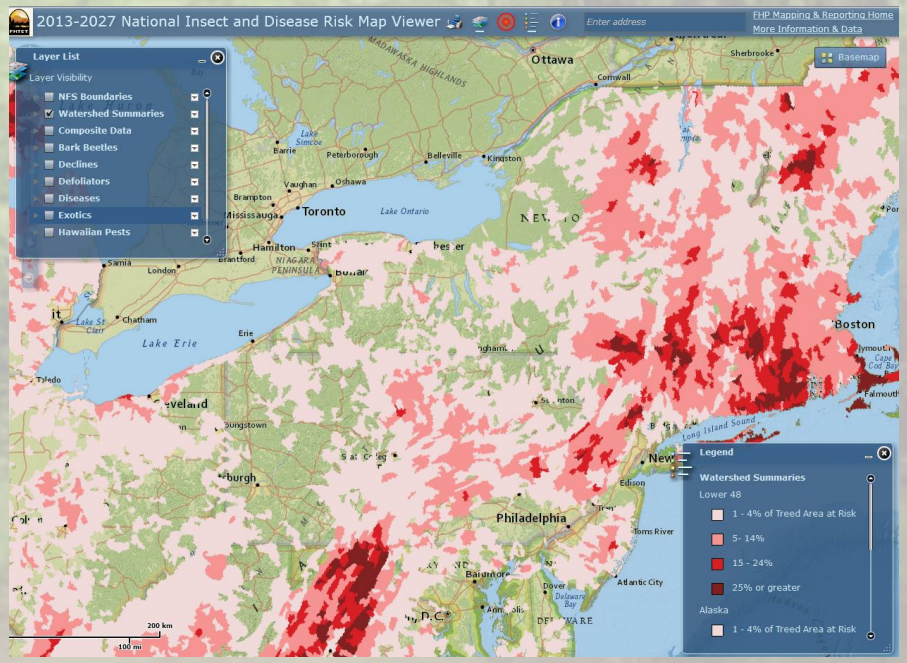
- Tabular summaries by pest/host
- Maps depicting:
  - Host species dominance
  - Extent & density of individual host species
  - Impacts by pest & host species

Composite Risk model/map is generated by individual pest/host models

National Insect and Disease Forest Risk Map Report

www.fs.fed.us/foresthealth/technology/nidrm



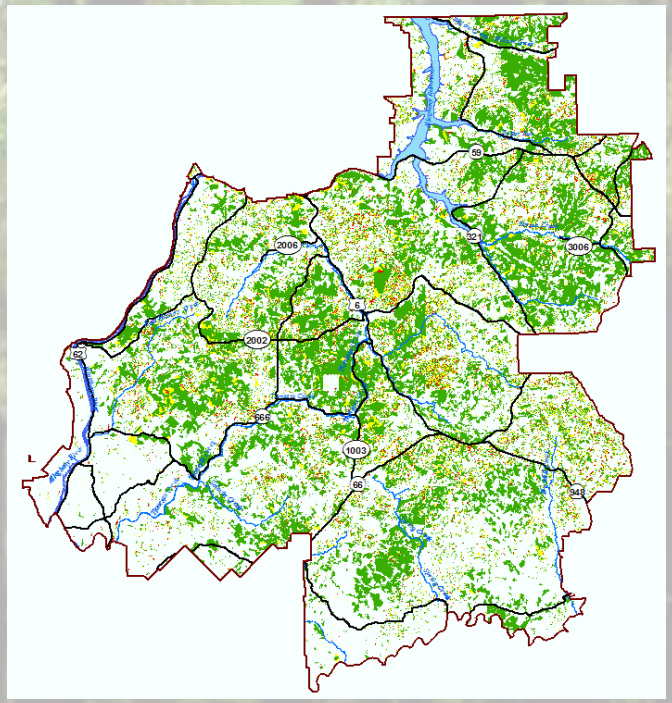


Allegheny National Forest Region Forest Risk Assessment

- Scaled down national models to regional extent
- Host Species Distribution and Abundance:
  - ANF Field Sampled Inventory Data + 30 meter modeled data
- Added new model for black cherry
- Adjusted major risk factors, importance of each, and maximum mortality based on local professional and scientific expertise
- 15 year time frame modeled

