

Monitoring and Managing Ash (MaMA) in LHPRISM: a platform to incorporate the search for EAB-resistant ash into an overall ash management strategy

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Overview

This document constitutes the final report by the Ecological Research Institute, on its 2019 project ***“Monitoring and Managing Ash in LHPRISM: A Platform for Citizen Science and Land Manager Engagement and a Source of Hope in the Fight Against Emerald Ash Borer”***. In it, we describe the project’s activities and outcomes and make recommendations for future work to build on what has already been accomplished.

Project funding was supplied by LHPRISM specifically to hold training workshops on ERI’s Monitoring and Managing Ash (MaMA) program, with each of these workshops but one to feature the establishment of an ash mortality monitoring plot that would be included in ERI’s MaMA Monitoring Plots Network, which extends through much of New York and beyond. In direct fulfillment of the project’s obligations, workshops were held at nine locations spread throughout much of the LHPRISM region and monitoring plots were established at the sites of eight of the nine workshops, as part of the training. As discussed below, workshop participants went on to set up additional such plots on their own, so that a total of 10 new ash mortality monitoring plots were established in the LHPRISM region in 2019.

In addition to the activities contractually required for and funded by this project, we also conducted the following activities to complement the workshops and help translate the training into lasting conservation impact: using the data from MaMA’s citizen-science project, in combination with EAB detection history data supplied by New York Department of Environmental Conservation Forest Health and research data from the US Forest Service to create a georeferenced Catskills/Lower Hudson MaMA Action Map (covering the entire CRISP region and most of the LHPRISM area, with the map development funded by CRISP) which indicates the high priority tasks (including searching for lingering ash and potential lingering) and making this map available through a web page (www.monitoringash.org/catskills/).

Each of the nine LHPRISM-funded workshops was hosted by one or more institutions that partnered with us for this project. A total of 157 participants attended the workshops, including representatives of 46 institutions, as well as high school and college students, private landowners and other members of the public who could potentially use the training to participate in MaMA’s citizen-science projects or apply MaMA’s lessons in ash conservation and EAB management to their own management and conservation efforts. Its achievements to date provide a solid foundation for additional progress and even broader participation in 2020, further facilitating ash conservation and EAB mitigation throughout the PRISM.

Background: *Monitoring and Managing Ash (MaMA)*

The Ecological Research Institute’s program *Monitoring and Managing Ash (MaMA)* provides an innovative framework that promotes undertaking particular tasks at each stage of emerald ash borer (EAB) invasion in order to achieve EAB mitigation and, even more importantly, to advance long-term conservation of native ash. Such conservation can be advanced by locating “lingering ash”, i.e., rare naturally occurring trees (of each native species) that remain healthy at least two years after 95% of the rest of the nearby mature ash have been killed by EAB (which, as ERI has shown, is the same point in time reached four years after 50% of the ash have been killed); the USFS has shown that some such trees have heritable EAB resistance, and scion from them can be used in a relatively rapid propagation and selective breeding program to yield highly resistant native ash.

The hope provided by lingering ash provides the basis for MaMA’s positive message, that everyone can still take important steps to help conserve ash, no matter what stage EAB infestation has reached in their area (and even before infestation has occurred). However, the promise offered by lingering ash means that it is crucial that enough living ash trees be left standing rather than proactively felled, as the detection of lingering ash requires both allowing some trees to decline and die (to determine when mortality thresholds are reached) as well as having sufficient numbers of standing, living trees that some are likely to turn out to be lingering ash (which typically are quite rare). Therefore, imparting the message that live ash should not be cut unless there is a compelling reason (hazard tree removal, economic necessity, etc.) has become a core component of the MaMA program in general, and in workshop presentations in particular. This is needed to counter the widespread advice to proactively cut trees in order to slow EAB spread (in fact it accelerates it) or to realize timber value before the trees are killed. Since there is the widespread perception that nothing can be done to save ash, often people see no reason to leave any live trees standing.

