CITY OF BOULDER
ENVIRONMENTAL ADVISORY BOARD MEETING AGENDA
DATE: May 14, 2014
TIME: 6 p.m.
PLACE: 1777 Broadway, 1st floor, 1777 W. Conference Room

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1. **CALL TO ORDER**

2. **SWEARING-IN OF NEW BOARD MEMBER**

3. **APPROVAL OF MINUTES**
   A. The **April 9, 2014** Environmental Advisory Board minutes are scheduled for approval.

4. **PUBLIC PARTICIPATION**

5. **DISCUSSION ITEMS**
   A. Climate Commitment (Brett KenCairn)
   B. Resilience (Brett KenCairn)

6. **PUBLIC HEARING ITEMS**
   A. IPM and Emerald Ash Borer (Rella Abernathy and Kathleen Alexander)

7. **OLD BUSINESS/UPDATES**
   A. Boulder Energy Challenge
   B. Joint PB/TAB/EAB meeting follow up

8. **MATTERS FROM THE ENVIRONMENTAL ADVISORY BOARD, CITY MANAGER, AND CITY ATTORNEY**

9. **DEBRIEF MEETING/CALENDAR CHECK**

10. **ADJOURNMENT**

For more information call (303) 441-1880. Board packets are available after 4 p.m. Friday prior to the meeting, online at www.bouldercolorado.gov, at the Boulder Public Main Library's Reference Desk, or at the Planning and Development Services Center, located at 1739 Broadway, third floor.

CITY OF BOULDER ENVIRONMENTAL ADVISORY BOARD
MEETING GUIDELINES

CALL TO ORDER
The board must have a quorum (three members present) before the meeting can be called to order.

AGENDA
The board may rearrange the order of the agenda or delete items for good cause. The board may not add items requiring public notice.

PUBLIC PARTICIPATION
The public is welcome to address the board (three minutes* maximum per speaker) during the Public Participation portion of the meeting regarding any item not scheduled for a public hearing. The only items scheduled for a public hearing are those listed under the category PUBLIC HEARING ITEMS on the agenda. Any exhibits introduced into the record at this time must be provided in quantities of eight to the Board Secretary for distribution to the board and admission into the record.

DISCUSSION AND STUDY SESSION ITEMS
Discussion and study session items do not require motions of approval or recommendation.

PUBLIC HEARING ITEMS
A Public Hearing item requires a motion and a vote. The general format for hearing of an action item is as follows:

1. Presentations

- Staff presentation (15 minutes maximum*) Any exhibits introduced into the record at this time must be provided in quantities of eight to the Board Secretary for distribution to the board and admission into the record.
- Environmental Advisory Board questioning of staff for information only.

2. Public Hearing

Each speaker will be allowed an oral presentation (three minutes maximum*). All speakers wishing to pool their time must be present, and time allotted will be determined by the Chair. Two minutes will be added to the pooled speaker for each such speaker's allotted time up to a maximum of 10 minutes total.

- Time remaining is presented by a green blinking light that means one minute remains, a yellow light means 30 seconds remain, and a red light and beep means time has expired.
- Speakers should introduce themselves, giving name and address. If officially representing a group please state that for the record as well.
- Speakers are requested not to repeat items addressed by previous speakers other than to express points of agreement or disagreement. Refrain from reading long documents, and summarize comments wherever possible. Long documents may be submitted and will become a part of the official record.
- Any exhibits introduced into the record at the hearing must be provided in quantities of eight to the Board Secretary for distribution to the board and admission into the record.
- Interested persons can send a letter to the Community Planning and Sustainability staff at 1739 Broadway, Boulder, CO 80302, two weeks before the Environmental Advisory Board meeting, to be included in the board packet. Correspondence received after this time will be distributed at the board meeting.

3. Board Action

Board motion. Motions may take any number of forms. Motions are generally used to approve (with or without conditions), deny, or continue agenda item to a later date (generally in order to obtain additional information).

- Board discussion. This is undertaken entirely by members of the board. Members of the public or city staff participate only if called upon by the Chair.
- Board action (the vote). An affirmative vote of at least three members of the board is required to pass a motion approving any action.

MATTERS FROM THE ENVIRONMENTAL ADVISORYBOARD, CITY MANAGER, AND CITY ATTORNEY
Any Environmental Advisory Board member, City Manager, or the City Attorney may introduce before the board matters which are not included in the formal agenda.

ADJOURNMENT
The board's goal is that regular meetings adjourn by 8 p.m. Agenda items will not be commenced after 8 p.m. except by majority vote of board members present.

*The Chair may lengthen or shorten the time allotted as appropriate. If the allotted time is exceeded, the Chair may request that the speaker conclude his or her comments.

CITY OF BOULDER, COLORADO
BOARDS AND COMMISSIONS MEETING SUMMARY

NAME OF BOARD/COMMISSION: Environmental Advisory Board

DATE OF MEETING: April 9, 2014

NAME/TELEPHONE OF PERSON PREPARING SUMMARY: Juliet Bonnell, 303-441-1931

NAMES OF MEMBERS, STAFF AND INVITED GUESTS PRESENT:
Environmental Advisory Board Members Present: Mara Abbott, Tim Hillman, Larissa Read, Stephen Morgan.

Environmental Advisory Board Members Absent: Morgan Lommele

Staff Members Present: Brett KenCairn, Jamie Harkins, Kara Mertz, Jonathan Koehn, Juliet Bonnell

MEETING SUMMARY:

- EAB felt the zero waste evaluation study and subsequent recommendations were thorough, informative, and well thought out.

- The board appreciated the community-driven approach of the Zero Waste Strategic Plan and emphasized the importance of zero waste education and outreach and of having the community's support for the plan.

- Overall, the board supported the evaluation study's recommendations, including mandating commercial recycling, but noted that mandates need to be implemented strategically and should be paired with incentives to be effective and acceptable to the community. S. Morgan suggested that there be incentives to the building trades. He recommended that there be a reciprocal benefit to both the city and the contractor: .if they volunteer to pay a 3% deposit they could cut their permitting time by 3-4 weeks. Right now 10-16 weeks seems long. Under **S. Morgan's** suggested approach, those who choose to pay 2% would still have normal permitting times.