Allegheny National Forest Region Species Risk Model- American Beech (7.8%)

Overall Mortality Risk (15 years)



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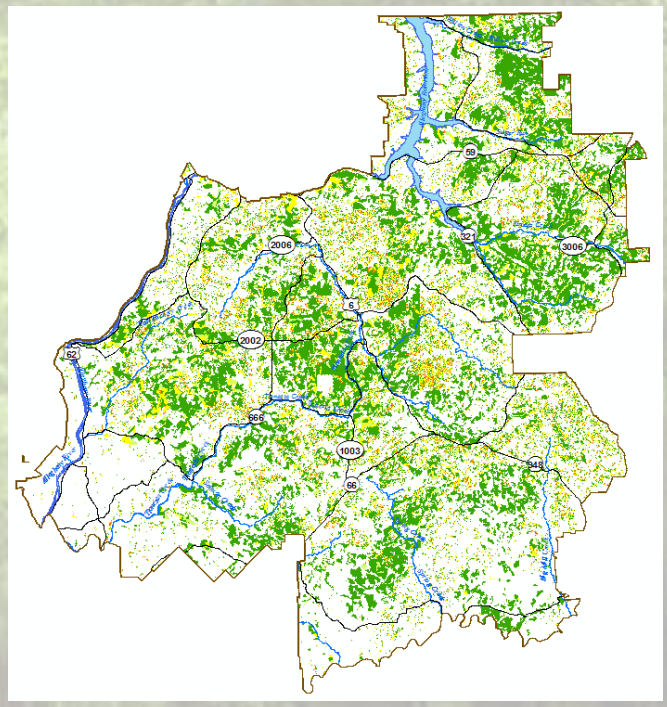
- Low (0-4)
- Medium (5-7)
- High (8-10)

Percent Host Basal Area Loss



% BA (Sq. ft/acre)

- 0 - 14
- 15 - 24
- 25 - 49
- 50 - 74
- 75 - 100

Risk Factors- Beech Bark Disease:

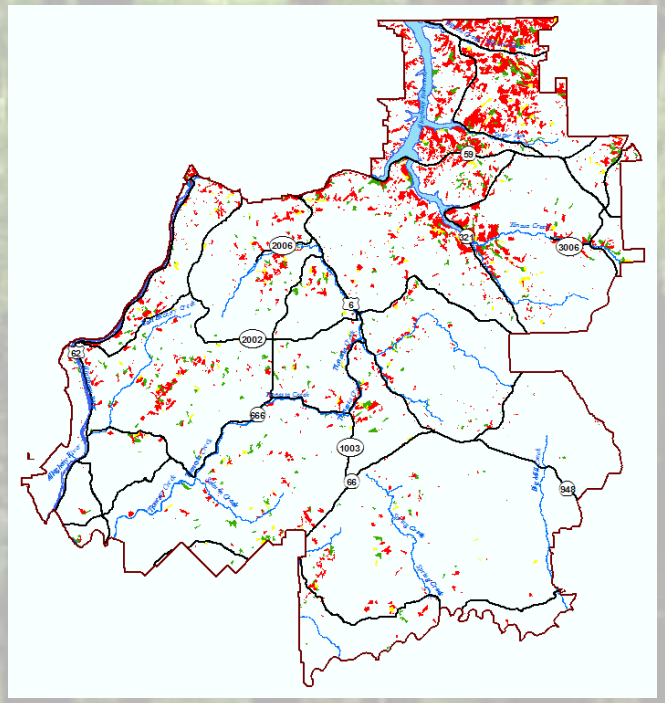
- Beech Basal Area
- Beech Mean Diameter

