2012

Communication Effectiveness and the Emerald Ash Borer Mitigation Campaign

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By

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A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Arts in English: Technical Communication

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Mankato, Minnesota

May, 2012

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This thesis has been examined and approved by the following members of the thesis committee.

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Abstract

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Environmental risk communication is scrutinized by several research fields including, as Herndl and Brown (1996) show, technical communications. This technical communications thesis rhetorically analyses how large and small government agencies in the State of Minnesota communicate a specific environmental risk: emerald ash borer (EAB).

EAB is an insect native to Asia and arrived in Detroit on a cargo ship sometime in the 1990s (Cappaert 2005, 153; Poland 2011, 46). By 2012, it spread to the 15 states and two Canadian provinces (USDA—APHIS 2012). EAB's life cycle will causes tree decline in Minnesota, the state with the most ash (MNDNR 2012). Government agencies (from state to city levels) have the strong challenge of mitigating the spread of EAB. In my research, I rhetorically analyze communication in a community where EAB is yet to be found. I sought to answer this question: How does the government persuade people in situations of

environmental risk? I hypothesized that much of the persuasion happens through direct communication from one government agency (in this case the MDA) to the publics.

I conducted qualitative research with three people responsible for communicating the specific risk of EAB: one from the Minnesota Department of Agriculture (communications coordinator), and two from a community where EAB has yet to be found (one forester and one communications coordinator).

This research shows the Minnesota Department of Agriculture (MDA) as a central communicating agency using its credibility as a government agency and its reliance on scientific principles to persuade publics, while (sometimes) revising its message based on the values and beliefs of the public (Waddell 1996). Both levels of government conduct direct and indirect communication—but also choose not to communicate some information, often to stem fears. And although Larson (2005) proposes alternatives to war metaphors in biology, the interviewees find war metaphors persuasive, and suggest their use.

The MDA's genre ecology presents a strong source of persuasion for publics. Local governments use the MDA documents, along with one-on-one conversation and neighborhood meetings to persuade publics. However, the local government provides less opportunity for inclusion in the communication process because of the mostly one-way communication strategy. My findings show a need for more involvement at the local level.

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Introduction

Communication about environmental risks is commonplace in today's society (Neuzil 2008; Herndl and Brown 1996). With the global population growing past 7 million in April (US Census Bureau 2012), concern about humanity's impact on the global ecology has become a large area of communication study (Cox 2010; IECA 2011). Government agencies such as the Environmental Protection Agency (EPA) are dedicated to researching and creating laws to manage the environment in the United States. The media commonly reports on environmental concerns, and journalists have created organizations specific to communication about the environment, such as the Society of Environmental Journalists. Many non-profit organizations advocate for the protection of the environment, and some such as the World Wildlife Fund list memberships of over 5 million. It is easy to see how the rhetoric surrounding the environmental risk constitutes a significant area of communication.

Many organizations and agencies attempt to inform and motivate their audience to care and act in response to environmental risks. The process is not an easy one; many of the factors surrounding environmental risks can be complex and difficult for those without a scientific background to understand. As our scientific fields get more and more detailed and nuanced, the need for technical commentators to present clear, logical information through digital and print media becomes more and more important. This technical communication

thesis focuses on this topic because I want to discover how authors persuade when confronted with environmental risks.

This type of persuasion happens often. Through old and new media, authors present environmental facts and opinions to their audiences, usually in an attempt to influence action. Authors submit information in many different media: in brief 10 p.m. television reports, in a series of 140-character messages on Twitter, in local city mandates, in national laws signed into action by the President of the United States, and even in signage. This information about environmental risks travels in different contexts, authoring differentiating viewpoints for various audiences, sometimes resulting in wide varieties of information and levels of factual competency regarding specific environmental risks.

Definition of Environmental Risk

The term *environmental risk has* a broad meaning. For this research, my definition is different than the common connotation of human illness. For instance, The World Health Organization (WHO) creates a broad definition in their *The World Health Report 2002 — Reducing Risks, Promoting Healthy Life*, which covers risks related to living in hazardous environments (WHO 2002). Also, the European Commission's Scientific Committee on Health and Environmental Risks (SCHER) defines the term as risks inflicted by the combination of chemical or material construction harming the human population

(EC 2012). I seek a wider ecological definition of the term. By *environment*, I mean the ecology—the water, air, plants, and soil—and population (animal and human) of an area. Although the population and the ecology might be in conflict, they combine to create the *environment* of an area. This definition includes the risks defined by the WHO and the SCHER, but also allows a concentration on problems started by humans and those started by natural processes (such as earthquakes or the advance of an invasive species). Therefore, for this research, the term *environmental risk* can be defined as something that threatens the natural ecology of a region, which allows the definition to cover human-focused situations (such as a synthetic chemical found in a certain brand of food) or non-human-focused situations (such as the attack of an invasive species on a forest far outside a human population).

There are many genres informing the public of various environmental risks. Each person may filter this wide variety of information differently. Values and beliefs also influence the meaning of the message. And some audiences do not have (or want) access to all the genres. The case of global warming is a good example. While there are specific scientific patterns that show a warming trend in the Earth's atmosphere, the values and beliefs of certain audiences may not align with the scientific results. And while scholarly journals may display information prominently, some audiences may not have (or want) access to them. Although news channels and newspaper may report the information, audiences may believe that the authors already hold bias—or another news

channel may doubt the scientific results. The result tends to be an information or opinion gap among populations regarding environmental risks.

However, the process of informing publics of environmental risks is an ancient one (Neuzil 2008, 15). Ancient scripture contains many examples of prophets attempting to persuade populations to change life patterns in order to avoid and overcome floods, fires, winds, and invasive species. These ancient societies were concerned with population expansion, food production, and good water sources (2008, 15–36).

Purpose of Study

My question is this: How does the government persuade people in situations of environmental risk?

Several follow-up question include the following:

- What mode of persuasion do the authors choose?
- Do the authors find their persuasion to have a positive outcome?
- What communication strategies can increase public participation to curb the environmental risk?

I will look at a specific case of environmental risk in order to study how a particular group of authors chose to address their varied audiences. The results of my study will provide government agencies opportunity to examine how their methods of persuasion differ from those in the specific case I am researching. After reviewing my research, I hope government agencies will be able to adapt

their persuasion patters in even larger, global environmental risks, as diverse as climate change, species becoming endangered, and a lack of seed diversity.

The specific case of environmental risk in my study focuses on a situation developing in the state of Minnesota. Minnesota's green ash (*Fraxinus pennslyvanica*), white ash, (*Fraxinus americana*), and the black ash (*Fraxinus nigra*) face a dire future because of the emerald ash borer's (*Agrilus planipennis Fairmaire*) quick advance since its 2002 arrival in the port of Detroit, Michigan (O'Brien and Suszkiw 2011, 18-19; Dunbar 2011). Emerald ash borer (EAB) is an invasive[1] species in the United States (Wang et al. 2011, 1). To date, officials have positively identified EAB infestations in 15 states and two Canadian provinces (USDA—APHIS 2012). EAB's life cycle could cause a large ash tree decline in Minnesota, the state with the most ash (MNDNR 2012).

The research problem is this: Massive public cooperation is necessary to slow the spread of EAB throughout North America. People will not watch for early warning signs of EAB and will continue moving infested hardwood for lumber, pulpwood, and firewood purposes unless they are persuaded to do otherwise. How important is it to persuade publics to stop or slow EAB? To provide context as to how drastic EAB could change the American landscape, many officials reference the emergence of Dutch Elm Disease, a fungus that drastically

[1] There is some question as to the implications of the term *invasive*, which I detail later in this research. For this paper, I chose the term *invasive* rather than *non-native* or *exotic* to maintain consistency with the MDA's terminology.

reduced the population of American elm trees in the US—and continues to prey on them, from the newly planted elms to the wide-branching elms stretching over boulevards and homes. Research done so far also shows a similar situation to that of Dutch Elm Disease. This displays a dire situation for urban forests (and taxpayers who must manage them) once EAB arrives (Kovacs et al. 2011; (O'Brian and Suszkiw 2011, 18; Wang et al. 2011, 1).

My research focuses on how government agencies rhetorically address a Minnesota community in order to persuade them to stop or slow the spread of EAB. To do so, I conducted interviews with government agency communicators to discover what methods and genres of communication they currently use to persuade a community *outside* the known[2] EAB infestations in Minnesota. I chose to study communication methods outside of the known infestations for two reasons:

1. The first infestations occurred in large (> 500,000 population) urban environments. Populations in the urban environments may have different opinions regarding environmental management than

[2] EAB is detected when people recognize the signs of a decayed and dying ash tree. By the time the tree has declined, EAB has likely been present for several years. So although the community I chose to study is outside the known EAB infestation area, it could be infested already and officials or community members have not located the infestation. This further represents the need for clear communication regarding EAB. The sooner it is located, the quicker the community can respond.

populations in smaller urban or rural environments (< 100,000 population).

2. Although two research studies have focused on EAB management in large urban environments (Dunens et al. 2012, Mackenzie and Larson 2010), I am not aware of EAB management research or communication research in smaller communities.

Evaluating the national or global rhetorical situation in regard to environmental risks is quite beyond the scope of this thesis. Instead of taking an international look at the vast subject of environmental risk, I pinpoint one risk and one community in order to better study the methods and genres of communication happening currently in a specific situation replicated many times over across the nation.

I hypothesize government agencies address Minnesota communities with a variety of methods and genres provide engagement of the audiences and participation for communities. Also, I hypothesize that the government agencies at the local, smaller community (> 100,000 population) level focus on a high level of community-based decision making, because the smaller number enables an easier decision-making process.

The Importance of Communication and Persuasion in the Case of EAB

The larger situation is this: EAB is killing ash trees. The death of the trees results from the insect's habitation under the bark. The worst-case long-term

scenario involves the mortality of all native ash trees on the continent. Because ash trees are common in deciduous forests and because they line many city streets, the result of such a worst-case scenario would pose a negative impact on the finances of local governments and the ecology of the continent (Hoff 2009, Smitley et al. 2008, Brockerhoff et al. 2006).

Increasing the communication between agencies and communities will help to limit the spread of this insect because the spread is largely because of people moving infected wood across large areas. This situation is somewhat unique in environmental risks because the insect is not often seen and its effects often don't show for two or three years. But the death of the tree can take anywhere from two to ten years after the initial infestation. As a result, this environmental risk is often invisible to communities for several years—in contrast to environmental risks such as large oil spill or a chemical fire. Therefore, a large amount of communication is required to inform populations about something they cannot initially see. It takes a motivated community to halt the movement of firewood and detect an incognito insect—but if agencies expect to slow EAB's spread, they must persuade the pubic to do these two things (MDA 2008).

Technical Communication and the Environment

The public today needs effective communication about environmental issues. After the boom of the environmental movement in the 1960s and 1970s, much has been written on various topics ranging from recycling to economic

progression (Neuzil 2008). However, many times environmental issues divide the public instead of uniting it (Tiessen 2007; Rosteck and Frentz 2009). Environmental issues such as climate change and forestry clear-cutting often divide the public, segregating people on either side of a dividing line—or so it looks from media reports. Perhaps a lack of communication, or distrust in scientific communication, enhances this divide. As scientists continue to collect more data than ever before, communication of up-to-date data becomes more difficult. One batch of data might disprove another. The data might not be presented in context. Or the public may be unfamiliar with the scientific discourse and misinterpret (Weingart 2007).

A new need has risen for technical communicators to enhance communication between scientific groups and communities with clear, visualized communication about divisive environmental risks. The communication needs to interpret appropriate data in context and provide scientists with the serious logical and emotional concerns of the public. Technical communicators, especially with environmental backgrounds, can help meet this need.

The connection between technical communication and the environment is evident in the required legal documentation in government agencies, such as the EPA. But some maintain a connection much further back, bringing conservation writers into the periphery of technical communication (Johnson-Sheehan and Morgan 2009). In my own research, I hope to strengthen this connection.

Environmental risk factors will only increase as our global economy continues to interact with shipping, travel, and industry (Hacket et al. 2002). Therefore, the need for technical communicators to facilitate written and visual interaction between government agencies and communities will only continue to grow, especially as environmental risk situations becomes more difficult to understand.

Qualification

While a law presents a strong force of persuasion for a governing authority, the study of law is outside the scope of this thesis. The wording and construction of local and state laws does play a part in persuading publics. And the laws will often give the government agencies the credibility to regulate. But using only the law creates an “us vs. them” mentality to governing and often creates division. Much of a governing body’s communication goes to persuade people in the reasons *why* they should abide by the laws, outside of getting a fine or going to jail. My study focuses on motivations outside of civic punishment.

A Specific Environmental Risk

As mentioned, I focus this study on communication surrounding a specific environmental risk: EAB in a small urban area in Minnesota with less than

100,000 people residing in the general region (within a radius of 15 miles).[3] The community in this area is within 100 miles from a known EAB infestation, well within the distance to be considered at risk of losing ash trees in the near future (Pulchinski 2012). In the past three years, EAB spread from eastern Wisconsin to Winona, then to St. Paul, Minneapolis, and Shoreview (a distance of more than 300 miles). Its arrival in many Minnesota communities has been called eminent (Linehan 2009).

While all states have much to lose to the spread of EAB, Minnesota has the largest population of ash trees within its borders. After completing a recent survey of ash trees in public parks and boulevards, Minnesota's ash population reached 998 million, surpassing Maine's ash tree population (MNDNR 2012). A massive communication plan was needed for Minnesota in order to save nearly a billion ash trees.

The community I chose for this research presents unique opportunities to examine the extent to which government agencies are preparing community stakeholders. A dime-sized bug may not seem like much to get alarmed about—but as of yet, no large-scale methods have stopped the insect, and many communities of under 100,000 people will have to pay more than $1 million to remove just boulevard ash trees (Linehan 2009; Meyer 2010)—although

[3] In order to ensure anonymity of the interviewees (as stated in the participation consent form, which can be found in the appendix), I withheld the name of the community throughout this research.

thousands more will be at risk on people's property and city land. The boulevard ashes represent a small fraction of the larger quantity in private yards and public parks. The community needs to brace for the tiny-winged creature's arrival.

Because much of the surrounding area of the city is rural, further research in this region could garner new information. A small number of communication studies have focused on largely populated areas (Mackenzie and Larson 2010), providing information about urban populations, which may have differing environmental values than rural populations. Mackenzie and Larson's research (2010) focused on a Canadian population just north of Detroit. Because the government agencies acted quickly and cut down trees without landowner permission, many conflicts resulted.

My research will seek to find what communication methods are currently working, and how the interaction between the community and the agencies should continue. Later research can focus on small-community communication by building on my research. This later research could gauge the public's knowledge of EAB and assess where they get their information in order to determine the best communication methods—and hopefully, help to slow the spread of EAB.

Process of Research

For this thesis, I conducted a literature review and conducted interviews with three people responsible for persuading the publics in a small city within 100 miles from an EAB infestation.

The process of this research began with a review of literature. The wide scope of this study needs diverse research in a range of fields in order to understand the need and the motivation for the government's message of persuasion. Although this thesis focuses on the rhetorical analysis of the government communication, it is necessary to pursue authors outside the technical communications field for perspective on the research problem.

I began with a literature review, which follows the following headings:

3. The specific environmental risk, which includes the narrative of EAB's spread to Minnesota, and the significance of EAB infestations;
4. The methods of rhetorical analysis, through classical and new rhetoric, as well as a description of how metaphors and anthropomorphizing shape messages, and how genres constitute a social action for a government agency;
5. Technical communications theory, and how writing about environmental risks can be considered inside the field of technical communications;
6. Public policy theory in relation to communication between government agencies and various publics (with one specific case study regarding communication about EAB).

With the literature review concluded, I describe my methodology for the interview process. I conducted thick research for this study, gathering qualitative information from the interviews. I contacted government agencies to determine who I should interview if I wanted to follow an organized system of communication from the lead agency to the local level. While I thought initially that I would interview someone from the MDA, the Minnesota Department of Natural Resources (MNDNR), and the University of Minnesota Extension, I learned that the MNDNR and the University of Minnesota Extension partner with the MDA to build the communication plan. So when I spoke with someone from the MNDNR, she was reluctant to be interviewed because she felt the MDA would have the most information—she would only repeat what the MDA said.