1. CALL TO ORDER
The Environmental Advisory Board Chair **M. Abbott** declared a quorum and the meeting was called to order at 6:11 p.m.

2. APPROVAL OF MINUTES
On a motion by **M. Abbott,** seconded by **T. Hillman**, the Environmental Advisory Board approved (4-0, **M. Lommele** absent) the March 19, 2014 meeting minutes as amended.

3. PUBLIC PARTICIPATION

4. DISCUSSION ITEMS
A. Climate Commitment

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B.KenCairn postponed this discussion item to next month's EAB agenda.

5. PUBLIC HEARING ITEMS

A. Zero Waste Strategic Plan: Kara Mertz and Jamie Harkins

K. Mertz provided background information about the Zero Waste (ZW) Evaluation Study.

Laurie Batchelder Adams, of Kessler Consulting and LBA Associates presented the findings of the ZW Evaluation Study. She noted that Boulder is already doing a great job of diverting waste which means that implementing additional zero waste measures will be more challenging than if Boulder hadn't already been working so diligently to reduce waste. The goals of the study are to provide recommendations on how to divert 85% of waste, maximize GHG emissions reductions, maximize jobs, minimize costs, and maximize leveraging partnerships, upstream conservation, public engagement, ease of implementation, and provision of a strong foundation for future zero waste activities.

L.Batchelder Adams recommended that yard and wood waste drop-off center customer analysis be improved, BVSD program funding be reprioritized, BCPH funding be refocused, and commercial programs (including compost subsidies, recycling coupons, and zero waste rebates) be phased out. Kessler also recommended increasing and modifying contractual relationships with haulers, recycling centers, and other zero waste partners to enhance the transparency of how money is being spent and the benefit to the community.

The Zero Waste Task Force helped to identify a broad range of zero waste initiatives that could be implemented to help the city reach its goal. These zero waste initiatives were short-listed to include the following mandatory initiatives:

- every-other-week (EOW) trash collection,
- multi-family unit (MFU) composting,
- all homeowner curbside service,
- commercial recycling,
- commercial organics recovery,
- C&D deposit program,
- special events diversion requirement,
- city purchase of local compost,
- BCRC improvements (ability to sort and recycle plastics more efficiently),
- existing program enforcement,
- And the voluntary initiative of take-out packaging.

The initial cost per year, diverted tons and costs/revenues per year to continue programs/initiatives for each of the initiatives were then estimated. If all of the identified initiatives were implemented, 82% of all waste would be diverted, GHGs reductions would equal 10-16,000 vehicles, and both city jobs and private jobs would increase.

The consultant then identified the initiatives with the greatest ability to meet specific project goals and bundled them together. Bundle 1created the greatest diversion/GHG reduction potential. Bundle 2 created the lowest cost to the city. Bundle 3 created the lowest cost to the customer. Tons diverted, net costs or revenues per year and customer costs per month were all calculated for each bundle.

The consultant recommended Bundle 1 which includes EOW trash collection, all homeowner

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service, commercial recycling and organics collection and C&D deposit. They suggested implementing these initiatives in phases with EOW trash, commercial recycling and organics implemented by 2016 and all homeowner services and a C&D deposit program implemented by 2018.

They also recommended the following:

- eliminating and modifying existing programs
- enforcing existing regulations
- improving data collection
- more clearly defining city contracts
- tabling discussion of a single-hauler system as long as there is hauler support for implementing other zero waste recommended initiatives
- expanding education and outreach with county-wide messaging and branding
- increased use of 6400 Arapahoe with C&D deposit administration/metals storage, Eco-Cycle's "Fix-it" clinic, and new metal diversion
- and on-going updates and evaluation of the Zero Waste Strategic Plan

If Bundle 1 initiatives are implemented, the estimated annual costs are $2 million.

K. Mertz noted that city staff will be sharing the consultant's recommendations with the community to gather feedback and discuss community values. She asked the EAB for ideas on the city's outreach approach including how to gather feedback from the community and what questions the city should be asking.

J. Harkins noted that staff is looking forward to discussing zero waste issues with council and the community to better understand what our goals are moving forward and how to accomplish them. There will be a zero waste event in May that will kick-off a robust outreach program. Staff's goal is to learn what the community thinks of the proposed zero waste strategy and discover what the community's barriers are to zero waste.

Public Participation

Randy Moorman of Eco-Cycle presented Eco-Cycle's recommended priorities for Boulder's Zero Waste Strategic Plan. Eco-Cycle supports adopting Bundle 1 from the Zero Waste Evaluation Study to achieve the greatest diversion and GHG reductions. Eco-Cycle felt the following initiatives were most important:

- mandatory commercial recycling and composting
- enhancement of composting and composting processing infrastructure
- expansion of recycling, reuse and waste reduction opportunities at CHaRM and other facilities at 6400 Arapahoe
- enhancement of C&D debris transfer station for Boulder and the region
- expansion and enhancement of the Boulder County Recycling Center
- expansion of public outreach and education efforts
- better connection between the city's zero waste efforts and Climate Action Plan

Board Discussion

T. Hillman thought the waste reduction strategy and study were great. The metrics used in the zero waste evaluation study were appropriate and he liked that this is such a community-driven approach and plan. He emphasized the importance of having the community's support for this zero waste plan since the city will be implementing mandatory initiatives.

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L. Read liked the scope of the study and the details included in the recommendations and noted that these provide council and the community with a lot to respond to. She commented that the name zero waste isn't entirely true since our community goal is an 85% diversion rate. She suggested enhancing the clarity of the city's messaging by advertising the 85% goal. Commercial issues keep recurring and she'd like a forum such as a future EAB meeting or retreat to discuss commercial issues across various topics such as zero waste, energy and more. She also emphasized the importance of outreach and education in businesses, colleges, and schools. Single family homeowners and commercial businesses should be better informed about the availability of tax incentives for demolitions. She suggested that Eco-Cycle increase their presence in our community and ensure that the community is aware of Eco-Cycle's new location and mission.

