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PESKY PESTS OF THE GREAT LAKES STATE: IS PUBLIC PARTICIPATION
INFLUENCED BY GEOGRAPHIC DIFFERENCES?

By

Angela W. Yu

A THESIS

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

In Environmental and Energy Policy

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2013

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This thesis has been approved in partial fulfillment of the requirements for the Degree of
MASTER OF SCIENCE in Environmental and Energy Policy.

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To my Father

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Abbreviations

CWMA	Cooperative Weed Management Area
KISMA	Keweenaw Invasive Species Management Area
L.P.	Lower Peninsula (Michigan)
MD	Metro Detroit (Michigan)
U.P.	Upper Peninsula (Michigan)
WUP	Western Upper Peninsula (Michigan)

Abstract

In Michigan, environmental issues, such as invasive species, are not geographically constrained, affecting citizens throughout the state. Regulations and management plans organized by scientists and officials are intended to address issues statewide, but these policies may not adequately tackle the threat from invasive species as it impacts different parts of the state at different times. Participation and contributions from citizens can offer insight into the impacts and changes non-native species have on the local ecosystem. However, chances to participate and contribute may be influenced by geographic location in the state. To understand if this was the case, this research studied publicly available documents and completed participant observations and semi-structured interviews with participants, leaders, and officials included in invasive species management.

Between the two study locations, Metro Detroit and the Western Upper Peninsula of Michigan, locational differences had some impact on opportunities to contribute to invasive species management. Population and the differences in the type of advertising used to alert citizens about events influenced access to participation opportunities. This research also revealed that this public policy issue lacks public involvement and contributions. Between the two locations, more involvement opportunities and organizations were present in Metro Detroit. However, it was the organizations themselves and their limited political involvement, and not geographic location, which had a greater impact on citizens' lack of participation in invasive species management.

Chapter 1: Introduction

Aquatic and terrestrial invasive species are a constant threat to not only to the forests, rivers, and lakes of Michigan, but also can impact humans and their relationship to the environment. Invasive species have the capability to decimate the populations of native organisms and can alter neighborhoods and other ecosystems. Communities and residents who rely on the environment for natural resources, economic wellbeing, recreation, and aesthetics will be directly impacted from these species (Boudjelas 2009). Because of the ecosystem changes that invasive species create, management programs intended to address the effects from invasive species could benefit from citizen input. Public participation can offer a different perspective on issues that may not be otherwise known by officials and leaders.

Public participation allows officials to gather additional information about policy issues since citizens are given an opportunity to contribute concerns and ideas that may help influence public policy decisions (Cogan et al. 1986; Brody et al. 2003; Hutcheson 1984). Including citizens in invasive species programs can create more effective control and management plans. While public participation is not intended to replace a representative governmental system, its intent is to complement a governance system (Fung 2006). Citizens and officials should work together and share ideas about issues and topics that need to be focused upon.

Public participation, in regards to involvement of people in political issues that address environmental topics, such as invasive species, should be equally accessible to all citizens regardless of their standing in society or where they may live. However, this may

not always be the case as availability of resources and lack of citizen interest play a factor in successful involvement opportunities. This may be due to geographical differences, such as rural versus urban areas within the same state, in an issue that impacts a wide population with no spatial boundaries.

In order to make public participation accessible to all citizens regardless of where they live and their personal characteristics, such as income level or educational background, there needs to be recognition of any type of variations due to place. These variations include how people may interpret issues and how the issue has impacted locations differently. Citizen perceptions of invasive species and other environmental concerns may not have any geographical differences (Huddart-Kennedy et al. 2009), but this is not indicative of the resources and roles that citizens may play in policy processes. To understand the differences in the resources and roles that citizens have on public participation, interactions with those who are involved in invasive species management should be completed.

This thesis research has two goals, 1) to discover if there are differences in public participation that can be attributed to geographic location and 2) to understand differences in public perception of invasive species and its management based upon location as well. By finding geographical dissimilarities, this can offer better insight for political officials and other leaders to better improve access to citizens. It may also inform these leaders about differing perceptions and why there may be citizen disapproval towards particular issues or management plans. Allowing citizens to share

their opinions and concerns may provide insight to officials that they were not aware of prior to this research.

To meet these goals, the question that will be asked is does geographic location, for example metropolitan versus non-metropolitan areas, have any type of impact on public participation processes in invasive species management, such as access and availability to contribute? Also, do participants contribute information to democratic process, such as planning and formulation of regulations? If so, how do participants contribute and through what avenues? If not, why are participants not contributing to policies? By interpreting and answering these questions, it may shed light into understanding how participants interpret this issue and if environmental organizations share information in a way that could be understood by participants of all ages.

Other secondary questions raised throughout this research include: Do the individuals that are involved feel as if they are included in the policy process? Are there differences in perceptions of what an invasive species is and roles by those who participate? These two questions are fairly related to the overarching question, but they can also provide more insight to if statewide invasive species management plans are adequately being implemented. If a management plan is to be successful, locations should have the same or similar access to policy resources, such as access to governmental officials and opportunities to contribute information through public meetings.

Overview of Thesis

The remaining chapters of this thesis will cover information about public participation in invasive species management. Chapter two will provide background information about invasive species in Michigan and the two locations within the state that were the focus of this research. Chapter three is a literature review about the history and characteristics of public participation. It also includes negative impacts of citizen involvement and its impact on invasive species management. Lastly, the review relates public participation with deliberative democratic theory. Chapter four outlines the research methods that were utilized in this thesis, which includes interviews, participant observation, and document research. Chapter five includes the results from the interviews and covers the opportunities for participation in both study locations and what resources about invasive species are available to citizens. It also examines the type of citizens who choose to be involved and what motivates them to participate in environmental organizations. Chapter six discusses the differences in perception and factors limiting participation due to geographic location. This chapter also investigates participant and organizational involvement in policy design. Chapter seven includes the discussion and concludes information about how location may impact availability for citizens to participate in invasive species management plans and discusses the differences that were discovered in this study. Also in this chapter, limitations from this study and opportunities for future research are deliberated.

Chapter 2: Background Information

Invasive Species

An invasive species is an organism that has been introduced into a new ecosystem previously devoid of this organism that can threaten native biodiversity and cause significant human, economic, and ecological harm in this new location (Bremmer and Park 2007; Hoddle 2004; Jordan et al. 2012; NISC 2013). These species are not native to the environment it has been introduced in and are considered as non-native species in their new habitats. Thus, in this research, the terms invasive and non-native can be used interchangeably. Some notable invasive species that garner the most media attention in Michigan and surrounding states are aquatic invasive species, which includes the Zebra and Quagga mussels (*Dreissena polymorpha* and *Dreissena rostriformis bugensis*) and the Asian Carp (family *Cyprinidae*). These invasive species and other notable species are outlined in Table 2.1.

Invasive species, which includes plants, animals, or bacterial organisms, also have the capability to outcompete native organisms, causing potential extinctions and greatly altering the ecological characteristics of a habitat (Schaeffer et al. 2011; Clout and Williams 2009). These unfamiliar species can displace natively occurring species and create an ecosystem with little to no organism diversity. Ecosystems would become monocultures or environments dominated by very few species. One prominent characteristic of invasive species allows them to control new habitats and outcompete native organisms is their capability to quickly reproduce and adapt to new ecosystems

(NISIC 2013). Also, many invasive species do not have natural predators in the introduced ecosystem, allowing them to further populate new areas.

Typically, invasive species control consists of the following management techniques:

- Manual removal species through pulling and cutting down invasive plant species, such as garlic mustard;
- Herbicide, for invasive plants such as Japanese Knotweed (*Fallopia japonica*) and insecticide, for insects, such as Emerald Ash Borer, treatments to prevent further spread of and target particular species, and;
- Use of portable trailer wash stations to remove potential aquatic invasive species, such as Zebra and Quagga Mussels, from being transported via boats.

Other management techniques are utilized to address other species. Organizations that use these management techniques do somewhat rely on the public to help assist control options. Public participants, or volunteers, typically help at manual removal events, as extra training is needed for individuals to use an insecticide or herbicide.

Table 2.1: Notable Invasive Species in Michigan

Description and impacts of notable invasive species within the state (Benson et al. 2013; NISIC 2013; Landis and Evans 2012; Wilson 2003).

Species	Location	Impacts
Zebra/Quagga Mussels (Mollusk)	Freshwater lakes and rivers	<ul style="list-style-type: none">• Clogs water intake pipes at industrial facilities• Overconsumption of food sources from native mollusks, which in turn impacts freshwater food chains
Asian Carp (Fish)	Freshwater lakes, and rivers	<ul style="list-style-type: none">• Overconsumption of food resources from native fish species; decreasing native populations• Can harm and injure boaters by jumping out of water into boats
Emerald Ash Borer (Insect)	Hardwood forests, neighborhoods	<ul style="list-style-type: none">• Infests ash trees, decimating ash populations
Garlic Mustard (Plant)	Woodlands	<ul style="list-style-type: none">• Spreads aggressively, shading out native plants and saplings
Japanese Knotweed (Plant)	Roadsides, wetlands, disturbed areas	<ul style="list-style-type: none">• Spreads aggressively, shading out native plants• Root system can damage pavement, sidewalks, and roads

The issue of invasive species is as much of a problem for officials as it is for citizens. These species are considered to be a nuisance and can cause significant ecological and economic harm to landowner property and surrounding communities. In the Great Lakes region, invasive species are capable of significant environmental damage and causing major economic harm to various sectors of the U.S. economy (Pimentel et al. 2005). Both aquatic and terrestrial invasive species have the capability of producing and have caused considerable economic and ecological losses in Michigan. Forestry, agriculture, and tourism sectors have been negatively affected due to these species. The estimated amount of environmental damages due to invasive species is about \$120 billion

per year (Pimentel et al. 2005). Individual species can also cause significant damages. For example, in 2005, the Zebra mussel was predicted to have caused about \$1-billion in damages annually (Pimentel et al. 2005). As more species that are non-native are introduced, this cost can rise significantly. To prevent costly control measures, regulations have been enacted to prevent and manage invasive species within Michigan.

The state's Department of Agriculture lists four federal and two state regulations that are intended to prevent and manage invasive species within the state (MDNR 2013). Federal invasive species regulations include the following (FWS 2013):

- National Invasive Species Act, which regulated ballast water release in the Great Lakes to prevent introduction of aquatic invasive species;
- Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, which aimed to control aquatic invasive species and the brown tree snake;
- Injurious Wildlife Provision within the Lacey Act, which prohibits and manages invasive species from being introduced into the U.S., and the;
- Federal Noxious Weeds Lists under the Federal Noxious Weed Act of 1974, which lists prohibited weeds and bans them from being sold interstate or through foreign commerce.

One state regulation addresses the issue of the Emerald Ash Borer (EAB) and other forest health problems. A state quarantine was passed in the summer of 2002 in response to the presence of the beetle. The quarantine regulates the potential spread of the EAB and forest diseases by regulating the movement of hardwood firewood, lumber, branches, and woodchips, in particular the transport of ash trees. Violation of the

quarantine can result in fines from \$1,000-\$250,000, depending on the amount of wood transported, and up to five years imprisonment (MDNR 2013).

The other state regulation, which is part of the state's Natural Resources and Environmental Protection Act, lists prohibited and regulated species and outlines punishment, by law, if a citizen is in possession of a restricted organism (MDNR 2013). This and the previously mentioned regulation are intended to address invasive species and prevent their proliferation throughout the state. However, these regulations do not take into account differences that are present throughout regions in Michigan.

Locational Background

This study aimed to discover the differences in environmental organizations and citizen access to group events between the Metro Detroit and Western Upper Peninsula of Michigan. Similar non-native species affects both locations, but the management scheme in each location and how citizens' knowledge is utilized is somewhat different. State regulations, such as the firewood quarantine, apply to both areas since they are both impacted by the presence of foreign forest health issues. While these locations are within the same state, the characteristics of these two areas are vastly different, most notably in their populations and forest cover.

I chose two regions in Michigan as the focus of the study, Metro Detroit (MD) and the Western Upper Peninsula (WUP). Counties included in MD for this study were Wayne, Washtenaw, Oakland, and Macomb. Counties included in the WUP for this study were Houghton, Keweenaw, Baraga, Gogebic, Ontonagon, and Iron. A locational map is

included in Appendix A. These counties were included because the individuals that were interviewed either represented organizations or agencies that are based in these counties or the individual currently lived in these counties.

One main difference between the two areas is population. This can affect the amount of potential participants that could be included in management programs and environmental organizations. Based on 2010 Census data, total population for MD was 4,208,715 people and for WUP was 67,028 (U.S. Census Bureau 2010). A further breakdown of population and density by county is in Table 2.1. Population density values are larger for MD than WUP due to the greater amount of people living in the urban areas, but this is also due to the area of the counties included. MD, 2,664.96 square miles, is about 52% of the area of WUP, 5,128.43 square miles.

In comparison between land cover types, MD is highly urbanized compared to the WUP. As a result, there are significantly less forested areas in the Metro area and access to undisturbed, forested ecosystems is limited. Areas that are forested in MD are typically smaller natural areas that are surrounded by developed and residential areas. For example, at the University of Michigan – Dearborn’s campus, there is a 300-acre Environmental Study Area, which is surrounded by the campus and surrounding neighborhoods (UMD 2013). Forest or small woodland areas are scattered throughout neighborhoods and communities and are generally fragmented from one another. This is unlike natural areas in the WUP. Forests are typically undisturbed and are not divided. Instead, communities are scattered throughout forestlands.

The greater amount in forestland in WUP could be attributed to the presence of federal and state forests. The Ottawa National Forest and the Porcupine Mountains Wilderness State Park are both found in this area. The Porcupine Mountains has about 60,000-acres of state protected land that is undisturbed and maintained as natural wilderness (MDNR 2013). While timber harvesting does occur in the national forest, it is done to manage the forest to improve forest health and promote productivity (ONF 2013). The forest is still considered much more natural compared to forests in MD.

Table 2.2: Study Area Population

Population and population density by county for the Western Upper Peninsula and Metro Detroit, Michigan (U.S. Census 2010)¹.

Location	County	Population Density (per square mile)	Population
Western U.P.	Baraga	9.9	8,860
Western U.P.	Gogebic	14.9	16,427
Western U.P.	Houghton	36.3	36,628
Western U.P.	Iron	10.1	11,817
Western U.P.	Keweenaw	4.0	2,156
Western U.P.	Ontonagon	5.2	6,780
		TOTAL	73,808
Metro Detroit	Macomb	1,754.9	840,978
Metro Detroit	Oakland	1,385.7	1,202,362
Metro Detroit	Washtenaw	488.4	344,791
Metro Detroit	Wayne	2,974.4	1,820,584
		TOTAL	4,208,715

¹ Counties included were chosen because interviewees lived or worked in the county or the county is included in a weed management area that is included in this research.

Chapter 3: Literature Review

Democracy and Deliberative Democracy in Public Participation

As stated previously, the environmental impacts from invasive species are not socioeconomically nor geographically constrained. Citizens and managers inevitably feel the effects from these species either recreationally, through loss of trails or shorelines, or economically, through impacts on fishing and tourism. Because the effects from invasive species can be felt by a variety of individuals, citizens should have an opportunity to participate in environmental issues, such as invasive species, that will impact their lives (Fiorino 1997). A democratic system of governance would allow for public participation for those who are affected.