Instead of three large state agencies, I determined it would be more effective to study the flow of communication from the MDA to a city forester, then to the local communications officer. I contacted the communications managers at MDA and a community in Minnesota with a population under 100,000 that had yet to be infested with EAB, but was on high alert for the insect's arrival. The MDA official agreed to an interview session and directed me to a professor of environmental science at the University of Minnesota, Dr. Kathy Quick, who has been conducting research the subject of EAB management and public inclusion in St. Paul, Minnesota, for the past several months.

After interviewing the MDA communications coordinator, I reviewed the interview and revised my questions for a communicator at a local level. I attempted—without success—to contact the forester in the community mentioned

above. So I contacted the director of public information for the community and interviewed her. Although she is not an expert in invasive species management, she and her team will play an integral part in working to persuade the in that community to not move ash firewood, to be vigilant for signs of infestation, and when found, to abide by community regulations that may require financial sacrifice. After I interviewed her, she gave me the contact information for the new forester (who wasn't listed on any of the community's websites at that time). I again revised my questions and contacted the forester over the phone. I recorded each interview and saved the recordings to my computer's hard drive. I listened to each interview twice and compiled significant quotes by categories relevant to my research.

I then moved into the conclusion, assessing what the interviewers said with the information from the literature review. I attempted to draw conclusions in relation to three of my own modes of communication (none, direct, and indirect), then four modes of communication provided by Waddell (1996).

Literature Review

The Specific Environmental Risk: Emerald Ash Borer's Advancement in the United States

Arrival

Sometime in the 1990s, a new species of insect arrived in North America (Cappaert 2005, 153; Poland 2011, 46). It arrived in a shipping vessel from Asia, in the wooden crating material. Port workers unloaded the cargo and the insects traveled into Detroit, Michigan and across the border into Windsor, Ontario (Cappaert 2005, 153; McCullough 2009, 1668). Its unannounced arrival set into motion a large ecological change in North American forests (Kovacs et al. 2011, 2170).

In the United States, the United States Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) maintains responsibility for monitoring Solid Wood Packing Material (SWPM) for invasive species in order to protect the natural environment and species native to North America. International guidelines also exist for SWPM; they are set by the Interim Commission on Phytosanitary Measures at the International Plant Protection Convention (IPPC). The IPPC is an international convention with 173 participating governments which determines guidelines for global plant health. With the increase in global trade and the IPPC's conventions provide a basis for consistency when protecting countries from introductions of invasive species. In 2002, the IPPC created common guidelines for countries around the globe in

relation to packing materials. Unfortunately, these guidelines didn't stop the insect that arrived in Detroit and Windsor.

The guidelines required all wood packing material be treated with chemicals or a high level of heat to kill insects and larvae. APHIS intended to adopt these guidelines, but in 2005, the National Resource Defense Council and three states (California, Illinois, and New York) sued, stating that the guidelines needed improvement. They desired a complete ban on wooden packing material, stating that the use of non-wood shipping materials "would provide the greatest protection against pest risk and could eventually result in decreased use of methyl bromide [an ozone-depleting chemical]" (National Resource Defense Council 2010, 80). APHIS recognized the danger or methyl bromide and acknowledged the best practice of completely eliminating wooden packing material, but they mentioned the difficulty of getting all countries to agree with such a plan, stating that it could "disrupt international trade and result in a potential violation of U.S. obligations [under previous World Trade Organization agreements]" (2010 National Resource Defense Council vs. US Department of Agriculture). In response to the suit, APHIS revised their Environmental Impact Statement concerning the amount of methyl bromide, but still adopted the IPPC's guidelines.

Although APHIS enforces the regulations on packing material, they still face enormous challenges to monitor billions of shipments into large ports throughout the country. Scholars note that finding invasive insects upon port arrival remains a daunting and difficult task (Brockerhoff 2006). A promising

prospect for the future is DNA testing. Initial tests for identifying insects with DNA testing show 100 percent accuracy (Brockerhoff 2006). Inspectors can sample any part of insect or larvae to find a match and identify a pest. However, a full database needs establishing first. In the future, this could be a "standardized tool for biosecurity managers around the world" (Brockerhoff 2006, 266)

But in Detroit and Winsor during the 1990s, the newly arrived insect passed by the inspection structure and continued to breed undetected for several years. Even when ash trees began experiencing canopy loss, the insect wasn't the initial culprit, since drought and heat damaged ash trees during the same time. Many of the ash trees could normally compartmentalize resources to combat drought and heat; indeed, they are chosen for nearly every city in America for their stubborn hardiness (Cappaert et al. 2005, 3). However, once large groups of trees began declining, researchers and scientists in the area began finding signs of a particular insect in each case. In late June of 2002, when a landscaping consultant examined ash logs in Canton, Michigan, he found small, green beetles and brought them to Michigan State University (MSU). There, entomologists from MSU, the Michigan Department of Natural Resources, and APHIS met to identify the bug (Cappaert et al. 2005, 152). When they suspected it wasn't native to the region, they began to set out to confirm the beetle's identity. This can be a daunting task, as there are many insects in the *Buprestidae* family with similar features (Hahn 2009).

The researchers sent specimens to experts across the world to verify their suspicions of its non-native origin (Cappaert 2005, 152). They contacted

researchers across the United States and Eduard Jendek in Bratislava, Slovakia, an expert in the CUSPID family native to Eastern Europe and Asia. As an international team, they verified the species was not native to North America and published their findings in the *Newsletter of the Michigan Entomology Society* in 2002. In the newsletter, they decided on an English name for the insect. They called it “emerald ash borer,” so named for its distinctive emerald markings, its sole preference for ash trees, and its tunneling characteristic of moving through the inner bark of the trees.

Little was known at the time about the species. Only two sources ere available on the insect, one from the Chinese Academy of Science (1986) and another a book of insects published in 1992 by the China Forestry Publishing House. Both sources gave brief introductions to the biology of the insect and native ranges. Neither source gave information about its predators or potential dangers of further spread (USDA—APHIS 2008, 2.1). It is an interesting point to note that although we live in the 21st Century, there are still many mysteries yet unexplored by science and yet to be defined by technical communicators for public understanding.

The initial response to the finding produced action in both the United States and Canada. In the United States, the USDA responded by quarantining on the movement of wood around five counties to address the most severe problem raised by researchers—the transportation of firewood (USDA—APHIS 2008, 2.1).

Description

In the similar environment on the other side of the world, scientists in China recognized a potential problem with EAB (Wang et al. 2011). The problems stemmed from the 1960s introduction of the green ash, which is native to the United States. China imported the tree because officials in Northeastern China recognized the hardiness of the tree. They planted it widely in residential areas. Soon after, however, small outbreaks of EAB followed. Little was known about the insect because most of its life cycle was hidden under the tree's bark. EAB remained "only sometimes an important pest in certain areas in China," and didn't pose a large-scale threat (Wang et al. 2011, 2).

With EAB's arrival in North America and it's potential for more destruction in China, the stage was set for a flood of research grants and opportunities for action research to stem the movement of the insect. Researchers gathered specimens for study and communication departments published images of the insect, often with EAB juxtaposed near other similar looking beetles. The University of Minnesota Extension service lists this description for the bug:

> EAB is a slender, elongate insect about 1/3 - 1/2 inch long. It is widest just behind the head, gradually tapering back to the abdomen. It is a bright iridescent green to copper-green color, often with a copper colored area behind the head. Its body underneath the wings is a purplish-magenta color (Hahn 2009).

He follows the description with the telling phrase, "Not every green insect you see is an EAB," which demonstrates the difficulty associated with assisting

the uninitiated in insect species identification. Midway through the description are two images of EAB: one with emerald wings partially spread and red body showing underneath, another (from the Minnesota Department of Agriculture [MDA]) with an EAB juxtaposed alongside 17 other similarly shaped and colored beetles.

Since EAB's arrival in North America, many researchers have studied the insect's hidden life cycle (Haack et al. 2002; Cappaert et al. 2005). Even in EAB's native habitat of China, entomologists conducted a study on the velvet ash forest in Guangang Forest Park, Dagang District, Tianjin Municipality, China, where "most forests are monoculture ash plantings" (Wang et al. 2011, 2). They found that the early arrival signs of EAB were difficult to detect, especially with thick-barked trees. Also, they found that "there were rarely any clear symptoms on the surface of the bark during the initial infestation" (6).

Once EAB enters a tree, the tree's life span is cut short. To study these life cycles, Wang et al. cut down infected trees and studied them in two environments, the laboratory (where each pair of EAB were caged with a log) and in the outdoor environment. They cut the logs and sealed the ends with wax (so the bugs had to enter through the bark) (3).

Wang et al. report that EAB deposit eggs under the ash tree bark. The insects hatch, and from June to April they are in larval stage, around 300 days. Upon hatching from the egg, the larvae burrow deeper into the bark. This creates a problem for the tree because the larvae feed down into the life-veins of a tree. As the insects grow, they eat through a delicate layer of wood just inside the

bark. This thin layer contains the xylem on the outside and the phloem further inside. The xylem, on the inside of the bark, moves nutrients and water from the roots to the rest of the tree. The phloem, just behind the xylem, moves the sugars from the leaves throughout the tree.

The EAB larvae first tunnel through the phloem, then into the xylem, creating serpentine tunnels (or galleries), growing all the while. They finish feeding around September to November and create a small cell for hibernation (Cappaert et al. 2005, 155; Wang et al. 2011, 6).

By the time of hibernation, the larvae create galleries in winding paths throughout the ash tree. These galleries break the chain of cells, choking or “girdling” the trees (Haack et al. 2002). The cause of decline in the tree doesn’t come from a negative biological reaction to the larvae; the tree declines because the chain of essential cells in the phloem and xylem is broken.

In China during mid-April, depending on the temperature, the larvae begin morphing into beetles. They first munch through the thin layer of inner bark, the cambium, then crunch through the tough outer bark, emerging out of d-shaped holes in May and June as full-grown beetles flying with brilliant green wings (Wang et al. 2011, 4). Earlier research by Haack et al. and Cappaert et al. found a similar timeframe for lifecycles in the United States in the examples of green and white ash, with full-size emergence during mid-May (Cappaert et al. 2005, 155; Haack et al. 2002, 14). After three to six weeks of feeding on the ash leaves, they mate, lay eggs and die (Wang 2011, 14; Cappaert 2005, 155).

This short life narrative is similar to many insects with tree habitats. Some of these borer insects do little to harm the tree, because their galleries aren't as large, or because they have enough natural predators to keep their population in check (Pedersen 2006).

Advancement

EAB is just one example of an environmental risk presented from an invasive species insect. When global trade became more commonplace, the shuttling of unintended cargo has brought seemingly harmless insects that have caused biological shifts in the ecology of many countries. Research has found that invasive bugs spread throughout a non-native region for these three reasons:

1. The plants in the non-native area lack an evolutionary natural defense;
2. few or no natural enemies exist in the non-native area; and
3. few or no natural competitors exist for the insects' habitat or food (Brockerhoff 2006, 265).

In the short time of less than 20 years, the EAB has posed an environmental risk to much of northeastern North America. At the time of EAB's discovery in Michigan and Windsor, Cappaert et al. reported that "it was apparent that at least 5–7 million ash trees were declining, dying, or dead in a six-county area of southeastern Michigan" (153).

By 2008, the pest had been identified in "lower peninsula of Michigan; six counties in Ontario, Canada; 39 counties in Ohio; 16 counties in Indiana; five

counties in northeastern Illinois; four counties in western Pennsylvania; one county in Maryland; and one county in West Virginia" (Smitley et al. 2011, 1643).

After evaluating the progression of fading in the ash canopy, Smitley suggests the EAB's natural rate of travel is 5 miles per year. Without assistance, it would not have been possible for EAB to travel to all the infested states. Humans have assisted the movement of the pest. Much of the movement has been related to the movement of EAB-infected firewood. Invasive species that cause decline in trees rarely spread hundreds of miles on their own. Most often, they travel on transported wood. People might be transporting the wood for commercial purposes such as lumber sales, or for personal use, such as firewood for home heating. Whatever the cause, this transportation has significantly aided the spread of the EAB.

EAB's successful spread using the combination of natural dispersal by flying and human-assisted dispersal in infested firewood moved it rapidly through all the major habitats found in the Lower Peninsula of Michigan. This suggested that EAB could continue to spread throughout the Midwestern and Eastern United States at a similar rate without much deterrence from large tracts of intensive agricultural land (Smitley et al. 2011), unless the public could be persuaded to stop moving the wood and means of diminishing the population could be found.

In December of 2006, the USDA established a quarantine around the entire Lower Peninsula of Michigan and one county in the Upper Peninsula. Also, "the entire states of Ohio, Indiana, and Illinois and a county in Maryland were

federally quarantined to prevent the spread of this destructive pest" (USDA—APHIS 2008).

Most trees infested with EAB took anywhere from 3 to 10 years to completely decline, and by 2008 entire city streets in many of these states were completely depopulated of trees. Many urban foresters compared EAB's movement and coordinated ash tree decline with the advancement of Dutch Elm Disease during the 1970s. Dutch Elm Disease created such a large environmental risk because so many communities chose to plant American Elm Trees in the early 20th Century as curbside trees, preferring their aesthetic and stately appeal when grouped together. Often their large canopies created a green tunnel for vehicles, providing shade for the surrounding houses. However, when Dutch Elm Disease arrived in North America, communities experienced rapid tree decline in nearly every neighborhood. As a result, communities paid massive amounts for tree removals and replanting and lost a large portion of their natural canopy. Instead of planting a variety of trees, many communities continued the practice of monoculture planting, preferring the aesthetic appeal of similar trees in the same geometric patterns of the streets.

By the time of this writing (July of 2012), EAB has spread through the seven states listed above as well as to New York, Maryland, Virginia, Kentucky, Tennessee, Wisconsin, Iowa, Minnesota; and the Canadian province of Quebec (USDA 2012, see figure 1).

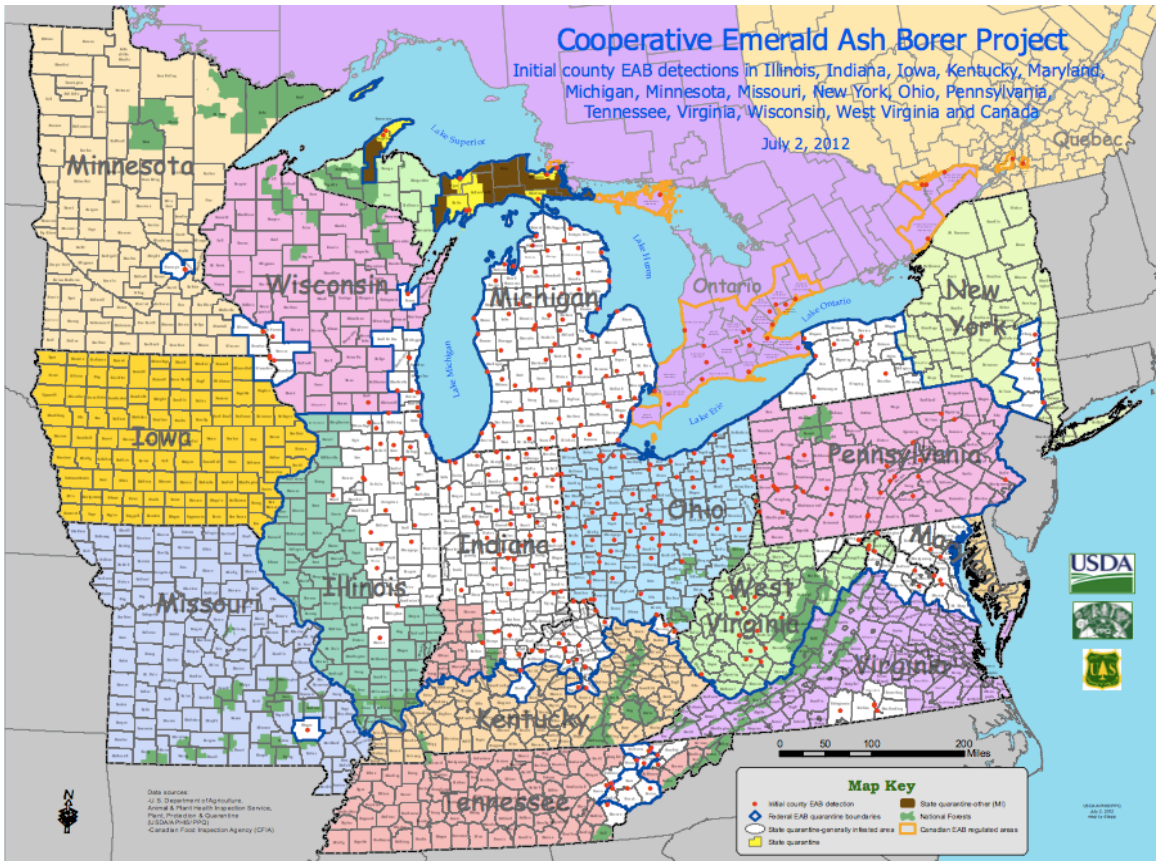

Figure 1. USDA—APHIS (2012) map of states known to have EAB. For updated status (as the insect continues to move due to publics moving firewood), visit the collaborative website for EAB information: www.eab.info.