S. Morgan noted that the commercial aspects are tricky. He commented that recycling should be done easily without much additional cost because costs will likely be passed along to customers, which is regressive and needs to be considered. Mandated recycling with incentives seems reasonable and rational. He felt that construction and demolition mandates need to be separated into MFU/commercial and single family because of different funding sources and economies of scale. He emphasized that the city should carefully consider the way in which commercial mandates are implemented and consider incentivizing initiatives. He suggested withholding Certificates of Occupancy until buildings have recycling and compost service as the most effective way to ensure this. He mentioned that single family homes will be hard hit by some of these mandates and that incentives on single family construction will be important to the community. Mandates for single family homes may not be necessary if there is a quid pro quo. If they volunteer to pay a 3% deposit on construction of single family homes, they could cut their permitting time by 3-4 weeks. Currently 10-16 weeks seems long to get a permit. Those who choose to pay 2% would still have normal permitting times.

M. Abbott loved watching the subsidies for commercial recycling move into mandates. She was curious about what can be done to increase composting and recycling in MFUs and suggested increasing mandates for that sector of the community as well. She noted that waste reduction is really tangible and something that can be seen. She supports additional outreach and education to help get people involved and interested in waste reduction where progress can so clearly be seen.

S. Morgan noted that just because people are required to have recycling service doesn't mean that they're using it. There is a disconnect between the current ordinance's goal and its effectiveness in reaching that goal.

T. Hillman pointed out that waste diversion is valued similarly to the city's Climate Action Plan (that there are similar funding amounts in the CAP tax and the Trash Tax). He commented that if these waste reduction initiatives reflect community values, he felt that the costs are minimal and wanted to keep the costs in perspective with the benefits of achieving the community's zero waste goals.

6. DISCUSSION ITEMS (CONTINUED)

A. Energy Future: Jonathan Koehn

J. Koehn provided the board with an update on municipalization efforts including: what has happened since August, the utility of the future, energy services, and what's ahead.

In August City Council authorized condemnation through an ordinance that was created.

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Additional charter requirements were added in November and since December staff has been working with a consultant to develop a transition work plan. The transition work plan includes steps that need to be taken between now and when the city would be running the utility (first to be able to replicate system and subsequently set up for the utility of the future) and prepare for condemnation. In January the city sent Xcel a notice of intent to acquire the system. The city is now in good faith negotiations with Xcel regarding the city's intent to acquire the system. Xcel will likely respond that they aren't willing to sell their system in which case the city will file for condemnation later this year.

The Boulder Docket is Xcel's request to the commission to limit Boulder's participation in on-going efforts that we pay into on efficiency programs and solar. The city is planning to file an appeal on the PUC decision regarding jurisdictional authority.

Solar issues (related to the Boulder Docket, net metering, and reduction of soft costs) are being addressed with the help of a Solar Working Group. The city is working to remove restrictions and barriers to solar to make Boulder the most solar-friendly community.

The Natural Gas Working Group is helping staff evaluate natural gas fracking concerns, determine how natural gas will play into Boulder's energy portfolio, developing criteria for purchasing natural gas, and develop an energy services plan to present to council.

Municipalization is an opportunity to help us achieve our climate commitment goals and create a Utility of the Future business model focused on decarbonization, decentralization and democratization of our electricity services. The city is focused on providing stable, safe and reliable energy using a customer centric model that makes energy a service instead of a commodity. Local economic vitality needs to be promoted and energy services should be flexible, dynamic, and universal (available to all, not just to those who can pay). Energy should be increasingly sustainable, resilient and carbon free and rates should be stable and predictable. An entrepreneurial platform will develop the model of the future that we're looking for.

Staff is working toward a seamless transition so that on day one the city will be able to provide safe, reliable utility services. A utility formation ordinance will be going to council so that the city will be able to finance this project. A transition plan outlining operations, power supply, customer service and more will be presented to council on May 13 and working groups will be formed to help implement the transition plan and potentially create new services and innovations and insure we don't create barriers to our long-term vision.

There are many legal steps that will likely proceed (such as condemnation, potential settlement, appeal). On April 29 there is a City Council Study Session during which energy services will be discussed. Next the transition plan will do to City Council on May 13. Public engagement and outreach around the Utility of the Future vision and transition plan will continue and the city remains open to working with Xcel on a potential partnership.

7. OLD BUSINESS/UPDATES

The 2nd reading of the ordinance related to bears and trash passed unanimously. After 3rd reading of the ordinance, all properties west of Broadway will be required to have bear-resistant containers.

8. MATTERS FROM THE ENVIRONMENTAL ADVISORY BOARD, CITY MANAGER, AND CITY ATTORNEY

9. DEBRIEF MEETING/CALENDAR CHECK

10. ADJOURNMENT
Environmental Advisory Board adjourned at 8:33 p.m.

Approved:

_____

Chair Date

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MEMORANDUM

To: Environmental Advisory Board

From: Kathleen Alexander, City Forester

Date: May 14, 2014

Subject: Emerald Ash Borer Update and Workplan

2014 Emerald Ash Borer Workplan

In late September 2013, the department's Forestry staff discovered an Emerald Ash Borer (EAB) infestation within the city. The subsequent delimitation survey showed that EAB is well established within a corridor in central Boulder. Over the next 15 years, EAB management, including tree removal, tree replacement, wood disposal and pesticide treatments will have a significant direct budgetary impact to the city and private residents. The loss of tree canopy will have considerable economic, social, and environmental impacts for decades. In April, an Information Item detailing the 2014 Emerald Ash Borer work plan was sent to City Council. This detailed information can be found in Attachement A.

Staff has collaborated with leading EAB experts from across the US and Canada to develop the 2014 EAB work plan. The plan includes:

- The formation of an Interdepartmental EAB Working Group;
- Tree removals, replacements and limited pesticide treatments.
- Community outreach;
- Collaborative research projects;
- Asset Management; and
- Ongoing monitoring

The collaborative research projects for 2014 include:

- Research into effects of wounding from trunk injected pesticides on ash trees in Colorado; with Colorado State University (CSU)
- Trials of 1 year vs 2 year control with TreeAzin vs. Tree-äge; with CSU
- Pesticide residues in leaf litter; with CSU
- Bee Pollen Study; CSU and local beekeepers
- Testing accuracy of degree day models to predict emergence of EAB in Colorado; with (CSU)
- Testing a new pheromone; collaboration with Canadian Forest Service (CFS)
- Testing new monitoring/survey protocols; with CFS
- Testing new trapping protocols; with USDA Animal and Plant Health Inspection Service (APHIS)
- Dendrochronology analysis of CO EAB infestation; with APHIS

The Interdepartmental EAB working group will meet over the next year to discuss EAB management on a city-wide scale and ensure consistency across departments. This group will develop a series of recommendations that will be presented to boards and city council during the first quarter of 2015.