In theory, a democracy allows an individual to participate in policy processes and issues that will have some affect on their life. By including citizens, this can educate them about the political realities in how the government can address concerns (Fiorino 1997). This could promote greater citizen involvement in democracy. However, according to Eckstein (1966) a pure, direct democratic government in which citizens are fully involved can lead to instability in the system, as some portions of the government and life itself cannot be democratized, such as in schools and in families (as cited by Pateman 1972).

Instead, a representative democracy is in place, where individuals elect officials that best exemplifies their concerns and opinions. Democratic theory states that while the government is by the people, for a democracy to survive, elites, elected officials, must take the responsibility of perpetuating this representative form of government (Dye and

Zeigler 1972). This does not mean that citizens should be apathetic towards their government. People are expected to participate in some way that can support or shape the direction of certain policy outcomes and by doing so, they can learn about why the government operates in the way it does (Samuelson et al. 2005; Ebdon 2000). The public should be involved within the system, whether it is through making decisions themselves or by electing leaders to make decisions for them (Pierre and Peters 2000).

While there are differing views of what a democracy is, such as the elite or liberal view, the main underlying value of democratic theory is individual dignity, as individuals have the right to life, liberty, and property (Locke 1698 as cited by Dye and Zeigler 1972). The role and impact of the individual and groups of citizens are vastly different within each view of democracy. Citizens can either have a significant influence on issues or an elected official represents their opinions, which is the case in the representative democracy in the U.S. By viewing democracy in a liberal manner, this allows people to do the following (Bollen 1993):

- Have the freedom to express their political opinions;
- Participate in any political group;
- Participate directly or indirectly through representatives, and;
- Be held accountable to the general population.

Citizens are expected to significantly contribute to various parts of the policy cycle and to actively participate in involvement opportunities. Participation in democracy can allow policy makers to better integrate citizen needs and concerns as well as make democracy more deliberative (Paehlke 1996; Buss et al. 2006). However, the manner in which

democracy is viewed defines the importance of participation. While the liberal view of democracy stresses the importance of citizen involvement, the elite view of democracy argues that a vertical structure of authority and leadership be maintained in order for a democratic system to properly operate (Sartori 1962 as cited by Pateman 1972; Dye and Zeigler, 1972).

Recently, citizen involvement in democracy has decreased since the formation of federal environmental agencies, such as the Environmental Protection Agency (EPA) (Dunlap and Mertig 1992). Prior to the establishment of federal environmental agencies, citizens were more involved with the formulation of natural resource regulations since issues impacted local communities and were based upon common knowledge (Wengert 1976). Presently, public participation has decreased due to a shift in the concentration of political power as well as the need for more scientific and technical knowledge when formulating policies (Fiorino 1997; Wengert 1976). For example, local citizens' knowledge can help detect where invasive species are, but citizens may lack the scientific knowledge to apply control techniques. Lay citizens may not have the adequate knowledge necessary to contribute information in a democratic system. However, citizens can be involved in democracy in other ways.

Deliberative democracy is a theory that states that public participation is an opportunity that allows for the involvement of the public to debate, have open dialogue, and form opinions about policy issues that affect them or their community (Parkins and Mitchell 2005; Pierre and Peters 2000, Mansbridge et al. 2010). All citizens have the equal right to contribute their concerns and debate over potential solutions to an issue and

come to a general consensus that benefits the common good (Mansbridge et al. 2010, Dietz and Stern 2008; Button and Ryfe 2005). In theory, citizens would have direct connection to all parts of the policy cycle and would be able to have some impact on regulations. Any decisions that are made needs to be viewed by all participating citizens as fair and legitimate or the outcome of a decision may be viewed as irrational (Button and Ryfe 2005).

The U.S. government operates as a representative democracy, but deliberative democracy does not seek to replace the current system. Instead, deliberative democracy is seen as an extension of a representative democracy (Chambers 2003). Citizens should have the opportunity to contribute their opinions to decisions that will inevitably affect their lives, increasing the legitimacy of laws and increasing a person's understanding of society and regulatory processes (Dye and Zeigler 1972; Christiano 1997). However, an average citizen does not typically have a direct influence on the establishment and planning of policies (Pierre and Peters 2000). It is difficult for an individual citizen to follow a regulation directly through the policy cycle and expect their policy to be enacted. Hence, elected officials are relied upon to represent the views of citizens.

There are two contrasting views of studying deliberative democratic theory; the micro, which suggests that citizens should participate in the political arena and collaborate with the state and the macro view, which stresses informal and unstructured participation with no association with the state (Hendricks 2006). While the basis for involvement differs between the macro and micro view, both emphasize communication between citizens and their government.

The research that will be completed will be mostly from a macro view of the deliberative democratic theory, as individuals that will be contacted are participating in some way in the political arena. If citizens become disengaged and do not participate in issues that directly impact them, democratic processes, like voting and open discussion forums, may lose their legitimacy (Samuelson et al. 2005). Citizens that would continue to be engaged and participate in government would not adequately represent society as a whole. Deliberative participation stresses that people should discuss and argue over potential solutions to a problem, think less of individual benefits, and come to a consensus that benefits the common good (Dietz and Stern, 2008; Mansbridge et al., 2010; Button and Ryfe, 2005).

Allowing citizens to take part in deliberation measures may improve public understanding of democracy and governmental legitimacy in implementing regulations, but including the public may also be a detriment to the system. The potential lack of diversity amongst those who choose to participate may threaten legitimacy because the views and opinions that are gathered from groups may be one sided; the opinions or views only capture one small group of society (Ryfe 2005). In the case of environmental issues, citizens interested in nature and may not be impacted by the decision may offer their insights to a meeting and it would not represent the entire community. If deliberation or discussions are to occur, every potential opinion should be included; otherwise, there may be misrepresentation within discussions.

Invasive species management would benefit from a deliberative democratic system. By allowing citizens to participate not only in control efforts, but also incorporate

their concerns about potential impacts on their livelihood throughout the planning process, this garners greater support for management plans (Sharp et al. 2011). Integrating citizens throughout the design process not only allows for deliberations about management plans, but also could lead to a successful program.

Deliberative democracy also, in theory, is supposed to operate under the notion that all participants are equal; no individual is better than the other. However, this usually is not the case. Some individuals who are involved may be more persuasive than another contributing individual; some may not even be willing to listen to other citizens' inputs because they just do not want to or they do not feel as if the other citizen is knowledgeable (Sanders 1997). This may mean that experts or individuals who are highly educated in issues like invasive species might not listen to a lay citizen. Deliberations and discussions would not occur. However, in order to prevent this, public awareness programs designed to educate citizens about invasive species would better prepare individuals to contribute and discuss management ideas.

Public Participation Policy and Citizen Choice

The public can voluntarily choose to participate within government or more specifically with policy formulation and implementation, but often this is not a legal requirement. In invasive species policy and management, public participation can mirror involvement in other regulations, through including the public through comment periods or volunteer efforts. While public inclusion in governance decision-making has occurred

well before the establishment of the U.S. government, its legal recognition within the government has only been started recently.

The first federal regulation that included public participation in the policy making process was the Administrative Procedures Act (APP) of 1946. The APA required governmental agencies to provide public notice in regards to policies that agencies were planning and allowing citizens to contribute comments and concerns in regards to new rules or laws (Beierle and Cayford 2002). In the 1960s and 1970s, participation became further established through President Lyndon B. Johnson's Great Society Act (Cogan et al. 1986). For example, one such act that was formed was the Freedom of Information Act of 1966, which gave citizens the right to access federal records (Beierle and Cayford 2002; FOIA 2013). FOIA and other acts included regulations that allowed citizens to have more access to governmental information and policy-making.

Additionally, in the 1960s, activist culture became popular; citizens, in particular young adults, were motivated to take action towards problems that affected their local community (Dunlap and Mertig 1991). Participation was also primarily utilized to include citizens in poverty and minorities that were generally left out of governance or decision making procedures (Halachmi and Holzer 2010). By involving these citizens, this increases the level of government accountability, as citizens that were not able to contribute were now given an opportunity to do so.

In addition to the Great Society programs, the modern environmental movement influenced citizens to participate in the government (Halvorsen 2006). Inspired by writers like Rachel Carson, the public became increasingly aware of environmental problems and

the associated anthropogenic impacts. In 1962, Carson's book "Silent Spring" was published, which described the connection between the application of the pesticide DDT, its negative affect on bird populations, and its harmful impacts on public health (Carson 1962; Brulle 1996; NRDC 1997). Carson demonstrated, in a manner that was easily understood by the public, that negative human impacts on ecosystems will in turn harm humans themselves. With a connection between ecosystem and public health, people became more aware and motivated about environmental issues.

Due to the increase in citizen concern for the environment and a push for the government to become more environmentally responsible, the National Environmental Policy Act (NEPA) of 1969 was created. NEPA gave citizens both legal and administrative power to challenge and influence a government's decision if it resulted in environmental degradation (Beirle and Cayford 2002; EPA 2012). This authorization intended to resolve any issues that the public may have with planned federal agency activities (Steelman 1999). Regulations similar to NEPA enable citizens to participate within policy planning and formulation, but it may not result in a policy change. The requirement by federal law can allow for participation, but it is not the only determinant to whether people actually get involved or not.

While invasive species management has opportunities for citizen involvement through public meetings and volunteer events, citizens choose whether or not to be involved through a variety of reasons, which may include personal impact from or interest in these species or related environmental topics. This is similar to other policy issues that have opportunities for input. Citizens that choose involvement in

environmental issues choose to because they see the opportunity to participate as a democratic right; being involved is something that they feel they are entitled to since citizens utilize the environment and its resources (Ryfe 2002; Rydin and Pennington 2000; Boudjelas 2009). Public participation is seen as an extension of voting or contributing information and opinions to a federal regulation.

However, simply believing that participation is a democratic right does not solely influence if people are genuinely involved. Citizens may also decide to actively participate in environmental issues because they believe that their contributions will be able to influence leaders, the issue could directly impact their life, or they feel that they may benefit from the decision that is made (Fung 2006; Rydin and Pennington 2000; Boudjelas 2009; Cogan et al. 1986; Bäckstrand 2003). These issues may affect their lifestyle or interests and citizens feel as if their contribution could personally benefit them. If a citizen believes that inputs would be personally beneficial, it could influence those they know to also contribute ideas and concerns as well, increasing participation (Beirle and Cayford 2002). People would hold a belief that inputs would inevitably benefit their lives.

Citizens that are participants in invasive species management are actively or minimally involved in the opportunities such as public meetings and volunteer events that are available to them since organizations allow people choose their level of involvement. Individuals who are actively involved in the group are present in all aspects of initiating participation, including planning of group events and contributing information to group policies (Anderson 2005). Active participants may also lead groups during volunteer

events and educate others. These participants are regularly involved, will share their knowledge with the group, and will constantly push for involvement because their environmental interests are at stake (Yang and Callahan 2003). For example, active citizen awareness is how the Emerald Ash Borer was discovered in the Keweenaw Peninsula. A homeowner in the Raymbaultown area of Calumet Township near Laurium, Michigan reported the infected ash trees to the Department of Natural Resources, which would not have been detected if an active citizen participant had not called the proper authorities (Nordberg 2008). Had the citizen chosen not to participate or report the potential infestation, this may have gone undetected until the damage from the ash borer was significant. Active participants are constantly aware of changes and will take the self-initiative to stay involved or keep groups alerted about potential invasions.

While there are members who actively participate and contribute, passive participants are those who do not contribute or offer their opinions to organizational leaders or officials. For example, these passive participants may only attend town meetings and act as spectators to active participants and group leaders (Boudjelas, 2009; Fung 2006). They only come to be informed and do not contribute knowledge or information to the community. These participants may do this because public meetings and hearings may not have an opportunity that facilitates public contributions; they rather listen to experts or political officials than have any input (Fung 2006).

Passive participation would also include citizens that just attend volunteer efforts to remove invasive species, do as they are told, and then leave. They do not help with planning nor do they contribute their opinions or concerns; these citizens just simply go

to meetings or events and observe others. They may also just follow directions and not ask for more information about what they are doing. Participants may come to events because they feel as if it is their civic duty to attend (Fung 2006). They feel personal satisfaction or benefit from choosing to be involved in volunteer efforts. Environmental organizations may have opportunities for citizens to contribute, but individuals need to take the self-initiative to speak and share information.

This varying intensity of participation can influence how a person may perceive an issue since the level of participation can have an effect on the amount of information a person may receive. Active participants are more likely to deliberate and discuss their knowledge with other individuals, unlike passive participants. This deliberation allows participants to gather outside information and interpretations through constant interaction with other participants (Fung 2006). Since passive participants do not interact with others, they only receive the information that a select number of officials or other participants will share. However, to understand why people choose to either be actively or passively involved, the motivations for participation need to be better understood.

Citizen involvement could play an integral part during the development and implementation of an invasive species management plan. Typically, invasive species easily proliferate in new locations due to introduction by unknowing citizens (Boudjelas 2009). By including them through the establishment of a management plan allow an individual to learn how not to spread these species as well as educate themselves about political processes. Also this involvement would garner public support for invasive species management plans. This in turn can allow officials to enact control options more

efficiently as the public are more supportive due to involvement (Caplat and Coutts 2011). Educated participants may also be more alert about potential invasions and sharing their concerns and information with officials, which in turn will benefit management plans (Selge et al. 2011).

Awareness by citizens is not the only way for the public to participate in invasive species management. Citizen involvement and contributions can also assist officials in invasive species control as outlined in regulations. For example, involving citizens in management fosters greater social acceptance of invasive species control methods that are generally found to be objectionable, such as herbicide or insecticide treatments (Sharp et al. 2011). Individuals can also contribute information through citizen science opportunities, where people can volunteer to collect data for scientists or officials and contribute work to management projects (Crall et al. 2013). Citizen scientists can educate others about invasive species and also assist with removal efforts.

Participation is also an important procedural policy instrument that serves as a legitimization function in modern democracies. A policy instrument is a process or method that governments use to help implement policies (Howlett et al. 2009). Legitimacy issues stem from disagreements between officials and citizens that the leader represents (Fung 2006). If officials desire to increase their legitimacy, they should engage and utilize citizens and citizen knowledge to help formulate regulations and management plans.

The involvement of citizens and organizations also stresses local governance versus just relying upon the government. The issue of invasive species afflicts the entire

nation, but each location has its own unique issues and local governance may be a better management approach. Governance is action amongst a network of actors, such as citizens and organizations, to reach a collective goal that might not result from political or other authority leaders (Rosenau 1992 as cited by Jun 2002; Melo and Baoicchi 2003; Pierre and Peters 2000). In the case of invasive species management, control and prevention plans benefit from operating as a governance system as citizens can contribute local knowledge, thus increasing the effectiveness of the system since programs can be better established in addressing issues that impact a smaller location (Fung 2006; Fischer 2002).