Many of these states have areas of USDA quarantine and state-enforced quarantines on the movement of hardwoods.

The USDA currently has ash wood quarantines around every county in which EAB has been found, totaling more than 270,000 square miles of quarantine area to slow the beetles' spread (USDA—APHIS 2008).

EAB feeds on all ash trees (Mackenzie and Larson 2010). The potential loss of forest canopy has governmental, environmental, and forestry organizations concerned (Myers 2010; Linehan 2011). Many companies have come forward with suggestions to save the urban canopies in Minnesota since infestation was found in 2009 (in two separate places—St. Paul and a small town right near the Mississippi River). But the response to chemical injections and sprays is less favored than some possible biological alternatives suggested by the Department of Agriculture and other environmental organizations (Mackenzie and Larson 2010; Hahn 2011, 1-4).

Pheromone traps prove successful, but studies have shown need for caution when interpreting the data because the number caught does not always relate to the population quantity in the area. Other control studies include the simple introduction of a native predator or fungus and confusing the pests by spraying sex pheromones (Brockerhoff 2006, 266).

Significance in Minnesota

As EAB progressed through the Midwest, many Minnesotan foresters, arborists, government officials, and nature advocates watched closely. During 2005, I began working at an arboriculture company in Minneapolis, Minnesota. The company emphasized education with its employee production of pruning, removing, diagnosing, and treating trees in the Twin Cities Metro area. As EAB was found in more places throughout Illinois, I learned how to identify and distinguish the bug others from similar in appearance. But most important was learning to distinguish the markings left in the ash wood. The company brought in

a new employee from Ohio, a state infested with EAB. The employee, with a background in academia, presented samples of infested wood, with galleries throughout.

There were mixed feelings throughout the company. I cared for the urban forest, and worked each day to enhance its aesthetic appeal (through shrub pruning) and health (through removing diseased trees and pruning when needed). But I knew the arrival of EAB would mean an increased importance for the company in the community and more sales—which would mean stable work for a long period of time. Many other employees at other tree companies expressed similar feelings. We didn't want the insect to arrive, but we knew if it did, the arboriculture community would benefit.

Minnesota had more trees to lose than any other state EAB has reached. Ashes are more populous in Minnesota's borders than any other state besides Maine. After surveying each county, state officials estimate 998 million green, white, and black ash trees exist in Minnesota (MNDNR 2012). After EAB was found, state and local forestry organizations stopped growing and selling ash trees. Cities began assessing ash inventory and even planning pre-emptive removals for some ashes.

The government agencies created an Emerald Ash Borer Readiness Plan for the state with the purpose of providing "a centralized plan of action for all organizations involved with the delay of entry of, establishment of, and recovery from the impact of the emerald ash borer (EAB) in the state of Minnesota" (2008). An EAB readiness team created a hierarchal structure for the response, placing

the MDA over pre-detection and detection statuses; and placing the MNDNR over the post-established status (although no definition is given for post-established). The document uses multiple illustrations to present the command structure for decision making processes and communication strategies. White space is used often in the 23-page document, as are frames for every page. The document addresses both online readers and readers following in print (although many of the urls are not clickable). The document lists dates for nearly every goal and outcome; however, some such as the Financial Forecast (10) remain incomplete, giving the document a “still in process” tone.

This document also contains a section central to the focus of this research: Communication. The communication section of the document, which serves to “identify and prepare education, research, and training” (14) lists three outreach audiences:

1. All,
2. Urban, and
3. A third group that includes forest, rural, and natural resources audiences.

Each outreach is detailed in a full-page table. The communication description for all audiences lists five different media, each with (1) several individual products to be issued through the specific media, (2) the EAB readiness work group assigned for collaborative authorship, and (3) a status update.

The urban outreach is divided by audience (although the enumeration continues from the “All Audiences” table on the proceeding page), as is the third group comprising forest, rural, and natural resources audience. Eight urban audiences are identified; eleven audiences are identified for the forest, rural and natural resources audiences. Each audience is followed by (1) a column for the EAB readiness team’s delivery method of communication, (2) a column for the EAB readiness work group assigned to the audience, and (3) a status column. For each of these tables, there are some uncompleted categories.

The Emerald Ash Borer Readiness Plan was one document of several that the state agencies worked on to prepare for the arrival of the EAB. By April of 2009, officials from several large governmental organizations (including the MDA, MNDNR, University of Minnesota Extension Service, and the USDA) had a structure in place to implement communication strategies, maintain a consistent message, and limit the spread of the EAB.

Arrival in Minnesota

On April 6th, 2009, officials confirmed the anticipated news for Minnesota's ash trees. The news originated in Victory, Wisconsin, just across the Mississippi River from Minnesota's Houston County.

Stands of ash trees in Victory lost their canopy and were in an obvious state of decline. The trees had slowly withered, unable to distribute the sugars from the leaf canopies or nutrients and water from their roots. In three years, the foliage disappeared. The bark, dry and brittle, peeled off in strips, alerting the officials to the infestation. Foresters inspected the trees and found thousands of

weaving tunnels underneath the bark. These tunnels signaled a new threat to forests and urban trees near the Mississippi River and beyond into the western United States (MDA 2010).

When Wisconsin recognized that the EAB had established a habitat on the shores of the Mississippi River, officials speculated that it already existed in Minnesota and Iowa but just hadn't been discovered. The stands of ash trees in Victory were removed. But the green insects that emerged from their bark had most likely been infesting the trees for three years at the point it had been found. And these insects didn't come from forests in Wisconsin. They were moved in firewood (Schuldt 2010).

A joint group of officials searched for signs of the EAB across from Victory, in the forested area of the river in Houston County, Minnesota. They didn't find any signs of the insect. However, officials implemented the EAB Response Plan and decided to place a quarantine on wood in Houston County (MDA 2010). Statewide public relations outreaches began along with training volunteer groups of EAB detectors. Purple triangle traps were hung from ash trees in cities throughout the state with papers explaining how the traps would draw any outlying EABs to its sticky walls.

The campaign to educate and inform Minnesotans had begun, and the EAB hadn't even been found. It took another full year until infected ash trees were found in the Houston County (Schudlt 2010), again demonstrating how difficult the process of identifying EAB presence in a stand of woods can be, even for experts. The MDA gave confirmation of the infestation on April 29th,

2010 (MDA 2010). MDA Plant Protection Director Geir Friisoe called the Houston infestation “an expected development” (Schuldt 2011).

The Houston infestation wasn’t major news, because the initial Minnesota infestation had been found a year earlier. The initial EAB infestation was found by one of my co-workers on May 13, 2009 (Mcauliffe 2009). Groups of the insect had migrated 175 miles northwest—to the population center of the state, the Twin Cities (“Forest Protection Reserve Appropriation” MDA 2010). Officials had estimated it would cost the city of Minneapolis $37 million to replace all their ashes on—just on the boulevards. In perspective, it cost nearly as much to run the Minneapolis fire department for a year (City of Minneapolis 2012, 124). On just a financial level, the Twin Cities public had cause for concern.

I remember the day EAB was first identified in Minnesota well. I worked for the arboriculture company and I commuted from my home in South Minneapolis to Roseville, where our company garage was located. On route that morning, I heard a news clip from National Public Radio announcing that the pest had been confirmed, and an employee from my company found the infestation. When I arrived at the garage, the workers were discussing the find. Co-workers joked about starting their own tree companies so they could get ahead of the curve and start making side money right away. They mentioned the news interviews (that I had missed the previous night) with the worker from our company who had found the pest.

The initial infestation was just off the University of Minnesota’s East campus, which was close to our garage. The identification was set into motion

when a homeowner noticed an ash tree declining in his front yard. He contacted an arborist from our company, who went over to examine an ash tree with many dead branches. After assessing the tree, the arborist thought it might be infested with EAB, so he contacted the MDA. The MDA confirmed a positive identification for EAB and Marc Abrahamson, communications officer for the MDA, quickly held a brief news conference to confirm that the EAB had arrived in Minnesota.

We had worked a few miles away several days earlier and hadn't noticed any telling signs. But that morning, we immediately drove to the spot of infestation and examined the tree. The bark was cracked and flaking away from the trunk. Galleries covered the exposed wood and the leaf canopy had mostly disappeared, leaving only 1/3rd of the tree with any signs of green leaves. It was obvious that the EAB found in this spot hadn't just been there a year; it had been there long enough to decimate the tree's inner bark and cut off the majority of water and nutrients traveling through the plant cells. The MDA's Forest Protection Reserve Appropriation document confirms the length of the initial EAB infestation:

> September 2009: Results from dendrochronological studies of infested trees conducted by PPQ with assistance from the City of St. Paul and MDA indicated that the St. Paul infestation dated back to 2006 (2010).

Within the month, nearly 70 green ash trees (some on private property, some on public property) were cut down and ground into woodchips. When EAB was found in Minneapolis, by the Mississippi River, a similar process followed; and again in St. Paul's regal Summit Avenue.

Today, EAB have been found in Hennepin, Ramsey, Winona, and Houston Counties, each of which is now surrounded by a USDA-established ash wood quarantines (“Found in Winona” MDA 2011). This means no one (loggers, campers, lumber mills) can move ash wood from these counties unless accompanied by a MDA certificate.

Several infected trees have been found in the Twin Cities. In Minneapolis, nearly one-third of the city is covered by tree canopy (Dunbar 2011). The stakes for the cities in the surrounding region are high. Nearly everyone agrees that the fastest way to curb the spread of EAB is the removal of dead trees (Kovacs et al. 2010, 570; USDA—APHIS 2008; O’Brien and Suszkiw 2011, 9).

The USDA responded to past infestations with the quarantines and by initiating informational campaigns to educate the public about the dangers of moving firewood. The state of Minnesota has made communicating this massage a gigantic rhetorical point, using billboards, websites, commercials, brochures, and many other genres in print and online mediums in order to present the information to the public. Recently, the MDA began releasing natural EAB enemies such as *Spathius agrili*, and *Sclerodermus pupriae* (MNDNR 2012).

In conclusion, it is evident that EAB presents a genuine environmental risk to the state of Minnesota. The population in Minnesota has much to lose if the EAB progresses through the tree canopy, both urban and rural. Although all Eastern and Midwestern states will lose trees and money in this battle (Kovacs et al. 2010, 575; H.R. 3901), some suggest that Minnesotans maintain a stronger emotional connection with their landscape, especially their trees (Atkins 2007, 1-

9). As a result, they may be more willing to engage with government agencies to protect the larger ash canopy in the state.

But many questions remain. As asked in the introduction, how can agencies and communities effectively communicate about environmental risks? And to what extent are communities involved in the engagement process? Also, what pitfalls prevent agencies from reaching or engaging with their audiences?

To better understand these questions I examine the role of authorship, audience, and persuasion through the lens of technical communication.

Rhetorical Analysis Methods

Classical Rhetoric

Two thousand years ago, Aristotle wrote that rhetoric is “defined as an ability, in each particular case, to see the available means of persuasion” (1.2.1).

Deciding on the means of persuasion can be a large task for a government agency. The staff at an agency needs to determine their audience and then determine what specific mean of persuasion will move the audience to act. For a company selling a product, this process can be direct. Most likely, there will be a specific audience for the product. But for government agencies responding to environmental crises, the audience includes an amalgam of the population. Some of the audience may favor environmental stewardship; some may reject the concept.

Defining an audience is a rhetorical move. For government agencies dealing with environmental risk, their goal may be to reach the entire public. However, the entire public won’t be receptive to the same message. This means the agency could be responsible for managing several different communication streams, and keeping those streams consistent in the content, but different in tone, depending on the audience acceptance level. To analyze this selective communication, I will first establish the difference between the classical rhetoric and the “new rhetoric” (Berlin 1982).

Many trace the roots of classical rhetoric to Plato and his Academy. Today we consider him a man of ideals. He held the ideal of a philosopher-king. He

longed for a perfect city of philosophers. He developed his idea of the “true art” of rhetoric as one with the full knowledge of a subject and a discernment of the audience’s soul (usually just another individual, not a large crowd) before providing discourse (*Phaedrus* 277b5-c6).

Aristotle maintains the Platonic philosophy of the rhetor being just. He felt the rhetor needed to be seeking truth (1.1.12) and broke down the process of rhetoric further than Plato. Scholar George A. Kennedy (2007) describes how the idea of rhetoric adapted over time. He states, “[Aristotle’s] response to Plato on the subject of rhetoric … is … less idealistic and more pragmatic, but based on the philosophical values and methods” (15).

Aristotle’s *On Rhetoric* centers on assessing all the available means of communication and choosing the most effective one. Aristotle spends chapters assessing character traits found in humanity in order that he might better assess the needs of an audience. The influence of this work is ubiquitous today (in college composition courses, for example).

On Rhetoric wasn’t a work Aristotle intended for widespread use, according to Kennedy. Instead, this was an esoteric work (one intended only for himself or for study by others he knew). Kennedy points out Aristotle had other works completed but none of the ones meant for large circulation survived from antiquity. The original audience of *On Rhetoric*, then, was the student body he taught. In his teaching, he attempted to differentiate between winning an argument for the purpose of winning, and winning an argument for the sake of pursuing the truth. At the time, many other teachers intended their work to be

produced many times over, and the scrolls were sold for a profit (10). One can imagine Aristotle shaking his head at scroll titles such as “Six Easy Steps to Winning A Court Case.” While Aristotle was learning from Plato at the Academy, Plato was loosing students to Isocrates’s school on the other side of Athens. Isocrates, according to Aristotle, had too little focus on logic, truth, and the knowledge of a subject. Isocrates instead focused on creating a smooth style of speech and developing strong voice amplification to speak to large crowds (13).

In contrast, Aristotle wrote *On Rhetoric* as a “systematic exposition of subjects which he probably sometimes used as notes for lectures. They were … kept in his own library for his use and revision and probably studied by others” (Kennedy 2007, 3).

Aristotle taught that rhetoric was an art form—unique in its ability to convey any subject in existence. Rhetoric was the ability to do so, meaning it could be measured and assessed, like other art forms.

Some of *On Rhetoric* focuses on understanding the character of the audience in order to better persuade them. This echoes Plato’s *Phaedrus*, where he writes about the importance of understanding the souls of the audience—understanding how to speak to them.

The means of persuasion (the pisteis) used by the rhetor are listed by Aristotle shortly after his definition of rhetoric (1.2.4). Aristotle claims that “there are three species [of persuasive means]” One is persuading by using the strength of the rhetor’s character (ethos), another is “seeming to show

something" (logos), and another is "disposing the listener in some way," which is commonly defined as using emotions (pathos) (1.2.4).

Expounding on the traditional view, Bitzer (1968) established that rhetoric consisted of audience, exigence, and constraints. The exigence was the event or moment providing an opportunity for rhetoric. For example, when the Russians first achieved manned space flight, the American public felt concerned they would lose the space race. President Kennedy gave a speech in response. The Russian space flight provided the exigence, or prompting, for the American President's rhetoric" (5–6).