INFORMATION PACKET
MEMORANDUM

To: Members of City Council

From: Jane S. Brautigam, City Manager
Paul J. Fetherston, Deputy City Manager
Jeff Dillon, Parks and Recreation Director
Kathleen Alexander, City Forester
Susan Richstone, Community Planning and Sustainability Deputy Director
Lesli Ellis, Comprehensive Planning Division Manager
Rella Abernathy, City Integrated Pest Management Coordinator

Date: April 16, 2014

Subject: Information Item**: 2014 Emerald Ash Borer Workplan**

EXECUTIVE SUMMARY

The purpose of this memo is to update City Council on the 2014 workplan for the federally quarantined ash tree pest, emerald ash borer (EAB), including:

- The potential impacts and scope of the issue;
- Action items completed to date;
- Analysis of the major issues associated with EAB including pesticide usage; and
- 2014 EAB Workplan.

The 2014 EAB Workplan includes:

- The formation of an Interdepartmental EAB Working Group;
- Community outreach;
- Collaborative research projects;
- Ongoing monitoring; and
- Tree removals, replacements and limited pesticide treatments.

In late September 2013, City of Boulder Parks and Recreation Forestry staff discovered an EAB infestation within the city. The subsequent delimitation survey showed EAB is well established within a corridor in central Boulder. Over the next 15 years, EAB management, including tree removal, tree replacement, wood disposal and pesticide treatments will have a significant direct budgetary impact to the City of Boulder and private residents. The loss of tree canopy will have considerable economic, social, and environmental impacts for decades.

Staff has collaborated with leading EAB experts from across the United States and Canada to develop an emergency 2014 response to EAB. An Interdepartmental EAB Working Group has been formed and will meet over the next year to discuss EAB management on a city wide scale and to ensure consistency across departments. This group will develop a series of recommendations which will be presented to council during the first quarter of 2015.

FISCAL IMPACT

The 2013 US Forest Service (USFS) Metro Denver Urban Forest Assessment Report estimates there are 656,000 trees in the city of Boulder with an appraised value of $1.2 billion. There are approximately 38,000 total city park and public street rights-of-way trees under the jurisdiction of the Parks and Recreation Forestry Division; 4,808 (12.6 percent) are either green or white ash trees with an appraised value of $15.4 million. The estimated number of public, private and naturalized ash in Boulder is 98,000 trees.

Current non-personnel budget for the Forestry Division is $280,000 for tree pruning, removals, planting, replacement, wood disposal, integrated pest management (IPM) and the commercial tree program. Once EAB populations increase, management costs for EAB alone will exceed existing Forestry funding levels on an annual basis and additional staffing will also be required. A PCA code was created to track EAB related costs and an adjustment to base will be requested in the third quarter of 2014 to cover the costs of the 2014 response. A variety of funding sources, both public and private, will be required for EAB management over the next ten years. The impacts to public funding will be to both the existing Forestry operating budget and Parks and Recreation Capital Improvement Program.

COMMUNITY SUSTAINABILITY ASSESSMENTS AND IMPACTS

- Economic: Ash trees are found in commercial areas throughout the city and two blocks of the Pearl Street Mall are predominantly green ash. Research has consistently shown that shoppers are more willing to pay for parking, goods, and services in business districts with trees. Trees increase residential and business property values and the tax base; attract visitors, businesses, and new residents to an area and increase occupancy and rental rates of apartments and offices. Shading from trees can defer maintenance longer for materials that are degraded by heat such as asphalt and pavement.

- Environmental: Boulder’s urban tree canopy provides many environmental benefits to the community. Urban trees help mitigate climate change by contributing to reductions in carbon dioxide and other pollutants, improving water quality, reducing stormwater runoff and saving energy through shading surfaces and reduced cooling demand. Although ash trees comprise approximately 15 percent of the total tree population, they are large maturing, long lived trees and therefore contribute more environmental benefits than expected by their percentage in the urban tree canopy.

  If left untreated, ash trees in infested areas will die from EAB causing high tree canopy losses and subsequent loss of environmental, economic and social benefits. Pesticides are an important component in EAB management programs and are effective in the prevention and spread of EAB. However, pesticide treatments, whether public or private, can have impacts to non-target organisms and the environment. Decisions about which pesticide products to apply and which trees to treat must be carefully balanced to provide the least overall harm to the environment.

- Social: Social scientists have shown trees and green spaces within cities provide social and psychological benefits and improve the quality of life for residents. Connection to trees and nature affects moods, activities and emotional health. Exposure to trees and green spaces can reduce stress and mental fatigue, enhance mental health, enhance recuperation rates in hospitals, reduce psychological precursors to crime, and increase recreational opportunities. A community's urban forest is usually the first impression a community projects to its visitors and is an extension of its pride and community spirit.

BACKGROUND

On September 23, 2013, city of Boulder Forestry staff found EAB, an invasive pest of ash trees, in a dead ash tree in the public right-of-way in northeast Boulder. The beetles were detected by staff when sampling the ash tree prior to removal. This was the first detection of this insect in Colorado and is the western-most occurrence of this invasive pest in North America.