While there are direct benefits to democracy, a number of authors believe that citizen involvement can have a negative impact on the government and in policy design. According to Schumpeter (1943), participation has no special role in democracy and any contributions by citizens are viewed as an attempt to take control over elected officials (as cited by Pateman 1976). Citizens are only meant to vote and have very little discussion with leaders, but not actually have a contribution in the political arena. Contributions or participation outside of this is seen as an opposition to democracy (Schumpeter 1943). Schumpeter (1943) also noted that a direct democracy would not result in absolute freedom as citizens are typically ignorant and lack the judgment to make rational decisions that will benefit the common good or society as a whole. Individuals may not have the necessary political skills beyond voting and their contributions beyond this could have detrimental effects to democracy.

Another issue with participation is the inclusion of all citizens in the policy process. Involving every citizen in the policy process is not feasible; those who generally do not participate can potentially upset the stability of the democratic system (Pateman, 1976). Non-participants that are forced to contribute are not beneficial to participation as these citizens may or may not offer any constructive information and may actually prove to contribute more harm than good. These individuals have the potential to create unstable masses, which are typically apathetic and ill informed about policies and other political matters (Dye and Zeigler 1972). Trying to properly advise citizens would be time consuming and stall management programs or the democratic system itself.

Not including citizens can create a top-down management scheme, which is what typically occurs in invasive species management. In this view, government officials, make policy and regulatory decisions (Sabatier 1986). Impacted stakeholders, such as citizens and environmental groups, have their opinions and concerns heard, but officials and leaders make the final decision on policies and regulations. This contrasts with a bottom-up arrangement, where stakeholders and a variety of other actors can contribute their goals and concerns in policy planning (Sabatier 1986). While policy actors, including the public, are involved in policy design, a bottom-up approach could also cause failure. If the expectations of public input are not fully defined, this can lead to confusion and provide useless contributions (Steelman and Ascher 1997).

As stated previously, invasive species management programs are usually top-down strategies; officials and experts tend to make the decisions that citizens follow. If citizens are involved, delays or blocked plans can occur (Selge et al. 2011). This may be

due to a number of reasons, but most notably, knowledge about invasive species by stakeholders is minimal when species are first introduced, so properly providing information about the particular species cannot be done in a timely manner (Mackenzie and Larson 2010). Also, officials may not want to include citizens at all because, typically, potential invasions need a quick response and involvement of citizens may slow down the process. The inclusion of citizens in invasive species management can result in potential problems for programs, such as opposition, increased lag time, and lack of knowledge, which can cause delays (Mackenzie and Larson 2010; Selge et al. 2011; Coenen 2008).

Citizen involvement may also cause a lack of diversity in those who decide to participate. Participants may have the same characteristics and opinions, which does not reflect a community with different beliefs and opinions. Citizens that are involved are usually from the same race, education level, and economic class; it is not representative of a community (Ryfe, 2005; Eden and Bear 2012). This uniformity results from the creation of a social environment, or network, that consists of people who agree with one another and reinforce each other's political views as correct (Mutz 2006).

Citizens in environmental organizations with similar characteristics are attracted to an issue because of their educational background or exposure to the debated issue. In the invasive species field, professionals may be from the same background and have similar educational experiences. Those with the same experiences may also group together because they bond and feel comfortable working with others that will agree with their opinions (Ryfe 2002). While it is important to ensure that there is expert knowledge

about an issue, this restricts the amount of deliberation that could take place, thus limiting the potential of a formulated policy or management plan.

Uniformity may also occur amongst environmental group leaders as well, as those who are in leadership roles may have the same opinions and characteristics as participants they represent. This is reflective of descriptive representation, where a representative mirrors or “stands for” their constituents, but does not necessarily act in favor of those people (Pitkin 1967). Descriptive representatives would only characterize the group of constituents from a particular location that selected the individual to represent them (Wellstead et al. 2003). Thus, only a small subset, or a minority, of characteristics and ideas are represented.

In contrast to descriptive representation, Pitkin (1967) also writes about substantive representation, where representatives “act for” a particular group, in this case environmental organizations, regardless of the mutual characteristics of their constituents. Substantive representatives will perform or behave in a manner that would benefit their constituents rather than just represent them. This means that representatives, or environmental group leaders, would make decisions on behalf of active, passive, or non-participants that they feel would better manage and control invasive species.

Without proper planning, invasive species control could fail and citizens in the community could negatively respond to plans because the manner in which they are implemented is done so quickly that citizens may delay management (Anderson 2005; Boudjelas 2009). Since citizens are not able to contribute concerns, they may instead stop plans from occurring. People are generally not knowledgeable about these species and do

not fully understand the threats and risks from invasive species like they do from natural disasters (Anderson 2005). Citizens do not readily see the damage created by invasive species like they do from earthquakes or tornadoes. Because of this, citizens need to be informed about the issue, which further delays plans.

The above limitations may be attributed to the lack of proper planning by citizens or officials that initiate citizen involvement groups. If a participation opportunity is not properly or carefully implemented, this can lead to a delay in decision-making, disappoint participants, increase conflict, or lead to more distrust between citizens and their government (Yang and Pandey 2011). If there are opportunities for involvement within planning or formulation, the resulting products should be in a context that is easily understood by citizens. If this does not occur, the programs or plans may not be successful. Failure or disapproval of citizen contribution may be the result of lack of attendance to public hearings or meetings, as these types of participation are considered to be the most heavily relied upon type of policy instrument (King et al. 1998).

Citizens and officials may also not agree about the techniques that are being used to address invasive species. In Bethel, Ohio, the Asian Longhorned Beetle (ALB) has decimated a variety of hardwood trees, such as maple, birch, and ash, throughout the local neighborhoods. Because the ALB does not have any natural pests and insecticides are significantly more expensive, the first method of control is typically removal of host trees (APHIS 2007). Bethel citizens did not feel that the officials that were in charge of the removal were adequately utilizing all potential control options, such as utilizing insecticides prior to removing infected and healthy trees, and decided to educate

themselves about the issue. In addition to the belief that officials were not telling them the truth, Bethel citizens did not feel as if the public meetings were organized in a way that allowed them to clearly state their concerns to officials, leading to their continued distrust of leaders (BALBCC 2013). While it is beneficial that citizens are educating themselves about a management issue, information does not come from those who are actually doing the control; rather the material gathered only benefits one side of the issue.

Participation should be structured in a way that allows expert knowledge and information from officials to inform citizen participants and citizen knowledge to inform the elite, whether technical or political (Steelman 2001). To properly address a policy issue, both officials and citizens should provide material to each. The information in regards to invasive species management should be shared openly between scientists and citizens; discussions between experts and lay citizens can lead to better management and control plans (Fisher et al. 2012).

However, the citizen involvement is not indicative of concerns being addressed by officials. Elected officials may call for public participation and deliberation of policy issue, but may not actually follow through with comments from the public. Also, these opportunities may be limited geographically; an issue may affect the entire state, but public hearings may not be readily accessible to all citizens. Online resources may be offered and leaders may listen to citizens that do contribute, but no action is taken. Officials in policy planning might not address public values and beliefs if they do not feel as if they are legitimate contributions (Beirle and Cayford 2002). This could lead to apathy or lack of trust by citizens, which may influence citizens to create grassroots

organizations to address issues like invasive species. However, this does not indicate that citizens will have access to political contributions. A better understanding of citizen involvement in grassroots organizations regardless of location and their contributions to policy issues needs to be addressed as this may give insight into if there are differences in environmental concern.

Geographic Differences in Environmental Concern

Characteristics of location itself may have some influence on the amount of citizens who choose to participate. An individual's sense of place is the identity a person forms from living in one location (Relph 1997). Since the location means something to the individual, a person become attached to this location and identifies with it, creating an emotional bond with the place (García-Llorente et al. 2008). This is a result of the experiences gained through interactions with people and participating in events while living there (Hanson 2001; Relph 1997). For example, if invasive species were to invade an area that a participant identifies with, they are more likely to become involved with management and control options (García-Llorente et al. 2008). This may also influence them to become politically involved as well, motivating local officials to formulate regulations that may help control or prevent further spread of these species. While individuals may want to protect the location they identify with, they may, however, not have the proper knowledge to guide officials.

Scientists, officials, and citizens are typically aware of the impact of invasive species, but only after they have caused significant harm. Officials need to utilize citizen

information in this situation as the information provided can provide additional resources during monitoring programs (Crall et al. 2011). Geographically, the knowledge of citizens may differ; rural communities typically have lower educational levels and knowledge about environmental degradation compared to urban areas since rural citizens do not have as high exposure to degradation as urban citizens do (Huddart-Kennedy et al. 2009). Still, individuals in rural locations are closer to natural resources and greater access to forested areas. This may increase their environmental awareness and concern, thus motivating them to participate.

Another factor that can be attributed to location is the significant difference in population between rural and urban locations. In areas of greater population with larger governments, urban or metropolitan areas, participation in local community governments is higher than in areas with small population (Wang 2001). Greater participation is attributed to either citizen's fear of losing contact with their local officials in their local governments or a greater amount of resources to allow for involvement opportunities (Wang 2001).

However location itself may not be the only influencing factor. Arcury and Christianson (1993) found that there were not many difference in environmental knowledge and concern between rural and urban areas. They discovered that income, education, and attitudes about the environment were more influential on environmental knowledge and concern than location. These factors may also affect participation as well.

Chapter 4: Research Methods

Public participation research is typically completed in three different manners, outlined in Table 4.1. Each approach utilizes different types of information to assist in better understanding the processes and characteristics of public participation. While each method offers its own benefits towards the study of public participation, the emphasis of this research will focus more on the theoretical concepts that can be applied to any public participation effort, regardless of what its intended purpose is (Abelson and Gauvin, 2006). A theory-based assessment could potentially give a better foundation of establishing why public participation is utilized in any policy process. The theories that will be utilized in this research will be based in the discipline of policy, as this view will provide insight to the role that citizens may play in government and decision-making. A user-based approach will also be utilized with interviews, as they will reveal the motivations and goals each participant has in public participation.

Table 4.1: Participation Research Methods

Three main research approaches used by public participation evaluations (Abelson and Gauvin, 2006).

Approach	Definition
User-based	Evaluation must take into account the different goals that participants have.
Theory-based	Normative evaluation that uses theories and models of public participation.
Goal-Free Evaluation	Evaluation does not utilize any theories nor does it have any stated goals.

To determine if there are differences in public participation access in invasive species management in Michigan, exploratory research was completed using qualitative

social science methods. A single case study was completed to help answer the research questions, with one case being studied in two locations. There was one focus case, public participation in invasive species management, but there were subunits within each case and therefore an embedded, single case study was completed (Yin 2012; Baxter and Jack 2008). To help answer my research questions, documentation research, participant observations, and in-person, as well as phone, interviews were completed with individuals that were either participants or leaders in groups that deal with invasive species control and management.

The document research that was completed involved obtaining publicly supplied information and local news articles about invasive species. The document research included informational sheets that described regulations and how to identify invasive species. These handouts provided by state agencies gave insight into what kind of information is available to the public, such as an explanation of what kind of damage an invasive species can do as well as contact information on how to report these species. Paper handouts were provided at Michigan Visitor Centers and state parks, while other documents were obtained through online resources, such as local community organizations' websites.

To understand what types of opportunities are available for citizen involvement in invasive species management, participant observations were completed in events that were held by various organizations in each study location. Both conferences and events that were advertised as open to the public or university students were attended. Participant observation was completed at one volunteer event in Southeast Michigan held

by Friends of the Rouge, which involved an invasive species pull. There was also an attempt to attend another volunteer event also in that area held by the same organization, but it was cancelled. There were no members from the organization present at the location of the event. An email was sent to the organization later that day and the reply email indicated that the organizer of the event cancelled abruptly. The group and organizer, however, failed to notify volunteers of this cancellation.

Attendance to the Upper Peninsula Research and Conservation District's RRIP-IT-UP fourth annual Northern Great Lakes Invasive Species Conference: Pathways of Invasion – Transport, Infestation, and Control event in October 2013 in Marquette, MI, located in the WUP, was also part of participant observation. The conference was heavily advertised towards professionals with few, if any, members of the public attending. To attend the conference, there was a small fee, with a discount for full-time students. Presentations covered current management plans in place in the Upper Peninsula (U.P.), potential control options that professionals could use to prevent the spread of invasive species, and how organizations and officials can advertise control and prevention to the public. While the events were focused towards professionals, it allowed for a better understanding of the invasive species work being completed in the U.P.

Semi-structured, open-ended interviews were also completed with participants and organizational leaders in invasive species management. These interviews offer a different insight into how an individual may perceive participation opportunities compared to what a survey may offer. Interviews are more dynamic than surveys and can provide detailed information than surveys (Yin, 2012). Also, interviews allow for further

explanations from interviewees of particular responses. If an individual answers a question in a manner that is not clear, further clarification can be asked immediately.

Interviewees were selected based on their involvement with environmental groups or local universities, with a focus on invasive species. Since this had the potential to create a large pool of candidates, an individual needed to fit categorically into one of four criteria groups. An interviewee needed to meet certain criteria prior to being contacted. Each role, outlined in Table 4.2, is in some way involved with invasive species management and local environmental organizations.

Table 4.2: Interview Criteria

General description of interviewee types and reasons for their selection.

Criteria	Role	Reason?
Participates with environmental group and knowledgeable of invasive species	Citizen Participant	Will provide perceptions as well as information about participation. Can establish roles/motivation.
Leader of environmental group that participates in invasive species management	Group Leader	Yes; will provide information regarding leadership roles and perceptions on issues.
Agency Official who has interests in invasive species and has worked with environmental groups	Official	May provide information in regards to perception of public participation.
Academic who teaches about invasive species and participates in environmental groups	Academic	Yes; will provide information in regards to what they teach students and their involvement locally.

Interviewed individuals were contacted initially through email, with follow up emails being sent if no reply was given. Phone calls were placed if the individual did not respond to the emails that were sent. Contact information for group leaders was obtained

over the Internet through organization websites. Other contact information was obtained either through other individuals who were contacted or through previous interactions. Those that were contacted were briefed in regards to who I am, my association with the university, what the research goals are, why they are being contacted, and what I hope to learn from them. This message was sent to 24 individuals who met the criteria listed in Table 4.2. A consent form was only sent to individuals who showed interested in being interviewed or requested for more information. Candidates were also informed that the information they provide will be recorded, but will remain confidential and all of their responses were anonymous.

The Institutional Review Board approved the project on May 21, 2013 as project M1071 and is provided in Appendix B. A total of 12 interviews were conducted with individuals that were involved with invasive species activities in the two study locations. A mix of participants and leaders were interviewed. The composition of these individuals is listed in Table 4.2.

Table 4.3: Interview Groupings

Detailed summary of completed interviewees and their position within environmental groups by location.

