Emerald Ash Borer: A Threat to Colorado's Community Forests



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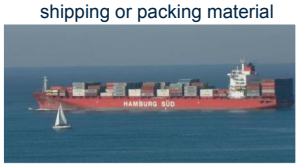
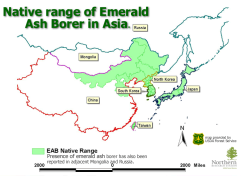
Objectives

- Introduce EAB
  - Pest origins and biology
  - Current impacts
  - Threat to Colorado
- Potential Community Risks
- Colorado Response
- Challenges and Possible Solutions

Pest Origins

- EAB was first identified in Michigan in 2002
- Initial introductions likely occurred in the 1990s
- Introduced from East Asia, probably through infested shipping or packing material





Pest Biology

- Impacts all species of ash
- Larvae feed under bark
- Trees killed within 1-3 years of first symptoms
- Trees of all size are colonized:1/2-inch saplings to largest mature trees
- Insect very difficult to detect

1- to 2-Year Life Cycle


Adults: May - September

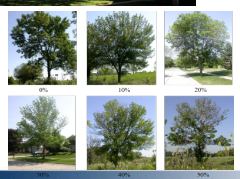
Eggs: May-June

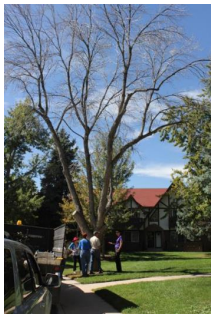

Larva: July - October

Pre-pupa: November-April

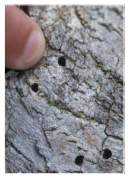
Pupa: November-April

EAB Symptoms





Diagnosing EAB

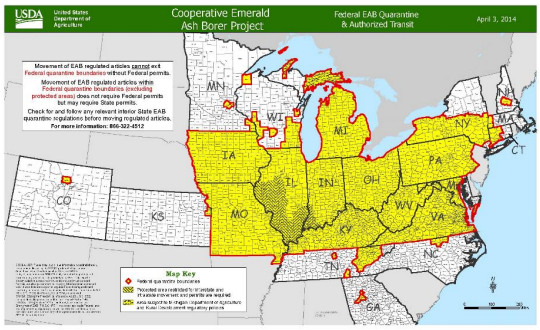


Small (1/8") D-shaped exit holes

Flat, tapeworm-like larvae with bell-shaped segments

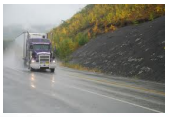
Serpentine galleries just under the bark

Known Distribution of EAB



EAB Comes to Colorado

- Infestations result from movement of infested ash trees and wood
  - Firewood
  - Packing material/industrial wood material
  - Live plant material



Economic Impact in Urban Areas

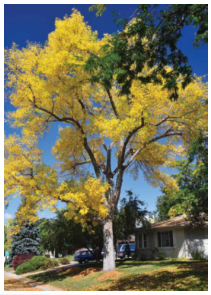
June 2006

August 2009

- $10.7 billion in Midwestern and eastern states for treatment, removal and replacement of more than 17 million ash trees on developed land (www.emeraldashborer.info)
- In Ohio a loss of $3 billion in property value and ecological services (Herms, Ohio State U.)

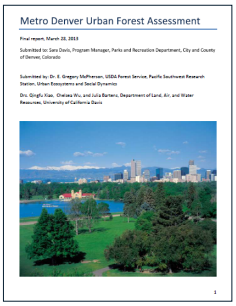
EAB Impacts in Colorado

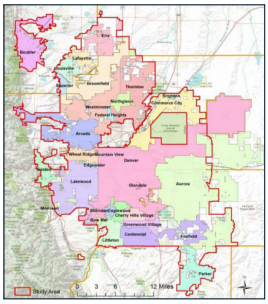
- EAB-infested urban areas in midwestern states typically include less than 5-percent ash
- Many Colorado community forests include more than 15-percent ash



The Front Range Urban Forest

2013 US Forest Service Canopy Assessment



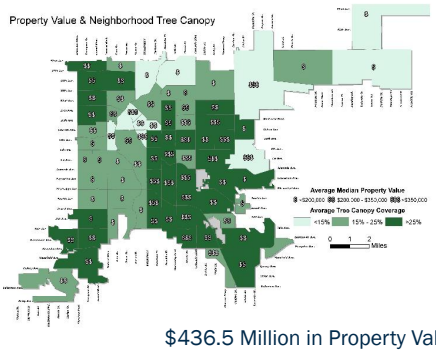


2013 Canopy Assessment Metro Denver Statistics

- 9.6 million trees
- 4.8 trees per capita
- Asset value of $13 billion

Annual Metro Denver Benefits

- $551 million in annual benefit from property value and ecosystem services

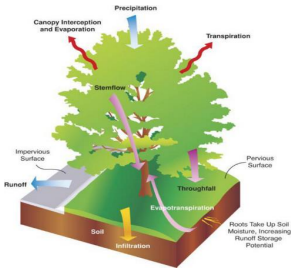


$436.5 Million in Property Values

Rain Fall Interception

Stormwater management

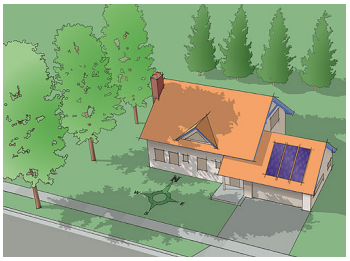
- 6.8 billion gallons interception potential
- $90 million facility would be needed to manage the stormwater managed currently