After the initial EAB detection in Boulder, Forestry staff completed or collaborated with other agencies to complete the following work items:

- *EAB Research Advisory Group:* To assist staff with EAB monitoring and management, an advisory group was formed including two of the leading EAB researchers and local experts in entomology and tree pest management:
  - Dr. Whitney Cranshaw, Colorado State University
  - Dr. Deb McCullough, Michigan State University
  - Dr. Krista Ryall, Canadian Forest Service
  - Dr. Sky Stephens, US Forest Service
- *Quarantine:* EAB is a federally quarantined pest. There are federal and state quarantines in effect that prohibit the movement of firewood and other ash wood materials outside the quarantined area. The quarantine area includes all of Boulder County and small portions of Jefferson, Weld and Larimer Counties to include landfills to facilitate movement of flood debris and EAB-infested material.
- *Detection Surveys:* City Forestry staff collaborated with the Canadian Forest Service, Colorado Department of Agriculture (CDA), United State Department of Agriculture Animal and Plant Health Inspection Service (APHIS), Colorado State University (CSU) Extension and forestry staff from nine nearby cities to complete an EAB delimitation survey within the city. EAB was detected in five of the thirty-eight square mile grids. Due to the flight ability of the insect and rate of spread, other parts of Boulder are likely infested at low pest populations.
- *Public Tree Inventory:* A tree inventory and asset management vendor was chosen and ash tree inventory updates were completed at the end of 2013. Information on the current condition class, tree diameter and recommended maintenance action was collected for green and white ash trees on public property under the jurisdiction of the Parks and Recreation Forestry Division.
- *Education/Outreach:* Education and outreach is a critical component of a municipal EAB response. Efforts were undertaken through city, county, state and federal agencies but many more are planned for 2014. Efforts since the pest discovery include:
  - News Releases: The CDA and city of Boulder have distributed four news releases since the initial detection.

- Websites: CDA has posted educational material about EAB on their website: www.EABColorado.com; a website was also created for Boulder specific EAB information at: www.EABBoulder.org.
- Tree Dissections: City Forestry hosted a series of EAB "tree dissections" to train over 175 foresters and arborists on EAB symptoms and branch peeling techniques.

- *Prohibition of imidacloprid:* The analysis of EAB pesticide options indicated that imidacloprid, a neonicotinoid commonly used for the control of EAB, posed a high risk to pollinators and other non-target organisms. Other products are available for EAB control that are significantly more effective over a longer duration and have fewer known environmental and non-target impacts. For these reasons, staff from the Urban Forestry and Integrated Pest Management programs recommended, and the city manager concurred, that the use of imidacloprid be prohibited for EAB control on city properties, including public street rights-of-way. A city manager rule was not required to support the prohibition as B.R.C. 6-6-5 (a) requires property owners gain permission from the city manager (designated to city forester) prior to applying pesticides to trees on public property. The city will also recommend to the public that imidacloprid products not be used for control of EAB on private property.

ANALYSIS

An analysis of the ash inventory updates, existing Forestry Division workload and the available EAB management options were completed for development of the 2014 EAB workplan.

Public Tree Inventory

Inventory information for ash trees in public street rights-of-way and in city parks was updated after the discovery of EAB in Boulder.

Number of public ash trees: The current tree inventory has 4,808 ash trees total with an appraised value of $15.4 million; 1,267 trees in city parks and 3,541 in public street rights-of-way. While the Forestry Division has not planted ash trees since 2003, ash is naturalized and many have seeded into natural areas in city parks or have been planted by adjacent property owners into street rights-of-way. Inventory data from 2002 indicated 5,615 ash trees in city parks and in street rights-of-way. Forestry staff has actively phased ash out of many locations and reduced the overall percent ash from 15.8% down to 12.6% over the past 12 years.

Tree diameter: Ash trees range in size from one to 48 inches in diameter with an average diameter of 12 inches.

Tree Condition: Tree inventory data indicated 80% of public ash trees were in good or fair condition while 20% were in poor condition. EAB has not yet impacted many public trees so the poor condition rating is due to other factors (i.e. environmental factors, other insect problems, etc.)

Maintenance Need: Ash tree maintenance need data was divided into three categories:

- Remove/Replace in 2014: 455 trees (9%);
- Phase Out as Trees are Infested: 3,150 trees (66%);
- Preserve Long Term (Treat): 1,203 (25%). The average diameter of ash trees in the Preserve Long Term/Treat category is 16 inches diameter.

Existing Forestry Division Workload
The Parks and Recreation Forestry Division manages approximately 38,000 trees in city parks and in street rights-of-way and administers the following programs: tree planting, tree safety inspections, commercial tree program, rotational pruning for trees in city parks and in public street rights-of-way, tree removal, integrated pest management, arborist licensing, emergency response, enforcement for tree protection codes and development review for park, transportation and private projects. Discussions with staff from cities in the Midwest indicate EAB is a high priority due to the large number of trees that will be impacted over the next decade, the documented rate at which EAB populations build and kill trees and the potential liability from the large number of standing dead ash trees. City Forestry services will be impacted and deferred maintenance will become an issue as staff time is diverted toward EAB as insect populations build over the next decade.

Control Options
Biocontrols
In Asia where EAB is native there are several important natural controls at work. Most important are defenses produced by trees which protect them from invading organisms common to the region, such as EAB. In addition, there are numerous natural enemies, notably various species of parasitic wasps. Together, the inherent resistance of Asian species of ash combined with the natural enemies very effectively limit EAB so that it rarely causes serious damage.

Host plant resistance is largely absent from the native North American species of ash which greatly undermines the potential of natural controls. However, there is research being conducted by federal agencies to identify parasites of the EAB present in Asia. Some of these have been found suitable for introduction and release into North America. Three of these introduced natural enemies have been released in EAB outbreak areas of the Midwest and in some cases they seem to have proved capable of establishing and reproducing.

This work with natural enemies is ongoing. The long term goal for natural enemies is to suppress EAB populations in the post-outbreak phase. If effective, they may allow for reduction in the need for pesticide treatments in the future and, possibly, allow some of the remaining native ash in the Midwest to survive without treatment.

The USDA Animal and Plant Health Inspection Service (APHIS) rears the EAB biocontrols at their Michigan facility. The local APHIS staff has applied for the permits necessary to release two biocontrols, both parasitic wasps, in Boulder later in 2014. APHIS considers Boulder to be a good candidate for introduction because it is still in the early stages of the infestation.

Pesticides
Since ash trees cannot survive an EAB infestation, the only option available to save the life of a tree is pesticide application. Research has shown that specific pesticide products are effective against EAB if used before trees are compromised by the pest and applied per label requirements. As local EAB populations decline due to death of untreated ash trees, it is likely that application frequency may be reduced in 12-15 years

The city of Boulder has an Integrated Pest Management Policy and any proposed action will be in compliance with the policy. Staff assessed four of the commonly used products using

documentation from the EPA, leading experts in EAB management and other regulatory agencies and open literature.

