



Emerald Ash Borer

LESSONS LEARNED AND IMPACTS TO DATE

CITY OF BOULDER URBAN FORESTRY DIVISION

City of Boulder Urban Forestry Division

Total trees maintained: **50,725**

- 37,273 street trees
- 13,452 park trees

Total appraised value of public trees under our jurisdiction approximately **\$110 million**

Total 2015 forestry budget: **\$1.1 M**

5 FTEs:

- City Forester + 4 Field Foresters
- 3 - 4 Seasonals

Number of ash trees

Approx. **6,000** ash trees in city parks and street rights-of-way

- **12%** of public trees

70,000 estimated ash on private property and along waterways



Services provided by Boulder's urban tree canopy

Economic

- Appreciating asset
- Property values

Environmental

- Energy savings
- Stormwater runoff reduction
- Air pollution removal

Social

- Quality of life
- Neighborhood character
- Aesthetics and shade



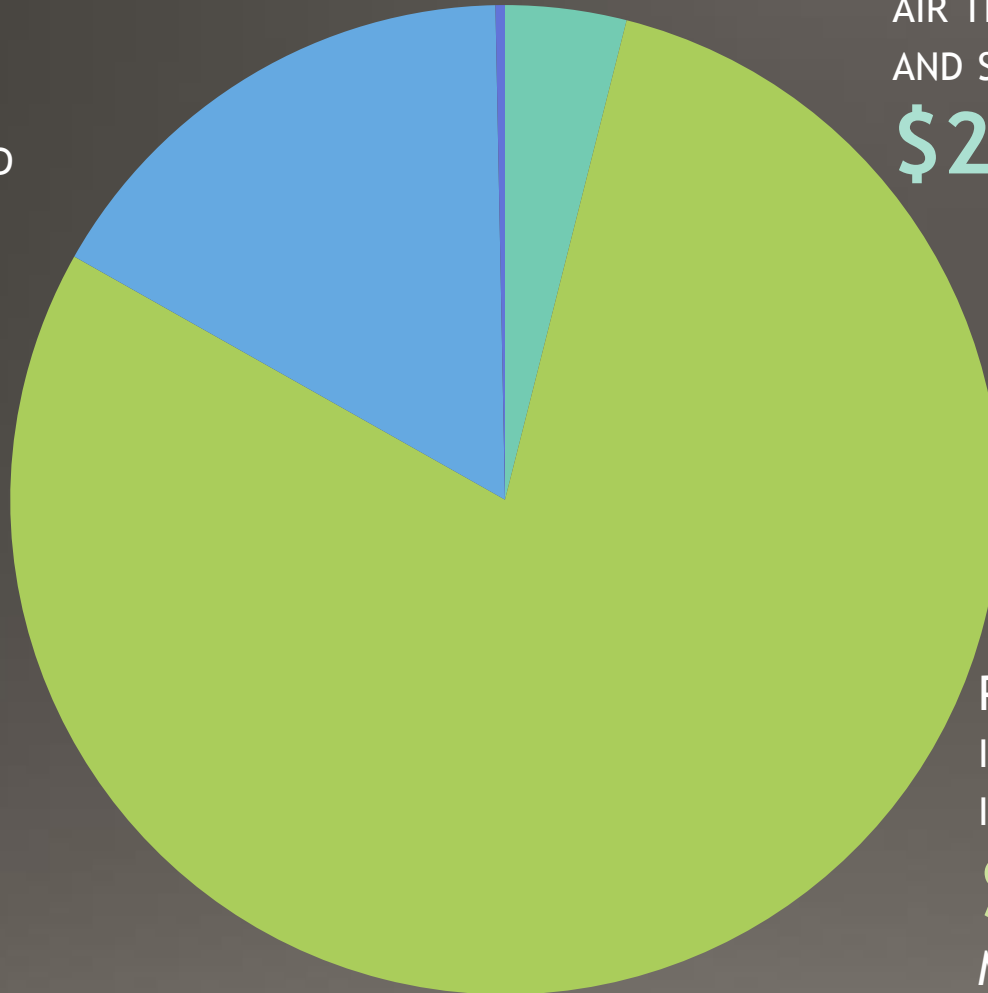
Annual Benefits - Denver Metro Area

ECOSYSTEM SERVICES AND PROPERTY VALUE BENEFITS TOTAL

\$551 MILLION

AIR QUALITY
FROM
PARTICULATE AND
POLLUTION
UPTAKE
\$1.7
MILLION

REDUCED
STORMWATER
RUNOFF
MANAGEMENT
COSTS
\$91 MILLION



COOLING SAVINGS FROM THE
AIR TEMPERATURE REDUCTIONS
AND SHADING FROM TREES
\$21.8 MILLION

PROPERTY VALUE
INCREASES AND OTHER
INTANGIBLE BENEFITS
\$436.6
MILLION



Emerald ash borer in Boulder

First CO detection

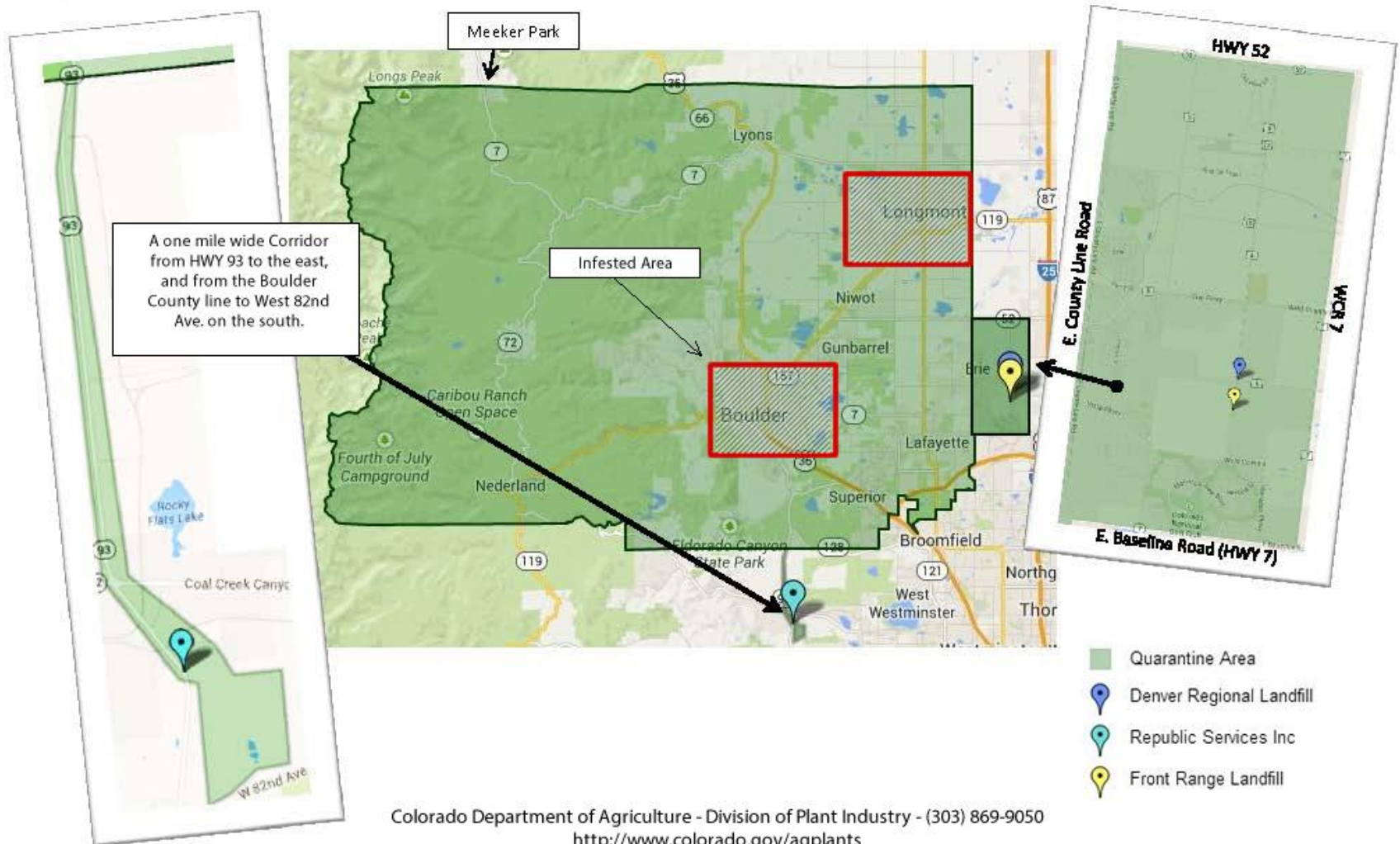
- Found in Kansas City in late 2012
- Forestry changed monitoring protocols in summer of 2013
- Discovered in Boulder in fall of 2013
- Likely introduced in 2008



