

Digital Mobile Sketch Map: Offline Airborne Mobile Mapping Solution for Forest Health Monitoring

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GIS in Action



Impact of Forest Insects

- Wood-boring insects cause the largest economic impacts by annually
 - \$1.7 billion in local government expenditures
 - \$830 million in lost residential property values
 - \$130 million in forest landowner timber loss



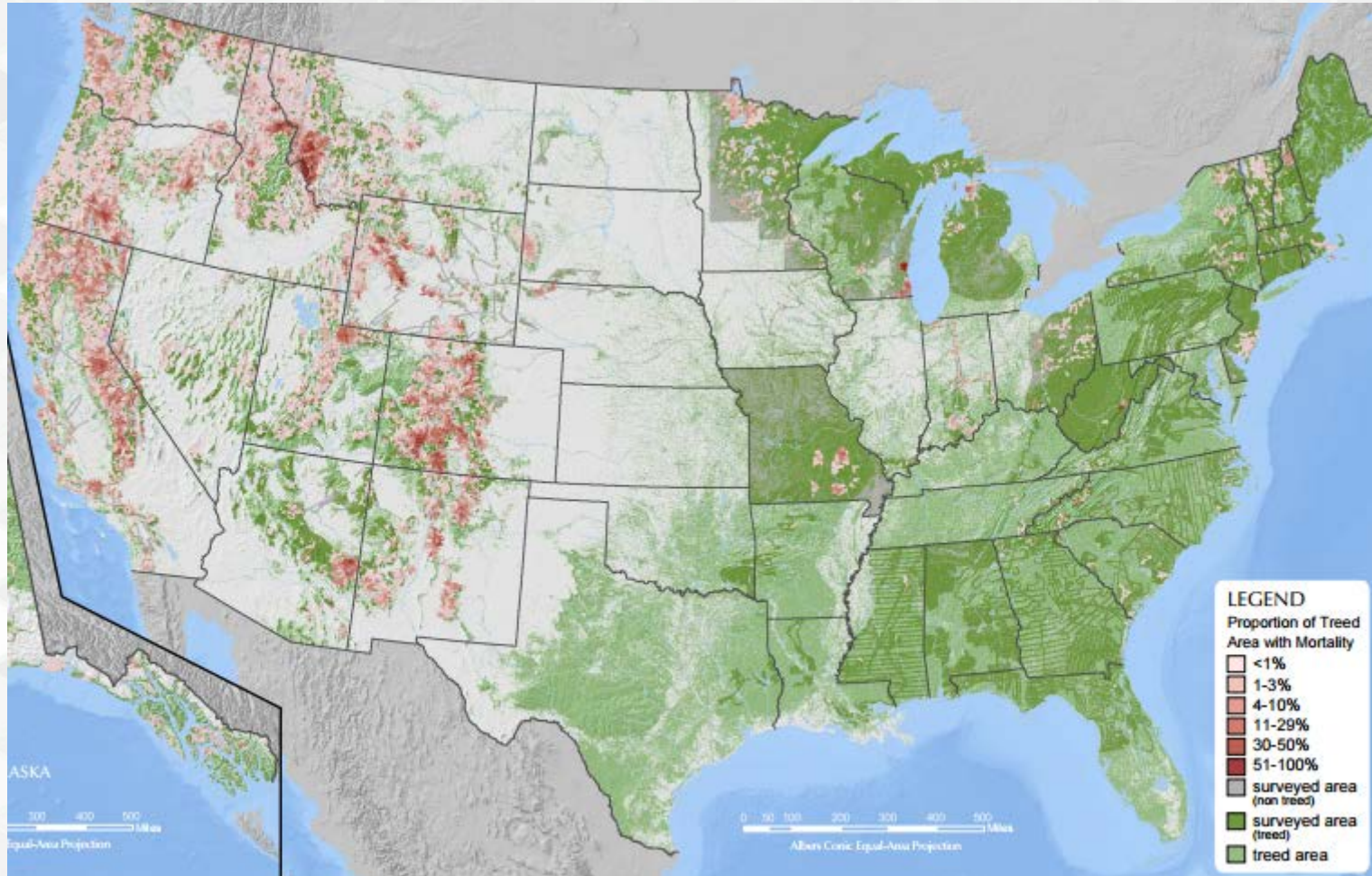
Aukema et al. (2011) Economic Impacts of Non-Native Forest Insects in the Continental United States. PLoS ONE 6(9): e24587. doi:10.1371/journal.pone.0024587

Forest Health Protection - USDA

- Protect and improve the health of America's forests
- State and Private Forestry Deputy Area of the U.S. Department of Agriculture (USDA) Forest Service
- Over 250 specialists in the areas of forest entomology, forest pathology, invasive plants, pesticide use, survey and monitoring, suppression and control, technology development
- Forest Health Technology Enterprise Team (FHTET)
 - Develop and deliver forest health technology services