- TREE-äge (emamectin benzoate) – a "semi-synthetic" product derived from a soil bacterium that is a restricted use pesticide (may only be applied by a certified pesticide applicator). This product is only applied via tree injection.
- TreeAzin (azadirachtin) – a natural product derived from the seeds of the neem tree – certified for use under the USDA's National Organic Program. This product is only applied via tree injection.
- Safari (dinotefuran) – a neonicotinoid insecticide applied as a low pressure, lower bark spray
- Merit (imidacloprid) – a neonicotinoid insecticide that is commonly used for EAB treatments by injection or soil treatments. The city manager prohibited the use of this product on public property for EAB control.

Only two of the products that were evaluated will be used during the 2014 season - TREE-äge and TreeAzin. There are knowledge gaps about each of these products. The non-target impacts are well-studied for TreeAzin with favorable results, but information about its efficacy is limited. Forestry staff will test TreeAzin to determine if it is effective and the duration of its effectiveness (1 vs. 2 year control) for EAB control in the local climate. TREE-äge has demonstrated excellent efficacy in multiple studies. However, studies for impacts to non-target organisms are lacking. Staff is seeking partnerships and research opportunities to explore potential environmental impacts from TREE-äge. For 2014, TREE-äge will be applied to a limited number of trees with a targeted strategy. This product will continue to be evaluated as more information becomes available.

Pesticides are an important component of EAB management programs to preserve ash trees long term, spread the tree removal and replacement costs over a longer time period and to help reduce community wide EAB populations. EAB researchers used simulation models of EAB dispersal and population dynamics developed from numerous field studies in the Midwest to evaluate the effects of treating varying proportions of ash trees with the pesticide TREE-äge in residential neighborhoods. The simulation showed that if 20% of trees were treated annually, 90% of the trees (including untreated trees) would remain after ten years because of an area-wide reduction in EAB population growth. Results showed however, that without any insecticide treatment, all ash trees would be dead within ten years of the initial EAB introduction, a pattern consistent with mortality rates observed in many communities in southern Michigan and northern Ohio.

Criteria to determine whether ash trees are candidates for long term preservation include:

- Tree health and condition: Because the EAB larvae feed under the bark, the most effective pesticides are systemic insecticides. Systemic insectides are transported throughout the tree within its vascular tissues. Feeding by EAB larvae damages the tree's vascular system, as does damage from wounds and other pests. If the vascular system has been compromised the pesticide will not translocate and be effective.
- Tree defects: Ash trees in the Tree Safety Inspection program with poor structure or defects are not good candidates for preservation and will be phased out.
- Tree Size: The pesticides used are trunk injected. The injection process requires drilling small holes into the lower trunk to inject the product. Large, healthy ash trees have a better chance to close off wounds long term. Generally, ash trees less than 10" diameter will not be injected and will be phased out as they are infested due to reduced ability to

close wounds and the economics favor planting a replacement tree over treatment with pesticides long term.

- Location: If a tree has a poor location ((i.e. under power lines, causing hardscape damage, etc) it would not be considered for long term preservation.
- Irrigation: All systemic pesticides require water to be taken up internally within the tree. Ash trees must be in an irrigated site or the site requires easy access for tank watering prior to the application.

SLAM (SLow Ash Mortality)

Dr. Deb McCullough, a leading EAB researcher and member of the city EAB Research Advisory Group, developed protocols to lower overall EAB populations during early infestation utilizing a SLAM (SLow Ash Mortality) approach .The rate at which ash tree mortality advances during an EAB infestation is related to EAB density. Therefore, an over-riding theme within the SLAM approach is to reduce EAB numbers and the growth of EAB populations by concentrating and eliminating adult beetles and their progeny.

As outlier EAB populations build and coalesce, the area encompassing dead, dying and declining ash trees increases dramatically. A do-nothing approach means that EAB populations will build and advance unchecked. Under that scenario, extensive local tree mortality is likely to occur much sooner than under a SLAM management scenario. Applying a SLAM approach will not eradicate EAB, nor will it eliminate tree mortality. The goal of this management strategy is to slow the local invasion process and allow a more proactive approach rather than simply reacting to overwhelming numbers of dead, often hazardous trees.[1]

Enforcement

Existing city code allows city Forestry staff to enforce on private property owners with infested or diseased and/or dangerous trees (B.R.C. 6-6-2). City Forestry has enforced in past years for trees infected with Dutch elm disease and Thousand Cankers Disease of Walnut and for dangerous trees on private property that directly threaten public property. For EAB however, research from the Midwest indicates that active enforcement for infested trees does not substantially slow the progression of the pest due to the inability to keep up with progressively larger numbers of dying ash trees as the EAB population grows. Due to this research and the number of potential infested ash trees moving forward, city Forestry staff will not enforce on private property owners for infested trees.

Research also indicates that ash trees killed by EAB dry out and start to fail within a few years after tree mortality. City Forestry staff will enforce as needed for dead ash trees that threaten public property. It is anticipated that current staffing levels will not be sufficient to keep up with the enforcement of dangerous trees as the EAB population reaches the peak. The methodology for handling long term enforcement of dead ash trees on private property will be a topic for the EAB Interdepartmental Working Group.

NEXT STEPS

Staff used the results from both the updated public ash tree inventory and the delimitation survey in collaboration with the city EAB Research Advisory group to develop a city EAB 2014 Work

[1] Additional information on the SLAM protocols can be found at http://www.slameab.info/

Plan to respond to the infestation within the city and potentially slow the spread throughout Boulder and to nearby communities. Work items below will occur simultaneously.

EAB Interdepartmental Working Group

The EAB Interdepartmental working group has been formed and will meet over the next nine months with the goal of providing City Council with long term recommendations to manage EAB. Recommendations will be presented to City Council in a study Session in first quarter, 2015.