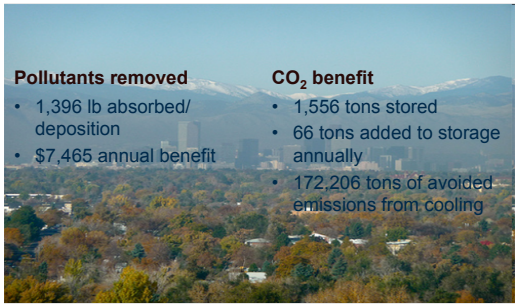
Energy Savings

Cooling

- $21 million
- Shading of structures reducing direct cooling costs
- Shading of impervious surfaces reducing air temperatures



Air Quality



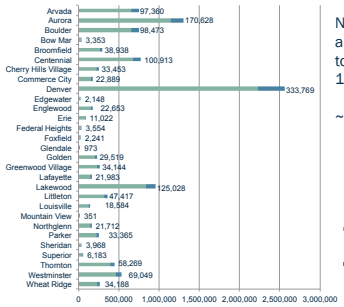
Pollutants removed

- 1,396 lb absorbed/ deposition
- $7,465 annual benefit

CO_2 benefit

- 1,556 tons stored
- 66 tons added to storage annually
- 172,206 tons of avoided emissions from cooling

Total Trees and 15% Ash



Numbers shown are estimates of total ash based on 15% factor

~1.45 Million Ash

	Annual Benefit	15% Service Loss	Balance
CO2 Storage and avoidance	$1,722,719	$258,408	$1,464,311
Rain fall interception	$90,980,000	$13,647,000	$77,333,000
Property value	$436,500,000	$65,475,000	$371,025,000
Energy saved	$21,786,677	$3,268,000	$18,518,677
Totals	$550,989,396	$82,648,409	$468,340,987

Attack of the Green Reaper

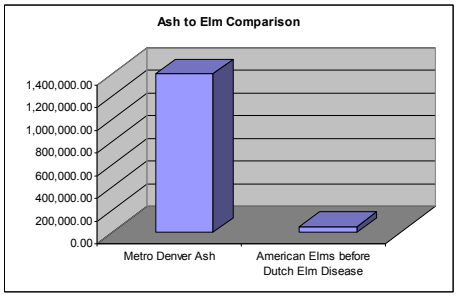
No EAB Were Harmed During Filming (photo by Russell Carr)

Dutch Elm Disease

American elms

- 50,000 American elms across Colorado prior to introduction
- 30,000 (60 percent) American elms removed between 1973 - 2012
- Management = prompt tree removal and proper wood disposal

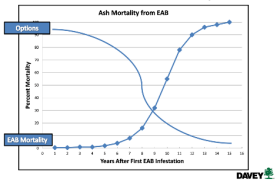
EAB to DED Scale



Emerald Ash Borer

- When EAB is present, ash will die if not treated with pesticides
- Pesticide must be administered as long as EAB is present within 5 miles
- EAB populations expand exponentially
- When untreated, entire ash populations in Midwest communities were beyond treatment after 10 years

An Inverse Relationship



Protective Treatments

- Several options available
- Trunk injections with over 90% protection
  - 2 year control
  - Repeated treatments needed over life of tree
- Cost to treat versus remove
  - $7 - 15 / inch for injection
  - $20-45 / inch for removal

  (not counting replacement)

Tree Removal/Replacement Estimates

- Tree removals ($300/tree) = $432 million
- Tree replacements ($400/tree) = $576 million
- Additional costs
  - Pesticide treatment, wood disposal
  - Landscape watering, property value

Wood Utilization or Disposal

- Planning for wood utilization
- Proper disposal sites meeting quarantine regulations

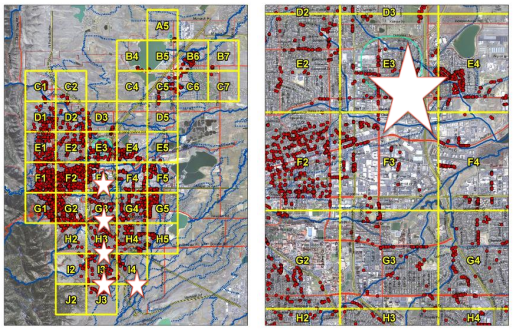
Challenges to Municipalities

- Public tree care operations
  - Number of removals may limit ability for pruning, planting and other duties
- Private trees
  - Managing code enforcement volume, contractor licensing, outreach
- Weighing treatment versus removal