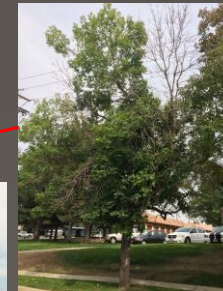
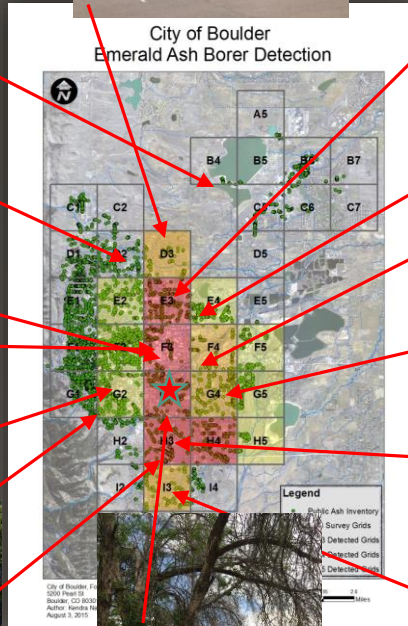
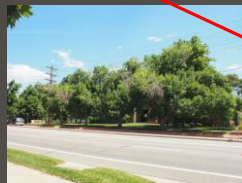


Current Detections in Colorado

Emerald Ash Borer Quarantine



Where are the "hotspots"? Everywhere.



How did it
get from
here...





...to here?

Probably in firewood.

- Firewood
- Nursery stock
- Debris from tree maintenance
- Shipping and packing material



It's been a whirlwind!

- Nearly 10 years since introduction
- 3+ years since detection
- Focus on removals
 - ~435 trees removed to date
 - 121 more this winter
- All of Boulder presumed infested
- "Ground zero" trees dead, nearly so, or gone
- Hotspots



Challenges

You'd think it would be easy to find...



Detection is DIFFICULT! Even in known infested areas



Ugly ash or EAB?



Crown thinning, early fall color, sprouting mid-crown (not at the base!), and dieback



Bark splits and galleries, D-shaped exit holes, larvae (late fall to spring), and adults (early to late summer)

Notes on detection efforts

- Trapping ineffective
- Branch sampling and trap trees are time consuming and difficult

Recommend:

- Sample all ash being removed
- Monitor for signs and symptoms during pruning ops



Differences from the Midwest

- Many stressed ash
 - Most of our trees look symptomatic!
 - Challenging environmental conditions
 - More native pests
- Differences in symptom expression
- Usually don't detect until tree is being removed, even in highly symptomatic trees



EAB is expensive!

Projected costs **\$10.7 billion** in Midwestern and eastern states by 2019

- Treatment
- Removal
- Replacement

Ohio: **\$3 billion** in losses in property value and ecological services



Boulder EAB-related costs

- Total EAB budget **\$2.88 million**
- Pesticide treatments approx. **\$40,000/year** (2014-16)
- Tree planting **\$152,000** 2015/16
 - Estimating **\$70,000** in from EAB budget
- Contracted tank watering for new trees **\$15,000 – \$20,000/year**
- Removals 2014 – 2016 **\$110,000**
- **Staff increases:**
 - 1 FTE (repurposed horticulture position)
 - Requesting 2 additional FTEs and one fixed-term position



Public safety



Declining trees quickly become a hazard

Ash widely planted

- Green ash the most widely distributed species in the U.S.
 - Naturalized along many CO waterways
- EAB-infested urban areas in Midwestern states typically include less than 5% ash
- Many Colorado community forests include **more than 15% ash** (per stem basis)



Photo credit: Ryan Lockwood, Colorado State Forest Service

Impacts on homeowners

- Removal of hazard trees
- Treatment costs and duration
- Disproportionate effect on vulnerable populations



Residence with three ash trees in the backyard that will likely require a crane removal.

Wood waste and utilization

- Wood disposal costs
2015/16 ~\$45,000
 - Mostly ash and Siberian elm
 - Nature doesn't give you one disaster at a time
- Looking for ways to better utilize/offset costs
 - Partnerships
 - Grants
- Quarantine regulations
 - Logistical challenges
 - Compliance agreements



Loss of ecological benefits

- Removal of air pollutants
- Reduction in stormwater runoff
- Mitigation of heat island effect
- Reduced energy usage
- Reduced sedimentation and erosion
- Reduction of point-source pollution from parking lots/roadways, urban landscapes and ag areas



Boulder's EAB management strategy

Urban Forest Strategic Plan

- City council unanimously supported EAB management strategy
- Urban Forest Strategic Plan
 - Comprehensive
 - Many issues broader than just EAB
 - Pesticide use
 - Wood utilization
 - Addresses other threats to the urban forest

Major components of EAB management strategy

- Tree planting
- Tree removals
- Pesticide treatments
- Education and outreach
- Biocontrol program

The importance of a completed tree inventory

- 15 years old at time of detection
- Davey Resource Group updated
 - Piggy-backed on Denver contract
- \$145,00 for approximately 50K trees
 - Approximately \$3.00/tree
- **Invaluable!**
 - Calculate potential EAB costs
 - Estimate loss of benefits
 - Where to focus:
 - planting efforts
 - outreach efforts

Have a complete ash inventory at the very least

Tree planting

- Focus on diversity
 - Boulder uses 35-40 species
 - Resiliency!
- Replacing and shadow planting
- No cost share
 - City and private property owners plant in ROW



Tree Removals

- Contracted and in-house
- Many ash now being removed on private property
 - Where is the wood going?