Focus areas for the workgroup include:

- Ensure consistent EAB management for ash trees in developed areas (streets rights-of-way, around public buildings and recreation facilities, in city parks);
- Management of EAB infested ash trees in natural areas;
- Research and coordinate with Community Planning and Sustainability's Development Review staff for possible code changes to facilitate EAB management;
- Long term wood debris plan;
- Assistance to private property owners;
- Downtown Sub-Area plan for phased removal/replacement of ash trees on Pearl St Mall and in Downtown area;
- Methodology for long term enforcement of dead ash trees on private property; and
- Discussion of impacts from loss of urban tree canopy.

Tree Removals / Tree Replacements

Seventy-five ash trees will be removed and replaced in spring 2014. An additional estimated 150 ash trees will be removed in fall 2014 and replaced in 2015. Planning for the eventual loss of ash tree canopy in the infested areas over the next several years, proactive tree planting will occur this spring in the ten city parks and facilities within the known infested area. Letters were mailed to property owners within portions of the known infested areas with good tree planting sites in the public street rights-of-way. The letter educated residents on the Forestry tree replacement program, the services provided by the urban tree canopy and offered to plant a tree into the right-of-way adjacent to their home. Ash trees will be replaced with a variety of tree species to ensure diversity in the urban tree population.

Education / Community Outreach

Extensive education and community outreach is planned for spring and summer, 2014. There will be a series of EAB open houses to inform the public on ash tree identification, EAB symptoms, approved pesticide treatment options for trees on public property, and assistance in determination of whether ash trees should and can be preserved.

The city website will be updated to reflect the most up-to-date information on EAB pesticide treatment options and Forestry staff will reach out to homeowner associations in the known infested areas to ensure access to information that will facilitate informed management decisions.

Forestry staff is continuing the collaborative partnerships with both the statewide EPIC (Emerging Pests in Colorado) workgroup and EAB Incident Command Team to develop and provide EAB educational material and trainings statewide.

Several stores and garden centers within Boulder sell (a) trees that can be planted as ash replacements; and (b) imidacloprid - one of the pesticide options. These stores are often a

primary source of information to residents about landscaping products and plant options for their yards. Staff will make contact with the stores within Boulder and provide information to distribute to the public about EAB, appropriate pesticide choices and ash tree replacement options. Information will also be provided about the prohibition of imidacloprid for EAB control on public property.

Pesticide Treatment

Parameters for TREE-äge and TreeAzin use will be reviewed by the IPM Program and the EAB Interdepartmental Working Group. The focus for pesticide applications in 2014 will be limited to those areas known to be infested with a goal to slow the spread of EAB within the city. TREE-äge and TreeAzin trunk injected products will be used to treat an estimated 270 ash trees. Pesticides will also be used to treat ash trees at Columbia Cemetery as part of a collaborative research project.

Trap Trees

Dr. Deb McCullough has recommended utilizing "trap trees" in Boulder. The methodology includes girdling lower value ash trees in May, 2014 within each of the known infested grid and treating public ash trees in the immediate vicinity with the pesticide, TREE-äge. Beetles will be attracted to the stressed (girdled) trees. Those trees will be removed and chipped in fall, 2014 to prevent those beetles from completing their life cycle. Additional beetles attracted to the area will be killed while feeding on ash trees treated with Tree-age.[2]

Collaborative Research

Colorado is the westernmost state with EAB. The weather patterns and ash tree growth differ from the Midwest where most EAB research has occurred to date. Several research projects are planned in Boulder over the next several years. Some initiated by city Forestry staff while others are in collaboration with CSU, USDA APHIS and the Canadian Forest Service (CFS).

2014 projects include:

- Testing a new EAB pheromone; initiated by Canadian Forest Service
- Testing new EAB trapping protocols; initiated by USDA APHIS
- Testing viability of degree day models to predict emergence of EAB in Colorado; Forestry staff in collaboration with CDA
- Research into effects of wounding from trunk injected pesticides on ash trees in Colorado (ash trees grow more slowly in Colorado and receive less rainfall than in Midwest so wounding may have bigger impact than elsewhere in US); Forestry staff in collaboration with CSU
- Research to determine feasibility of multi-year control with TreeAzin; Forestry staff in collaboration with CSU
- Measure amounts of certain pesticide products in ash leaves and pollen to determine potential impacts to non-target organisms; Forestry staff in collaboration with CSU.

Asset Management

[2] Additional information on trap trees can be found at http://www.slameab.info/wp-content/uploads/2010/05/SLAM_general.pdf

Forestry staff is working with Davey Resource Group to configure the TreeKeeper tree inventory and asset management software to manage public trees in Boulder. The software will be used long term to track not only EAB related maintenance but all tree maintenance for public trees in city parks and in street rights-of-way.

On-Going Monitoring

Because EAB was detected in only 5 of the 38 grids during the delimitation survey, on-going monitoring over the next several years is needed to track EAB progression through the city of Boulder.

- Forestry Annual Tree Health Survey: The focus of the 2014 survey will be to locate ash trees exhibiting symptoms of EAB throughout the city.
- Public Service Requests: Forestry staff will inspect symptomatic public ash trees at the request of adjacent property owners. Requests to look at private property ash will be directed to city of Boulder licensed certified arborists.
- Destructive sampling: All declining public ash trees removed in EAB non-detect grids will be sampled for the presence of EAB life stages.
- Branch sampling: Additional branch sampling will be conducted in fall, 2014 in EAB non-detect grids.
- Trapping: Several types of EAB detection traps will be deployed throughout Boulder in an attempt to detect its presence. Detection traps have not shown high success rates in the Midwest due to the absence of an insect pheromone lure but both the CFS and USDA APHIS want to conduct trapping experiments in Boulder as a leading edge of an EAB infestation.
- Rotational pruning: Tree care contractors conducting pruning on city Forestry contracts within the city will be looking for signs of EAB infestation when working in ash trees.

Research Additional Funding Opportunities

Staff is working with state and federal agencies to identify potential funding sources to assist with some of the anticipated funding impacts of the EAB management efforts, as well as the development of a comprehensive Urban Forest Master Plan that would help guide the long-term management of both the EAB outbreak and the city's larger community forestry program.

