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Building social networks to capture synergies in wood-based energy production and invasive pest mitigation

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Abstract

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Keywords

Natural Resources Ecology and Management, Bioeconomy and energy

Disciplines

Entomology | Natural Resources Management and Policy | Oil, Gas, and Energy | Wood Science and Pulp, Paper Technology



Building social networks to capture synergies in wood-based energy production and invasive pest migration

Abstract: This project makes a variety of policy recommendations for cities and the private sector to help deal with the consequences of emerald ash borer infestations.

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\$38,368 for year one
\$38,168 for year two

Q How well prepared is Iowa for the onslaught of the emerald ash borer that may decimate the populations of one of the state's most prominent trees?

A A tailored management approach, taking into account the business make-up of cities and the variations in local business networks, is likely to have greater success in terms of preparing cities for EAB than adopting a "one size fits all" approach.

Background

The Iowa Department of Natural Resources (IDNR) estimates that 15-20 percent of all trees in Iowa communities are green ash. In addition, outside of Iowa's urban areas the Iowa Department of Agriculture and Land Stewardship estimates there are more than 50 million ash trees in bottomland and upland forests. The IDNR (2013) has estimated a lower bound cost of Emerald Ash Borer (EAB) in urban contexts at around \$2.56 billion (which includes removal costs, tree replacement costs and lost amenity value). These costs will be distributed across public agencies and private homeowners who will be forced to remove and dispose of trees on their own properties.

At present, there are no comprehensive strategies for addressing the overwhelming costs associated with managing the spread of Emerald Ash Borer in Iowa. The project goal was to analyze the nature of effective partnerships and business networks in Iowa to support sustainable land management activities and economic opportunities that capture value in low-quality woody material, and specifically Emerald Ash Borer-infested wood.

Approach and methods

This EAB research includes four components:

1. Analysis of current policies and programs that structure, in part, current management and response efforts;
2. Evaluation of stakeholder interests and social networks surrounding wood utilization and EAB response and management;
3. Development and delivery of collaborative workshops to encourage social learning and innovation; and
4. Design of online information venues to strengthen relationships, encourage sustained engagement, and provide other communities in Iowa with access to continued policy analysis and network suggestions.

Results and discussion

The policy analysis segment of this project noted a number of internal issues within the Iowa EAB Readiness team regarding communication challenges and role delineation. Organizations represented in the Iowa EAB Readiness Team include ISU Extension (forestry and entomology), the IDNR, USDA Forest Service, USDA Plant Protection and Quarantine, and USDA Animal and Plant Health Inspection Services. Given the way in which EAB affects ash trees (the pest reproduces for a number of years, then attacks and kills a host tree in a relatively short time frame) and the unpredictable movement pattern of EAB (including the fact that it is a relatively recent pest to Iowa; first identified presence in 2010), the time spent managing EAB will only increase. In addition to the call for additional EAB monies (echoed by all respondents), there was a call for creation of a new, full-time state-level position that deals solely with EAB-related management efforts. Having a single individual focused on the general management for EAB could partially free up existing team members from this duty and may create an opportunity for more effective damage mitigation in the long run. This is especially relevant as more invasive pests and diseases will threaten the Iowa landscape over time.

One of the expected outcomes of EAB is that it is apparent that businesses and city entities will be looking to form new ties with businesses to share workload or otherwise collaborate for the mutual benefit of both parties. This includes partnerships between businesses, between city staff (across different city offices – e.g., Parks and Recreation, City Hall, Waste Management, etc.) and businesses, and between neighboring cities. These collaborations can take the form of coordinated contracts for large jobs (tree removal, replanting, disposal, end-use designation for waste materials), gathering/disseminating information about EAB spread and various tactics of pest mitigation and material handling, and potentially sharing of equipment.

There are obvious central leaders in each private and public stakeholder group (identified by the total number of connections in the social network associated with remediation efforts like this), and these entities are likely preferential collaborators with others on a variety of issues (sharing information, equipment use, contracts, etc.). This hopefully will could result in cities with collaborations already in place to be able to respond to EAB quickly and efficiently.

Interestingly, the remediation stakeholders (e.g., tree services) act on the “periphery of the network,” meaning that their interaction with the larger whole is somewhat limited, and this group is not as likely to collaborate on various issues as are more central figures (such as the advisory group). This is problematic as these tree services will be directly responsible for much of the ash tree removal in the community. In addition, wood utilizers appear to have some fairly central actors who could facilitate opportunities for alternative wood use. As of yet, they are not closely tied with the remediators who will be handling the wood waste initially. This latent inefficiency could confound the emergence of beneficial (higher value) end-uses of ash material. The possible outcome is that ash may become a costly waste disposal issue and not a synergistic, value-added material.

The number of business adaptations in the case study cities (Dubuque, Burlington and Iowa City) indicates that these cities already were responding to EAB in fairly

dynamic ways at the time of the project survey. Thus for these cities, the response to EAB has the potential to be relatively efficient. As EAB continues to move westward in the state it will be imperative for city governments to recognize the inevitability of EAB (sans new chemical-biologic discoveries for treatment) and to enhance their ties to neighboring communities as well as the private entities (tree services, nurseries) that will manage many of the more costly activities (tree removal, initial material handling, re-vegetation, etc.). It may well require a dedicated “EAB official” to coordinate these efforts.

