

Human Dimensions Research Around the Invasive Species of Emerald Ash Borer and the Native American Cultural Keystone Species of Black Ash

John J. Daigle, Professor,
School of Forest Resources,
University of Maine, Orono
jdaigle@maine.edu

Darren J. Ranco,
Associate Professor,
Department of Anthropology,
University of Maine, Orono

Marla R. Emery,
Research Geographer,
US Forest Service
Northern Research Station,
Burlington, VT

Human dimensions research can help assess, monitor, and evaluate the effectiveness of forest planning and management. In the case of invasive forest pests impacting the health of our forests there are a number of research needs to better understand the socio-ecological relationships. On one hand, humans act as negative agents such as campers transporting infested firewood and on the other hand, humans act as positive agents such as willingness of a forest landowner to monitor his/her land and alert others of a potential infestation. Understanding human behavior is critical to assist with efforts in modifying undesirable behaviors as well as empowering new behaviors to learn and build capacities in ways to help protect and sustain healthy forests and better understand relationships of people and forests. We share a synopsis of human dimensions research efforts through a chronological timeline of events this past decade around the invasive species of Emerald Ash Borer and the Native American cultural keystone species of Black Ash. Human dimensions research activities reported have mostly occurred at this time in Maine but also in Michigan, New York and Vermont in concert with the developing understanding of the biology of EAB and associated management strategies. Importantly efforts are expected to continue among interested folks and research collaborators as EAB expands across the landscape of the Northeast.

This human dimensions research project began in an unexpected way during the early 2000's when tribal communities in Maine were reached out to in developing a report of potential implications of climate change in Maine (Daigle and Putnam 2009). It was at these meetings that many tribal basket makers and ash harvesters from the Wabanaki nations of Maine (the Penobscot Indian Nation, Passamaquoddy Tribe-Pleasant Point, Passamaquoddy Tribe-Indian Township, Aroostook Band of Micmacs, and the Houlton Band of Maliseet Indians) reported hearing stories from tribal basket makers and harvesters in Michigan about an insect having devastating impacts to ash trees. These concerns and uncertainty about the impacts of this invasive insect and rate of spread to Maine led to the initial meetings and reformulation of a black ash task force that had developed a decade earlier with the University of Maine, Maine State Forest Service, and Maine Indian Basket-makers Alliance (MIBA) to address concerns about die-back and health of black ash. The prior relationship building and trust cannot be undervalued to the rate of speed and commitment of these entities coming together quickly to reform the black ash task force and also incorporate new entities that could share knowledge about this new and emerging invasive insect Emerald Ash Borer. These meetings became an important platform to establish ideas around planning and management and most attendees quickly saw the value of different entities coming together, for example, forest entomologists shared the biology and life history of EAB and projected rate of spread and tribal harvesters shared knowledge of different ash species and in particular black ash (Benedict 2001; Benedict and Frelich 2008; Ranco et al. 2010). Another example and with agreement among black ash harvesters was that not all black ash are basket quality trees and greatly depends of the location of where it grows and the environmental features of the landscape. Clearly, there was value in multiple ways of knowing and learning from one another that had implications for planning and management around this invasive species (Figure 1).



Figure 1. The knowledge shared by harvesters of black ash for basket making is one of several key component to effective planning and management of forests.

Important in the inclusion of initial black ash task force meetings was entities that could bring in the latest information to learn about the invasive insect and these included among others the USDA Forest Service and APHIS (Animal, Plant, Health, Inspection Service) where scientists and resource managers shared the emerging science around EAB and unfortunately negative results to eliminate or contain EAB populations. Equally important was the inclusion of other tribal representatives from Michigan and New York at the meetings that helped all attendees learn about impacts of EAB to sustaining cultural practices as well as actions being initiated such as ash seed collection by Akwesasne Nation in closer proximity to EAB infestations (Benedict and David 2000). These meetings were powerful experiences for attendees and one of the first meaningful actions taken as a result of these initial meetings was an emergency rule introduced by the Maine Forest Service to ban the transportation of firewood from out-of-state (Figure 2). At the committee hearing for supporting or not supporting this rule measure was testimony in support given by members of the black ash task force.

From the beginning meeting to subsequent meetings someone would always pose the difficult question to the state forester as to when EAB would likely arrive in Maine. An honest and best guest estimate was provided but all knew the difficulty in responding to the question as the rapid and leap frogging spread of EAB had less to do with biology and reproduction of EAB but more so through human assisted transportation of infested live trees initially with ornamental garden centers and then more so harvested trees infested but transported for camping trips and bringing home to heat houses. Efforts were made to bring awareness of the invasive species and implications to cultural practices with a video with collaboration of multiple entities and the Maine Public Broadcasting System (Maine PBS 2012) and articles began to appear documenting potential implications of EAB to cultural practices (Diamond and Emery 2014; Reo et al.). These efforts led to meetings hosted and planned by tribal communities such as Michigan to better understand impacts of EAB (Figure 3) and to learn the progressive efforts by the Akwesasne with one of the first tribal EAB management plans. There has been a core group working at a regional perspective involving tribal, state, and federal entities helping with efforts to plan and manage for EAB.



Figure 2. The Maine Forest Service had a free exchange of firewood during the first year of implementing the ban of out-of-state firewood.

Critical to the efforts of planning and management related to EAB has been the gathering and insights of shared knowledge systems at meetings and organized conferences. Because of the interest and desire a conference was organized with financial support to bring together the latest science associated with the species of black ash along with traditional ecological knowledge in efforts to protect and conserve black ash and in particular basket-quality black ash. An output of this conference was a synthesis of current knowledge with implications for planning and management (Costanza et al. 2017). Other research has resulted in the vain of reducing the rate of spread of EAB through the human assisted movement of infested firewood. An important research project examining the behavior of campers in Maine, Vermont and New Hampshire and their knowledge of invasive species and behaviors around transporting firewood is another good example of the synergy of interest by university faculty and external funding support (Daigle et al. 2018).



Figure 3. Meetings with Michigan tribal ash harvesters was an important part of the human dimensions research project and remains important for continued collaborations for assessing and responding to the impacts of EAB on sustaining cultural practices.

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