ERI has developed the MaMA program in close collaboration with two of the USFS scientists leading the efforts for ash conservation, Dr. Kathleen Knight and Dr. Jennifer Koch, who together have pioneered methods to identify lingering ash and select for EAB resistance. In particular, we have taken their methods for lingering ash detection and modified them to make them accessible for citizen scientists while still retaining their rigor. This close cooperation and coordination is maintained on an ongoing basis. Moreover, ERI analyzes the relevant data contributed to its citizen science projects to determine which areas are ready to be searched (based on reaching particular mortality thresholds) for lingering ash.

MaMA’s framework provides the foundation for locating and protecting lingering ash trees while integrating this into an overall program that takes account of various land management goals and constraints (see Fig. 1).

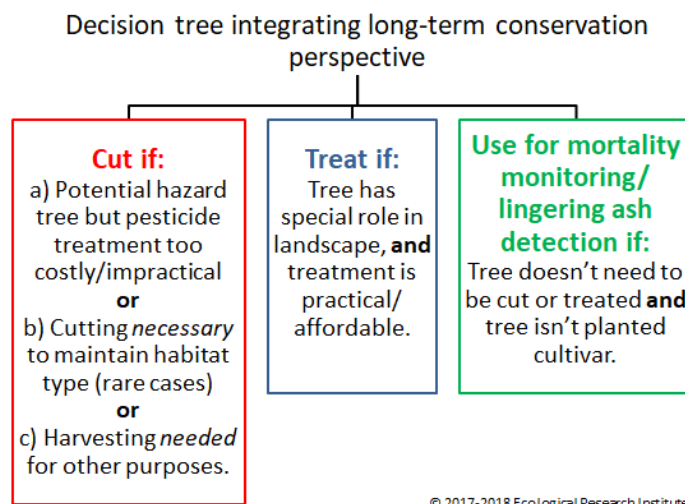


Fig. 1. MaMA’s management approach takes into account local needs as well as actions needed to ensure long-term conservation and restoration

Implementing the MaMA framework requires engagement by well-informed citizen-scientists, land managers, forestry professionals and natural resource agencies and organizations; this is made possible

by its outreach activities and materials as well as its four distinct citizen-scientist/land manager-driven data reporting projects (hosted on the Anecdata.org citizen science platform). Information on these projects; other materials (e.g., decision tree) we have designed to guide ash management; background materials on relevant topics (e.g., ash identification, EAB-resistance breeding); and links to tools (e.g., cost calculators) are available at our MaMA program website www.MonitoringAsh.org. Here, we briefly describe the three citizen-science projects we have constructed on the Anecdata.org platform:

MaMA Ash/EAB Surveys (<https://www.anecdata.org/projects/view/316>). In this project, the observer documents the presence/absence of evidence of EAB infestation and EAB-induced mortality at a site having ash trees. Its purpose is to fill information gaps regarding the distribution of EAB.

MaMA Monitoring Plots Network (www.anecdata.org/projects/view/319). To assess EAB-induced ash mortality levels, which is necessary for appropriately timing the local search for lingering ash, ERI has developed this network of plots, each of which must cover at least 0.5 acres, and have at least 40 native ash that have not been chemically treated against EAB, are at least 10 cm dbh and are unlikely to be cut down while living (even if dying). This network extends through much of NY and as far east as Vermont and west as Illinois and continues to expand rapidly. While establishing a plot (which can only be done during the June-September field season), data are collected on tree location, crown health and whether or not each tree has evidence of EAB infestation. Living trees (which get tagged) are included along with trees that have been killed by EAB. Data has to be collected and reported once yearly until either the 50% mortality level is reached (for relatively recently invaded sites) or the 95% threshold has been reached (for long invaded sites). Reaching the 50% threshold triggers the onset of a four-year waiting period until the search for lingering ash in the nearby area; the 95% threshold triggers such a search two years after it has been attained. These thresholds and waiting periods were developed by the USFS (95% + 2 years) and ERI using USFS data (50% + 4 years) based on ash mortality trajectories.

MaMA Lingering Ash Search (www.anecdata.org/projects/view/320). Participants can submit reports of lingering ash only after an area has been determined to be eligible based upon its having reached one of the mortality thresholds and completed its associated waiting period. However, potential lingering ash (ERI's term) comprise healthy trees occurring in areas where most of the ash are either dead or dying. These trees can also be reported via this project; follow-up to determine whether the trees are still healthy then occurs at a later date, when their area has reached the point where it's ready to be searched for lingering ash.