Conclusions

In order to provide for best management, the interactions of the Iowa EAB readiness group were analyzed to determine the effectiveness of their strategies. Understanding of the team’s dynamics and power structures, as well as their interactions with local-level stakeholders, provides basis for effective management not just of EAB, but future pests that threaten the state. Although readiness team members cooperate well with one another to a large degree, issues involving mistrust and communication, as well as varying degrees of role overlap were observed.

Adding to this, local-level stakeholder interactions and adaptations surrounding EAB were documented to better understand the way local communities will handle a full-fledged pest invasion. To a great extent, the way that these tree management and end-use entities communicate and collaborate will determine pest management outcomes at the local level. The knowledge of these formal and informal networks will aid in management at this scale, as city officials and natural resource managers can use this information to better allocate funding, workload and resources for maximum damage mitigation and recovery.

The investigators created a new metric for measuring overall stakeholder preparedness for EAB (new business adaptations). They found that public-sector entities in these communities generally are preparing for EAB; the private sector is preparing as well, but to a lesser degree (roughly half as much). Additionally, the researchers determined that public-sector stakeholders likely would not be able to handle the rising workloads as EAB becomes fully established in a community, and they will rely on contracts with the private sector to adequately mitigate damages.

Social network analysis showed that some businesses in the private sector are tied into community stakeholder networks by only one other stakeholder or “actor.” These businesses may prove crucial in a post-EAB situation (assisting with cleanup and replanting), but may find it difficult to secure contracts or otherwise capitalize on the influx of woody material if they aren’t well connected

The researchers recommend that the information from the study be used to plan for pest impact at both the state and local level and to generate policy that encourages stakeholder engagement and collaboration. Additionally, they suggest that future research be conducted on the after-effects of pest infestation given existing stakeholder networks; how effectively were damages mitigated by the current networks?

Impact of results

Working with the Iowa EAB Readiness Team, this research will form the basis for modest, but effective policy reform designed to make the policy side of EAB management function more efficiently. Recommendations will be made to shore up communication lapses, and better delineate agency roles largely via creation of a dedicated EAB coordinator position at the state level. This policy review has the potential to encourage a more structured approach to coordinating information and governmental assistance at the state level but also provides a realistic view of how the social system surrounding EAB likely will respond.

The diversity of stakeholder networks (e.g., interactions between stakeholders) seen among the three communities in the case studies, and the marked variance among businesses and other groups, suggests that a “one size fits all” state-level approach to management likely will be less successful than targeted management. A tailored management approach, taking into account the business make-up of cities and the variations within local business networks is likely to have greater success in terms of preparing cities for EAB. Targeted communication to a few key individuals may go a long way toward diffusing information throughout the entire network, as well as facilitating further collaboration among city employees and private-sector entities.

Managers also should look to facilitate collaborative efforts between the remediation (tree services) and utilization (wood products) groups to provide an outlet for excess woody materials from tree removals. This will reduce the strain on city waste managers for whom it may be costly to dispose of these materials. From previous discussions with city foresters in Iowa, researchers know there are existing problems with disposal of woody material in urban areas, including illegal dumping and other cost-avoidance practices. Typically, wood from urban trees is chipped and/or whole logs are disposed of by any means necessary. This may mean distributing chips for landscaping, dumping slash at the local waste disposal site (usually for a fee), or stacking logs on the private property of the tree service or city entity performing the removal.

Although this may have worked in the past on a small scale, the unprecedented level of waste removal Iowa cities will face in the next five to 10 years, as well as the sensitive nature of the material from a legal standpoint (businesses likely will deal with one or more quarantines at both the local and state level), will force a new approach to urban waste wood management. Those in the wood products and wood byproducts sectors may not realize that they, too, could have a role to play, and indeed there were very few cases where respondents intended to use ash wood for something other than waste. However, other states (Illinois, for example) that have dealt with wood waste have shown that there is a niche to be occupied by these industries. A useful amount of low-quality wood material could be produced for the firewood, wood chip or animal bedding industries.

Education and outreach

As part of this project, Jesse Randall updated three ISU Forestry Extension publications:

- “Kiln Drying of Lumber”, F-328,
- “Grading Hardwood Lumber”, F-307, and
- “Air and Solar Drying of Hardwood Lumber”, F-303.

The team also developed and circulated among workshop participants a “Wood Utilization Workshops: Report and Summary, 2012” that summarized the results of a wood utilization workshop series (April 18-20; Dubuque, Iowa City, Burlington).

Two journal articles on EAB and invasive pest management are being prepared for Small Scale Forestry and Urban Forestry and Urban Greening. A master’s thesis (“Analysis of adaptive capacity and governance surrounding an invasive pest, the Emerald Ash Borer, in Iowa”) based on the project was completed in summer 2014.

Presentations on the project were made at the

- 18th International Symposium on Society and Resource Management, Edmonton, Alberta, Canada, June 2012;
- Society of American Foresters 2012 National Convention, October 2012, Spokane, Washington; and
- Resilience 2011: Second International Science and Policy Conference, March 2011, Arizona State University, Tempe, Arizona.

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No additional funds were leveraged by this project.

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