American Beech Values and Hazards

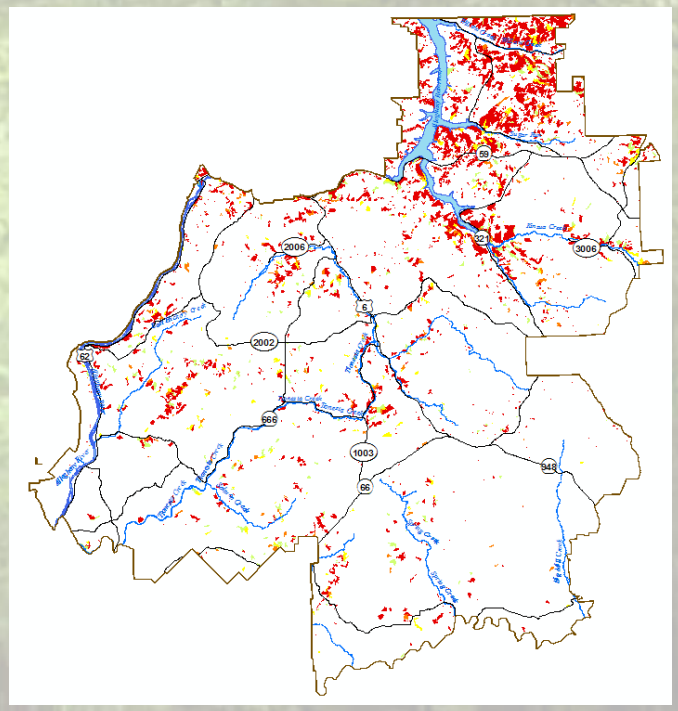
- Hard Mast (seeds) for Wildlife
- Milling, flooring, cabinets
- Aesthetic Value
- Short term snags
- High risk for “Beech Snap” hazard trees

Allegheny National Forest Region Species Risk Model- Ash Species (2.3%)

Overall Mortality Risk (15 years)



Percent Host Basal Area Loss



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Risk Factors- Emerald Ash Borer:

- Ash Basal Area

% BA (Sq. ft/acre)

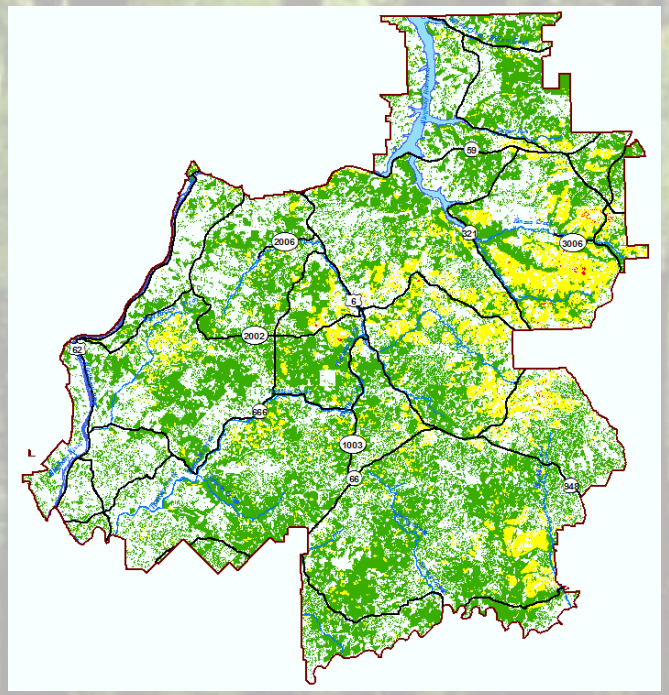
- 0 - 14
- 15 - 24
- 25 - 49
- 50 - 74
- 75 - 100