Challenges to Municipalities

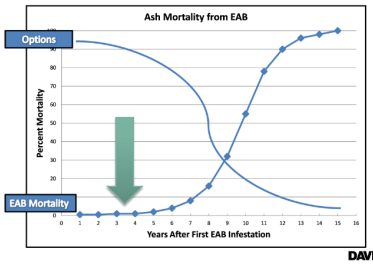
- Large numbers of standing dead
- Safety risk to parks, streets, schools, and commercial property
- Enforcement and action
- Financial assistance programs

Boulder Infestation



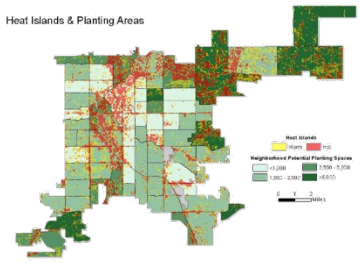
Boulder Infestation

An Inverse Relationship



DAVEY

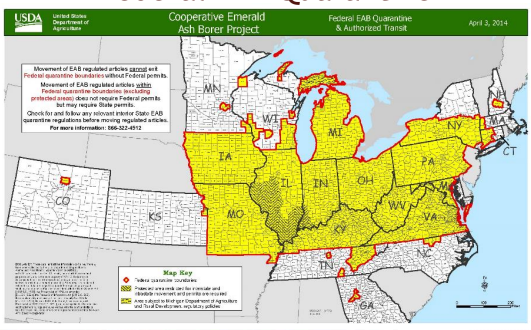
Planting Today for Tomorrow



EAB: A Federally Quarantined Pest

- USDA has jurisdiction over movement of the pest between states.
- The role of the USDA is to contain the pest to infested areas and prevent spread via quarantine.
- USDA will quarantine areas of infestation by city/county or state.

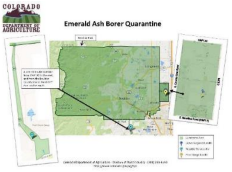
Federal EAB Quarantine



CDA Authority For Internal Quarantines

Pest Control Act 35-4-101.5 Legislative declaration.

- "…This act provides for the regulation of the movement of plant products, materials, and pests in Colorado…."
- And ….. "provides for the establishment of interstate and intrastate quarantines"
- Authority given to the commissioner of agriculture



Role of Colorado Department of Agriculture

- Monitor for pest
  - Determine area of infestation
  - Contain the pest and delay spread
- Respond
  - Implement Quarantine
  - Initial goal will be to contain EAB and slow ash mortality

Colorado Response

- A collaboration of local city/county & CDA, CSFS, USDA-APHIS, CSU
- Agencies work with affected cities/counties to determine a course of action
  - Incident Command System structure
  - Quarantine the county or counties?
  - Money for enforcement, who will pay?

Boulder EAB Detection and Response

- Found in Boulder, September 23, 2013
  - Quarantine put in place
    - Emergency quarantine adopted, Nov. 12, 2013
    - Permanent quarantine effective, Mar. 2, 2014
  - Compliance
    - Over 2,000 contacts made
    - Agreements with 54 Businesses/entities

Response in Boulder

- Survey
  - Approx. 52 people from different local, state and federal agencies participated
  - 820 branches peeled in Boulder
  - Five 1-square mile areas found with EAB
  - Survey efforts ongoing

Challenges

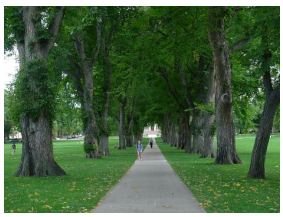
- Emerging pest awareness
- Fiscal hardships to communities
- Decisions regarding treatment, removal and replacement of trees
- Appropriate use and treatment of infested material

Solutions

- Strategies to reduce risk and improve preparedness
  - Conduct tree inventories
  - Develop management plans
  - Identify priority high value trees
  - Implement municipal codes and county resolutions to enforce sanitation of infested material and promote diversity of plantings

An Example from the Past
Dutch Elm Disease

Colorado State Forest Service program helped inventory, manage, preserve and replace American elms



Solutions

- Education and Outreach
  - Local government, green industry, special interest groups, general public
- Recommendations on tree planting
  - Increase diversity in planting
- Monitoring and early detection

Inter-Agency Cooperation

- **EPIC (Emerging Pests in Colorado)**
  - City Foresters (Boulder, Denver, Fort Collins)
  - Colorado Department of Agriculture
  - Colorado State Forest Service
  - Colorado State University
  - US Forest Service
  - USDA Animal & Plant Health Inspection Service (APHIS)
  - Green and Wood Industries
- **EAB Incident Command Structure**
  - Colorado Department of Agriculture
  - USDA Animal & Plant Health Inspection Service (APHIS)- City Forester – City of Boulder
  - Colorado State Forest Service
  - Colorado State University

ASLA COLORADO · CNGA · Colorado Tree Coalition · Colorado State University Extension

Colorado State Forest Service · Colorado Department of Agriculture · ISA International Society of Arboriculture Rocky Mountain Chapter · Front Range Urban Forestry Council · Denver The Mile High City

Questions?

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Colorado State Forest Service