Monitoring and Managing Ash (MaMA) training workshops in the LHPRISM

The present project aimed to promote implementation of MaMA throughout the LHPRISM region, to spread the word out about what should and should not be done to counter EAB and conserve ash at each invasion stage and even pre-invasion, and to train attendees in how to collect and report data for MaMA's citizen-science projects. In choosing workshop sites and hosting organizations we sought to not only have the trainings spread across the region but also to partner with entities that could reach audiences likely to translate the training into action. Because the funding of the present project was specifically allocated for workshop preparation and presentation, we focus on that for the remainder of this report.

We presented a total of nine training workshops at the following locations across the region, with the host organizations indicated in parentheses:

- Katonah (Bedford Audubon Society);
- Millbrook (CCE Dutchess County and Cary Institute of Ecosystem Studies);
- Otisville (CCE Orange County);
- Kingston (CCE Ulster County);
- Carmel (Green Chimneys/Clearpool Model Forest);
- Minnewaska State Park (Office of Parks, Recreation and Historic Preservation);
- New Paltz (New Paltz High School);
- Ossining (Teatown Lake Reservation);
- Poughkeepsie (Vassar College)



Fig. 2. Workshop hosted by Green Chimneys/Clearpool Model Forest.



Fig. 3. Workshop hosted by Bedford Audubon Society.



Fig. 4. Workshop hosted by CCE Ulster County.



Fig. 5. Workshop hosted by CCE Orange County.

These were attended by a total of 157 people, including representatives of NGOs, government agencies, and cooperative extension units; forestry professionals; private landowners, and other members of the public (list of all participating institutions is in Appendix 1). Contact information was recorded for all attendees, except for the student attendees at the New Paltz High School workshop (as we are communicating with that group of participants through their teacher; see attached letter), enabling us to maintain ongoing communication with them regarding MaMA program developments. The workshops introduced participants to all three of MaMA's citizen science projects (MaMA Monitoring

Plots Network, MaMA Ash/EAB Surveys, MaMA Lingered Ash Search), described the steps to be taken at each stage of EAB invasion (including pre-invasion), and most importantly explained how the search for lingering ash fits into an overall framework for ash management and EAB mitigation. These workshops also made participants aware of particularly helpful management tools and trained them regarding ash identification, tree canopy health assessment, and recognition of signs of EAB infestation.

Establishment of MaMA Monitoring Plots Network plots

At eight of the training workshop sites (all except Kingston, for which a plot is not necessary, as we already know the mortality level from plots we previously established), MaMA Monitoring Plot Network plots were established and initial data collected as part of the workshop (for the one at New Paltz High School, initial data collection will be done by workshop attendees as follow-up in June 2020 as it was not possible to be done in 2019 due to the school calendar). In addition to the eight plots established as part



Fig. 6. Field training at Vassar College Ecological Preserve, Poughkeepsie.



Fig. 7. Field training at Cary Institute of Ecosystem Studies, Millbrook.



Fig. 8. Teatown Lake Reservation, Ossining.



Fig. 9. Field training at Minnewaska State Park.

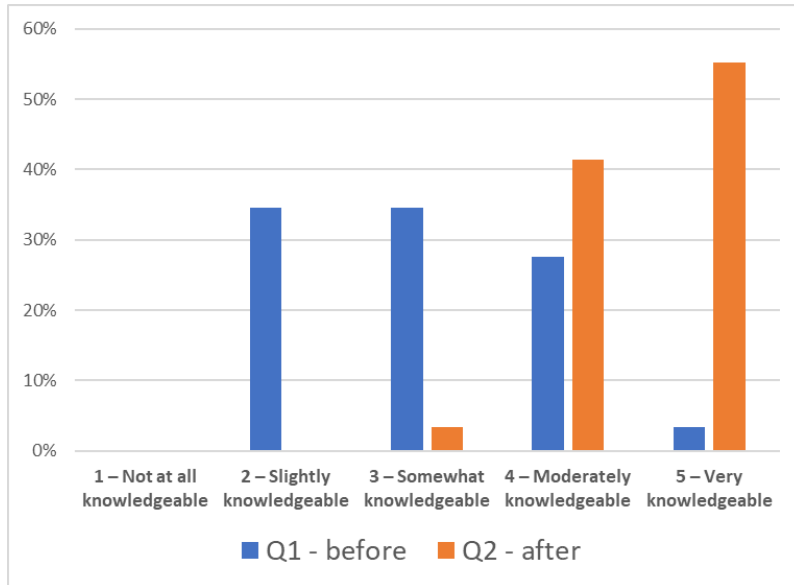
of the training sessions, another two MaMA Monitoring Plots Network plots was established in the LHPRISM region by a workshop attendee on his own.