Ash Values and Hazards

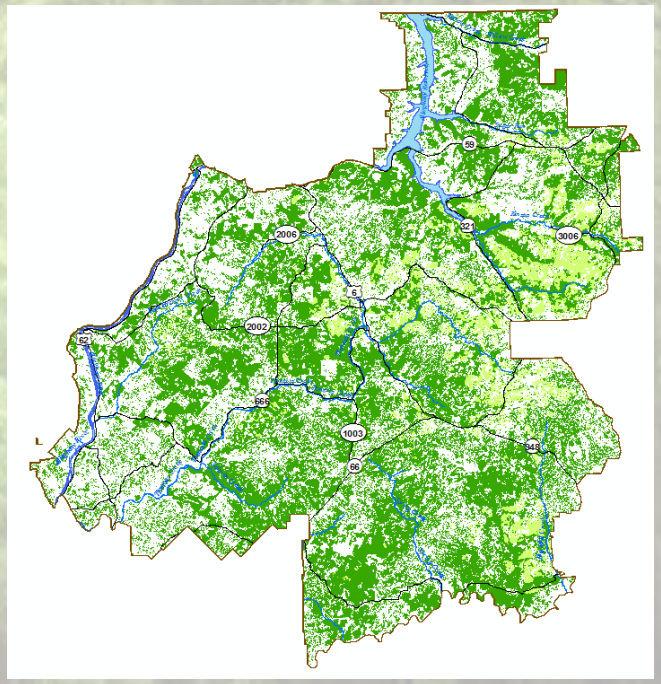
- Hard Mast (seeds) for Wildlife
- Economic Value
- Milling, flooring, cabinets
- Baseball Bats
- Very rapid mortality
- Very Short term snags
- High risk for stem failure-hazard trees (80% in 6 years, Knight)

Allegheny National Forest Region Species Risk Model- Black Cherry (24.7%)

Overall Mortality Risk (15 years)



Percent Host Basal Area Loss



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- Low (0-4)
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- High (8-10)

Risk Factors- Mortality:

- Black Cherry Basal Area
- Black Cherry Mean Diameter
- Landform
- Number and timing of Defoliations

% BA (Sq. ft/acre)

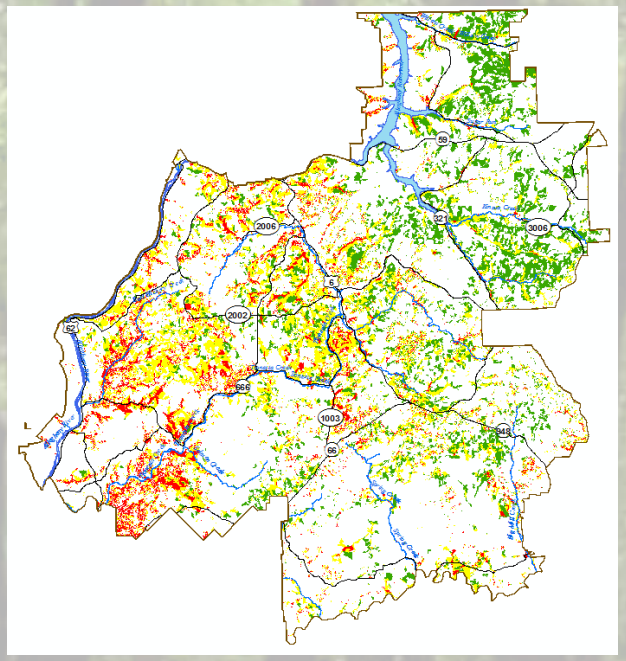
- 0 - 14
- 15 - 24
- 25 - 49
- 50 - 74
- 75 - 100