Location	Role	Number of Interviewees
Metro Detroit (Wayne, Washtenaw, Macomb, and Oakland Counties)	Participant	3
	Group Leader	3
	Academic	1
Western Upper Peninsula (Houghton, Keweenaw, Baraga Gogebic, Ontonagon, and Iron Counties)	Participant	1
	Group Leader	3
	Official	1
Total		12

Interviews were completed in June through September 2013 and were about 30 to 90 minutes long. They took place in a variety of locations throughout Southeast Michigan and the Western Upper Peninsula, wherever the interviewee requested. Interview locations included offices, coffee shops, and university campuses. Some interviewees requested for phone interviews instead of in-person interviews due to geographic location. For example, the day that the interviewee was available, it would be scheduled while I was not in the same location. Online interviews via Skype or Google Chat were given as an option, but interviewees preferred phone calls because they were not familiar with the technology. Phone interviews were conducted through a campus office phone or personal cell phone.

Interview questions were grouped into three categories that aimed to help understand perceptions of individuals depending on what group that they belonged to. Interview questions by position of individual are provided in Appendix C. Interview questions were grouped into the following three categories:

- 1) Information about interviewee involvement with the group;
- 2) Citizen involvement and events in the group, and;
- 3) Interviewee perceptions about invasive species management and policy.

The first section focused on what organization the interviewee was involved with and their background with the organization. The second set of questions focused on the types of events that the group has focusing on invasive species, how citizens were involved in these events, and how citizens, in general, are involved with the group. This section also had questions that aimed to understand the differences in availability of invasive species

events that are held and the expectation that people had during these events. The last section concentrated on the interviewees' perception of invasive species, its management, and state and federal policies that are currently in place. The final section also asked individuals on their opinions about local communities support for this issue and if interviewees have actively participated in their local governments.

Once the interviews were completed, they were transcribed and sent back to the interviewees, via email, requesting that they look over the transcripts and edit their responses as they saw fit. They were also reassured that their confidentiality would still be maintained throughout the process. Confidentiality was maintained through utilizing a numbering system to identify each interviewee. Individuals were identified through their role and location, as described in Appendix D. Most interviewees did not edit their interviews. Those that did decide to edit did not remove information; instead, they edited it for clarity in response that they felt needed further explanation.

After interviewees approved their respective transcripts, transcripts and field notes were coded using an open-coding method, which allowed for more flexibility in establishing topics and ideas that were similar throughout the interviews (Emerson et al. 2011). Through coding, themes were identified to help answer the research questions. Because the interview questions were grouped in separate categories, answers were already somewhat grouped together by an already existing, overarching theme. The answers were further coded into themes that seemed to reoccur throughout the interview responses (Emerson et al. 2011; Gorden 1992). Some themes that were repeated

throughout the interviews and field notes were motivation, types of involvement, and accessibility to information about invasive species.

Computer programs to assist with coding were not used due to time constraints and the lack of flexibility in changing codes and information refined from the transcripts (Emerson et al. 2011). By not utilizing a program, this allows for dynamic transcriptions and constant editing, which would be more difficult to complete if a computer program was used. Also, with the number of interviews that were completed, it was not beneficial to use a program.

To avoid bias, a variety of citizens with various roles within invasive species management were interviewed. Participants and leaders from a variety of groups were interviewed to gain different perspectives on a similar issue. Also, both uninformed individuals, such as those who do and do not actively participate in groups, and those that hold positions in environmental groups were interviewed. By doing so, this did not skew responses for or against invasive species management. This provided a broader insight to a variety of participant types in invasive species management.

Chapter 5: Participation Opportunities in Invasive Species Management

From the data that was collected through interviews, participant observation, and documentation research, common themes and information appeared within the results. The common themes were then utilized to help answer and meet the outlined research goals and questions. While this research sought to focus on difference between the two locations, there were many similarities between Metro Detroit (MD) and Western Upper Peninsula (WUP) environmental organizations, outlined in Table 5.1.

Table 5.1: Similarities in Participation Opportunities

Similarities in availability and access to public participation opportunities between both locations.

Characteristic	Overview
Environmental Organizations	<ul style="list-style-type: none">• Opportunities to join equal.• Groups established to address environmental issues, not just invasive species.
Types of Opportunities	<ul style="list-style-type: none">• Groups used public meetings and volunteer events.• Group leaders see citizens as valuable in the work they do.
Motivations for Involvement	<ul style="list-style-type: none">• Participants were either recruited or self-selected to join a group.• Education or personal interests appear to have influence as well.
Availability of Information	<ul style="list-style-type: none">• Use of signs along roads and near boat launches, billboards, and handouts.• State websites utilized to share information throughout state.

Environmental Organization Availability

Opportunities for citizens to participate in invasive species management were provided by local environmental organizations in both study locations. These events are open to the public and are usually volunteer opportunities; citizens are not paid for their work. Some organizations do hold member exclusive events, such as meetings, where participants that have paid a membership to the group can attend; however, groups do not devote the majority of their opportunities towards these member exclusive occasions. Instead, they have a variety of public events that aim to address a variety of environmental issues, which include managing invasive species in their local community.

Groups that have established to help manage and control invasive species do so because these species threaten portions of their mission statement. Environmental organizations may not have formed for the sole reason of combating invasive species. This is the case for organizations in both locations. For instance, Friends of the Rouge (FOTR), an organization based out of Dearborn, MI in MD, was established “... to raise awareness about the need to clean up the Rouge River in southeast Michigan” (FOTR 2013). FOTR does this through education and citizen involvement in the Rouge River watershed. This is similar to the Gratiot Lake Conservancy, which is located in Keweenaw County in the WUP, whose mission is to “promote environmental education and conservation in Gratiot Lake” (GLC 2013).

FOTR and the Gratiot Lake Conservancy are just two of the environmental organizations that were part of this research. Other organizations, including the two previously mentioned, that interviewees were members, participants or leaders of are

listed in Table 5.2. All of these organizations, regardless of their location, have similar goals, to protect the local environment and to educate others about the local environment. Many stress the importance of educating citizens about the environment and the need to protect it, first at a local level, which then transcends into a global level of awareness.

Table 5.2: Environmental Organizations

List of organizations interviewees were associated with, grouped by location (divided by bold line). Top half of table is groups in Metro Detroit and the bottom half is groups in Western Upper Peninsula.

Organization Name	Organization Type	Membership Composition
Belle Isle Conservancy	Non-profit Conservation Group	Paid Membership
Environmental Interpretive Center (UM-Dearborn)	Research Based	Volunteers
Friends of the Rouge	Non-Profit Conservation Group	Paid Membership and Volunteers
Grosse Ile Conservancy	Non-Profit Conservation Group	Paid Membership
Matthaei Botanical Garden Nichol's Arboretum	Research Based	Volunteers
The Stewardship Network	Environmental Alliance Group	Volunteers/Paid Membership from associated groups
Gratiot Lake Conservancy	Non-Profit Conservation Group	Paid Membership
Houghton-Keweenaw Conservation District	Non-Profit Conservation Group	Volunteers
Keweenaw Invasive Species Management Area	Environmental Alliance Group	Membership in associated groups
Keweenaw Land Trust	Non-Profit Conservation Group	Volunteers
Ottawa National Forest	Research Based	Volunteers
Pilgrim River Watershed	Non-Profit Conservation Group	Volunteers

Almost all of the organizations had open memberships. Organization participants include volunteers, paid members, and other individuals who may solely attend group meetings. Participants, as defined by both WUP and MD leaders, were involved in some way with the organization, but political participation was not indicated as a characteristic of participation within the organization. Because of this, and also due to the lack of political interest by all interviewees, participation in this study refers to individuals who are involved in some way with an environmental organization.

There were opportunities for participants to pay for membership; however, it is not required to do so. Individuals that are not paying or donating members can still attend meetings and events. The Gratiot Lake Conservancy leader estimated about 140 paid members, while other groups did not provide a rough estimate regarding the number of memberships they had. Membership benefits were relatively basic. Paid members may receive discounts to paid events or can vote on board members, but membership does not result in greater access to group decision-making or more benefits.

Volunteers made up the largest portion of participants in all organizations. These volunteers largely complete the tasks that are outlined by organization management plans. While group leaders may be in charge, the volunteers are the ones that complete a bulk of the work. The number of volunteers at events varied not only by location and type of opportunity, but by organization as well. For example, FOTR holds an annual event every year called the Rouge Rescue Day where approximately 1,700 volunteers work at a variety of locations scattered throughout MD (FOTR 2013). This contrasts to meetings

that are held by organizations, which may be attended by two to 80 people. Table 5.3 outlines the number of participants at organizational events. The number of volunteers at workdays varies depending on the amount of available resources, which includes tools and leaders that the group has. Workdays tend to attract more participants than meetings.

Table 5.3: Estimation of Participation

Approximate estimation of number of participants to organizational events. Top portion of table are groups in MD, while the bottom portion is a group from WUP.

Organization	Number of Participants	Type of Event
Friends of the Rouge	1,700	Volunteer Workday
Matthaei Botanical Gardens	50-100	Volunteer Workdays
Belle Isle Conservancy	Up to 350	Volunteer Workday
Gratiot Lake Conservancy	Around 80	Public Meeting

Most of the organizations that interviewees were involved in were non-profit, conservation groups. These groups are 501(c)(3) groups, meaning that they are considered as tax-exempt organizations by the U.S. government. Groups such as the Grosse Isle Conservancy rely heavily on donations, membership fees, and federal funding to complete their work, which is to maintain natural areas within the isle. Two organizations were considered to be research-based groups, the Environmental Interpretative Center and the Matthaei Botanical Gardens/Nichol's Arboretum. Both of these organizations are located on university campuses, the University of Michigan in Dearborn and Ann Arbor, and stress environmental education and research in their natural areas.

Organizations in both areas may be part of a larger environmental alliance network that aims to allow groups to interact and work with one another. Environmental

alliance networks, or groups, are formed by partnerships between organizations to share ideas and information about management techniques, lobbying efforts, and funding opportunities (Milne et al. 1996). These alliances allow groups to work with other local organizations in invasive species control and management.

In MD, the Stewardship Network based out of Ann Arbor, Michigan is a conservation organization that aims to connect various groups to manage natural areas throughout the state (Stewardship Network 2013). The Network not only connects groups, but also individuals that are not members to events and conferences. The Stewardship Network has divided the southern L.P. in what they refer to as “clusters”, which are intended to “increase communication and resource-sharing among people in the targeted geographic area” (Stewardship Network 2013). Currently there are eight clusters, with most near the MD area and on the western portion of the state, and two planned clusters, one near the Ohio-Michigan border and the other in northern Indiana. These clusters allow organizations to work together and also encourage interested individuals to also participate.

The WUP version of this network is the Upper Peninsula Cooperative Weed Management Areas (CWMA), which includes the entire U.P. and three northern counties of Wisconsin, Forest, Florence, and Marinette (ONF 2013). This partnership between different weed management areas in the U.P. was designed to allow for organizations, cities, and federal agencies to work together to prevent and manage invasive species. In the past year, the Keweenaw Invasive Species Management Area (KISMA) was formed, which created partnerships in the counties of Houghton, Keweenaw, and Baraga. All but

one of the interviewees from WUP had some involvement with KISMA. Unlike The Stewardship Network, KISMA works with federal and state entities, environmental groups, conservancies, and universities in the area and not individuals. If individuals have the desire to participate, they must join an associated organization.

Types of Opportunities Available for Participation and Contributions

Citizen involvement in invasive species management includes a variety of events. The most common were public meetings, where citizens were informed about the management and control measures that the organization was utilizing, and volunteer opportunities, where citizens could help with removal of invasive species. Most of the participant interviewees attended both meetings and volunteered at removal events. One interviewee, who is an active participant and a university professor in MD, attends meetings and volunteer events, but is also invited by the group to do more:

... I attend all their meetings and participate where I see fit in the meetings, fundraising, and programs that they have and so on, like last night, I was at [their] public information subgroup meeting ... with [this organization] also I will be leading and narrating the boat trip they have [in August] down the Detroit River to [another river] ... I've done that several times in the past ... (Interview 3 2013).

The organizations included do invite particular citizens to join in on activities and events due to their background and expertise, but other citizens can also contribute their knowledge in other ways.

When leaders were asked about how citizens typically help, one leader in MD mentioned that public knowledge helps them with their work.

[Public contribution and knowledge] has been helpful. I think probably what's most common is that the more environmentally aware or educated an individual that does volunteer will help educate the less educated and aware volunteers ... We also have had people who have spotted things, plants, that they thought might be exotic species that we should know about (Interview 5 2013).

Besides teaching others, active participants can also assist leaders in accomplishing larger tasks that might otherwise not be completed. An agency official in WUP mentioned the increased amount of work they could now complete due to inclusion of participants.

There are things I used to do and it was a struggle to get them done, but then I was able to pass on things to these citizen groups ... there are some cases where the citizen groups may disagree on the science, priorities, or consequences of their groups, but generally our position is if it's an invasive species and they want to treat it, then we'll support them (Interview 4 2013).

Another group leader in WUP echoed the sentiment of public participation and its benefit in greater support in management and control plans.

You definitely need [citizen knowledge and involvement] because it's very beneficial. Once people take ownership of it they are more likely to want ... to get the word out ... you need the community and the people to take responsibility to know what's going on in the community and their property for us to make a change (Interview 12 2013).

However, one group leader in MD saw participants, or volunteers, as a source of manpower rather than an information resource that could potentially help their organization better manage invasive species.

[Citizens] have helped in that they volunteer. They help in that they learned. We don't require anybody to have knowledge when they come to this ... (Interview 6 2013).

The response from this MD group leader indicates that passive participation, or individuals following directions and completing tasks as they are told to, is this leader's expectation of public involvement in their organization. Active participation, or contribution of knowledge by participants, does not appear to be a main expectation by this MD leader.

Motivations for Involvement

While citizens can voluntarily join an environmental group since it is open to anyone who wants to attend, other selection processes can take place. Individuals could be recruited through a friend or colleague who is already part of the group. As stated previously, an invitation to join a group may be the result of an individual's knowledge or expertise in the area of interest. A number of interviewees were involved with some local environmental groups for that reason. Those that were considered as MD active participants typically were recruited by friends or by group leaders.

... [My friend] actually told me to go check [the organization's office] out and I did. I sent an email to... the program tour supervisor and he said come on in... (Interview 1 2013)

At first, I was a basic volunteer... [The organization's leader] moved [me] up from there to a sort of assistant leader since I had more experience with plants (Interview 7 2013).

If an individual was recruited by friends already part of a group, it may create a homogeneous group that is not reflective of the community since it would be a small subset of individuals from the same social or educational network. This creates a group that only represents a small subset of the population.

Uniformity in background and interests was evident in the interview candidates. Individuals were fairly similar in race and educational background, regardless of where they lived. All the interview participants were white, with most having a Bachelor's degree. Some had Master's degrees or will pursue one. Only one interviewee had a Doctoral degree. Almost all of the interviewees had an educational background either in biology, environmental science, botany, or some other environmentally related natural science. Those that did not have an educational background in the natural sciences were interested in some aspect of the natural environment, including bird watching or gardening, and educated themselves about issues that impacted their interests.

The individuals that were not educated in the natural sciences were motivated to become involved in environmental topics due to other reasons. When asked about why they had joined their respective groups, two MD leaders responded in similar manners.