Bitzer's ideas of how we repeatedly respond to exigence presented theories for genre development. As Miller states, much recurrent discourse takes the same forms and these forms "arise in situations with similar structures and elements and because rhetors respond in similar ways, having learned from precedent what is appropriate and what effects their actions are likely to have on other people" (1984, 152). By studying genres, we can learn about what audiences expect, how authors frame content, and the values of a culture—by examining them as cultural artifacts (Miller 1984).

To traditionalists, all success of rhetoric was dependent on the situation. An objective reality existed, and in the reality, an exigence prompted rhetoric. This rhetoric was then defined as successful or not by the audience or anyone looking back on the context of the situation. Therefore, audiences or those examining the context could define the "right" rhetorical response.

In the context of environmental risks, a traditional rhetorical view would maintain proper exigence for rhetoric to form; this rhetoric, or response, could be seen as correct or incorrect, depending on whether the author met the needs of the audience.

New Rhetoric

As time progressed, scholars questioned the possibility of objectivity in any situation (Berlin 1982; Miller 157, 1984). A “correct” response to a given exigence would not be known except in the context of a given community (Harrison 1987, 258). The implications were far reaching. This meant that knowledge was “always determined in reference to the context in which it [arose]” (Harrison 258). Because no objective rhetorical response existed, the opportunity for the study of rhetoric as different types of cultural artifacts arose (Miller 164; Harrison 259). The communities who composed rhetoric could be seen as cultures. And organizations, such as government agencies, could then be considered a “rhetorical context” in which to study “rhetorical action” in content and the formation of genres (Harrison, Miller). It is on this platform of theory that Harrison lays out her view of organizations as “(1) systems of knowledge and (2) patterns of symbolic discourse” (260).

Even definitions could be considered in the realm of objectivity. Scholar Kenneth Burke (1966) defined man as a symbol-using animal—writing a new definition of what makes humans distinctive from other species. Burke’s definition summarized the evolutionary process in which humans have developed the ability to use and decode symbols (first in crude forms, later in letters and

language). He continued to define humanity as looking through “terministic screens” in which we view the world. The terministic screen is like a window unique to each individual, through which the view of the world is shaped. Because past experiences tint or warp each window differently, every view is slightly different. Therefore, the reality of those with differing experiences (for example, those from different nationalities) doesn’t align. Two people from two different countries with two different governmental systems (such as democracy and Islamic fundamentalism) actually live in separate realities (Burke 1966, 45).

For an author seeing through a Burkean worldview, it becomes of utmost importance to define a subject. And how? The symbol-using animal does so by creating definitions. Burke distinguishes a definition from just being symbols that describe an object fixed in an eternal reality. Instead, Burke argues that the definition itself *creates* a reality outside of the physical object. In this perspective, the definition moves from a simple idea—a reference tool used for better understanding something—to a powerful diction capable of shaping the reader’s worldview and observing phenomena through the basis of the definition. The implications for technical communications were equally important; terms created in response to a technical environmental problem could define the reality of the problem’s framework, and the problem’s result instead of it being interpreted by its own physical (or digital) reality (Burke 1966,15).

Richard Vatz (1974) suggested a shift in the definition of rhetorical situation by doing two things: looking deeply at *which* situations authors presented and examining *how* authors presented those situations (157).

Vatz argues that an author first chooses the selection of situations. The ones chosen will retain salience; the ones not chosen become forgotten about or are avoided. Second, the author chooses how to describe the salient situations. Third, the audience chooses how to translate the description of the salient situations. Each step is a progression of choice, not a response “correct” or “incorrect” in obvious situations. Every aspect of the communication becomes a selection process for the author. Even the adjectives used in the communication of the situation are “value-laden”; they affect the translation. Vatz states, “No theory of the relationship between situations and rhetoric can neglect to take account of the initial linguistic depiction of the situation” (157).

“The facts or events communicated to us are choices, by our sources of information” (156) Vatz writes. He includes that our sources of information (such as our media outlets) determine which events are relevant sometimes "based on pure arbitration" (157). Examples of this can be seen with ease on today’s 24-hour news channels, where some events are deemed relevant just because of time gaps needing to be filled, or because of the need to sandwich “hard” news with “soft” news, which presents more entertainment value for a public that may be exhausted from traditional news casting. An example mocked by David Letterman on *The Late Show*’s bit called “CNN Slow News Night,” shows the clip of a Cleveland news anchor proclaiming the breaking news that “Actress Demi Moore has just changed her Twitter name” (Yoder 2012). While we laugh at *The Late Show*’s example, editors did choose to display this fact along with world news and other commonly valued information (school closings, weather reports,

needed information regarding safety); therefore, they create salience for the situation of Moore's Twitter tangle.

After creating, Vatz says an author "must assume responsibility for the salience he has created" (158). He continues, "Rhetors choose or do not choose to make salient situations. This may be the *sine qua non* of rhetoric: the art of linguistically or symbolically creating salience. After salience is created, the situation must be translated into meaning" (160). And it is up to the audience, Vatz continues, to determine the translation of the meaning. Because the audiences will have differing backgrounds, some meanings may translate differently.

Here is a pinnacle question of much rhetorical study: how does the author present information and how does the audience interpret it? In science and technical writing, this question holds much significance, as wrong interpretations from a machine operator's manual could result in damage or death. And misunderstood messages from a science writer's report could lead to setbacks in research or misguided public perceptions. And often, in science writing, authors rely on a key tool that can both aid understanding and polarize audiences: the metaphor.

Metaphors and Anthropomorphizing

B. H. M. Larson writes about metaphors in science writing. In particular, he defines the problematic military metaphor often used when authors write about insects such as EAB. Even the terms "invasive" or "non-native" can have multiple interpretations from varied audiences, some politically charged. Larson states,

"Militaristic metaphors harbor inaccuracies that contribute to public misunderstanding of invasive species and even to misperception by conservationists themselves" (496).

Larson finds two problems with strong military-style language in biological situations. First, by dividing clear lines with war language, authors ignore the grey lines of responsibility for invasive species progression. If we declare "war" on EAB, then those who move it are not just unwitting campers, they are "traitors to the cause" or “insurgents.” Second, the promise of an ultimate positive outcome is rarely ever a reality. Instead of “winning a war” by reestablishing the former boundaries of invasive species, the best results are often far from “eradication.” Instead, some species mingle and become indistinguishably different, or some control agents become severe environmental risks (496).

Even though the benefits of conservation advocacy are heavily disputed, the language of war, even if implicit, reveals a zealous commitment to a particular plan of action. It may cause those most committed to conservation to have doubts about the invasion biologists’ intentions. (497–8)

Larson lists other off-putting reasons for military metaphors. Audiences can misinterpret the intentions of the author, some interpreting it with a “xenophobic resonance” (497), sometimes even prompting indigenous people to turn attention to the “invasive people who have brought about the greatest ecological impacts on their lands” (497).

Along with misinterpreting the message, the audience could misinterpret the motive of the author. If a governmental agency wishes to produce inclusion in

its management strategy, the language of war builds a wall to any cooperation. Larson states:

> Even though the benefits of conservation advocacy are heavily disputed, the language of war, even if implicit, reveals a zealous commitment to a particular plan of action. It may cause those most committed to conservation to have doubts about the invasion biologists' intentions. (497–8)

He lists other negative communication results of military metaphors including:

1. The political connotations of war can corrupt perceived neutrality of the scientist as author.
2. Using war metaphors can bring a heightened sense of attack on persons and communities by the government's planned control agent response.
3. Using war metaphors to describe biology "diminishes actual war" (499).

Of course, if the war metaphor ceased in science writing, a new selection of metaphors for more accurate description would be needed. Larson notes this and lists the following alternatives in conclusion:

1. Health analogies from eastern world views ("quality of life")
2. Metaphors that focus on how we live together, instead of how one lives as an invader. ("Symbionts—in the original Greek sense of the species 'living together'" [499].) This would make humans implicit in the movement and introduction of invasive species, "directly

confronting the complexity of how we are changing the planet" (499).

3. Cyclic cultural models that focus on restoration, organic processes which include decade-long natural processes involving interconnectivity.

Larson's article demonstrates the importance of rhetoric when communicating scientific knowledge to audiences. Communicating animal or insect actions presents even more challenges. Jon Mooallem wrote about these challenges in the *New York Times Magazine* article, "The Love that Dare Not Squawk its Name." In the article, he profiles Lindsay C. Young, an albatross researcher who discovered female-female pairs among the monogamous Laysan albatrosses. These albatrosses live 50 to 60 years and mate with one partner for life. But Young began finding female-female pairs after researching "supernormal clutches," where extra eggs appeared in one nest. She published a paper in *Biology Letters* detailing her findings. While researchers talked about her findings objectively, many other media outlets anthropomorphized the paper, turning the scientific research into something political. The research paper prompted news stories, blog posts, emails, and comments from lawmakers in Washington D.C. about the misuse of tax dollars. Viewers of Comedy Central got a laugh from Stephen Colbert's warning of the "albatresbians" and their "Sappho-avian agenda" (246).

Mooallem writes about how scientists are now studying animal gender interactions more than ever. But most of them aren't trying to explain homosexual

behavior. They are trying to study the animals. Mooallem shows the difficulties researchers face when selecting metaphors and analogies for their study. Young struggles to describe the colony of albatrosses, not wanting to use the term "homosexual animals" (245) or "mutually beneficial sex" (260).

The article also focuses on how audiences interpret the results of these studies in polarizing ways. In the article, biologist Marlene Zuk states that audiences want to anthropomorphize these results because we tend to see animals as "blurred, imperfect copies of humans" and their behavior is just "some version of the way people do things" (250).

Mooallem states the following:

> In retrospect, the big, sloshing stew of anthropomorphic analyses that Young's paper provoked in the culture couldn't have been less surprising. For whatever reason, we're prone to seeing animals—especially animals that appear to be gay—as reflections, models, and foils of ourselves; we're extraordinarily, and sometimes irrationally, invested in them. (255)

The examples presented in Mooallem's article show the role rhetoric plays in communicating the actions of insects. Humans tend to have an adverse reaction to insects in general. They have been the subject of sci-fi horror for years, from *Them*, the 1954 film about gigantic, killer ants, to director David Cronenburg's 1986 version of *The Fly*, to the humorous and frightening *Arachnophobia* from 1990. Many of these fears can result in war metaphors and anthropomorphizing the actions of these insects. Or authors may use humor to offset audience's adverse reactions. For example, when writing about the

invasive species *Halyomopha halys* (the stink bug), journalist Heather Haddon (2012) describes a farmer training his dog to gobble them up when found in the house, and offers several puns on the smell—of course the insects are “out of odor” and causing “a big stink” (Haddon 2012). Whether authors use humor, metaphors, or anthropomorphications to describe the actions of insects, we should be aware of how this rhetoric affects our interpretation and develops meaning for us when dealing with EAB and other species presenting environmental risks.

In a Minnesota Public Radio news report, Matt Sepic (2012) demonstrated how rhetoric affects our actions regarding invasive species. Sepic says that many people in the land of 10,000 lakes are concerned about a particular carp. This fish is a You Tube sensation for its hilarious antics on the rivers of Illinois. When a loud sound disturbs the carp, it jumps out of the water. Because the fish can reach upwards of 100 pounds, they can really knock a fisherman for a loop, especially if he or she is traveling at high speeds on a river.

Sepic said that researchers at the University of Minnesota were “waging war” to prevent the carp from reaching the Upper Mississippi River (2012). Researchers found one carp in the St. Croix River and another in the Mississippi by Iowa. The carp could move further upstream by swimming or by hitching a ride in boat ballast. Most agree that the carp could devastate the river ecology because they eat so much food, there is little left for the native fish.

However, one of the interviewees pointed to the rhetoric and suggested we reframe it. Sepic reports:

> Greg Breining says all this war rhetoric reinforces the myth that humans can control nature. “It's just not very effective. It's like a war on terrorism or a war on drugs. It's just a way to spend a lot of money to no particularly beneficial end,” he said (2012).

The interview continued to explain how terms like *war* provide strong reactions, but they end up sustaining “money pits,” where the government recognizes an emergency and dumps money into the problem without ample benchmarks to evaluate success—or without doing enough research beforehand to ensure success.

Even the term “invasive” was also called into question. Sepic’s report suggested that some of the other fish in many of our rivers have changed through time, and that the carp may not change the ecosystem as much as some researchers expect.

State and local government agencies must make decisions on how to communicate about EAB to their publics. In order to do so, they will rhetorically present the problem and possible solutions. They may choose to create war metaphors and anthropomorphize. And even with simple terminology, they define what insects are considered *native* and which are *non-native*, although it can be difficult to define just when an insect moves from one category to the other (Sepic 2012).

Many of these rhetorical situations involving insects can persuade or detract publics. The language used matters greatly.

Genres

Carolyn Miller, writing in 1984, explained how authors create rhetorical action before even putting words to the page. In her article “Genres as Social Action,” she builds on the Burkean notion that rhetorical situations are based in motives and those situations prompt genre creation, but she separates her view by explaining how developing categories can never completely avoid abstraction, they don’t accurately portray the motivation of the situation, and—perhaps most importantly—they represent a somewhat closed system. She offers the semiotic framework to determine definitions of discourse: substance (semantics), form (syntactics), and rhetorical action (pragmatics) (Miller 152). However, Miller determines that genre is not centered on the “substance or form of discourse but on the action it is used to accomplish” (151). So although many genres may exist in the realm of environmental risks, for example, those genre forms may adapt depending on the motive of the distinct author. A conservation group might form a genre differently than a governmental agency.

Miller suggests that genre must be grounded in situated rhetorical action. And situations, like Vatz presents, are interpreted, or in Miller's terms, socially constructed (156)—placing exigence in the “social world, neither in a private perception nor in material circumstance” (158). We classify to understand. Genre classifies by signaling through forms. If a current formal type cannot adequately convey a message another form will be taken up (157). Thus, genre evolves.

According to Miller, genre is more than “a formal entity”; it is “pragmatic, fully rhetorical, a point of connection between intention and effect, an aspect of social action” (153). The term “pragmatic” takes a stance against a closed

system and bases it instead in practice; the form used by different and similar social groups. She argues the classification should be based in an ethnic system of methods, or "ethnomethodological" (153). She also points out "levels of abstraction" relating to genres (163).

From Miller's ideas of genre defined by collective social groups and selection of genre as rhetorical action indicating something similar to artifacts in a culture, we can surmise that a government agency's choice of genre to persuade publics have implications. To further study the means of persuasion used by agencies, looking at genres can help build understanding. As Miller states, "genres serve as keys to understanding how to participate in the actions of a community" (165). Also, as Berkenkotter and Huckin later assessed in 1993, genres provide us with a sociological perspective into an organization's community. Through the years, the defections of genre have advanced.

Definitions of			
	Aristotle	BC	based on mode, object, and medium; they can be classified into tragedy, epic, comedy and parody; the classical view
	Bitzer	1968	forms of discourse that are the rhetorical responses to rhetorical situations
	Simons	1978	a distinctive and recurring pattern of similarly constrained rhetorical practices, in which the constraint is based primarily on purpose and situation

Harrell and Linkugel	1978	works which stem from organizing principles found in recurring situations that generate discourse characterized by a family of common factors
Miller	1984	as typified rhetorical actions based in recurrent situations; a social constructionist view.
Yates and Orlikowski	1992	typified rhetorical action in the context of socially defined recurrent situations
Berkenkotter and Huckin	1993	an "insider's definition" defined by dynamism, situatedness, form and content, duality of structure and community ownership; a sociological perspective

According to Carolyn Miller, "genres serve as keys to understanding how to participate in the actions of a community" (165). Clay Spinuzzi (2004) suggests four ways to group genres: (1) Sets, (2) Systems, (3) Repertoire, and (4) Ecology. (110)

Showing the difference in each definition proves tricky—there are so many abstract concepts at work. So Spinuzzi runs a helpful illustration to develop concrete examples of the differences. He presents "Ralph," a fictional character at a telecommunications company. He described all the genres that Ralph used in a simple phone conversation. Spinuzzi describes every post-it note, scribbled pencil mark, and calendar annotation, applying each as a separate genre (111).