Post-workshop survey

To assess the efficacy of our workshops, we invited attendees to participate in an online survey posted on SurveyGizmo.com. It comprised the following questions, with the responses shown graphically:

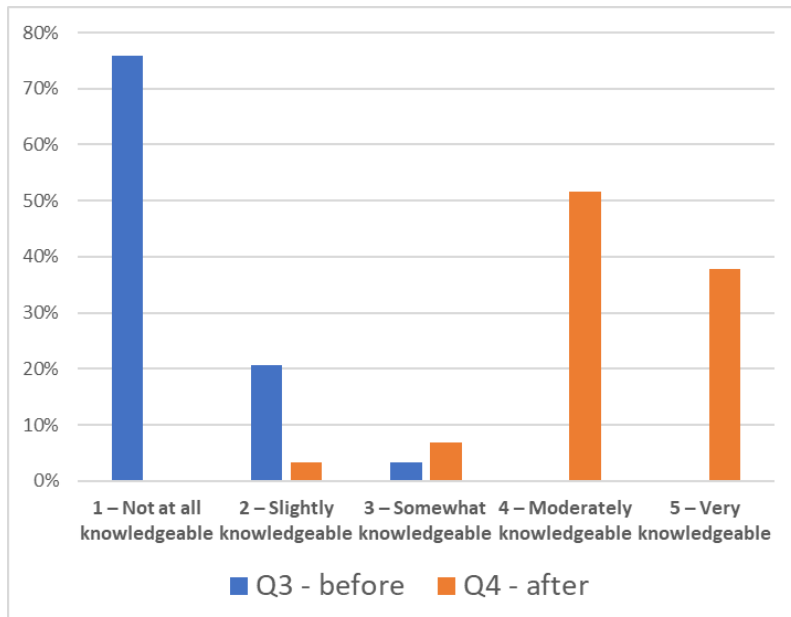
Q1. Before this workshop, how knowledgeable were you about EAB and responses to it?

Q2. After this workshop, how knowledgeable are you about EAB and responses to it?



Q3. Before this workshop, how knowledgeable were you about lingering ash and how they can be used for ash conservation and restoration?

Q4. After this workshop, how knowledgeable are you about lingering ash and how they can be used for ash conservation and restoration?



Q5. Do you intend to keep an eye out for lingering ash or potential lingering ash, and if you find any, reporting them via the MaMA Lingering Ash Search project?

YES - 93%

Q6. Are you responsible for the management of any ash trees?

YES – 44.8%, NO – 55.2%

Q7. If you manage ash, will anything you learned in this workshop affect how you manage them?

YES – 92%

Based upon these responses, as well as communication with participants after the workshops, we are convinced that the workshops were highly successful. Post-workshop communication with attendees has included multiple instances in which we have been asked to do additional workshops hosted by other organizations with which participants were affiliated (e.g., NYS DOT; Caramoor; Hudson-to-Housatonic). We have also been frequently consulted by attendees with questions regarding EAB and ash management. Also, in addition to the monitoring plots established in the LHPRISM region, EAB presence/absence data was reported via our MaMA Ash/EAB Surveys project from 20 locations either in or directly adjacent to (and thus relevant for) the LHPRISM region. Validating data from such reports (as well as the monitoring plots) also represents ongoing participation with program participants, helping to maintain their engagement.