Black Cherry Values and Hazards

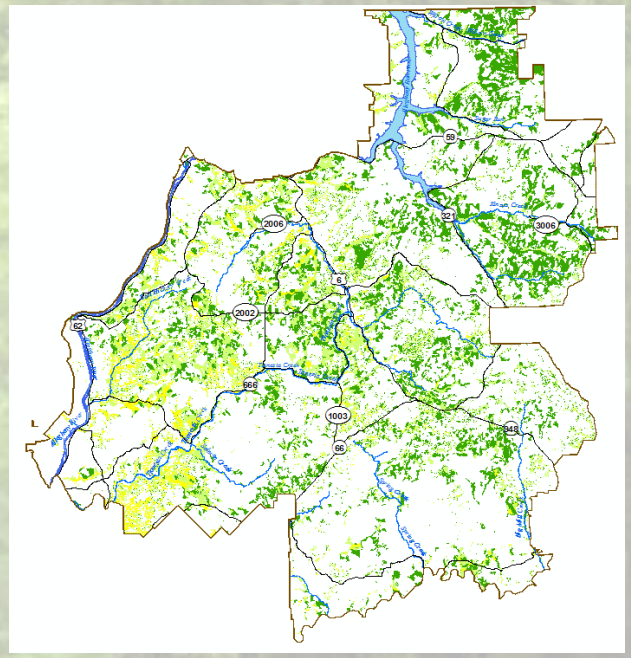
- Soft Mast (seeds) for Wildlife
- High economic value
- High quality on Allegheny Plateau
- Furniture veneer
- Milling, flooring, cabinets
- Around 25% of trees on Allegheny Plateau

Allegheny National Forest Region Species Risk Model- Eastern Hemlock (7.3%)

Overall Mortality Risk (15 years)



Percent Host Basal Area Loss



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Risk Factors- Hemlock Woolly Adelgid:

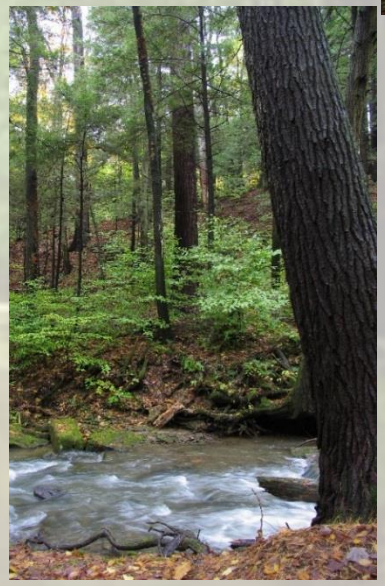
- Hemlock Basal Area
- Hemlock Mean Diameter
- Average Low Winter Temperatures
- Soil Moisture
- Percent Hemlock

% BA (Sq. ft/acre)

- 0 - 14
- 15 - 24
- 25 - 49
- 50 - 74
- 75 - 100

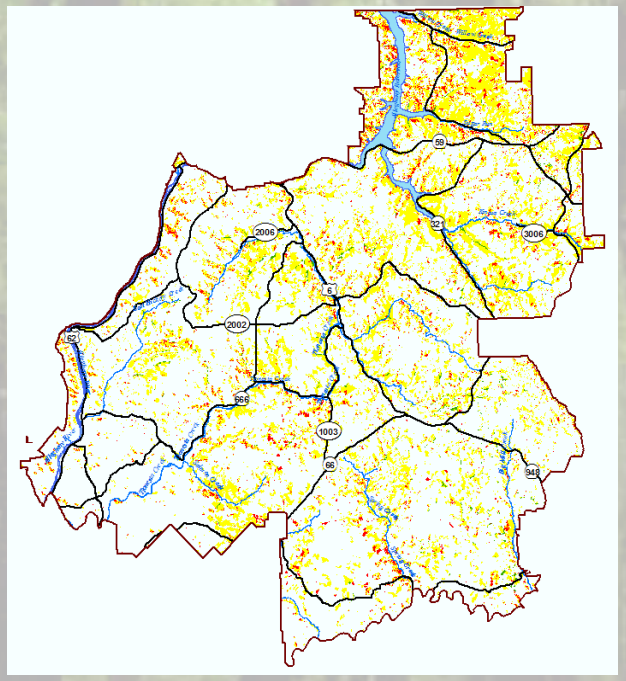
Eastern Hemlock Values and Hazards

- Hard Mast (seeds) for Wildlife
- Unique habitat attributes- nesting, hiding cover, thermal cover
- Ecological “Foundation Species”
- Riparian and habitat values
- Short term snags
- Aesthetic Values- beauty, shade
- High potential for value loss- no suitable replacement species