Community Planning and Sustainability/Planning and Development Services Department Calendar

May 2014

Amended: May 7, 2014

Last Planning Board Meeting: May 1, 2014

Mon	Tue	Wed	Thu	Fri
Apr 2014 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 Jun 2014 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30			1 **PB Meeting, 6pm in CC** **A.Brockett absent** *Density ROW/valuation code change (K. Guiler) *2200 Broadway Trinity Commons (McLaughlin)	2
5 **DMC Mtg, 5:30 p.m., CC**	6 **CC Meeting, 6 p.m. in CC** *IP: Update on the Boulder Energy Challenge Grant Program (Jamie H) *IP: Potential Call-Up for Vacation of Utility Easement at 3584 Kirkwood Place (Jonathan W.)	7 **BJAD, 9 am., CC** **LB, 6 p.m. in CC**	8 **BOZA Meeting, 5 p.m. in CC**	9
12	13 **CC SS, 6 p.m. in CC**	14 **BDAB, 4 p.m. in 1739 Broadway, 401 Conference Rm.** **EAB 6-8pm, 1777 West Conference Room** *IPM and Emerald Ash Borer(R.Abernathy, K.Alexander) *Resilience (B.KenCairn)	15 **PB Meeting, 6pm in CC** **C.Gray absent** *Pennsylvania Ave. Flood Repair Info Item (K. Knapp) *Resilience Update (L. Ellis) *Comprehensive Housing Strategy (J. Sugnet) *Inclusionary Housing 101 (M.Allen)	16
19 **Board and Commission Orientation, 6-8pm in CC**	20 **CC Meeting, 6 p.m. in CC** *1st reading Trinity Commons Ordinance (Elaine M) *1st reading Density ROW/Valuation Code Changes (Karl G) *1st reading Ordinance for Landmark Lofts Phase II Deed of Vacation (Elaine M) *Chautauqua Auditorium Restrooms Approval (Jeff H) *North Boulder Subcommunity Plan (Jeff H) *IP: Civic Area Plan Update (Paul L) *IP: Update on the Mosquito Control Program (Rella A) *IP: Potential Call-up for Trinity Commons (Elaine M)	21 **UHCAMC, 9am, Grace Lutheran Church**	22	23
26	27 **CC SS, 6 p.m. in CC** *Comprehensive Housing Strategy (Jay S) *East Arapahoe SS&c - Envision East Arapahoe (Lesli E)	28	29	30

June 2014

Mon	Tue	Wed	Thu	Fri
2 **DMC Mtg, 5:30 p.m., CC**	3 **CC Meeting, 6 p.m. in CC** *2nd reading Ordinance for Landmark Lofts Phase II Deed of Vacation (Elaine M) *2nd reading Trinity Commons Ordinance (Elaine M)	4 **BJAD, 9 am., CC** **LB, 6 p.m. in CC** **EAB 6-8pm, 1777 West Conference Room** *Climate Commitment (B.KenCairn) *Energy/Climate Commitment/Env. Outreach strategies & Sustainability Survey results (S.Huntley/C.Crouse)	5 **PB Meeting, 6pm in CC** **B. Bowen absent** *SE Corner of 30th & Pearl Concept Plan (McLaughlin) *2550 Canyon Site Review (McLaughlin) *AMPS near term strategies and new TDM toolkit (J. Sugnet)	6
9	10 **CC SS, 6 p.m. in CC**	11 **BDAB, 4 p.m. in 1777 West Conference Room**	12 **BOZA Meeting, 5 p.m. in CC**	13
16	17 **CC Meeting, 6 p.m. in CC** *2nd reading Density ROW/Valuation Code Changes (Karl G)	18 **UHCAMC, 9am, CC** **Begin CC Recess**	19 **PB Meeting, 6pm in CC** **L.Payton absent** *Pennsylvania Ave. Flood Repair Hearing Item (K. Knapp) *TMP Draft Plan and Recommendation for Adoption (Rutsch)	20
23	24 **CC Recess**	25 **EAB 6-8pm, 1777 West Conference Room** *Local Food (L.Kolb) *Mid-year schedule check-in (B.KenCairn)	26 **PB Recess**	27
30				

May 2014

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Jul 2014

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July 2014

Mon	Tue	Wed	Thu	Fri
Jun 2014 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	1 **CC Recess**	2 **BJAD, 9 am., CC** **LB, 6 p.m. in CC**	3 **PB Recess**	4
7 **DMC Mtg, 5:30 p.m., CC**	8 **CC Recess**	9 **BDAB, 4 p.m. in 1777 West Conference Room**	10 **BOZA Meeting, 5 p.m. in CC**	11
14	15 **CC Meeting, 6 p.m. in CC**	16 **UHCAMC, 9am, CC**	17 **PB Meeting, 6pm in CC** *Bike Parking changes (M. Ratzel) *Flood and Transportation 101 (E. Stafford) *Short term parking code changes (K. Guiler)	18
21	22 **CC SS, 6 p.m. in CC**	23	24	25
28	29 **CC SS, 6 p.m. in CC** *Climate Commitment (Brett K/Lesli E) *Zero Waste Strategic Plan (Jamie H.)	30	31 **PB Meeting, 6pm in CC** *2015-2010 CIP *East Arapahoe/SS&c Draft Vision and Scenarios	Aug 2014 S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

August 2014

Mon	Tue	Wed	Thu	Fri
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4 **DMC Mtg, 5:30 p.m., CC**	5 **CC Meeting, 6 p.m. in CC** *1st reading Short-term Parking Code Changes & Bike Parking (Karl G)	6 **BJAD, 9 am., CC** **EAB 6-8pm, 1777 West Conference Room** **LB, 6 p.m. in CC**	7 **PB Meeting, 6pm in CC**	8
11	12 **CC SS, 6 p.m. in CC**	13 **BDAB, 4 p.m. in 1777 West Conference Room** **CU/City Oversight Group Meeting, 4 - 5:30 p.m., ATLAS Building CU Campus - Executive Board Room #229, 1125 18th St.**	14 **BOZA Meeting, 5 p.m. in CC**	15
18	19 **CC Meeting, 6 p.m. in CC**	20 **UHCAMC, 9am, Grace Lutheran Church**	21 **PB Meeting, 6pm in CC** *NoBo Subcommunity Plan Update	22
25	26 **CC SS, 6 p.m. in CC** *BVCP Scoping and Resilience (Lesli E)	27	28	29