My father was a bird watcher. He took me along when I was a teenager and I was already a member of an environmental protection organization ... I don't think anyone knew much about invasive species at the time. I've been interested in nature protection since my early teens (Interview 8 2013).

... I [learned] a lot about plant communities ... I [am] a conservation steward ... I'm also a Master Gardener ... I'm a life long gardener, since I was a child ... I've also been involved with groups that raise food and raised bed gardens ... (Interview 6 2013).

Both interviewees' responses reveal that having a degree in environmentally related topics is not the sole influence of involvement in invasive species management. Also, it reveals that organizations are not exclusive; groups allow all individuals to join. Many other reasons can motivate an individual to join, such as personal impact, but the main motivation in the case of these individuals is self-interest.

Citizens may also choose involvement for other reasons. If an organization is known to treat their members well, this may influence others to also join the group. One interviewee, a MD active participant that had led a volunteer group, pointed out that motivation was influenced by other means:

I first [give] them cookies, so they liked me ... It's important to treat your volunteers well and they will at least want to come back or tell other people. 'Hey! Free food!' Food before, during, and, sometimes, after (Interview 7 2013).

The response from this active MD participant indicates that a reward system, through food, and respect from leaders keeps people returning to volunteer. They have an established expectation that they will be treated well and enjoy their time with the organization.

Availability of Information about Invasive Species

Individuals that attend organization meetings are regularly updated about invasive species control, if the group is currently doing it, or other environmental issues that the group is addressing. If citizens are not participating members of an environmental organization, there are other ways that they can be informed about invasive species regulations, as outlined in Table 5.4. News articles published in local papers provide information about potential invasions that are arriving in the local ecosystems and any new research on notable non-native species, such as Asian carp.

Table 5.4: Information Availability

Summary of resources available to the public about invasive species and where information can be obtained.

Information Type	Where Information was Obtained
Newspaper Articles	Local Newspapers: <ul style="list-style-type: none">• The Daily Mining Gazette (WUP)• Detroit Free Press (MD)
Signs and Billboards	Along roadsides, next to boat launches, and at trailheads.
Handouts	Organizations, at Visitor Centers, State Parks, National Parks, etc.
Web Information	Local/State/Federal Government and Organizational Websites

A comparison between the two well-known newspapers in each location was completed. The Daily Mining Gazette, which serves WUP counties, and the Detroit Free Press, which serves MD counties, was searched for articles related to any invasive species news. Internet searches through both newspapers' archives revealed that local environmental group leaders submitted the majority of articles in The Daily Mining Gazette, while articles in the Detroit Free Press were written by reporters from the newspaper or from an outside news service. Articles in the Free Press were aimed more towards federal regulations and Asian Carp news, whereas the Mining Gazette featured local invasive plants and also advertised about up-coming public events.

Other than news articles that reporters or organizations submit to local newspapers, information shared to citizens is fairly limited. Typically, signs and billboards are used to communicate invasive species information to the general public. This includes how to avoid transporting invasive species, what organisms may look like, and regulations that may apply to citizens. These information sources are located near

boat launches, trailheads, roadsides, and nature centers with the intention of alerting citizens about regulations that may apply to them as they recreate or travel.

For example, road signs and billboards are the primary method which Michigan alerts travelers about the Emerald Ash Borer state quarantine. This quarantine restricts the movement of firewood within the state, regardless of if it is ash or not (MDNR 2013). The regulation prohibits firewood transport between the two peninsulas. Citizens are expected to voluntarily drop off firewood if they are traveling between the U.P. and L.P. of Michigan. Firewood can be dropped off at two Michigan Welcome Centers, one in the U.P. and the other in the L.P., prior to crossing the Mackinac Bridge. Signs direct citizens to the location of the center and large posters point drivers to the trailer which firewood can be dropped off.

One drop-off location in the L.P. was visited to obtain information that is provided to the public at the center. An employee at the Welcome Center indicated that the Michigan Department of Agriculture (MDARD) asked the center to host a drop-off location for them. Questions about EAB or the quarantine itself were answered in the form of being pointed to handouts that had been provided by MDARD, the Michigan Department of Natural Resources (MDNR), and other agencies that focus on Michigan forests. These Welcome Centers are actually designed to promote the state's tourism industry rather than informing citizens about invasive species or environmental issues, so this may be why the employee was not knowledgeable about the quarantine (MDOT 2013). The employee also provided copies of the quarantine map and a handout, which outlined restricted and unrestricted wood products that can be transported between the

peninsulas. This information was not easily accessible to citizens as it was stuck on a bulletin board behind the counter and was not the most recent version of the quarantine maps. The material appeared to be aimed towards employees and not citizens. The copies were only provided after there was an explanation about why there was an inquiry about the drop-off and quarantine.

Aside from providing handouts, the employee could not answer questions outside of what was provided on the sheet or were basic in nature. The response received when the employee was asked what citizens normally ask about the quarantine was, “citizens only want to know where the trailer is to drop off their wood.” The drop-off location was pointed out to me. The firewood drop-off is a moveable trailer with signs directing drivers to its location. If there were not any signs, the drop-off location would just appear as a non-descript trailer in a parking lot.

Any further inquiries that were not answered by the handouts or that were basic in nature were referred to the phone numbers and websites that were listed on the sheets. The phone number listed on the informational sheet is a toll-free national hotline numbers. Two websites are provided, one is a national website and the other is a state of Michigan website. Both are websites that inform citizens about the Emerald ash borer and what to do if they believe there is an infestation in their community. Pictures of the borer and the damage that it causes are also provided on the websites. This information is also on the available handouts, but the website data is more detailed and updated.

The handouts at the visitor center were also available at state parks that were visited. Employees at the park asked park users if they have their own firewood when

they check-in to their campsites. The limitation in the movement of firewood prevents campers in the park from bringing in their own firewood to burn at campsites. Instead, campers are encouraged to purchase firewood from local sellers or from the park itself. Typically parks will have a shed or woodbin where visitors can purchase firewood. While wood is supplied and the state quarantine restricts firewood movement, citizens still violate this regulation. One interviewee, a WUP leader, discussed why citizens might break this law:

... You get people that are like, 'I know where my firewood comes from and I know what [Emerald ash borer damage] looks like' kind of thing ... People in parks, people that are in recreation... they bring their [own] firewood and [officials] tell them not to [and] they get very angry with that. Tell them they have to pay for it. They get very angry ... you get a lot of people to follow [the quarantine] and pull over and get rid of [their firewood]. You still [see] people going through [the Mackinac Bridge] with firewood because they don't want to give up their firewood (Interview 12 2013).

This response indicates that since people do not want to spend extra money for firewood and feel as if their actions do not have a detrimental consequence, they will continue to move firewood even if there is a risk of being caught and punished by law.

Three of four participant interviewees mentioned seeing billboards aimed towards alerting citizens about firewood restrictions. One MD interviewee deduced that because they had seen the billboards, there would be more regulations intended to prevent the spread of the Emerald Ash Borer. Since participants had an educational background in environmental science, they already had previous knowledge about the quarantine and restrictions. However, this shows that drivers will potentially notice these billboards along the side of the road.

Internet resources are also available to notify the public about regulations and news regarding invasive species. While billboards, road signs, and handouts are integral in alerting and teaching citizens on the road, not everyone travels or visits campgrounds. The state of Michigan's Departments of Agriculture and Rural Development (MDARD), Natural Resources (MDNR), and Environmental Quality (MDEQ) all have invasive species information that is not regionally based. Each agency website targets a particular group of species. MDARD provides information about non-native pests that threaten the agricultural and timber industries; MDNR offers material on mostly terrestrial species, but also offers information about mollusks and fish; and lastly MDEQ presents information on aquatic invasive species (MDARD 2013; MDNR 2013; MDEQ 2013). The materials on the websites include regulations, news, and control efforts that the departments are using to manage these species.

Some participant interviewees also mentioned taking classes through universities and organizations (Interview 1 2013; Interview 2 2013; Interview 11 2013). University classes included general biology and environmental science. The University of Michigan in Dearborn, MI (MD) offers a graduate level course called Invasive Species Ecology, which discusses the "biological, ecological, and societal impacts of invasive species" (UMD 2013). One of the two MD participant interviewees from the university took the class as part of their degree requirements.

Chapter 6: Differences in Public Involvement and Perception in Invasive Species Management

While similarities in access and availability of invasive species information were present, differences were also inherent within the research as well. The Western Upper Peninsula (WUP) appears to have fewer opportunities available for citizens in comparison with Metro Detroit (MD), as well as a greater influence by official and leaders towards management plans and control options. Active participation is still accessible, but the capacity in which these opportunities are available differs between the two locations.

Table 6.1: Differences in Public Involvement and Perception

Summary of dissimilarities between the two study locations.

Characteristic	Overview
Perception of Invasive Species	<ul style="list-style-type: none">• Not influenced by role• WUP leaders stress “natural, pristine areas” in definition, while others did not.
Factors affecting citizen access and opportunity	<ul style="list-style-type: none">• Less events and opportunities in WUP (during study period).• Opportunities affected by advertising, lack of funding.
Lack of Public Participation	<ul style="list-style-type: none">• WUP: Smaller population results in a smaller pool of potential participants.
Perception of Political Involvement	<ul style="list-style-type: none">• Lack of political involvement by participants and organizations• Lack of deliberation between participants and group leaders

Differences by Role in Defining an Invasive Species

All interviewees were asked to provide their own definition as to what an invasive species is. While all of the interviewees are involved with invasive species in some manner, their background and interests shape how they define what an invasive species is. There was an expectation that the involvement level of the interviewee would have an impact on perception, but the responses indicate that role, whether they were a participant or leader, did not influence perceptions and definitions. Self-educated participants formed definitions from what they learned in classes and online research. The definitions provided by all interviewees by role and location is attached in Appendix E.

Individuals in MD had similar definitions of what an invasive species is. Interviewees, regardless of position, tended to include that these species were dominating, threatening, and foreign to the local ecosystem that they worked in. Many stressed that invasive species will crowd or dramatically change the native environment.

Interviewees from WUP also had similar explanations of what an invasive was, regardless of their role. The definitions provided by interviewees included words like not native to the area and harmful or detrimental to native species. Species were also described as having the capability of “taking over” the local habitat because there are no native “enemies”.

However, in a comparison of the definitions provided by WUP and MD leaders, there was a difference in the specific habitat that was state. In WUP leaders’ definition of an invasive species, three organizational leaders included the threat from these species to natural areas. All three specifically mentioned the potential it had to disrupt “pristine”

natural areas. This was unlike MD leaders, which only mentioned impacts that invasive species had on native species and local habitats. There was no specificity in ecosystem or condition of the impacted area.

All interviewees were also asked to provide examples of species that they have either studied or dealt with. Invasive species that were mentioned differed depending on the occupation or group they were part of. Majority of the interviewees worked with non-native plant species. A total of 50 different types of terrestrial and aquatic invasive species were mentioned. Of the 50, 35 were plant species, which includes aquatic plants, while the other 15 species consisted of fish, mussels, forest pests, and tree diseases. Of the plant species, one terrestrial plant that was mentioned by all interviewees was the Garlic Mustard. Other than that one plant, location did not have an impact on which species were provided as an example, which indicates that species are not regionally confined; they are a statewide issue.

Factors Affecting Citizen Access and Opportunities to Participate

For the public to have the opportunity to contribute concerns and information to group leaders and officials, local communities and groups need to hold events for individuals to attend. If no events are available, this hinders citizen input since individuals need to take more of a self-initiative to contact public officials or they need to organize events on their own. Environmental groups that contribute to the control and management of invasive species are visible in both locations and citizens are free to join as many groups as they choose. There was an expectation that there were a greater

number of events and organizations to choose from in MD compared to WUP during the research period and this was indeed the case.

One indication of fewer events in the WUP was the number and type of advertising about them. Because of the difference in the amount of organizations between the areas, availability of events and opportunities and the manner in which they are advertised were different depending on location. Finding events or public meetings on the Internet that involve invasive species was much harder to do for the WUP than for MD.

Between the months of May to September 2013, five events in the WUP were found on the Internet. Most of the events in WUP were featured in The Daily Mining Gazette. Leaders in WUP answered questions about advertising of participation events that the newspaper is one of the primary ways they advertise volunteer opportunities:

When we have control efforts, I try to put out calls to volunteers to help out and sometimes put little news briefs in the paper to see if we'll get some volunteers. I usually send out emails to people that I know that have volunteered in the past... (Interview 9 2013).

I do put out press releases out for some of the events, not all of them. We get into the calendar that's in the newspaper (Interview 10 2013).

... [Advertising about public meetings or presentations has] been through the newspaper or radio ... we did send out landowner letters about what they have on their property ... but newspaper and radio is probably one of the main ways to do it (Interview 12 2013).

Newspaper articles and small write-ups appear as the main publicity for some of the groups in WUP. This is unlike the MD where, in addition to the Free Press, there are many local newspapers serving cities within the MD counties. While an organization may post events in those newspapers, MD groups tend to rely upon a different publicity route.

Many WUP environmental organizations' websites were not regularly updated with information regarding events and meetings. Some groups also had social media pages on Facebook and Twitter, but, similar to group websites, they were not updated on a routine basis. In MD, organizations rely heavily on social media and websites to publicly advertise about upcoming events and meetings that citizens can attend. They are both regularly updated, with information about public meetings and events readily available. Local newspapers are also used to alert citizens, but this was minimally used compared to WUP organizations. When asked about advertising about events, MD leaders explain that a combination of all three resources, social media, website, and local city newspapers, is used to inform citizens about events and organization meetings:

Well [we tell citizens] mostly through our newsletter, our website, and, in the past, we have done something through the local newspaper (Interview 8 2013).

[The group] advertises [its public meetings] to the membership and they put it on their website. [The organization] has a [newsletter] that they publish once a week... the [local] newspapers carry a lot of the information from [the organization] and they get out notices for [certain special events] (Interview 3 2013).

In MD, organizations also tend to post their public events on a centralized location on the Internet. The Stewardship Network offers a public calendar that is free to other environmental organizations in Michigan and throughout the Midwest to advertise events (Stewardship Network 2013). The Network holds events of their own, but the website also has a listing of various events throughout Michigan that individuals can attend to help with invasive species removals and attend environmentally themed workshops. The searchable event calendar gives users the ability to find events by

county, topic, and cost of attendance. Most are free to attend. The listing of involvement opportunities allows citizens to easily find events that fit their schedules and are near their community.

WUP does not have an organization website that lists all events. KISMA, which is one of the WUP's version of The Stewardship Network, does have a website, but it is similar the management area itself, fairly new and does not provide information about events. However, one WUP agency official believes that with the establishment of KISMA, this may change the number of events in the area.

... [There are less invasive species related events in the U.P. and] population density would be a big factor I would imagine, but [invasive species are] also newer. Before KISMA, there really was just about nothing ... the creation of KISMA just two years ago was when we first starting talking about it. And last year, 2012, that was the first time there was a public invasive species plant pull ... but ... it's really new up there in Houghton County (Interview 4 2013).

While events are just starting to become increasingly available in WUP due to invasive species proliferation, there may be other reasons as to why there are not as many opportunities in the area, such as population.