He builds a framework for understanding "unofficial" genres like those notes. To find the layers of genre definition, he suggests looking through several lenses:

1. Model of Action
2. Agency
3. Foregrounded Genres
4. Perspective
5. Relationship between Genres (111)

Spinuzzi applies each lens to genre sets, genre systems, genre repertoire, and genre ecology. He finds that the genre sets focus only on the product of the work from an individual perspective (111–112). The genre systems work along “textual pathways” to comprise social activity (Yates and Orlikowski 2002), and much of genre research is built on this idea of genre as a system of coordinated documents that signal a community’s action. This idea of genre systems has a strong and ordered structure. The genre repertoires (Yates and Orlikowski 1994) "emphasize individual and group communicative performances," but the emphasis is still on communication. Finally, Spinuzzi gets to the genre ecologies, his preferred assemblage.

Genre ecologies "emphasize genre as collective achievements that act just as much as they are acted upon" (114). This is based in a theory of distributed cognition. Genre ecologies take into account what Spinuzzi calls "mediating artifacts" such as checklists, calendars, and notes. In this assemblage of genres, none of the artifacts or genres stand alone, they interact (114). The framework seems much more like biology—it's messy and not easily defined. Spinuzzi mentions that “the emphasis is on how several genres are simultaneously (or nearly simultaneously) brought to bear on a problem" (115).

Together, the genres and artifact create something unique together—not as one piece of communication.

When analyzing genres which communicate environmental risk, genre ecologies have an interesting appeal, especially for those going through a training process to be first responders. While several genres guide their actions (checklists, comparison posters, signs posted on trees) they do work in cooperation with each other and assessing one without the other may lead to an incomplete picture of the situation's context, thus leading to a misunderstanding regarding the particular genre.

Herndl and Brown (1996), in their introduction to *Green Culture*, elaborate on how the interpretation of genre continues to prompt a need for rhetorical criticism in environmental communication.

> Our examples and the complications that arise in [environmental discourse] demonstrate the need for rhetorical and cultural analyses of environmental rhetoric. Whether we think our language practices privilege some kinds of thinking and some forms of knowledge at the expense of others, or whether we thing the genres of environmental writing e.g., EPA reports, *New Yorker* essays, books such as *Silent Spring*—as recurrent forms of social action (Miller), it is clear that environmental discourse is a historically developed cultural form maintained by rhetorical activity. … rhetorical criticism does provide a method for analyzing our public rhetoric, and principles that can guide our rhetorical practices in the future. (9–10)

Technical Communication Theory

Neutrality of Author

A central question that defines the field of technical communication is this: "How do texts (print, digital, multimedia; visual, verbal) and related communication practices mediate knowledge, values, and action in a variety of social and professional contexts?" (Rude 2009, 176). In an attempt to further define technical communication's focus as a field, Rude (2009) divides the field of research into four categories: (1) Disciplinary, (2) Pedagogy, (3) Practice, and (4) Social Change (176).

Many documents from the MDA work to bring social change—public acknowledgement of environmental risks and directed public action. The action in this case results in urban forestry conservation (at least this is the hope of the authors). But should documents prompting social change and conservation be considered "technical communication?"

The topic of social change is a broad category of technical communication studies, and at times a debate can ensue as to how far the parameters of technical communication should be stretched. Some would argue that conservation writing is outside the parameters of technical writing. However, Johnson-Sheehan and Morgan (2009) argue that conservation writing is an emerging category genre in technical communications. The authors suggest this genre be taught in technical communications departments as a form of technical writing.

In the article, they find that environmental communication continues to become more detailed and intertwined with other aspects of ecology and global urban life. They define conservation writing as “an umbrella term for a range of writing about ecology, biology, the outdoors, and environmental policies and ethics” (10). Although conservation writing shares concern for ecology as nature writing does, and shares emphasis on evidence as science writing does, it differs from both in that it is pragmatic and calls the audience to action. The authors expect this form of writing to advance. Indeed, many of us need a concise, simple description of the advanced, detailed environmental problems, such as climate change, because they—or their study methods and implications—are too detailed for us to understand.

The authors lay out their argument through a literary study. They make a quick case in the introduction for how conservation writing fits between the categories of emotional nature writing and complex scientific writing to scholarly or science-practice communities. Conservation writing does both, they argue, but never so much as to be extreme or leave out emotional impact. With a dense historical literature review of past conservation writers and new genres which have emerged, they seek to place conservation writing into the technical communications field. Some of the genres the suggest in the field of conservation writing are as follows:

- Natural Histories
- Feature Articles and Essays
- Analytical Reports

- Technical Descriptions
- Environmental Impact Statements
- Grants
- Brochures, Handouts, Websites
- Newsletters
- Natural Resource Inventories
- Environmental Management Plans
- ISO 14000 Environmental Management Systems

And does this argument (for conservation writing as technical writing) still fit with traditional understandings of technical communication? In 1961, Israel Light's significant article regarding the professionalization of technical communications clarified the term *technical communicator*. Light's definition, although older, "is in some respects forward thinking" (Hallier 2012). He proposed that technical communicators have skills and training in three areas: writing and technical genre adoption; familiarity with visual and audio communication; and a major emphasis in a specific scientific background (Hallier).

Multiple authors with scientific backgrounds write many of the documents from the MDA. They do adopt technical and common genre patterns, many used in other forms of technical communication such as visual presentations, informational videos, identification charts, comparison charts, and marketing material. Some of the documents or displays are tested in focus groups

conducted by hired contractors in order to get the largest level of participation with visual and audio communication.

With these definitions, I can place some of the communication surrounding EAB's emergence into the category of technical communications. The authors of documents (especially for the MDA in regard to scientific and legislative purposes) have a strong and clear writing style, show familiarity with visual communication, and provide a wealth of specific scientific background.

Herndl and Brown (1996) also introduce environmental discourse as a technical form of communication. While their criticism focuses on rhetorical methods, they see a need for detailed analysis of environmental documents and dialogue. They created a model based on the traditional Aristotelian rhetorical triangle developed by Ogden and Richards and an article from *Ecospeak* by Killingsworth and Palmer. This model, illustrated in figure 2, attempts to draw the motive (Kenneth Burke's term) from the authors and understand the context in

which the discourse takes place.

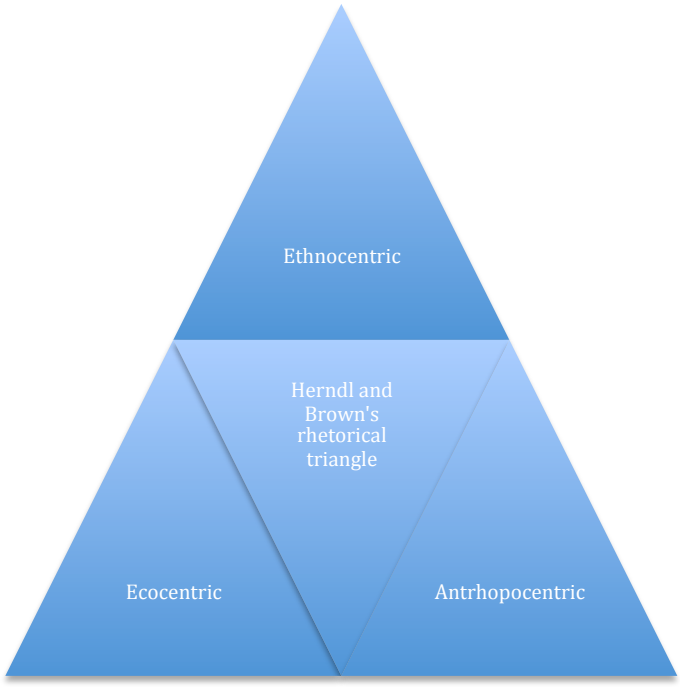

Figure 2. Three modes of ecological communication for governmental authors (Herndl and Brown 1996, 11).

The top of the triangle represents the communication coming from an author with a strong authority. This communication relies on a substantial credibility of the organization or agency communicating. They rely on their authority, and the tacit trust found in the name of their group to substantiate claims and validate decisions that are then communicated. Most of these agencies take a utilitarian tact, believing that nature should be regulated and used in many different ways. Herndl and Brown state that “in many ways this discourse is the legacy of [the founder of the US Forest Service] Gifford

Pinochot's version of a utilitarian management of natural resources which eventually won out in the contest with John Muir's wilderness philosophy" (10).

The Anthropocentric discourse represents the communication based in the science. The means of persuasion for the communicators using this tact lies in the society's trust of logic and the scientific process. Data and scientific observation usually accompany this type of communication.

The Ecocentric discourse represents communication that appeals to the emotions. Often this comes in the form of discussing ideals of nature, or persuading with images of the beautiful side of the environment, "locating human value in a harmonious relation to the natural world" (12).

While these represent three distinct communication methods, one could argue that none could be used with complete independence of another.

Public Policy Theory

Participation

As mentioned, in environmental risk situations, government agencies work to persuade audiences to act. A simple action is often helpful to end or mitigate the risk. However, the simple action is often not the ultimate desired goal of a governmental agency. Instead, the agency seeks to get people involved, and works to have them identify with the goals presented. Not only should they be educated about the risk, but—ideally—they will take ownership of the environment which is at risk.

At times, the agencies can do more to promote participation and inclusion. By defining two terms, scholars Kathryn Quick and Martha Feldman use language to draw the public and the agencies into more meaningful dialogue (2009). The two public policy terms and the definitions Quick and Feldman give are as follows:

- *participation* "public input oriented primarily to the content of programs and policies"
- *inclusion* "continuously creating a community involved in coproducing processes, policies, and programs for defining and addressing public issues" (272).

The term *inclusion*, as researcher Katherine Quick describes it, refers less to diversity of race or ethnicity, and more to *drawing in all audiences*. Aristotle mentions the importance of reaching as many audiences as possible, but when

the audience broadens, often the message becomes more generalized and less satisfactory with the public who maintain knowledge about the risk.

Therefore, it can be difficult for government agencies, considering the wide variety of audiences. Inclusion-focused communication seeks to draw in all audiences possible in order to promote public cohesion in policy building.

The authors build off of the idea that "engagement practices are not merely techniques to be acquired in order to organize meetings effectively, but highly consequential choices that shape the inherently political process of planning and policy making" (273). The authors want government agencies to "make use of community capacities to improve planning and policy outcomes in part by building community itself as a resource for decision making" (273). In other words, they want the government agencies to collaborate with communities.

In Quick and Feldman's research, they narrow the scope of the literature review to the authors focused on the topic of public engagement. The authors describe two concepts of public engagement. In the first concept, the public must force their way into the process. They call this *adversarial.* In the second concept, the public and the government collaborate to create policy. The authors advocate for this second concept, stating their wish to "push [the approach] further" (273).

Their research is a case study with four cases, each representing a different amount of inclusion and participation. All the case studies took place in Grand Rapids, Michigan. The author's methodology included interviews and

observation of meetings. Their data was longitudinal, or taking place over a long period of time. It was also from several perspectives and it provided an insider view of the situations.

The authors show how inclusion builds community. And the community practice increases ownership of policy.

In one case, an advisory committee of several critical residents succeeded in a task to distribute a shrinking budget. The advisors opened a narrow discussion into a broader one by asking "What do we want for our city?" instead of "What should we cut today?" This created temporal openness, leaving the door open for future decisions. They "reframed the mission of their group from overseeing public engagement to being the venue for public engagement" by firing a city-appointed overseer. They then co-authored budget decisions in tandem with the city officials (instead of just suggesting options) (281).

It surprised me that the officials took their suggestions to heart. It even meant firing one of the higher-up administrators. But their will to enact the citizen advisor's suggestion gave the committee actual power.

The authors state the following about the powerful idea of inclusion in public policy making:

> Inclusive practices involve creating community through sharing practices, bringing together what in other contexts might be different "cores"—such as different sectors or types of expertise—and creating together a moving, changing combination of them. (286)

But just because the advisory committee worked in one situation, the authors caution against using it in every circumstance. What worked in one situation may not work in another. They attempt to restrain people from creating a systematic approach to public policy, instead favoring an assessment of each scenario to find what works best (285).

Social Constructionist Model

Another study done earlier brings more definition to participation models. Waddell (1996) outlined the public's role in saving the Great Lakes. In the article he defines four different models of public participation:

1. Technocratic (the experts make the decisions without the public's input),
2. One-Way Jeffersonian (where the experts educate the public),
3. Two-Way Jeffersonian (where the experts explain their knowledge and the public explains their beliefs), and
4. Social Constructionist (where the public communicates both knowledge and beliefs and the experts communicate both knowledge and beliefs) (1996, 143).

Waddell writes that the technocratic model results in “devastating consequences,” as evidenced in the example of the Soviet Union’s environmental communication process (141). He cites Robert Oppenheimer, who opposed the United States hydrogen bomb development. Oppenheimer, in a 1954 security clearance hearing, suggested that the technical and complex

decisions made in secret by highly- educated and informed individuals ignored the “important moral and human consequences” (141).

The one-way and interactive Jeffersonian models come from different interpretations of Thomas Jefferson’s version of democracy. Waddell describes one-way Jeffersonian as the experts educating the publics in a one-way transfer of knowledge. While this represents transparency and openness for public process, it also assumes that the experts are always right—and the public just can’t understand their reasoning. The interactive Jeffersonian provides the public the opportunity to interact with the government agency and even push back for change. This model has the public bringing their values and their emotions to the agencies. Waddell says that in this model, “the public adjusts to expert knowledge, [and] the experts adjust to public sentiments” (142).

The idea of inclusion that Quick and Feldman favor easily falls into Waddell’s last category: social constructionist. This category validates two missing pieces of the interactive Jeffersonian model. Values and emotions can come from the experts and technical information can come from the public.

While it may seem odd for the role of the expert and the public to blur, this model acknowledges the large growth in the non-profit sector of highly educated professionals as well as the tacit knowledge and folk knowledge in public communities. Lindehan (2007) confirms this shift. As more and more NGOs work to decrease environmental risks, they may add professional researchers to their staffs and providing significant funding for in-house investigation regarding conservation problems. Consequently, "for some years now, a good

volume of conservation science is being generated by the NGO sector" including "much of the new and exciting research" in conservation (Lindeman 432, quoting Fonseca).

Waddell describes the social constructionist further:

> Under this model, risk communication is not a process whereby values, beliefs, and emotions are communicated only from the public and technical information is communicated only from technical experts. Instead, it is an interactive exchange of information during which all participants also communicate, appeal to, and engage values, beliefs, and emotions. Through this process, public policy decisions are socially constructed. (142)

EAB Communication Case Study

A case study regarding agency-pubic communication in the emergence of EAB was done shortly after the Canadian government initiated a clear-cutting method to slow the spread of the beetle (Mackenzie and Larson 2010). This case study examines the trust in a community-agency relationship between the community of southern Ontario, Canada, and Canadian Food Inspection Agency (CFIA) when infestations of EAB were discovered for the first time in Canada. The agency provided a rapid response to the pest by cutting down all ash trees within a barrier zone 10km wide and 30km long. Most of the removed trees resided on private property.

In cases like these, three things prevent participation from communities: The speed at which the government needs to react to prevent the spread (the "rapid response"), the lack of knowledge about the particular bug, and the length of time it takes to plan and create community-oriented participation programming.

Mackenzie and Larson write that the government should proceed with the participation of the public as much as possible. They state the following: "Generally speaking, citizens should be direct participants, as equals in face-to-face discussions with decision makers throughout the process and in advance of any actions" (1014). Some may disagree with this claim because they value the response of the agency over the participation of the group. They write the case study to "contribute insights that will reduce the social impact of future rapid response programs" (1014).

The study begins with a review of social articles on trust. This shows how a form of government might better gain the trust of the communities. They can do so by getting people to participate (1013).

Mackenzie and Larson explain how many citizens thought the government acted too slowly. They formed a coalition and pleaded for the government to cut down trees immediately. But when the government started removing trees, private landowners got angered (1016). Crews were held up, equipment was damaged, and there was a strong landowner vs. government struggle.

The study consists of interviews with people in the barrier zone. The authors took a snowball sampling of people they found interviewed in the

newspapers. They conducted 17 face-to-face interviews lasting one hour each. The interviews were transcribed and recorded, then coded.