Directly flowing from our workshop presented at CCE Dutchess County (indoor portion) and Cary Institute of Ecosystem Studies (outdoor portion), we were invited to submit an article to the Northern Dutchess News (Aug 7-13, 2019), which has further raised the profile and awareness of the MaMA program in this portion of the LHPRISM region. This complements the attention that the MaMA program has received at the state (e.g., NYS DEC website), multi-state (e.g., FEMC – Forest Ecosystem Monitoring Cooperative; Forest Connect) and national (e.g., NAISMA conference; EAB University) levels

Future directions

We recommend the following actions be undertaken in 2020 to enable MaMA to further advance ash conservation and EAB mitigation in the LHPRISM region:

1. Establishing more MaMA Monitoring Plots Network plots. The locations of existing plots should be taken into account in determining where to aim to place plots in the upcoming field season, such that the new plots will be most informative and reach additional audiences.
2. Continued data collection for the MaMA Monitoring Plots Network plots project. All already-established monitoring plots that have not yet reached the relevant mortality thresholds will need to have their tree health, EAB infestation status, and mortality assessed once during the June-September field season.
3. Expanded participation in the MaMA Ash/EAB Surveys project. Participation in the MaMA Ash/EAB Surveys project should be promoted for those areas where EAB has not yet been detected; the importance of this citizen-science project has increased as detection effort by agencies has been scaled back.
4. Maintaining communication with MaMA's 2019 partners and workshop participants. This communication should be aimed at both promoting further participation in MaMA's citizen science projects and – perhaps even more importantly – integrating a long-term ash conservation perspective

into ash and EAB management such that sufficient numbers of healthy, mature ash are left standing to enable eventual lingering ash detection in the region. Beyond showing partners and workshop participants that their time, interest, and efforts are valued, the communication would inform (and remind) them of the relevant tools and resources not only for participation in MaMA's projects, but in achieving ash conservation through informed decision-making.

Additionally, it's important that messages take account of the big picture, both in terms of the fight against EAB and the competing demands upon land managers. Thus, to encourage participation, updates on the overall progress of the MaMA program as well as other efforts against EAB should be shared, and the ways to integrate lingering ash detection into overall timber management should be emphasized.

5. Presenting additional workshops. It would be helpful to have a small number of additional workshops where the need for them has been expressed.

6. Developing educational materials to enable some MaMA monitoring plots to be used as demonstration plots. Four of the plots in the CRISP region have been designated by us as demonstration plots, with their tree health and mortality data prominently featured; of these plots, we have already designed site-specific educational signage for two of them. We believe it would be very helpful to similarly designate demonstration plots in the LHPRISM region and developing associated materials for them.

7. Updating all outreach materials. This is necessary on a continuous basis, to reflect new information and developments.

9. Data management, validation, and analysis. These tasks, along with project coordination are also being done on a continuous basis by ERI.

10. Ongoing collaboration with partner agencies and NGOs.

Appendix 1.

Institutions that participated in the LHPRISM MaMA workshops:

Audubon	Mountain Tree Care
Bedford Conservation Board	New Paltz high school
Bellantoni Landscape	New York State Parks, Recreation & Historic Preservation
CCE Dutchess	North Salem Open Land Foundation
CCE Orange	NYS DEC
CCE Putnam	NYS DEP
CCE Rockland	NYS DOT
CCE Ulster	Pound Ridge - Conservation Board
Dutchess Land Conservancy	Pound Ridge Land Conservancy
Ecological Analysis, LLC	Rye Nature Center
Green Chimneys and Clearpool Model Forest	SavATree
Hazon	Scenic Hudson
Highlands Repellent	Shade Tree Commission - City of Poughkeepsie
Hudson Highlands Land Trust	Teatown Lake Reservation
Hudson River Estuary Program	The Environmental Cooperative, Vassar
Joy of Gardening	The Fresh Air Fund
Master Gardeners and Master Naturalists	TIP - PR
Mianus River Gorge	Vassar College
Mill Brook Preserve, Inc.	Wallkill Valley Land Trust
Millbrook Garden Club	Watershed Agricultural Council
Millbrook Golf and Tennis Club	Westchester County
Mohegan Woodlands	Westchester Teatown Tramps, NY/NJ Trail Conference
Mount Kisco CAC / Tree Board	Woodstock Environmental Commission