Citizens that choose to participate in invasive species management also might not have the opportunity to do so because organizations may not have the financial resources to plan an event. This issue impacts both geographic locations. Typically, management strategies and control efforts are federally funded through grants. Funding sources include the Great Lakes Research Initiative, National Fish and Wildlife Foundation, and other federally funded sources. Organizations in both WUP and MD apply for grants with these federal sources in hopes of obtaining money to help plan management proposals

and run public participation events. Interviewees, regardless of location, were vocal about how money has significantly affected the amount of work they could get done:

... It was a lot easier when there's funding... we didn't have a public meeting this year, but maybe at some point we will have another public meeting (Interview 12 2013; WUP).

Before we had money, like five years ago, it was much more of a struggle... finding and working with local citizens. We would seek volunteers for an event, but much less was happening without the money... (Interview 4 2013; WUP).

Without the government, without big money, [the organization] won't be able to do anything (Interview 8 2013; MD).

These responses indicate that without funding, whether from grants or other sources, organizations would be unable to complete the work that they set out to do. However, one interviewee, who is originally from WUP, had a unique perception on why there may be a greater amount of opportunities to participate in MD compared to WUP:

***Q:** Do you think the money issue is not locational based and rather, it is statewide?*

A: It's statewide. I mean, this is someone from the U.P., lots of money goes downstate and stays downstate. It doesn't stay up here very much (Interview 12 2013).

No other interviewee in either MD or WUP responded with the same sentiment about money distribution within Michigan. This individual has interacted with officials in MD and relies upon funds from the state, so their perception may be correct in their line of work.

Lack of Public Participation

Some citizens may choose to not participate even if opportunities to contribute are available. These individuals may consist of passive participants or non-participants.

Those that are passive participants may go to events, but not actually contribute information or may only attend meetings in a non-habitual manner. One notable difference between the two locations is the population. According to the 2010 Census data, the MD area has about 57 times the population of WUP; the population of WUP is 1.8% of MD's population. The sizeable difference in population between the two areas significantly limits the amount of participants. Since the pool for potential active or passive citizen involvement is significantly smaller in WUP than in MD, attendance to events in WUP is also significantly lower. However, when two WUP leaders were asked about this difference, in addition to a smaller population, they speculated about other reasons for low attendance:

... [The U.P.] is primarily a rural area and the population is much smaller than in the areas of the [other] organizations that I've worked for ... there's not as much population here [in the Keweenaw], so when you need help from volunteers, although there are very many dedicated people, it's harder to find enough people to address something like invasives (Interview 10 2013).

... There are a lot of environmentally oriented organizations and a limited amount of free time for people, so that's probably part of how people get spread thin and burned out (Interview 11 2013).

These two responses show that while there are volunteers that do help, people are most likely included in other groups within WUP and are active participants in the primary organization they are associated with. If they are part of other organizations, they may act more as passive participants.

Some people may not find the time to adequately participate in organization, but there are citizens who do have the time, but still choose not to participate. These individuals are considered as non-participants. While invasive species do inevitably affect citizens in some way, not everyone will necessarily feel or understand the negative impacts from these species. When asked about citizen involvement and concern about this issue, interviewees, regardless of location or role, had the nearly the same opinion:

... It does not really affect [citizens] personally, these invasive species. That's the problem ... when you tell them, 'well the invasive species suppress others and reduce the variety [of plant species],' that's hard for people to really get their arms around that. It's only the people that are really interested in the environment, the health of the environment ... it's always a limited percentage of the population (Interview 8 2013; MD).

... Why would somebody invest in wanting to do something about [controlling invasive species] if they didn't see it's importance in their life? People have different focuses [in life] ... (Interview 10 2013; WUP).

Since people are not personally affected, they are apathetic to the impacts from invasive species and will not choose to participate in any manner. Citizens are not informed about the issues that stem from these organisms. One interviewee, an academic professor, attributed this apathy and unawareness to education issues:

... [Concern from the impacts of invasive species] is just not in the general public. It's among the people that really care [about the environment] and I think that it has to take a different kind of educational strategy to the public than what we have and what the strategy is, I don't know... an organization does it and they head it up, but it doesn't get into the municipalities and into the nitty gritty of the citizens and community organizations as much as it should (Interview 4 2013).

This response reveals that only a small group of citizens are exposed to material that the organization releases. The public is not heavily exposed to education about invasive

species, thus they are not properly informed about environmental issues tied to these species.

While people can choose not to participate and remain unaware, the manner in which an organization is structured may prevent involvement. When WUP organizational leaders were asked about the inclusion of individual citizens in the management area, responses were mixed.

...[The organization] is just made up for [agencies and] groups... if some individual wanted to join up, they could (Interview 9 2013).

Citizens certainly can participate, but I will say that the way that [the CWMAs] are set up, the members are typically organizations... If there [were] someone that was interested, they would really be welcome, even if they weren't part of a lake association. Perhaps one of the groups that would be a best match would sort of adopt them (Interview 4 2013).

An active WUP participant who has worked with management areas in the WUP also felt the same way. "I think unless you're part of a group, there's not really a lot that an individual can do" (Interview 11 2013). From these responses it appears that an individual in the WUP may not have much influence in the area unless they are part of an environmental organization that holds the same beliefs and concerns that the citizen does. It implies that a certain type of person would be involved, not just uniformed individuals.

Leaders in MD had similar comments about including citizens in organizational decisions. In groups like FOTR, the executive board and paying members weigh in and vote on decisions. Non-paying members or the general public are not able to vote, but can pay to be included and contribute information to board members and leaders of the group. Their lack of donation or payment does not hinder their contributions in most

organizations. However, one leader stated that they had requirements before someone could help or contribute information:

I have a committee of 10 people ... that wanted to be on our committee and these are all people with some kind of knowledge and experience. I don't really want input from anyone that doesn't know anything about the environment. They'll want to do things like plant daffodils in it, which is inappropriate. I mean, other groups certainly have been welcome and are welcome to be involved in [volunteer opportunities]. We don't exclude anybody (Interview 6 2013).

While this response is contradictory, it outlines that being educated in the issue gives a person credibility in contributing to group decisions.

The events that were available through environmental organizations were not opportunities to deliberate about potential regulatory measures within the local or state government. For example, the invasive species conference attended during this research was aimed towards teaching, alerting, and sharing information with others in the region. It did not provide information about how to motivate citizens to be more politically involved. Instead of relying upon environmental group leaders for political assistance, citizens need to take the self-initiative to participate in their local government and to learn about invasive species related regulations. However, in order to properly contribute, citizens need to understand the issue that they want to participate in.

Perceptions of Political Involvement

The active environmental organization participants in this study were somewhat knowledgeable of invasive species regulations, but many chose not to participate in their local governments for a variety of reasons. Participants also did not regularly contact

their local representative about invasive species, but stated that they would contact officials if an issue had some impact on them. While these participants were fairly active in their respective environmental organizations, they acted more similarly to passive participants in political matters. The issues that concerned the interviewees did not always relate to invasive species. Instead, interviewees contacted their local officials about Internet neutrality and other environmental issues, such as removal and replanting of native trees in their neighborhood.

The lack of political involvement appeared affected by an interviewee's age versus location. When asked about participating in their local governments or contacting officials, MD participants who were in their early- to mid-twenties tended to lean towards non-participation with reasons ranging from boredom to no reason at all.

Those meetings are just so boring ... they usually talk about things that have nothing to do with me ... it infuriates me and I get angry and I leave (Interview 2 2013).

I'm not inclined to [contact my local officials] because I'm not sure if they will respond and I'm not sure what I would say (Interview 7 2013).

No I have not [contacted a local official about invasive species information], unfortunately (Interview 1 2013).

This contrasted with two participant interviewees that were both over 50-years old. These two participants are considered to be active participants as they are in regular contact with their local officials, whether it is through alerting officials about the needed management of invasive species or if it is through offering advice and information. One active participant lives in MD and the other in WUP, but both have had interactions with local officials and had similar experiences:

When I moved here, I discovered [that we had] spotted knotweed along the roadsides of my street. It's a solid thicket of it on my street and it was spreading into my yard, so I took some information into the city manager and talked to him about possibly mowing [the knapweed]. He was very agreeable and he did do it, but they didn't [mow] at the right time ... they came through with weed whackers after the knapweed had gone to seed and they basically just made it worse [by spreading the seeds] (Interview 11 2013).

You know if you have a concern, at least in our communities [in Metro Detroit] and other ones around, you can call the local officials. You can call your city government people, city council people, and voice your opinions very, very easily. I have done this to the Department of Public Works that handles a lot of these things and I call and I can voice my opinion ... they've been very responsive. I get emails from them ... phone calls ... they may not do anything, but they will listen... (Interview 4 2013).

The varying responses depending on age, not geography, indicates that location does not necessarily have an impact on if an individual will contact their local official or be involved with their local government. Age does appear to have some influence on active participation.

While local organizations are one of the main ways for the public to be informed about environmental impacts, the groups that were included in this study were not politically involved. If an individual is involved with a local environmental group, they do not necessarily have more political influence by doing so; they are not active political participants. Instead, group leaders may be asked to add comments or ideas to policy planning, but even their contributions may be limited. When asked if group leaders that this MD professor worked with had any political involvement, their answer indicated that there typically was not any participation.

If they got involved in politics or if they offered an opinion on something, the people that did it would get fired. That's the way it is (Interview 3 2013).

This may indicate why environmental organizations tend not to affiliate with political matters until a potential regulation threatens their mission statement or activities.

This is also the case for those who work with the federal government as well, either as employees or a contracted worker. One WUP official and one WUP participant defined themselves as federally involved or employed. When asked if they have commented or contributed to invasive species regulations, those whose occupations were federally related had similar responses:

As a [federal] employee, we don't ever comment or influence things like that [regulations that control the spread of invasive species] ... (Interview 4 2013).

... As a federal contractor ... I'm limited in what I can do politically, so I don't do political work anymore (Interview 11 2013).

One state official at the invasive species conference that I attended suggested that if group leaders and officials wanted to make a change to invasive species regulations or funding, they should send their state representative a message as a private citizen with no affiliation with an organization.

Many organization leaders in both WUP and MD also chose not to pursue policy routes outside of their groups because they were either not interested in the matter or they do not feel as if they would have adequate knowledge to help contribute information towards a policy.

... I don't really have an interest [in policy formulation]. I know I'm not going to get involved with that (Interview 9 2013; WUP).

You need somebody who knows the political system better than I do. I don't do well in the political system, I think (Interview 3 2013; MD).

Due to the lack of political involvement by every interviewee, regardless of role or position, and environmental organization that was included in this research, it appears that deliberative democratic theory is not applicable because there is no involvement in the federal or state policy process. This failure of political engagement was present in all interviewees. Because of this failure, they are considered as passive or non-participants.

Although deliberation does appear to occur within the organizations itself, but this occurs when active participant knowledge and contributions are considered. Some interviewees, considered as active participants in their respective groups, were invited by organizational leaders to help contribute to management plans and provide insight to issues related to their occupation (Interview 1 2013; Interview 3 2013). For example, one active participant interviewee has been asked by a local environmental organization about their knowledge in environmental science.

I get involved in [input] with something like The Stewardship Council ... I'm in contact with them about quality of the environment. They keep me informed about what they're dealing with, with the city council, and I give them information and advice ... as best as I can ... [I am also on a] public information group, the committee I sit on ... we talk about [informing people] and see what we can do (Interview 3 2013).

Because of this individual's background and expertise, as well as their habitual involvement with organizations, groups rely on this person to help make decisions. While they do not directly make decisions, the interviewee does deliberate and contribute.

Chapter 7: Policy Implications and Future Research

Discussion

The three main research questions of this research were:

- 1) Does geographic location, for example metropolitan versus non-metropolitan areas, have any type of impact on public participation, such as access and availability to contribute and distribution of information?
- 2) How do people perceive an environmental issue depending on their role within an organization?
- 3) How are people involved within the policy process when dealing with invasive species and its management?

By answering and understanding these questions, this can offer insight into how citizens are utilized in invasive species management and if people are involved in policy formulation or implementation. It could also allow for understanding how similar issues within a state can affect different locations at different times, thus there is no “one size fit all” approach to public participation and managing invasive species.

For this research, geographical location did not have a significant impact on the availability and accessibility of public participation in invasive species management. In both study locations, there were opportunities for citizens to be involved in controlling these species. A variety of events, which include public meetings, comment period for regulations, and volunteer events, were available during the study period. According to the interviewees in both locations, active and passive participants did take advantage of these opportunities and helped control invasive species and with other issues. However,

other factors that were influenced by location had more of an effect on availability and accessibility, such as population, funding, personal motivation, and organizational structure.

The pool of potential participants is drastically larger in MD compared to WUP. This was also reflected among the individuals interviewed for this study. In MD, organizations were able to attract a larger group of interested citizens. This may be due to the greater amount of resources in the larger communities in MD (Wang 2001). Interviewees in MD mentioned that hundreds of volunteers would come out and help with their organizations, which was not the case when talking to individuals from WUP. However, the volunteers that do contribute are considered to be passive participants as most solely attend volunteer events and are not regular members who regularly attend events outside of volunteering. Environmental group leaders in WUP brought this point up as an issue in recruiting citizens to volunteer at events or attend public information meetings. When there were events, the same few active participants would attend.

Almost all of the interviewees mentioned that the population differences would be a main impacting factor in participation between the two locations. While volunteer opportunities are not as plentiful in WUP compared to MD, both active and passive participants in the WUP still volunteer and attend events and meetings. However, the number of people that do attend is significantly different between the two locations. Population does reduce the amount of active participants who decide to join organizations, are regular participants, and leads to a select group of individuals to join.

Those that choose to actively participate in organizations have interests in environmental sciences or have been impacted by invasive species. In the case of all of the interviewees, most have educational background that reflects their interests. These individuals may be knowledgeable about the issue, but this creates a homogeneous organization. A homogeneous group prevents deliberation amongst participants since “everybody agrees. That’s why they join the group” (Interview 3 2013). Opinions and concerns would be fairly uniform, as people with the same background would join the same group.

Citizens that do not necessarily have an educational background in natural sciences who do choose to join may be outnumbered and not adequately represented in the organization. Opinions and concerns that are addressed by the group would be fairly one sided and only reflect a small subset of the population. This sample of society would not represent the community; the opinions and information of a select sample would be heard (Pitkin 1967). Active citizen recruitment may help prevent a biased group, but individuals may recruit within their own social or educational network thus not expanding into the community it intends to reflect (Ryfe 2005).

Access to adequate funding was and is the major factor in determining if public participation opportunities will be available to citizens. This was an issue for both study locations. With no funding, programs cannot be run and citizens will not have accessible chances to contribute information or concerns to officials. This sentiment was raised amongst organization leaders regardless of location. Three leaders mentioned that without funding they would be unable to work with citizens or hold public information

meetings. One WUP leader mentioned that they believed that the majority of funds from the state of Michigan to fund invasive species management is geographically influenced; money that “goes downstate ... stays downstate” (Interview 12 2013). Their response may be influenced by this individual’s sense of place; since this leader is originally from WUP, any negative experiences they may have is felt personally and could sway the actual perception of this issue (Relph 1997). However, it is unknown if this is actually true as funding trends were not tracked during this study. State funding allocation was not part of this study.