Pesticide treatments

Goals

- Slow the spread of EAB within Boulder and to other communities
- Stage removals to spread out costs and minimize disruptions
- Maintain urban tree canopy
- Preserve significant trees



Treatment criteria for public trees

- Ash trees > 10" diameter
- Good health
- Good location



Long term plan

- Treat 25% of public ash trees (~1,500)
- 3-year rotation
 - Fewer trees each cycle
- Treat primarily with TREE-äge
- Adjacent property owners may opt out of treatment
 - Very rare
- Boulder does not allow neonic use on public property
 - Exception for important trees, research
- Residents can treat on their own
 - Supposed to inform the city

Do treatments work?



Treated

Untreated

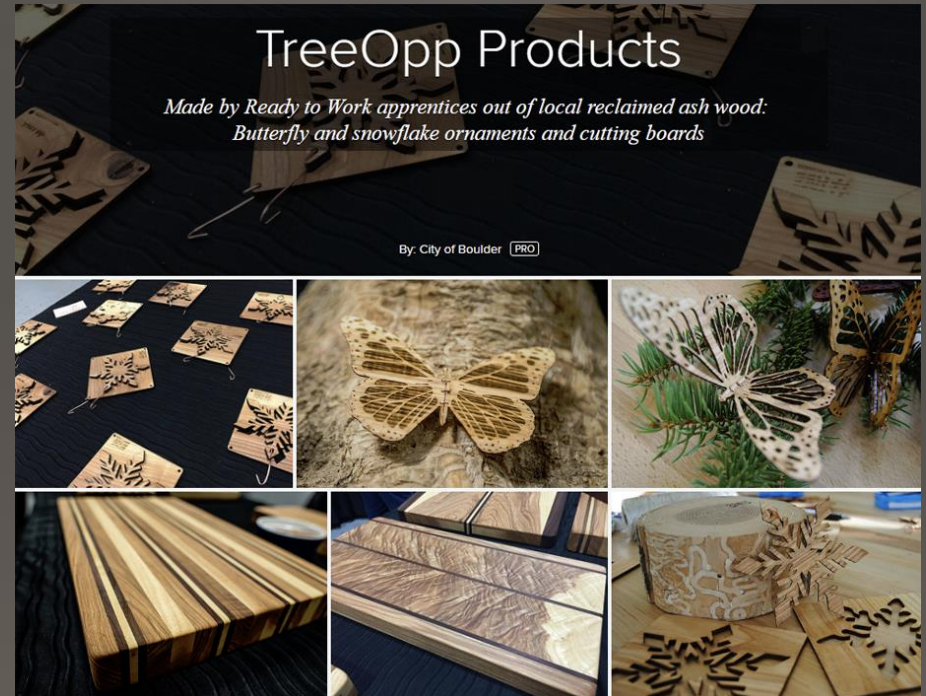
Yes, but not every tree is worth treating



Public outreach
and partnerships

Look for partnerships early and everywhere!

- Knight Foundation Challenge Cities Grant
 - #TreeOpp Project
- Boulder Tree Trust in the works
- Looking for corporate sponsors
- Grant opportunities
- Local sawyers and woodworkers



Outreach and education

- HOA and neighborhood groups
 - Very effective
 - Focus on smaller groups
 - Support for City's management plan
- Website
 - Really helpful, BUT has to be maintained
 - Also have a state website
- Email newsletters
 - Work well
- Social media
 - Works well, but difficult to keep up
- Door hangers
 - Residents thought too little too late or already knew about EAB

Wider outreach efforts

- Detection training for arborists, educators, and industry groups
- EAB van tours
- Conferences
- Webinars



Biocontrol program

- 4 species of wasps
- All are **STINGLESS!**
- Research in collaboration with APHIS biocontrol program and Colorado Department of Agriculture
- Interaction of parasitoids and insecticides



Boulder dangerous and diseased tree ordinances

- Time consuming
- Compliance
 - Usually after first notice
- Enforcement
 - City can conduct a warrantless search
 - No criminal penalties or tickets allowed
 - Failure to pay may result in a lien against annual county property taxes

Summary

- Plan now!
- Municipalities: inventory
- Homeowners: do I have an ash tree?
- EAB is expensive, even if you do nothing
- Detection is difficult and methods are time consuming and/or ineffective
- Look for partnerships
 - Treatment and removal costs, education, wood utilization

Questions?

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Thank you!