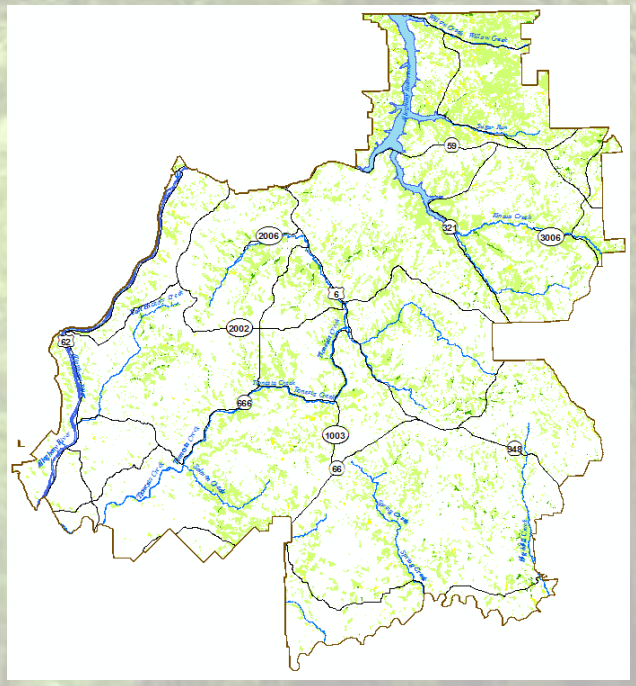


Allegheny National Forest Region Species Risk Model- Sugar Maple (7.5%)

Overall Mortality Risk (15 years)



Percent Host Basa Area Loss



Index

- Low (0-4)
- Medium (5-7)
- High (8-10)

Risk Factors- Maple Decline:

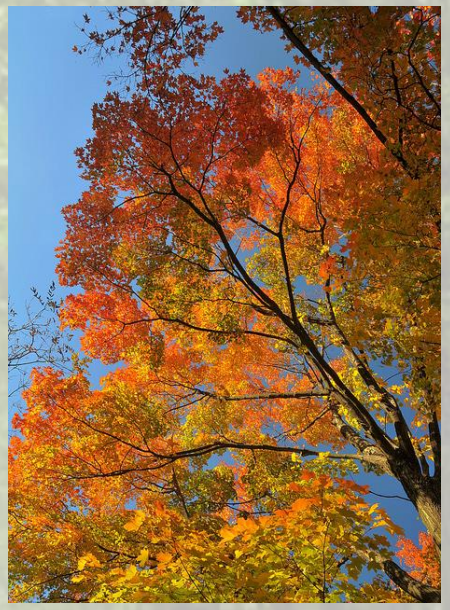
- Sugar Maple Basal Area
- Soil Nutrient Regimes
- Landform Classification

% BA (Sq. ft/acre)

- 0 - 14
- 15 - 24
- 25 - 49
- 50 - 74
- 75 - 100

Sugar Maple Values and Hazards

- Hard Mast (seeds) for Wildlife
- Milling, flooring, cabinets
- Economic Value
- Fall Foliage
- Sugar Industries