Federal and private funding is key to running programs and events, as well as donations from companies and volunteers. While active and passive participants can offer their time at no cost to the organization, funding is still needed to mitigate the damage invasive species has done. Removal efforts, such as chemical treatments, and enforcement of regulations are tasks that cannot be completed solely by volunteers. Invasive species management is a costly process that would not be as successful without funding. At an estimated cost of \$120 billion per year, funding is integral to invasive species management (Pimentel et al. 2005).

While participation opportunities are available and accessible, individuals may choose not to take part because they do not associate invasions as an environmental issue. The topic of invasive species does inevitably have an impact on citizens and the resources available to them; however, they do not necessarily feel the direct impact from these species. If people are not directly affected by invasive species, they do not feel as if it is a problem and are not compelled to contribute to its management. This also applies to a

variety of policy issues that people could potentially add comments to, such as climate change. The effects from both invasive species and climate change are not immediately felt; citizens will not notice the negatives until it impacts their lifestyle or wellbeing (Selge et al. 2011). Because of this, citizens are apathetic to precautionary management plans.

Lastly, the manner in which an organization is structured impact if there are opportunities for citizens to participate in invasive species management. This factor was also somewhat geographically influenced as well due to a difference in temporal scale of invasive species introduction. The majority of species that are present in WUP have shown up in recently, compared to invasive species in MD, which tends to where invasive species are first found or assumed to have entered into the area. For example, the Emerald ash borer was first found in MD in 2002, while the ash borer was discovered in Houghton, Michigan, located in WUP, in 2012 (Kovacs et al. 2010; MDARD 2013).

Role did not appear to affect perception of invasive species as considerably as initially predicted. Interviewee definitions of what an invasive species is was similar regardless of their role and location. Perception appeared influenced more by an individual's educational background and personal interests. Two interviewees, who were MD organization leaders and did not have an educational background in environmental related sciences, focused on vegetation and the impacts on native plant species. Their self-interests in gardening has them solely focusing on plants because invasive species directly impacts their environmental interests. Other species do not necessarily impact their interests or life, so they do not have as much concern for these species.

However, leaders in MD and WUP had different perspectives on what an invasive species was. Of the four leaders from WUP that were interviewed, three specifically mentioned the type of ecosystem in their definition. These three leaders mentioned natural areas, or “pristine natural areas” as their ecosystem to focus upon (Interview 4 2013; Interview 9 2013; Interview 10 2013). The geographic area in which the leaders worked in or managed may have influenced their specificity in area impacted. Their areas of focus are either relatively undisturbed environments or national forestland. While the roles of the individuals in both study locations were similar, they could potentially be considered different stakeholder groups because their focus areas are much different (García-Llorente et al. 2008). Leaders in WUP work in more undisturbed areas, while leaders in MD are conserving forests and ecosystems within urbanized cities. Forested areas in MD may not be considered as pristine as forests in WUP.

All four leaders in MD did not mention a specific habitat or ecosystem (Interview 3 2013; Interview 5 2013; Interview 6 2013; Interview 8 2013). Instead these leaders focused on the impacts that these species had on the habitat and other species in that ecosystem. The specificity of ecosystem by WUP leaders and not by MD leaders could potentially be due to the differences in land cover. Since MD has less forest cover and undisturbed forest areas, focus for invasive species control tends includes more neighborhoods and urbanized locations. Whereas in the WUP, control efforts tend to occur in woodlands that have not been overrun with invasive species.

The difference in interpretation of the areas impacted by invasive species could be attributed to each individual leader’s sense of place, or the location they identify with

(Relph 1997). Since WUP group leaders and agency officials focus on the management of invasive species in relatively undisturbed locations, their attention is on these more “pristine” locations. While the actual reason for this difference is unknown, it is interesting to note that leaders in MD were not as specific in their ecosystem definition as “pristine natural areas” since there are not as many in this location. There are natural areas throughout MD that are managed and focused upon by the leaders included in this study, but they may not be considered pristine locations, as they are surrounded by suburban homes and neighborhoods.

One of the main goals of this research was to discover how people are involved with policy design and understanding their perceptions of this process. However, interviewees did not participate in policy design or in other aspects of the policy process. The closest to policy design described by interviewees were that some individuals utilized invasive species regulations through applying for permits to control invasive species to avoid fines or jail time (Interview 4 2013; Interview 5 2013; Interview 12 2013). This lack of involvement may stem from apathy or the manner in which regulations are typically formed.

The five participant interviewees considered themselves as active participants within environmental organizations, but being involved and knowledgeable in the issue of invasive species did not correlate to being politically involved. Three of the participants mentioned that they choose not to participate in their local government, making them non-participants in policy processes (Interview 1 2013; Interview 2 2013; Interview 7 2013). Responses either showed apathy or lack of political interest. The other

two participants, one from MD and the other from WUP, only contacted their local government officials when they were either alerting officials about the presence of an invasive or providing some advice. These interviewees are considered as passive participants within policy processes as they add little information to formulation or implementation of regulations.

Organization leaders that were interviewed also did not participate in the government as initially hoped. Many were either apathetic about participating, which may have influenced individuals to not participate in their local governments. Other participants were restricted occupationally or because the organization they were affiliated with were classified as a tax-exempt, non-profit organization. Because of their lack of political involvement similar to participant interviewees, organization leaders and agency officials were also considered as passive participants in policy processes since they are not involved in all aspects of the policy cycle.

Almost all of the environmental groups that were part of this study are considered 501(c)(3) organizations. A 501(c)(3) organization is typically referred to as a charitable organization that does not spend a majority of its time or resources towards influencing legislation or participate in campaign activity that is for or against a particular candidate (IRS 2013). An organization that is classified as 501(c)(3) can only devote about 10-20% of its resources and activities towards lobbying (FG 2013). Campaigning and endorsing candidates in elections are activities that are strictly forbidden. This may allude to why organization participants that are only involved in these groups do not have much political or legislative influence in invasive species management. The organizations that

individuals are participating in do not have the capability of devoting a majority of their resources towards influencing regulations.

Instead of having much stakeholder input, invasive species regulations and management plans are formulated using a top-down method, where officials have established the regulatory restrictions, not participants. Since response to invasive species control needs to be completed quickly, citizens are generally not consulted prior to regulatory measures. Deliberations do not occur with citizens and other impacted stakeholders, which would be in the case in a bottom-up method where a network of impacted actors would be consulted in regards to their strategies and goals in control (Sabatier 1986).

Deliberative democratic theory, which would involve citizens in all aspects of policy design (Pierre and Peters 2000), was not applicable in this study. For example, in a deliberative democracy, organizations would not apply and compete for grants with winners being selected by federal agencies. Instead, organizations that apply to the grant would deliberate and discuss about what they would do with funding and come to a general consensus regarding the best use of the monies. This does not occur. Groups that receive the grant were selected as having the best application by a group of officials that have been chosen to judge grant applications. This selection committee deliberates and decides who is granted the funding, not organizations or citizens, including those who may be impacted by what groups plan to complete. This was similar in most aspects of invasive species control planning and managing. Citizens followed the lead of organizations instead of contributing and discussing all potential ideas.

While deliberative democracy was not applicable, aspects of this theory were present, such as involving citizens in helping implement invasive species regulations and some groups including knowledge and information from active organization participants. There was an expectation that participants would be more involved in either local or state government and contributing information towards invasive species regulations and policy changes, but this was not the case. Overall there was a clear failure of political involvement by all individuals that were included in this research, as well as those that attended volunteer events and the conference.

Policy Implications

While the democratic system does not have direct involvement from the public in policy processes, it stresses that individuals should not be apathetic or non-participants within the government. However, this research, clearly demonstrated that those involved with environmental organizations, including active participants, group leaders, and agency officials, are generally not involved with local, state, or federal government. This undermines the basis of deliberative democratic theory, as there is a lack of both participant deliberation and discussion. The inclusion of environmental groups and participants is fairly limited in invasive species policy processes, if it occurs at all. Group leaders and agency officials promote organizational involvement, such as volunteering or attending an organization meeting, as a passive activity; individuals that do choose to be involved are considered more as volunteers versus sources of information that could be used towards the formulation of regulations that address invasive species.

The engagement of participants can be described as one-dimensional; participants usually volunteer with the removal of invasive species versus actually contributing within the political system. While the involvement of participants through volunteering may improve a local community forest or habitat, this does little to actually influence regulations that are intended to prevent or control the spread of invasive species. Environmental group leaders appear to promote a type of participation, promoting a passive approach to invasive species control, as a way for citizens to make a difference. However, such activity fails to address participation in influencing policy change. No policy changes can result if this is the only manner in which participants are involved in invasive species management. Since leaders do not see participants as sources for information or opinions on the political aspect of invasive species and do not participate in the government themselves, this results in a lack of perpetuation of political involvement. If environmental organization leaders are not involved, both active and passive participants are more likely not to be involved as well.

These groups should be the vehicles for participants to express their concerns to local elected officials to help shape policies. However, in this research, this was not the case. The environmental organizations included in this research did not deal with their local representatives and did not appear to contribute information to invasive species regulations. Active environmental organization participants who rely on their respective group to complete policy actions may actually be passive participants in the political system. To change this, organizations should be more explicit with participants regarding

their lack of political involvement and how individuals can more actively involved with their local governments.

Limitations to Research

While this research allowed for some insight into the dynamics of how citizens are utilized and can participate within invasive species management, additional research could be completed in addition to the results obtained through this study. Only 12 interviews were completed during the course of this study. More interviews with both active and passive participants in both locations may have offered different insights into citizen perception of regulations and how they were involved with their local governments.

There was a lack of responses from individuals whose insight would have been beneficial. A few interviews were not completed due to the summer field season. One interviewee had scheduled the phone interview a few weeks in advance to ensure that there would be adequate time around them being out of the office (Interview 4 2013). However, many potential interviewees would answer to initial emails and request for further information, but I would not hear from them again. Even after continued contact with them, the line of communication would end. Phone calls and emails were continuously unanswered.

The research question was intended to cover all invasive species, both terrestrial and aquatic. However, almost all of the participants spoke about terrestrial species, in particular non-native plant species. While both terrestrial and aquatic species control

response times are quick, the management between the two types is fairly different. The impacts from invasive species on the Great Lakes and its watershed impact all users of the lakes, regardless of where they are from. It may have also been beneficial to focus on the management of one species versus any species. For example, in Mackenzie and Larson's (2010) study on citizen perceptions to rapid response programs, they focused solely on the Emerald ash borer and the management that was done in Southern Ontario, Canada. By concentrating only on the borer, this allowed them to focus on control options and citizen reaction to the one response program. Answers were more focused compared to those from this research because response programs differ for different species.

Since none of the participants interviewed had any political involvement, it would have been significantly beneficial if interviews were completed with individuals that have been involved. To better understand how citizen knowledge and information is utilized, interviewing a person who has gone through the political process or is an active participant in the government would have given a better perception of people in policy design. The group of individuals interviewed was a small subset of the invasive species management community, but it did discover that most people are not politically driven. However, asking these participants about how they feel their involvement in the group impacts local policies could have offered more insight on perceived political involvement.

Although there were limitations to this study, it still offered an insight into a public issue that utilizes the public to help complete its goals. It discovered that while

citizen input is encouraged and a variety of participants are invited to events, policy design involvement is limited within organizations, regardless of participation. Deliberative democratic theory was also not present in these organizations as well. Location may have some impact on participation, but ultimately it is the individuals who are involved that dictate policy involvement. While this study was small, the research methods utilized revealed information that may not have been obtained using other approaches. However, further research could be completed to provide a wider understanding of the research questions.

Opportunities for Further Research

This research question could be applied to a variety of political issues that include public opinion, but it may produce different results. The issue of invasive species is fairly new in some locations and this may have influenced the results. If the case study topic chosen was not as new or was an issue that has been politically involved, this may have produced results that were more evenly distributed. Since invasive species are a fairly new environmental concern in WUP compared to MD, the establishment of organizations and associations are still in its infancy. If the case study focused on environmental degradation from development or pollution, this may have offered more insight in citizen involvement in policy design within the state.

Interviews with political leaders would give better insight into the perspective that officials have in regards to public participation in government instead of in environmental organizations. Since environmental organizations generally do not include themselves in

policy design, this offered no insight in how people could potentially contribute to local governance structures in their communities. Government officials in either location could offer a broader understanding of how citizens are involved with policy in their local communities. This could then be compared by location and then analyzed for differences amongst citizens in either location.

Interpretation of environmental issues similar to invasive species can shape the manner in which people manage or approach an issue. While organization leaders in the study had the same goal, to manage invasive species, the way they perceived what a species was could influence how they approach management. Further research into understanding how a leader comprehends an issue could offer insight into the methodology they use to teach citizens within their group and if this also shapes a participant's definition. While this research showed that role did not play an influence in perception, more work could be done to see if it really is the case.

The effect of age and influence on political involvement is an additional topic that could be focused upon. In the results, it appeared as if age was more of a factor than location when influencing public participation in public policy issues; younger citizens were less inclined to participate than those who were over 50-years old. Studies have been completed about young adults and their lack of involvement in interest even though it is accessible via the Internet (Lupia and Philpot 2005). In addition to this study, it would be interesting to understand if a select public policy issue, such as invasive species, could influence younger citizens to be involved or more politically interested.

Lastly, the effect of sense of place and how it may influence an individual's political involvement would also be another aspect of this study to follow-up on. Within the results, it appears as if an individual's sense of place plays some factor on whether a person may or may not participate, due to their connection or identification with a specific location. An issue similar to invasive species that affects individuals statewide may be interpreted differently and it may influence individuals to choose or not to choose political involvement, either actively or passively. The connection to a specific location and its potential influence on how it could be a factor in deciding if an individual will participate at all should be further investigated.

Chapter 8: Conclusion

Public participation in invasive species management can be beneficial to both the public and environmental organizations. Organizational leaders rely upon the public to help control and prevent further spread of these organisms, while the public has this expectation for the organization. While the issue of invasive species affects everyone regardless of geographic location, the opportunities for citizens to contribute is affected by the organizations present in their local community. However, for citizens to choose involvement, they must take the self-initiative towards inclusion and to discover chances for participation.

Citizens who are not knowledgeable in this issue do not involve themselves in environmental groups or policy processes, unlike citizens who are educated in natural sciences or have environmental interests that are impacted by invasive species. Citizens may help with preventing the further spread of a particular species in their local communities, but their overall lack of knowledge and awareness makes leaders view them more as manpower than actual sources of information. Thus, the contributions from citizens are fairly limited unless the individual has established himself or herself as knowledgeable in the issue.

Both citizens and organizations in this research lacked political engagement, which meant that deliberative democratic theory would not be applicable in invasive species management, as deliberations do not normally occur. This political apathy by all interviewees indicates that this is a potential policy failure that needs to be addressed.

Leaders in organizations need to promote involvement of active participation in both environmental organizations, as well as in local governments.