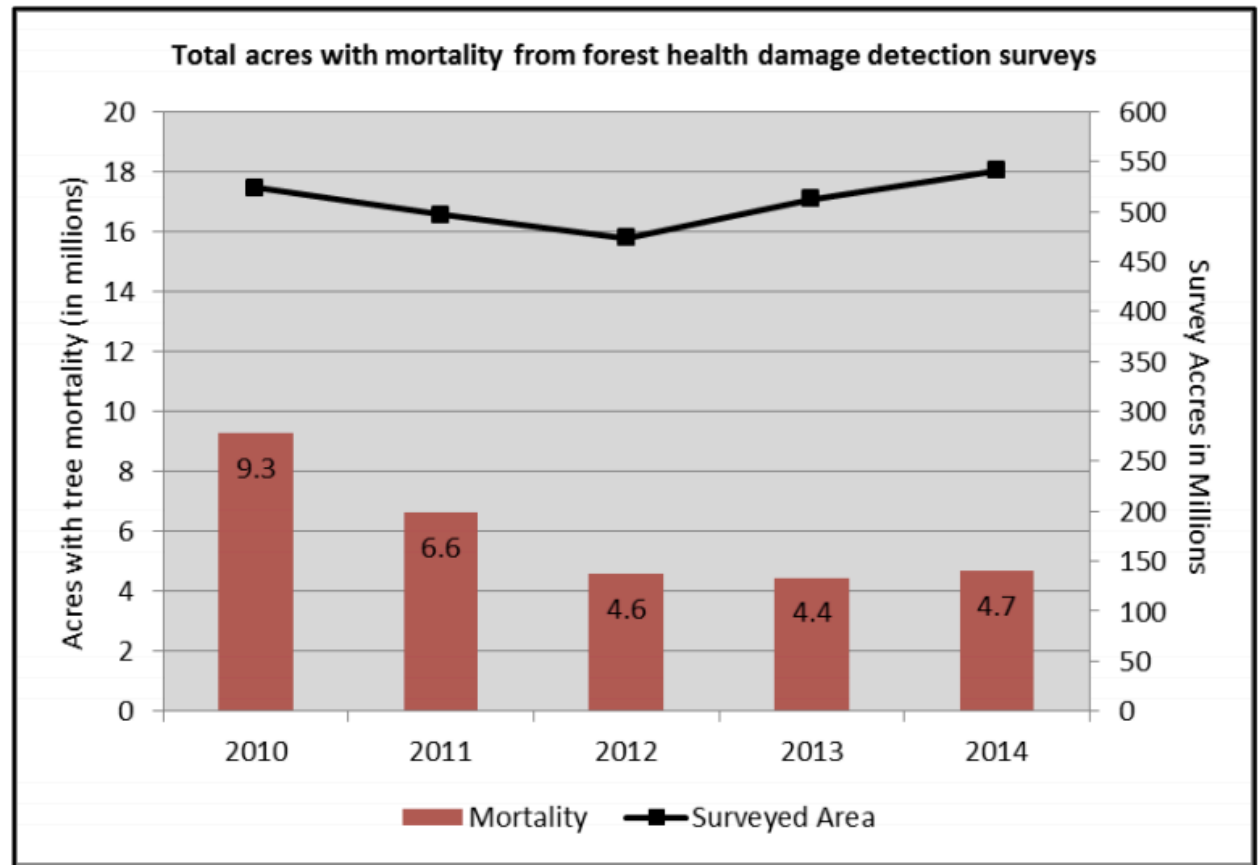


Insect and Disease Detection Surveys



2014 Detection Surveys Results

Top pests by acreage:
Mountain pine beetle 38%
Spruce beetle 16%
Fir engraver 15%
Western pine beetle 7%



Aerial Detection Surveys



USDA United States Department of Agriculture
Forest Service

INSECT & DISEASE DETECTION

Rocky Mountain Colorado Larimer

Tool Box
Search
Explore

To start exploring pest damage, please select the year of interest. Explore all pests or add a pest of interest.