In this article the authors cite from government sources, such as the Canadian government website and the USDA; newspapers, such as the London Free Press and Guelph Mercury; science journals, such as Journal of Forestry and Journal of Agricultural Environmental Ethics.

The article's short length prevents a reader from getting a greater context for the problem. Using qualitative research, the authors were able to demonstrate why the government's communication process received criticism.

The case study revealed many unhappy homeowners. Some cited a lack of institutional trust (1017), some cited doubts about the science behind the barrier zone (1017), and some citied concerns about the public consultation process (1018). To conclude, the authors provide some quick active response protocols for public engagement.

Methodology

I conducted three interviews to gather qualitative data for this research. As mentioned in the Process of Research section above, I contacted the MDA, a community forester and a public information officer. My process of selecting the interviewees came from my understanding of the communication process from the state (which has more resource to fund research and publications) to the local government levels (who I hypothesized would rely on the state's research and publications to persuade publics).

There were not multiple people to select from in each position. There was only one MDA communications coordinator for EAB, one forester for the community,[4] and one public communications officer for the community. So the selection process for the people was easier than the selection process for the community. As mentioned in the Process of Research, I chose the community for this research because it has yet to be infested with EAB, but it stands to lose a significant portion of its urban forest if EAB is found. This will affect the taxpayers, who will have to help pay for the removal of the trees,[5] unless the government provides relief money. This community presents unique opportunities to examine the extent to which government agencies are preparing community stakeholders.

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[4] There may have been two foresters, but I believe that was only because one was on a leave of absence.

[5] Although there are other options besides removal, such as chemical treatments, the forester mentions (later in the Interview section), that the community will not be treating trees—public trees infested will be removed.

For each interview with a government agency representative, I gained permission through Minnesota State University, Mankato's Institutional Review Board process.

To do so, I summarized my research for the IRB and submitted it electronically. The IRB requested some changes regarding specific IRB protocol for submission, which I followed up with and changed. I resubmitted a more complete form that included complete participation consent forms for any interviewer to sign. These can be found in the appendix.

I contacted the interviewee at least 24 hours beforehand via email (emails were collected from agency websites and referral emails. I informed the interviewees of my research project by explaining my thesis statement before asking them to participate.

I also informed the interviewees how the information will be used (to develop my thesis), that their information would be confidential (all digital files were locked and saved, and names of people and cities have been changed in the thesis paper to protect identities). This may seem unnecessary for a study on communication and invasive insects. I felt this way at the beginning of my research. However, as I conducted the interviews, I found that some of the interviewees' answers could cause conflict with upper management in their agency or other stakeholders, such a chemical company representatives, treecare contractors, or other communication officers in a different agency. These situations are intensified in smaller communities as well, where people might have to work closer with each other (such as a forester and a treecare

contractor), and word tends to get around fast about what one person said regarding another person's actions or ethics. I didn't want interviewees to be hindered from speaking freely regarding the communication around EAB, so I have made the changes to keep the interviewees anonymous.[6]

After setting the date and time, I brought a consent form for the interviewee to read and sign. I asked at the beginning of each interview if there were any concerns the interviewee may have had and let them know they could decline to participate or state something off the record with the recording device turned off.

I informed the interviewee that there would be no financial compensation for my interview. But I also informed them that, in the long run, communities may save thousands of dollars by having the community incorporate early prevention techniques based on requirements from government agencies such as the MNDNR, the MDA, and the EPA. Also, the prevention of the EAB's advance and communities' engagement in the process of slowing the infestation will decrease use of insecticides such as imidacloprid, dinotefuran or emamectin benzoate. While the University of Minnesota Extension found the chemicals do not harm woodpeckers or other insects, they can affect groundwater if applied incorrectly.

All data from the interviews was collected with a digital recording device, which was contained a password to access. After each interview, I downloaded

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[6] Of course, I recognize there is only one communications coordinator for the MDA, which can be found by anyone able to do a Google search. However, I made it clear that she could speak off the record at any time and still followed the IRB suggestion that her name be changed as well.

or re-recorded the digital file on my hard drive, which was also protected with a password. All consent documents were stored on my hard drive as well.

By August 1st (after my thesis defense), all digital data and documents will be downloaded to CDs and presented to Dr. Lee Tesdell for storing at MSU (also, any paper documents will be handed over as well) for at least three years. By August 1st, all data will be erased from my hard drive.

Interview

I conducted three interviews for the process of this research that follow the flow of information outlined by the Emerald Ash Borer Readiness Plan. I chose to interview Lucinda, a communications coordinator for the MDA; Renée, a forester in a medium-sized outlier community; and Clarissa, a director of public information in the same community. I've changed the names to protect the privacy of the interviewees. Each of the interviewees represents an integral step in the process of communication regarding the EAB (see figure 3).

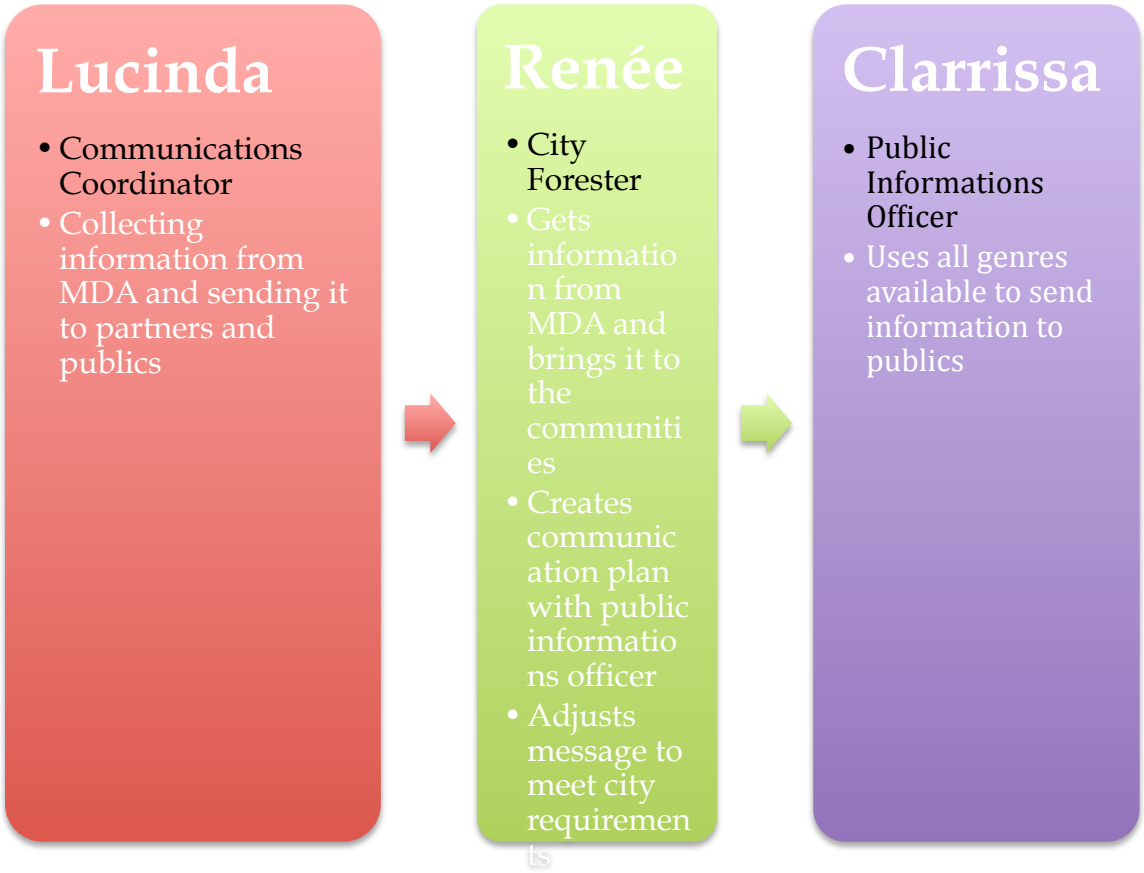

Figure 3. Flow of communication in Minnesota's EAB management with interviewee's occupation and role in the communication process.

I met the Lucinda at a restaurant in Minneapolis. The interview process lasted an hour and a half over the lunch hour. I spoke with Renée over the phone for an hour when she was in her office in the morning. I met with Clarissa at the intergovernmental center in the community for 40 minutes during the afternoon. During each interview, we discussed what it meant to effectively persuade the public in response to the environmental risk of the EAB.

Starting the Interviews

Before asking any questions, I reviewed the participation consent form and asked if the interviewee had any questions relating to my thesis, their privacy, or the information I collected. Then I reviewed the topic of EAB and how technical communications research could provide insight into agency communication strategies. After each interviewee gave consent for the interview, I asked if I could record the conversation. I then began recording and asking questions.

Establishing EAB as a Risk

I first established that EAB represented an environmental risk. The communications coordinator, Lucinda, agreed that EAB was an environmental risk to the state of Minnesota on many different levels. She noted that researchers recently found that Minnesota has 998 million ash trees—surpassing Maine to become the state with the largest tree population in the United States. She also noted air quality, ground water, commerce, and sentimental factors were all at risk if EAB spread throughout Minnesota.

Renée, the forester, also agreed that EAB represented an environmental risk. “It’s not a matter of *if* it’s going to come to [this community], it’s a matter of *when*.” The impending risk compelled her to stop the community from planting ash trees. Instead of ash, she advocates for many other species, and insists on a diverse group of young trees.

Clarissa mentioned it was a risk for the city, but stressed that it had yet to be found, and that communication at a large scale was not necessary until it was found.

Management

To act on this environmental risk, she worked with others to develop an EAB management plan for the city. At the time of the interview, her proposed plan had yet to be put through the city council because it could be years before EAB is found. Renée mentioned that maintaining just the draft state at this point gives the city flexibility in managing EAB. “We’re open to new ideas and new research for control based on what is found by other communities currently fighting and battling it,” she said.

The EAB management approach for the city would be similar to the Dutch Elm Disease (DED) management already in place. When DED is discovered in a tree on public property, the forester tags the diseased tree and either the city or a contractor removes the tree within a certain timeframe (usually within a month, if not earlier). If a diseased tree is tagged on private property, the property owner hires a tree company and pays for the removal—or removes it himself or herself—within the certain timeframe. However, if the property owner can’t pay

for it, the city hires a contractor to remove it and adds the cost of the removal onto the homeowner's property tax, which they can pay with a payment plan.

Renée mentioned research that recommended removing trees during the winter months. The research said infested trees could serve as magnets for more EAB, and the tree would collect larvae during the time of June and July. Then the winter tree removal would also take out the maximum amount of EAB larvae. Renée mentioned this could "take a bite out of the larvae population." However, Renée mentioned that "the number one priority for the future is making sure we have [urban forest] diversity so we don't have this problem in the future."

But what if a homeowner has sentimental attachment to a tree? Or what if they feel their ash trees could withstand an EAB attack with the help of insecticides? Do they have a right to decide whether or not their trees should be removed?

Renée says that if homeowners wanted to keep their trees, they could hire an arborist to treat them with insecticide. She says, "anyone that wants to treat their own trees, they certainly are welcome to do so. But we are requiring them to hire an arborist—no homeowner treatments, because there's no way to track that." If people opted to treat their trees, the city would provide treatment permits, so the treatments could be recorded. Then the treatments would need to occur on an annual or bi-annual basis (which is needed for effective treatment [Herms 2009, 8-9]).

Renée said the city would not opt to treat any ashes unless the community determined a certain ash was, in her words, "a specimen that we need to fight to

save." She continued, "Right now we're just kind of giving into that aspect of trees may need to be removed and this is just part of [dealing with EAB]."

She mentioned that people in the community were truly concerned, however, their concern was less for the ecological impact on the state or the regional forest.

> They aren't worried about the state of Minnesota or the city … they're worried about the trees in their yard—so I think the language that's been used has brought them on board for the concern of their own lot. It doesn't seem to be a concern for the whole community, but instead for their lot.

After referring to an information sheet first, Clarissa, the public information officer, also agreed that EAB represented an environmental risk, although she noted that because it had not arrived, it may not be one for several years. "Right now we're in a monitoring phase," she stated.

Regarding management, Clarissa mentioned that the city already had tree benefit programs in place and she felt that most residents were responding quickly to the city forestry programs to removed diseased trees. "Most people," she said, "when educated, they will respond by doing the right thing."

She also spoke of a "tree for life" program, which the community had invested in. When a person passed away, they could purchase a tree in memorial of the deceased. After doing so, a tag would be placed on the tree so people could remember the loved one. This shows community investment in the urban forest.

Clarrisa felt confident that using multiple messages through various mediums would persuade the community to stop moving firewood, to watch for signs of EAB, and to pay for any trees that needed treatment or removal. She concluded by saying, “It’s really a pretty simple formula. The educated staff gets the information and they interact with the homeowner. We do as much as we can to get the forest healthy.”

Developing Modes of Communication

I next worked to break down the different types of communication that might take place. I determined three modes of governmental communication to evaluate (see figure 4).

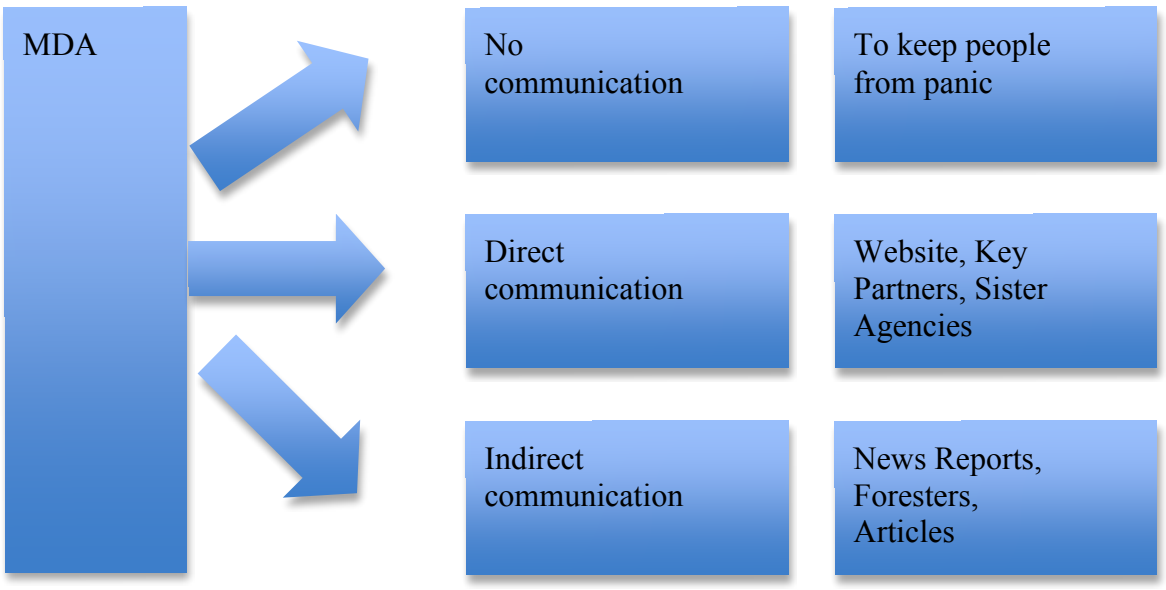

Figure 4. Three modes of governmental communication.

She agreed that these modes accurately divided government's communication regarding environmental risks. However, she suggested there should be strong emphasis noted for key partners and sister agencies in the Direct Communication category. Key partners are defined as cities considered infested with EAB. The communication with the cities is initiated with the foresters and the public relations officials and the city managers, who have to deal with creating city regulations related to removing diseased trees. Sister agencies for the MDA include the MNDNR, the USDA APHIS, and the University of Minnesota Extension. Much emphasis is placed on the direction communication with these key partners and sister agencies.

> There's no exact science to this … You have to formulate the key messages, and you have to send the message in multiple ways in multiple formulas. Effective communication is multiple mediums. They say you have to send your message 10 times for it to get picked up once.