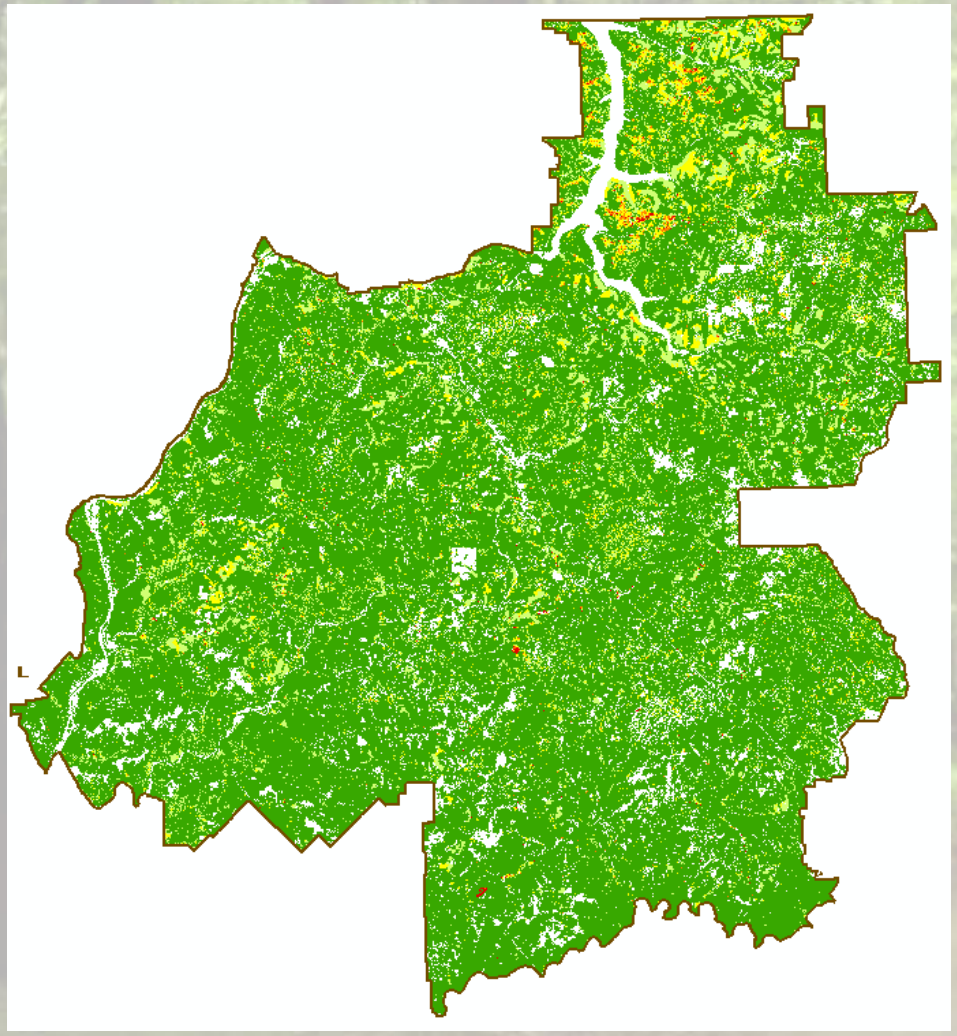


Allegheny National Forest Region Other Species Modeled

Host Species (% of stocking)	Risk Agent
Eastern White Pine (0.6%)	Annosus Root Disease
Red Oak Species (6.4%)	Oak Decline
Red Oak Species (6.4%)	Oak Wilt
Red Pine (2.6%)	Annosus Root Disease
Red, Pitch, Scotch Pines (2.6%)	Sirex Noctilio (Wood Wasp)
White Oak Species (2.7%)	Oak Decline

Allegheny National Forest Composite Risk Map-

Percent of Total Basal Area Loss for All Pests



Percent of Basal Area Loss

% BA	Acres	% ANF
0-14	553,495	74.7
15-24	78,987	10.7
25-49	26,953	3.6
50-74	2,998	0.4
75-100	978	0.1
Total	**663,411**	**89.5**