2014
Select Pest
Exploring All Pests

IDS
Surveyed Area (where provided)

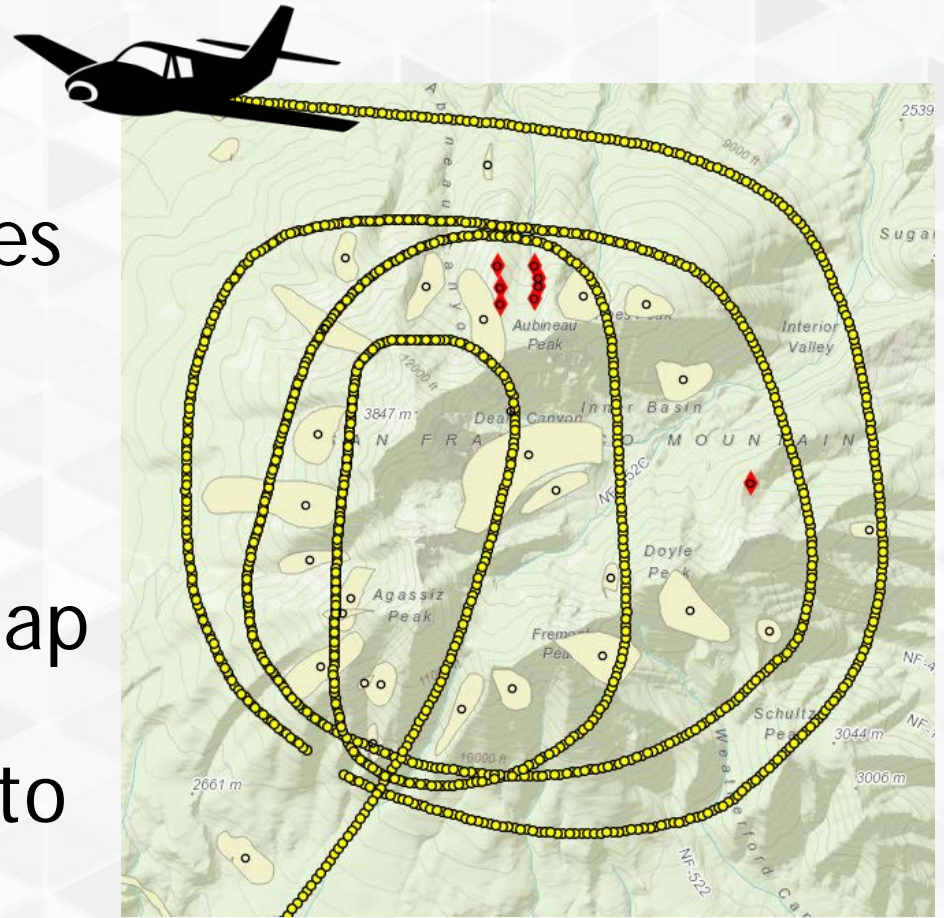
Layers
NIDRM
Aerial Imagery
Hillshade
USGS Quads

IDS Legend
Surveyed Area
Mortality
Defoliation
Other Damage
NIDRM

An aerial map of the Rocky Mountain region in Colorado, specifically Larimer County. The map shows a green line representing the surveyed area. Red areas indicate mortality, while other colors indicate defoliation, other damage, and NIDRM. The map includes various geographical features like roads, rivers, and elevation contours. A legend on the right side of the map provides a key for the different colors and symbols used. The map also shows a grid of latitude and longitude coordinates.

Data Collection Challenges

- 100-120 MPH
- 1,500 ft. AGL
- Irregular flight lines
- Disorienting
- Long days
- Bright sunlight
- Need good base map data
- Offline, but need to share data



Current Tool: DASM

- Rugged Windows tablets
 - Expensive
 - Hard to maintain
- Insufficient Base Data
 - Often using topo maps
- Poor data workflow
 - Inefficient data preparation process
 - Long lag time between collection and analysis
 - Data quality issues



Next Generation of DASM

- 2013
 - MB&G received contract from FHTET to build Digital Mobile Sketch Map (DMSM)
 - Requirement gathering and technology assessment
- 2014
 - Prototype development and testing
- 2015
 - Beta development (initial version delivered)
 - Continued development and testing
 - Rolling out to ~100 aerial surveyors this summer

DMSM Requirements

- Modern hardware
 - Low cost
 - Consumer grade
- Integrate with Enterprise GIS
 - Reduce lag time between collection & analysis
 - Minimize conversion steps and manual processes
 - More and better base map data
- Improve data quality and efficiency
 - Consistent data model, allowed values (codes)
 - Pre-defined attributes combinations
 - User configurable map and UI



Technical Solution



DMSM 74% 3:54 PM

Map interface showing a topographic map with yellow contour lines and blue stream lines. A large blue shaded area is overlaid on the map, containing several red labels: PC-MPB-M, PC-MPB-M, PC-MPB-M, PC-MPB-M, PP-MPB-M, and water. A red airplane icon is visible on the left side of the map.

Map controls: Pause, Play, Location, Refresh, Home, Search, Layers, Erase, Measure, Scale, Settings.