No Communication

Each interviewee favored communication over the option of withholding information. However, Renée did say that many people, when they hear that an invasive species is coming, want to act immediately. Renée mentioned how slow the progress of the EAB has been so far, and how it may take a decade for the bug to reach the medium-sized community where she worked. Therefore, she didn't want to send the public *too* much information, because she felt if they heard too much about it, they would begin cutting down trees preemptively and treating trees too early.

Lucinda also mentioned this as a problem. There was one example of another small community where an arborist was interviewed on a radio show and told the listening audience that EAB had arrived in the community (when it was still 80-100 miles away). As a result, the community was confused about what they should do. In this case, no communication would have been better than the miscommunication that took place.

Some interested parties (such as treecare companies) feel that the MDA's communication, direct and indirect was not significant enough to warrant action. Because the MDA offered warnings on their pesticide information sheet and suggested waiting until EAB was found within [HOW MANY] miles of the tree, the some tree companies felt the MDA kept the information from publics about how fast EAB would move—or that it already may have moved, but just hadn't been discovered. Of course, some tree companies would stand to gain business if more homeowners removed trees and injected insecticides. So the MDA had to choose between information they felt was valuable (about insecticides) even though some of the key partners felt it was too much information, or misinformation.

This presented a communication conflict, the communication officer mentioned a pesticide information sheet. This genre is common in the department of agriculture. However, the audience is often specific: those who apply pesticides and have a background knowledge of the risks involved The general public may have misgivings when approaching a pesticide information sheet due to negative reactions regarding the chemical reference. Those used to

dealing with it would be familiar with the terminology and they may have tacit knowledge regarding the use and safe handling of pesticides.

When the pesticide information sheet was presented to the public, there was some conflict regarding chemical company (or companies) who felt the language used in the sheet presented an unflattering view of a tool which could assist the homeowners in saving their ash trees. In this case of conflict, the governmental agency went back to their values to determine how to phrase and structure the document. Their desire at the agency was to establish a stable and safe base of information for the use of chemicals. After evaluating, they decided to keep the document as it was originally written. Although there are chemical companies who feel uncomfortable with the way the government presents information, the agency still felt their greater persuasion was accomplished.

Renée mentioned the challenge of persuading people to choose good treecare providers. The city, she mentioned, cannot recommend a contractor. They can provide lists and tell the public to hire ISA-Certified arborists, but that's about all they can do. "I know there are contractors out there that aren't as qualified as others and that's something that the public is going to have to work through."

When I asked Renée about doing programs throughout the community to talk about EAB before it is found in the community, she said she preferred to do them on a request basis. Any more than that wouldn't build more interest, she felt, but instead would build fears that the bug was already present in the community.

> Right now we do presentations based on request. The reason for that is this: the last thing I want to do is create a mode of panic where we start talking about it a lot. There's people that are going to think, "Well, it must be here and they just aren't saying anything yet."

When a treecare company from the Twin Cities offered to travel to Renée's community to put on an educational program about EAB, she declined their offer, citing possible fears that could arise in the community. Renée felt the company offered quality education and good presentation without a sales pitch (they don't service Renée's community—although the pesticides they developed could be used in the community by other treecare companies). However, she only wanted them to come when EAB was found closer to the community's border.

Clarissa said there wasn't any scenario in which the government wouldn't release information. "Our goal in government is transparency. Transparency is absolutely key. All we are is a conduit, we are here to serve the people. It's inherent that sometimes conflict is a part of the communications process. But again, we don't really have a current example of this."

Even if a faction of the community didn't want information released, Clarissa said that would be a good thing because then the community would flush out the details.

Direct Communication

When Lucinda asked how the MDA persuades the public to protect the environment while losing financially, she first mentioned how the main audience

is narrowed to urban residents. This doesn't take into account the Winona and Houston Counties; however, she talked about how the agency works to frame the situation outside of the environmental movement.

> A lot of people don't care about the environment. In order to reach a broad audience, you have to have a broader message. One of the broader messages is this: How do the trees affect them? … Ultimately, we leave the decision to city agencies and homeowners. We don't take a 'This is what you have to do now' approach … we tell cities and residents, 'We know this is going to cost you; There's a good chance this is going to come to your town, and here's what you can do about it.

The officer stated that the communication's aim was to get audiences to weigh cost benefits of a future problem, not just by looking at the present time, but to get them to envision a long-term idea.

With the diversity in the direct communication's audience, getting across a timely and consistent message was challenging. The most effective genre of communication was direct, personal messages, one to one. She mentioned "talking to someone they trust" for public participation as a very important method of persuasion. For those people buying trees, a physical card that is attached to the tree is the most effective. While some states provide signage when leaving counties, the communication officer mentioned being frustrated that there was not money for a genre which would be effective in persuading people to meet the regulations presented by the MDA.

But instead of adopting one genre to conduct direct communication, the officer found it best to pick key people in the sister organizations and set up a "phone tree" to only communicate to those key individuals.

> For me, email is the easiest. But a lot of those master gardeners don't have email! That's why we send it to the agency, we know they will figure it out, give [the master gardeners] the information they need, and we'll rely on [the master gardeners] to send it out however their constituents prefer.

Also in direct communication, the agency risks confusing publics because of compliance agreements. The compliance agreements allow for cities on the northern border of the quarantine areas to move wood outside of the quarantine zone because the waste facility is just down the road, but across the county line. The compliance agreement includes that the wood not be moved during EAB movement months. When the MDA issues the compliance agreement for the city to move wood across quarantine borders, other publics can get confused and think that they too can move wood, just not during the EAB movement months. The most important thing to remember when doing Non-Direct communication was building relationships in order to provide the interpersonal trust and context for the message.

Direct communication with waste sites proved difficult because "there's no consistency among waste sites! So we've given them options to make sure that they aren't violating the quarantine too." Because the sites were so varied in use (some only for residents, some for multiple counties), sending the same message for every site was impossible. A lack of money and staff at some waste sites also

made it difficult for them to follow through with action, even if they did understand exactly what the MDA expected of them.

Invasive terrestrial is a term used in the MNDNR agency, but this confuses many publics, according to the MDA officer. “How do you say, ‘All of these things are going to be a problem?’ I go to invasive species … of a lack of better terms.”

What terms offend the public? “Alien. Non-native species. However, non-native isn’t the correct term, because some species that are non-native have become established, such as the Japanese Beetle” [43:00].

Focus groups are used to determine the effectiveness with large campaign messages such as advertisements and billboards.

For Renée, the most effective genre of direct communication was face-to-face conversation. She mentioned the difficulty of convincing people to pay for a tree removal, reduce property value, and lose aesthetic value—all for the environmental benefit of the community.

> As far as convincing them, a lot of times I point back to Dutch Elm Disease. Because we have a lot of people that remember that. Either they were adults at the time or they were just kids and especially as kids there was a big impact in their mind. They … do remember that they used to have trees lining the streets, and then there was nothing. And how hot it was. And nothing looked the same. Typically, I bring back that image of Dutch Elm Disease, and how EAB could cause that same effect because of how heavily ash trees were planted. They think back to that and realize that, “Yeah, we need to do something.” And I’ll usually throw in the

promotion of diversity at that time, and how diversity can help prevent this sort of an impact in the future. And at that point they are usually very open to different species and they will even ask, “Well, what do you recommend that we plant? … What would be best for my site?”

When I asked about the more effective genres of persuasion, Renée mentioned ones she would use if EAB was found closer to the community. She mentioned conducting meetings with neighborhood committees where she would share visual presentations and provide MDA handouts. Her preferred documents were as follows:

- MDA Q&A Document: Do I have EAB?
- MDA Document: EAB Lookalikes
- MDA Document: Wallet-sized Cards for EAB (with actual size photos).

Renée mentioned two ways to get information to the publics that don’t attend the meetings. One way was to connect people to the MDA documents through the city website. Another way was to provide information through the “311 Desk”, which is a phone number city residents can call for basic information. The people working at the 311 desk could provide more information. Renée said she would work with Clarissa to make this happen.

“I think we are going to tap into every avenue that we have for public information to try and ensure that everybody gets the message, one way or another.”

Renée supports using war metaphors to describe EAB. Because she relies on the public to watch for EAB or other significant problems in the

community's forest, she relies on the war metaphors to create a distinction between EAB and other, native borers. These native borers can be of a similar size, but only do minimal damage to the urban forests because they have natural predators and other checks on their population. While all of the boulevard trees and 90 percent of the community's park trees have been surveyed, the majority of trees grow on private land. From the standpoint of EAB management, the trees on private land are very important.

> We don't necessarily have a good idea of the ash trees in our community. We know what trees are in the public sector. But as far as the private side … I don't even have a good number to even think about, you know, how big of a management this is going to be.

Describing EAB as the "enemy" or something to "war" against can help publics understand the severity of the impact EAB could have, according to Renée.

> I think the war metaphor draws attention to the layman, someone who knows very little about trees and very little about insects. I feel that is a good metaphor because it makes them realize that … this must be a big issue. Without the war metaphors, I don't think people would pay that much attention, even to what type of tree they have.

In the power structure of communication, Renée conceded that the one-way system of communication was authoritative. But it also provides consistency for publics.

> If it's too much two way, well one community will do it one way and another community will do it another, but for something like this, I think the consistency is important. If we just follow the MDA recommendations and such, then we know that we are doing what everybody else is doing and that's the best because the MDA is the driving force right now; so they are going to have the latest information on management and that sort of thing, so that's … who we should be listening to.

Clarissa mentioned both direct and indirect communication as the main modes of communication. She mentioned several modes of communication, authored by the public communications staff, with input from the experts, which Clarissa defined as the forestry staff. The direct communication might take the form of the city website, an RSS feed, an email list, or direct one-on-one information at a city neighborhood meeting.

She said that after EAB was found nearby, the public information staff would get together with the forestry staff to author informational documents and plan a communication strategy to communicate to the publics. The natural audience she mentioned was homeowners. She did suggest the city needs to be a "responsible agent" for persuading people. While the MDA did a good job persuading with their level of expertise, the city also had a part to play in influencing people to act in response to the risk.

When I asked about power structures, Clarissa mentioned that the power could be shared for communication. She mentioned that the best place for homeowners to communicate would be the neighborhood meetings that take

place throughout the year. The public information office has staff liaisons to each of the neighborhood associations. They meet on a “fairly regular” basis.

> We get a really effective feedback from the neighborhood associations. And with technology the way it is today, people can get a hold of us through any avenue. But what’s most effective for communication from the public changes based on circumstances.
>
> The type of rhetoric that would be used?
>
> It would be very plain-speak. … our job is easy! We focus on the key messages. We’re just honing in on one specific topic. Common sense is the overarching principle. Craft the key messages, then use multiple mediums.

Clarissa was aware that Renée was developed a management strategy, but was continuing to adapt it with more information regarding EAB. The community stood at an advantage, she stated, because they could learn more from the Twin Cities communities already infested.

Indirect Communication

I shared a story about a news clip I watched from a local newscast where a newscaster explained what EAB was. During the voice-over explanation of EAB, a graphic showing dots throughout the state appeared. The map zoomed in slowly for two seconds and disappeared. I viewed the news clip with my laptop screen, which present a visual challenge when deciphering just what the map displayed. The initial reaction from hearing the newscaster explain how the bug could kill millions of ash trees seemed to imply that all the dots on the screen

showed where ash trees had died! I watched the video two more times before I could read the top of the map, which read “readiness traps in the state of Minnesota. I told her that I felt people would get the wrong idea, especially if they don’t know much about EAB before seeing the news clip. I asked her what she though about he news coverage after she worked hard to put out a press release regarding EAB. Without established relationships with media and training members, the content can travel without the appropriate contextual understanding of the message. She gave an example how building relationships with media members strengthened the mode of indirect communication.

“I read every story that comes out about EAB. And I can’t think of a single instance when I thought a story was perfect.”

While the indirect mode of communication opened the door for misunderstanding, she mentioned how it could also be very successful in getting the public’s attention. She used the example of EAB-smelling dogs which were recently trained and brought into Minnesota. The actual impact they will have may be minimal to other biological controls, but “it was a great story.” Because it was a great story, the MDA received a massive about of media coverage and media hits. “Sometimes I have to keep in mind just how much a good story means to the public. We can spend a lot of money on advertising, but if a good story gets to media outlets, people will be interested, and people will be more aware of EAB in Minnesota.”

However, to get the information to the public correctly, without obscuring or misstating the details and complexity of situation, the communications officer

stated a preference for the indirect communication in print instead of television (due to the larger space for the audience to process the information). She stated that no matter what the media, the essential element for communicating the technical information was this: building relationships with the right reporters.

To illustrate, she shared a story. She had built a relationship with a key reporter, one who had a background in environmental knowledge and had a credible history covering environmental issues in print. This served as the contextual understanding to further explain the individual documents (press releases or speeches) sent. At one press release, the print publication sent a different reporter to cover the story. The communication officer didn't have a relationship with the reporter and the reporter didn't have the educational background to understand the context. As evidence, the communications officer said that after the press statement, the reporter asked why the government had released Asian carp into the rivers. When the time came to report after the press conference, this reporter had a much different story than other news outlets (and less desirable from MDA standpoint). When a reporter with a relationship established and a background in environmental education reported the story, it had a much different layer of substance and message. When the reporter without a relationship with the communications officer and without an environmental background reported the story, it didn't persuade the public.

I asked Renée if the city forester should be a point person for the treecare companies in the community. Should she direct treecare providers in new treatment techniques and information, or should it be the MDA's role? This

question wouldn't be practical in a large city of over 100,000, where there are likely to be many treecare companies and fewer forestry staff. But in small- to medium-sized communities, it could be practical for city forestry workers to be the point of contact for the treecare companies.

Renée didn't feel comfortable being the point of contact for tree companies. She said the following:

> I would prefer that the MDA [be the point of contact], because otherwise I feel like the contractors would develop an opinion such as, "The [city officials] are putting their nose where it doesn't belong; they are putting their ideals and ideas into my business. Who are they to tell me how to run my business?" Verses if the MDA did [the communication], well they are the government agency overseeing this and that would have a lot more push to them; it would be something [the treecare companies] would have to listen to, verses, "Oh, it's just the city telling me I need to do this, this, and this."

Renée also mentioned tension that arises from the contract process for removing trees. If a private homeowner can't pay for a tree removal on their property, but it is found to be infested with a pest, the city will open a bidding process for treecare companies to bid on the job. This can pit one company against another and create conflict. The author matters greatly in such situations.

"If the MDA is telling everybody, then I won't have anyone forming the opinion of, 'Well, since I wasn't as receptive to their information, I didn't get the

job.' They form opinions of each other. 'I'm more qualified than he is, but I didn't get the job.'"

When I asked what the MDA could to better in their indirect communication through city foresters, she said it was difficult to answer the question because she felt they did a terrific job. She gets a email newsletter from the MDA updating her on any new findings and she also checks their website for updates on EAB studies and movements. However, she mentioned one thing that could improve:

> The main reason I haven't gotten stockpiles of their publications is that the ordering process isn't cut and dry. It doesn't say, "Contact these people to receive these publications." They are there and I can get them, they don't just tell me how to get them. I'd probably get 100 copies to start with. Right now we don't have a lot of copies of the documents. I don't want to publicize it because I don't want a panic, but as it gets closer I definitely want that information available to the public and for them to be able to pick them up and use them.

She also mentioned a versioning system would be helpful so that she always had updated information sheets. For example, there was a document about the wasps released as a natural biological method of slowing EAB. But the document didn't have much information on it because of the short period of time the effect of the wasps had been studied. Most likely it will be updated in the future, but Renée didn't want to be giving outdated information to the public, so it

was difficult for her to determine how many sheets to print out without wasting paper or laminating costs.

When I asked Renée how she felt the city forester could better communicate with the public, she mentioned that they could utilize indirect communication more. The genres in indirect communication might cater to a different audience, she suggested.

> We do a lot with our website, and we provide a lot of free resources through email—but the elderly will more likely sit down and read the newspaper. As EAB approaches, I foresee that we will use the newspaper a lot more to get information across.

One article that did come out in the community was from the University of Minnesota Extension. The article asked for volunteers to help survey trees on private property so the community could have a better idea of the amount of ash trees growing in their borders. Many people showed up for the volunteering opportunity and committed to doing it again. However, Renée mentioned that the article could have been improved by saying *how* the information could be used. She said many people might have been skeptical because they thought the survey would waste time and not contribute to a larger cause.