Allegheny National Forest Composite Risk Maps-

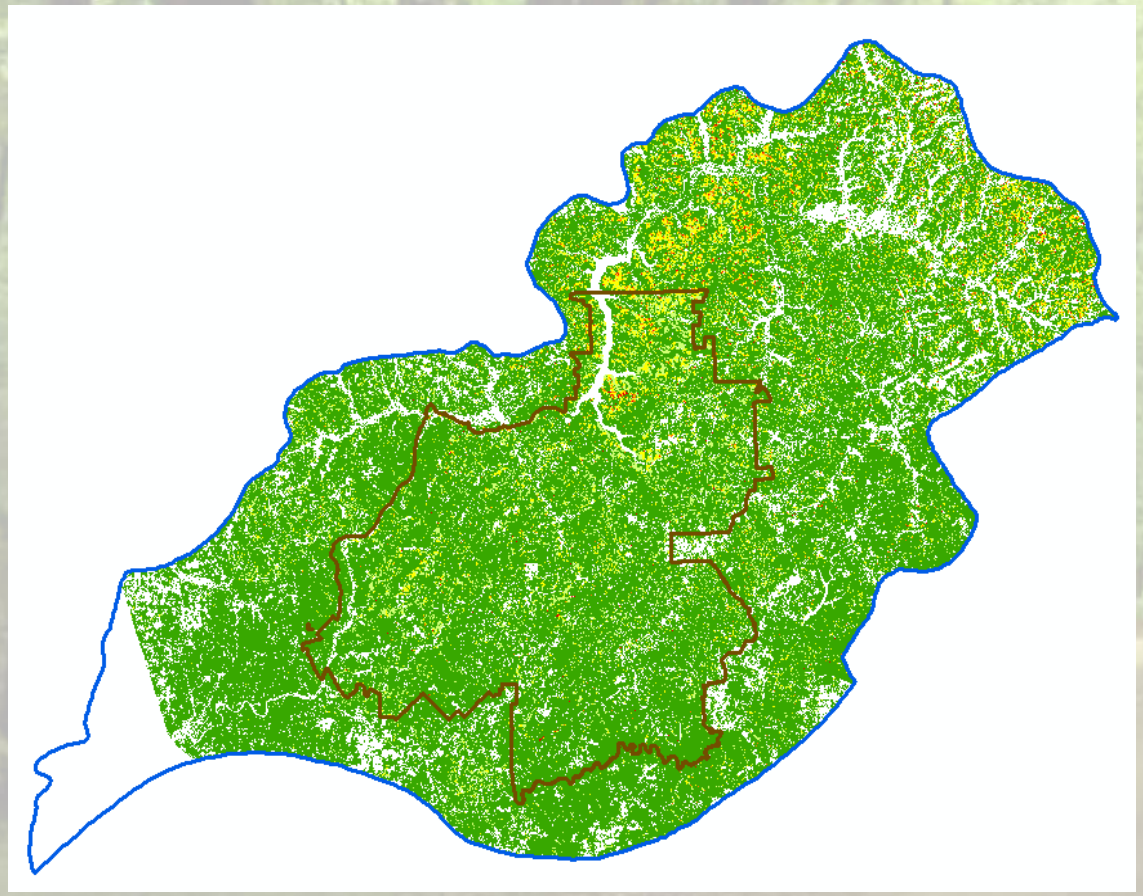
Total Basal Area Loss for All Pests

Composite Basal Area Loss (square feet/acre)

BA (Sq. Ft./Acre)	Acres	% ANF
0-5	310,464	41.9
5-26	288,389	38.9
26-51	53,263	7.2
51-76	8,571	1.2
76-101	1,948	0.3
101-400	777	0.1
Total	**663,412**	**89.6**

High Allegheny Unglaciated Plateau (Subsection 212Ga) Composite Risk Map-

Percent of Total Basal Area Loss for All Pests



Percent of Basal Area Loss

% BA	Acres	% Mapped 212GA
0-14	1,645,326	70.0
15-24	191,907	8.2
25-49	105,381	4.5
50-74	18,718	0.8
75-100	4,154	0.2
Total	**1,965,486**	**83.7**

High Allegheny Unglaciated Plateau (Subsection 212Ga) Composite Risk Map-

Total Basal Area Loss for All Pests

Composite Basal Area Loss (square feet/acre)

BA (Sq. Ft./Acre)	Acres	% Mapped 212GA
0-5	1,107,379	47.0
5-26	658,542	28.0
26-51	149,403	6.3
51-76	34,859	1.5
76-101	10,087	0.4
101-400	5,219	0.2
Total	**1,965,489**	**83.4**

Risk Modeling Conclusions

- Our models were conservative- limited scientific data
- Models are useful to focus on individual species
- Individually, most species result in minor basal area losses
- Cumulative effect of many forest stressors: implications for –
    - Resilience
    - Diversity
    - Regeneration
- Tool for landscape level strategy and prioritization of resource investments

Allegheny Plateau Forest Health Risk Model Team

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Questions or
Comments?