Scale: 240, 480, 960, 1920

QUICK KEYS

PP-MPB-M	AL-DC-M
PC-MPB-M	PM-DB-M
PE-SB-M	PF-PC-M
PP-PE-M	PT-PC-DL
PT-PC-DH	PA-PC-M
PE-DC-M	

Percent of tree area affected:

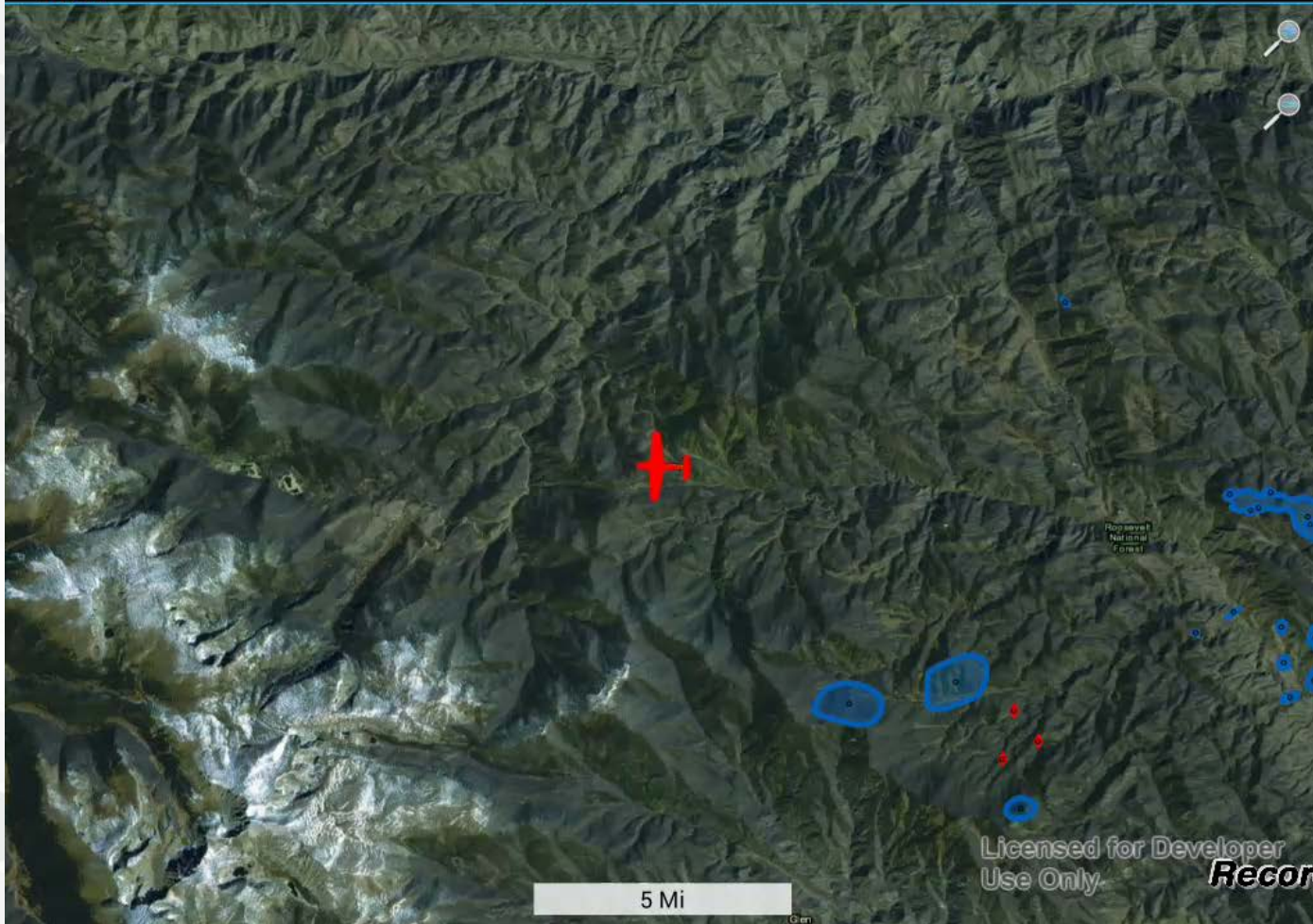
1-3	4-10	11-29	30-50	> 50
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Auto-Save  

Clear Apply

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Open multimedia menu



Navigation and controls panel:

- Undo, Erase, Text (T)
- Zoom levels: 240, 480, 960, 1920
- QUICK KEYS and LISTS sections with various alphanumeric codes.
- Percent of tree area affected: 1-3, 4-10, 11-29, 30-50, > 50
- Auto-Save checkbox and Apply button.

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Recorded by Mobizen

Questions?

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