Clarissa mentioned that the media outlets offered the public information staff a way to communicate complex information. When the information might be hard to communicate to publics, she suggested letting the journalists work out the details of the information and present it to the public. This does display a

large level of trust between the information officer and the indirect means of communication.

Discussion

I sought through this research to determine how government agencies worked to persuade publics in environmental risk situations such as EAB's emergence in Minnesota. I hypothesized that much of the persuasion happens through direct communication from a government agency (in this case the MDA) to the publics.

Through the MDA literature and the three interviews I found a strong communication plan was in place and local governments engaged in persuading publics—all before EAB had been found in the community. Both the forester and the public information officer I spoke with cited the MDA as the lead agency and praised the MDA publications.

All the interviewees agreed that EAB poses a significant risk to ash trees state of Minnesota, and two interviewees indicated it was challenging to persuade people to invest financially while losing property value in order to curb the environmental risk. Both the forester and the MDA communications officer recognized a challenge in the task of producing rhetoric to persuade. However, the public information officer felt that "people will do the right thing if they are educated on the details," and people would be fully educated by the multiple genres and mediums of communication sent from the information office. From her perspective, it was little different than persuading people to abide by any other city regulation on noise, signage, or property taxes.

No one type of communication was cited repeatedly for being the more persuasive than others. Instead, the forester and public information officer look to

a genre ecology to persuade the publics (Spinuzzi 2004). In other words, they don't cite one or two documents as being the key resources to persuade a homeowner. The forester might have a short conversation with someone in their yard, and then give him or her three MDA publications and a phone number. The homeowner might reference the three of these while looking at the *eab.info*, which he found on the MDA publications, then call a treecare specialist and ask questions related to his or her specific trees.

The forester and the public information officer regarded the authorship of the MDA highly. Both felt that MDA produced multiple genres which worked together with one another in both digital and print formats. Some examples and their uses are as follows:

- Informational documents to persuade publics to do a variety of tasks, from identifying ash trees to understanding the EAB problem.
- Identification cards (wallet-sized and laminated) to persuade publics to differentiate EAB from several other similar looking insects (a difficult task for someone unfamiliar with entomology or arboriculture).
- E-mail lists to keep publics informed on developments regarding EAB.
- Websites posting group scholarship between Universities and government departments.
- PowerPoint presentations to persuade publics to identify the warning signs of EAB.
- Videos with full audio to persuade publics not to move firewood.

This is not a complete list of the MDA genres, but it shows the variety of mediums and genres used to persuade publics about EAB.

The forester mentioned that the print formats also met the needs of their audience by veering from the typical “information sheet” genre (one piece of 8x10 paper with illustrations and writing on both sides) by always including contact information for public response. Also, in the case of the insect comparison document, the MDA provided a wallet-sized, laminated paper, which the forester said persuaded people to learn the identity of several insects and differentiate them from EAB. In the case of any physical documents, concern came up that they could be outdated quickly, and this concern prevented the forester from using them to persuade publics before EAB had arrived.

One informational sheet caused some conflict among various publics. The Homeowner Pesticide Information sheet, available online as a PDF, successfully cautioned homeowners who considered chemical treatments for trees (according to the MDA communications officer and the forester). The MDA-authored document displays all the chemicals available to the homeowner in a well-designed table. Some conflict arose regarding how strongly the document persuaded the homeowners to either stay away from the chemical materials entirely, or do it themselves instead of hiring a professional arborist to treat the tree. Some of the publics who offer services related to EAB treatment, such as chemical companies and treecare companies, mentioned some dissatisfaction with the persuasion. Some of them even questioned the goal of the document,

and felt that the document demonstrated the inability of the MDA to make a firm decision to treat trees or to let all the ash trees go without chemical management.

Interestingly enough, one method of communication unexpectedly brought participation: the MDA's purple EAB traps. These triangular EAB traps were set up around the state of Minnesota with no cost to cities, and they presented a communication method. MDA and MNDNR workers hung the traps in ash trees to catch EAB. But the traps draw curious onlookers, who look to the signs placed on the tree for more information. The signs are laminated paper wrapped with clear wrapping so as to not injure the tree, and they describe the purpose of the trap and offer ways to communicate with the agency (with a phone number and website). The communication strategy here is to create a mystery for the public to investigate. Also, the traps allow for the public to interact with the MDA; if one falls, they can call the number and get it placed back up, or respond if they felt something was wrong.

There may be some potential here as well when people are discovering an answer, they become more confident about sharing the answer with others, as opposed to being told by a message in the mail, on a billboard, or on television. They have come to the message instead of the message coming to them. Specialists involved in managing the EAB have also mentioned the traps have become a public awareness tool (Dunens et al. 2012, 5).

When speaking with the forester, it was obvious that she preferred direct communication. She spoke highly of people's reception to MDA documents, but she offered many instances where being physically present in the community

offered the strongest opportunities to persuade people to (1) be observant for the environmental risk, (2) educate themselves further regarding the environmental risk, (3) prepare themselves to invest financially in responding to the environmental risk, and (4) recognizing the importance of diversity in urban planting. For the forester, the stronger goal of the persuasion wasn't regarding EAB in this environmental risk; it was regarding diversity in urban forests. Using past examples of environmental risk (with DED), people were persuaded to plant a diverse urban forest, forgoing the ascetic appeal of a street lined with the same size and type of trees. However, none of the interviewees talked about the IPPC as a potential audience for persuasion regarding EAB. Although they are focused on communicating to the Minnesota population (as focused in the EAB Communication Plan) the root of the problem (shipping containers hosting pests) seem to be completely absent from any discussion or communication besides a mention of how EAB arrived. While this cannot be expanded on in every MDA publication or meeting, there didn't seem to be any persuasion along the line of communication regarding the *source* of the environmental risk. All persuasion was directed toward stemming the movement of the pest and overall forest education.

All interviewees rejected Larson's suggestions of reducing war metaphors. The forester and the public information officer cited effective public awareness that war metaphors produce. The only interviewee who expressed some hesitation for the effectiveness and moral responsibility of any term was the MDA communications officer, who stated trouble with the terms "invasive" and "non-

native." Many of her statements echoed Larson's: the term "invasive" implies action by the insect, "non-native" has political implications—and neither may be correct after a significant amount of time. However, on the war metaphors, such as "battle" or "destroy," the MDA communications officers said that they help with persuasion.

Sending out more information to indirect sources can provide more coverage to publics; the communications officers' experiences show that building relationships with reporters who have backgrounds in environmental communication allows for a great change of public persuasion. However, the public communications officer placed much greater trust in the ability of the journalists. Where the MDA officer mentioned that there was "always something that could be better" in a TV, print, or web genre of news, the public information officer stated that journalists "know what they are doing—they'll do all the research before they put it in the paper, they have to know a lot about this before it goes to press."

And although the technical information is important, it helps the indirect communication get attention if it comes packaged in a story, as seen from the MDA communication official's example. The story draws the audience to the technical information, providing audiences with a greater patience and willingness to interpret data presented. This can present a temptation for communication officials to elaborate or stretch environmental communication, even if unintended. Often in environmental contexts, the stories display an element of the sublime, or the vision of a nature restored and ideal. Researchers

Rosteck and Frentz (2009) write about how stories that relate to conservation persuasion often rely on an imagined version of nature by painting images of it as sublime.

> For more than two centuries, artists and writers used the sublime to evoke emotional responses toward nature, to confirm aesthetic or ethical beliefs about nature, and to call attention to particular landscapes of settlement, tourism, or preservation. In other words, from its very inception, the sublime as a style has been thoroughly moralized. (16)

Stories bring attention, but they may also present a sublime version of nature as the ultimate goal while the violent and chaotic version of nature is ignored. Although there may be temptations to take this to an extreme, the values recorded at the core of the organization will assist in keeping the communication honest and on purpose.

Most interesting among the interviews was the category of communication as one-way Jeffersonian and interactive Jeffersonian. Where the forester and the city communication officer mentioned some opportunity for the public to be involved in communication, it would be communicating morals and values, not any expert knowledge. Each interviewee reported that the government agency held the power in the communication. Giving the public power would “get messy” according to the forester. The admission from the public information official that the public would “do what was right” if they only could “be educated by the experts” demonstrates the one-way Jeffersonian model of communication. However, each interviewee did mention that the public had opportunity to provide

feedback on the EAB management. The forester mentioned that people could get a hold of her if they had any questions and the public information officer mentioned that “the city has a information desk that people can call” if they wanted to provide their opinions. Neither of these methods demonstrates an easy opportunity for communities to respond together, however, or for a larger governmental audience to hear their concerns or expert opinions. It could be though, that at this level, the forester and the public information officer feel that there is little they can do to change how the MDA suggests EAB be managed. The forester mentioned that the MDA was doing an excellent job; the public information official mentioned the MDA as the experts who have great information already available. But they wouldn’t want the public to provide an entirely different management plan because then they might be put at odds with the MDA and other state offices.

The MDA communication official expressed more of an interactive Jeffersonian model of communication. She noted that the agency is the one with the power, although the communities do have numerous chances to respond, the most popular of which is a spoken media: the telephone. The most feedback comes from this “Arrest the Pest Hotline” a phone number that citizens can call to report EAB. Once the call is placed, a voicemail can be left and a member of the agency will call the person back and determine a course of action. This one-on-one communication has been the most successful at getting feedback. However, the agency has decided to change the name. The term “hotline” gives it an immediate tone, but when no-one answers and the caller has to leave a

voicemail, he or she may feel confused or deceived. The agency took the "hotline" phrase off; now concerned citizens can call just the "Arrest the Pest" number. Because in order to build trust with the publics, it's a bad idea to only have them talk with a computer-generated voice when they expect an entomologist to be waiting for their call.

But again, this provides an opportunity for the public to respond with emotions and values. The MDA communication official mentioned that people call and say it's a waste of tax dollars, people call to rage against the chemical insecticide industry. Although people do provide eyewitness accounts to possible EAB movements, most often they will get responses of education. MDA officials will call back to confirm the size and shape of the insect or the hole, the type of tree, and the possibility that the resident actually has EAB. This again provides people with a way to solve a mystery—like the purple traps. Who will find EAB outside of the areas where it is already found? Could it be you? The element of being a detective does draw people to participate. But most of the calls aren't about the management process or from people providing their expert opinion on how EAB should be managed.

This research would be lacking if I didn't mention the dozens of other ways for the public to respond, through multiple meetings, website comments, correspondence with MDA officials through email and phone, interactive kids programming—and every publication I've seen from the MDA has email addresses and phone numbers that the public can use to provide information and address the government agency.

Conclusion

In Minnesota, in the case of EAB, the government uses a Jeffersonian mode of communication with an ethnocentric and anthropocentric motive. In other words, the government uses its credibility as a government agency and its reliance on scientific principles to persuade publics, while (sometimes) revising their message based on the values and beliefs of the pubic. Also, they find war metaphors persuasive, and suggest their use.

At the beginning of this study, I asked how the government persuades people in situations of environmental risk. I hypothesized that much of the persuasion happens through direct communication from one government agency to the publics.

While the government agencies do persuade through direct communication (authored documents, presentations, one-on-one discussions), they rely on indirect communication to present a storyline and generate greater interest for people to pursue direct communication.

Each agency sends their message through multiple mediums to persuade publics to action regarding environmental risks. They show awareness of the diverse audience they need to reach in order to slow the spread of EAB, referring to informational phone numbers, RSS feeds, Facebook pages, direct mail options, billboard and TV ads, just to name a few. Still, three specific recommendations were made by the interviewees:

1. Provide a system of versioning online documents so foresters can be sure they have the most updated information before handing out hundreds of papers.
2. Provide easy access for foresters to get large quantities of the physical copies.
3. Provide physical signs along roadways at county lines to inform and persuade drivers not to move hardwood out of quarantined areas.

However, much of this communication follows an interactive Jeffersonian model at the state level and a one-way Jeffersonian model at the city level. The balance of the rhetoric used in most of this governmental persuasion is heavily weighted toward the government as a source of power and influence. There is more potential for more dialogue between agencies and publics to continue building on the positive examples of communication already in place. As Quick has also found, most messages currently tends to be unilateral, although it could be bifurcated more (2012).

More research to gauge the public's opinion on the government's rhetoric will provide context for the government agencies to communicate in. I suggest that more research be done using quantitative methods to find the Minnesotans' preferred way of persuading and providing inclusion in government agency management options, especially in relation to EAB.

The communication methods used by the MDA and the advanced structure set in place far before the initial infestation have been effective at managing a communication strategy where there is a central agency streamlining

all messages to multiple publics. While the process of involving the publics could continue to be improved at lower levels of government, most agree that the MDA has brought a gigantic amount of information forward to educate a mostly willing public to act in response to an environmental risk. It is my hope then that other state agencies may find this research helpful in maintaining their urban forests with the help of the publics. In the end, we might have our ash trees for longer periods of time than currently expected, providing people, young and old, with shade and majesty of these large plants and our urban and rural environments.

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Appendix

Interviewee Participation Consent Form

Communicating Environmental Risks

You are invited to take part in research about communicating environmental risks in small- to medium-sized communities. You are a potential participant because you either a) have a role in communicating environmental management, or b) could be affected by environmental risks to the Mankato region.

For example, an invasive species called the emerald ash borer may be found in Mankato in the next three years, according to some estimates. The arrival of this pest could result in thousands of ash trees being cut down. This includes boulevard trees, public park trees, and even trees on private property. I (Jonathon Heide) am conducting this research in order to better understand communication methods regarding environmental risks. This research will complete my MA in English: Technical Communications at Minnesota State University, Mankato. I ask that you read this form before agreeing to participate in an interview.

Purpose

The purpose of the research is to explore the communication methods between government agencies and communities with environmental risks.

Procedures

If you agree to be in this research, and sign this consent form, I ask that you allow me to interview you via phone or in person. I will record the interview with a digital recorder and take notes. Participation should take no more than 60 minutes or less.

Risks

Potential risks include: having confidential information stolen if the digital recorder is stolen. However, the digital recorder will be locked automatically and information will not be accessible without breaking the digital lock.

Benefits

The benefit of this study is that the government agencies will see the best ways to communicate risk in small- to medium-sized communities such as Mankato. The final thesis project will be assess the needs of Mankato citizens as well, and those needs will be made public to the government agencies. There is a possibility that the community's communication will be enhanced when creating an action plan when emerald ash borer reaches Mankato.

Compensation

Sorry, no compensation will be given for participating.

Confidentiality

All interviews will be conducted with a digital recorder and physical note taking. I will keep all physical documents locked in my MSU office. All digital recordings will be stored on the digital recorder (under digital lock) until transferred to files my hard drive (also under digital lock). By May 1st, all digital and physical files for this project will be stored digitally at MSU, in the secured office in the English department. The research will be kept in a secure location for three years before being destroyed.

Voluntary nature of study

Your decision whether or not to participate in this research will not affect your current or future relations with Minnesota State University, Mankato or any government agency. Even if you sign the consent form, you are free to stop participation at any time. You do not need to complete participation if you feel uncomfortable doing so.

Contact

I, Jonathon Heide, am the researcher conducting this study. For any questions or concerns regarding this research, you may contact me (email: jonathon.heide@mnsu.edu, phone: 612-987-1031). Also, for any questions or comments regarding this research subject, conductor, or method of conduction, feel free to contact the investigators (professors who oversee the research. Their contact information is:

Principle Investigator: Dr. Lee Tesdell (email: lee.tesdell@mnsu.edu, phone: 507-389-2117).

Secondary Investigator: Dr. Nancy Mackenzie (email: nancy.mackenzie@mnsu.edu, phone: 507-389-2117)

If you have any questions or concerns regarding the treatment of human subjects, contact: MSU IRB Administrator, Dr. Barry Ries, Minnesota State University, Mankato, Institutional Review Board, 115 Alumni Foundation, (507) 389-2321.

I have read the above information and understand that this survey is voluntary and I may stop at any time. I consent to participate in the study.

_____

Signature of participant

_____

Date

☐ Participant received a copy.