The battle against invasive species has become a lesson in learning and managing how to live with these invaders. While the issue has impacted locations at different times and intensity, it is still a public policy issue that appears to lack not only active public involvement, but also contributions from local environmental organizations that address the issue more than local governments. Geographic differences may have some influence on differences in availability for citizens to contribute, but environmental organizations and their restriction in and indifference to political involvement have more of an effect on citizens and their inaccessibility to provide knowledge and information to invasive species regulations.

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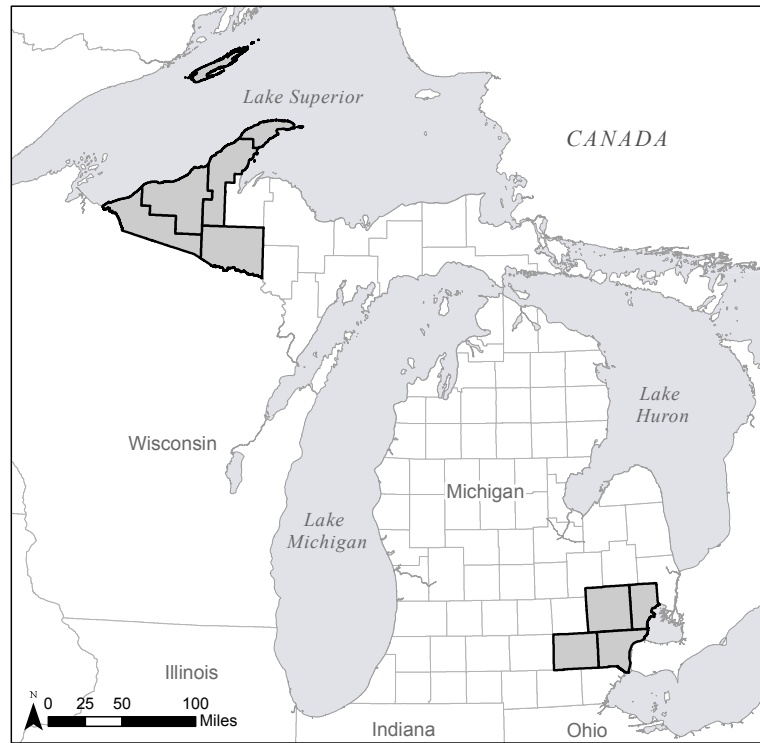
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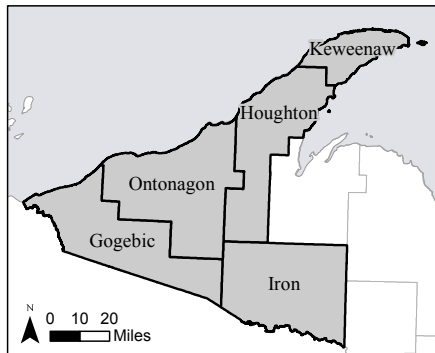
Appendix A: Study Locations

Geographic overview of the two locations included in this research.

Study Locations within Michigan



Western Upper Peninsula Counties



Metro Detroit Counties



Coordinate System: MiGeoRef

Data Source: Michigan Geographic Data Library (2013)

Angela Yu, 2013

Appendix B: IRB Consent Form (M1071)

CONSENT TO PARTICIPATE IN RESEARCH

Pesky Pests of the Great Lakes State: Is Public Participation Influenced by Geographic Differences?

You are asked to participate in a research study conducted by Angela Yu and Dr. Adam Wellstead from the Department of Social Sciences at Michigan Technological University as part of a thesis research project for obtaining an Environmental Policy degree. Your participation in this study is entirely voluntary. Please read the information below and ask questions about anything you do not understand, before deciding whether or not to participate.

Purpose of Study

The purpose of this research is to understand if there are differences in public participation due to geographical location and if these differences impact people's perceptions of invasive species and its management. This research hopes to better understand if, within the same state, there are locational differences in the availability and accessibility of citizen involvement opportunities.

Procedures

You are being asked to participate in this interview because of your involvement with environmental groups and/or invasive species management. Interviews will be completed in the Western Upper Peninsula and Southeast Michigan (Metro Detroit) areas.

If you choose to participate, you will be included in an interview that will attempt to understand your perceptions and opinions about invasive species management and your involvement with environmental groups. You will be asked questions about your role and contribution to the group, your perception of invasive species and the issues surrounding it, and information that is provided to you from environmental groups.

The interview will be audio recorded and transcribed. You are allowed to review the transcript.

Potential Risks

We do not believe that there will be any risk to you by participating in this research. We will also be keeping interview recordings and transcripts confidential and your participation will be kept anonymous. Your name will not be connected in any way with the information that results from this project.

Potential Benefits

There are no direct benefits for you by participating in this study. Your participation will help in understanding potential geographic differences in public participation and perceptions towards invasive species management.

This research hopes to better understand if, within the same state, there are locational differences in the availability and accessibility of citizen involvement and management opportunities. The data that will be collected and the conclusions that are drawn from it has the potential to impact future invasive species management plans in Michigan. It can also potentially impact the understanding of public participation in other environmental issues.

Confidentiality

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Your name will not be shared with anyone except with the research team.

The data and information that you provide will be anonymous to prevent identification and will be secured on a password protected laptop. Transcript and any coding that is produced from the interview will not include any information that would allow you to be identified. The transcripts will only be shared with you and members of the research team. Quotes from the transcripts may be used in the thesis write-up, but any information that could allow for identification will not be included in the document.

Participation and Withdrawal

You can choose whether or not to be in this study. You may also refuse to answer any questions you do not want to answer.

Identification of Researchers

If you have any questions or concerns about this research, you can request information by contacting:

Angela Yu
Environmental Policy Graduate Student
Michigan Technological University – Department of Social Sciences
awyu@mtu.edu
(313) 820-9824

Adam Wellstead
Assistant Professor of Environmental and Energy Policy
Michigan Technological University – Department of Social Sciences
awellste@mtu.edu
(906) 487-2115

Rights of Research Subjects

The Michigan Tech Institutional Review Board has reviewed my request to conduct this project. If you have any concerns about your rights in this study, please contact the Institutional Review Board, Michigan Tech-IRB at 906-487-2902 or email IRB@mtu.edu.

By signing this consent, you are stating the following:

- The details of the research has been explained to me, which includes what I am being asked to do;
- My questions have been answered to my satisfaction;
- I am voluntarily agreeing to participate in this research as described on this form;
- I have been given a copy of this document for my records;
- I understand that there is no financial gain from participating in this research;
- I can ask more questions and withdraw from this study without any penalties at anytime with any reason. I may also request that tapes or transcripts of my participation be destroyed and not used any further.

Printed Name of Subject

Signature of Subject

Date

Appendix C: Interview Questions by Role

All interviewees, regardless of their role were asked these background questions:

1. Where are you originally from?
 - a. How long have you been living in the Metro Detroit/Western Upper Peninsula area?
2. What is your educational background?
3. What is your current occupation?

Citizen Participant

Citizen Involvement/Public Participation Opportunities:

1. What group/organization do you primarily participate with?
 - a. How many years have you been involved with them?
 - b. Why did you choose to participate with (organization name)?
 - c. How did you know about them?
 - d. Do you need to pay membership dues or fees?
 - e. Are you involved with any other groups/organizations?
2. What do you typically do with the group?
 - a. Does this match what you feel is your role with the group?
 - i. What would you describe is your role?
 - b. Why do you participate in these events versus other events?
 - c. How does the group prepare you for these events?
 - i. Are the opportunities for training or is it right before the event?
3. Have you contributed to a decision that the group has made recently?
 - a. Who do you think was in the best interest of this decision?
 - b. Is citizen input generally accepted?
 - i. Who typically contributes?
4. Have you participated in groups or events outside your local community?
 - a. Did you notice any differences between these groups?
5. Have you participated in invasive species related events within the community?
 - a. What did you do?
 - b. What kind of information do they provide to you and other participants in preparation of the activity?

Invasive Species Related:

6. What is your definition of an invasive species?
 - a. What are some species that you know of in your community and their impacts?
 - b. From what you know, what are some control methods that your local community has used to address invasive species?
 - c. Where did you learn/hear about them?

7. What are some ways that you share what you know about invasive species with other citizens who might not know about them?
 - a. Were these people interested in what you were teaching them?
 - b. What methods did you use to teach them?
 - c. Did you do some research before teaching them?
8. What local/state/national regulations do you know of that address invasive species?
 - a. Where did you get this information?
 - b. Do you think the state/country is doing enough to address the issue?
 - c. Would you change anything about these regulations?
9. Have you contacted a local official about anything invasive species related?
 - a. What was their position?
 - b. Were you listened to? See any changes?
10. Has your local community been impacted by invasive species?
 - a. What did your community do to address the impact?
 - b. How were you and other citizens informed?

University Professor and Leader

Citizen Involvement/Public Participation Opportunities:

1. What have you been involved with in the local community that deals with invasive species management (outside of involvement with groups)?
2. What environmental groups are you involved with?
 - a. How many years have you been with (organization name)?
 - b. Why did you choose to participate with (organization name)?
 - c. How did you know about them?
 - d. Are you involved with any other groups/organizations?
3. What do you typically do with the group?
 - a. What would you describe is your role in the group?
 - b. How does the group prepare its members for events your participate in?
 - i. From your perspective, do you believe that the group prepares citizens in manner that lets them participate in the event?
4. Based on what you know and have been provided with, what are some decisions that the group has made recently?
 - a. Do you agree or disagree with their decision? Why or why not?
 - b. Did you have any opportunity to contribute to the decision?
 - ii. If so, what did you contribute?
 - iii. If not, what would you have contributed?
5. Have you participated in invasive species related events with the group?
 - a. What kind of information do they provide to you and other participants in preparation of the activity?
 - b. In your opinion, does the information provided allow citizens to complete the activity/task?

Invasive Species Related:

6. What is your definition of an invasive species?
 - a. What are some species that you know of in your community and their impacts?
 - b. Where do you typically get your information from in regards to invasive species?
7. What kind of information do you share with your students and citizens about invasive species?
 - a. Do you provide handouts or websites to them if they have more questions? If so, what are these resources?
8. What are some state/federal/local regulations do you know of that address invasive species?
 - a. In your opinion, are these regulations enough to control/manage invasive species?
9. Have you contributed knowledge or information to invasive species policymaking?
10. Have local communities asked you for your input at meetings or events to help talk to citizens about invasive species??
 - a. What have you done with these groups or communities?
 - b. What are the citizens' reactions?
11. In your opinion, do local communities provide enough information about invasive species to citizens in terms of their impact and regulations?
 - a. If not, what could be improved upon?
12. From your perspective, are there enough local opportunities for citizens to state their concerns and questions about invasive species to local officials?
 - a. Similar to the above question, are citizens engaged in local policymaking dealing with environmental issues?
 - b. In what ways could citizens be involved in management processes?

Group/Organization Leader

Organization/Group Information:

1. What is the organization's mission statement?
 - a. What topics does the group address?
 - b. How does invasive species fit into the goals/mission statement?
2. What are your responsibilities with the organization?
 - a. How long have you been involved with the organization?
 - i. Have you worked with any other organization?
 - ii. Does the group work with any other groups in the area?
3. Has the local government supported the work that has been completed by the organization?
 - a. Do the surrounding communities rely on the organization to address the issue of invasive species in the area?
4. What invasive species are present in the local community?

- a. How are citizens and visitors informed about the presence of invasive species?
- 5. What are some current projects on in the area that manage/control invasive species?
 - a. Is there an invasive species management plan in place for the area?
 - i. What does it aim to do?

Citizen/Group Participation:

- 6. Can citizens participate in the projects that are currently in place?
 - a. What types of invasive species related events are available for citizens to participate in?
 - b. How are citizens recruited to these events?
 - c. What typically occurs at these events?
 - d. How are citizens prepared to participate in events?
 - i. What kind of information is provided to them?
- 7. What are citizens' reactions to the work that has been done in the local community?
- 8. What is your opinion on the inclusion of citizens in the control and management of invasive species?
 - a. What about citizen knowledge of invasive species?
- 9. Have citizens contributed information that has been used to manage invasive species?
 - a. What kind of information was provided and how was it used?
- 10. From you experiences, has citizen involvement contributed to the work that you complete?
 - a. What kind of involvement?

Invasive Species Related:

- 11. What is your definition of an invasive species?
- 12. What are some local/state/federal regulations of invasive species that you work with?
 - a. From your perspective, do you believe citizens are aware of regulations?
 - i. What could be improved so citizens are informed?
 - b. Do you believe these regulations address the impacts from invasive species?
- 13. How have you worked with local communities in managing invasive species?
 - a. From your perspective, do you know of any differences amongst communities you have interacted with?
- 14. How do you think the local community is doing in addressing the impacts from invasive species?
 - a. Are communities adequately addressing the issue?
 - ii. What are some improvements?
- 15. Have you worked with any communities outside of Metro Detroit/Western U.P.?
 - a. Are there any differences that you have experienced?

Appendix D: Interview Reference

Description of roles of interviewees and location in which they represent in study.

	Role	Location
Interview 1	Citizen Participant	Metro Detroit
Interview 2	Citizen Participant	Metro Detroit
Interview 3	Citizen Participant/Professor	Metro Detroit
Interview 4	Agency Official	Western Upper Peninsula
Interview 5	Organizational Leader	Metro Detroit
Interview 6	Organizational Leader	Metro Detroit
Interview 7	Organizational Leader	Metro Detroit
Interview 8	Citizen Participant	Metro Detroit
Interview 9	Organizational Leader	Western Upper Peninsula
Interview 10	Organizational Leader	Western Upper Peninsula
Interview 11	Organizational Leader	Western Upper Peninsula
Interview 12	Citizen Participant	Western Upper Peninsula

Appendix E: Invasive Species Definition by Role of Interviewee

The definitions interviewees provided during interviews regarding what an invasive species is.

1: MD Participant	A species in which dominates over a native species and thrives, blocking out the success of the native species. Something that shouldn't be in the location that it is.
2: MD Participant	Something that is not native to this area. It's not part of the community originally and has either super flourished and is taking over the niches or habitats of other animals.
3: MD Academic	A species that can move into a habitat and dominate the habitat by then crowding out or eliminating other species.
4: WUP Government Official	A species that is not native to this area, so it's not native here and it's causing some harm, typically ecological harm, and is spreading into natural areas.
5: MD Leader	A species that is out of place or out of balance with the system that it's in and it may or may not be native to the area. It's something that's having a negative impact on the ecosystem as a whole, either affecting processes or throwing it out of balance.
6: MD Leader	A species of plant or animal that does not originate in this area, so it doesn't have natural enemies and when it gets to flourish here, where it's not from, it creates a monoculture. One that creates a monoculture and eliminates diversity in the plant and animal kingdom.
7: MD Participant	A species that is exotic, introduced recently, escapee from cultivation or another source, causes detrimental effects to the native flora.
8: MD Leader	A foreign species that is not native to our vegetation and it threatens to replace other native plants. It would be overwhelming the native ecosystem.
9: WUP Leader	Invasive would mean that it could be a health concern; a harm to the environment... economically cost a lot of money to take care of. Something that gets out of hand. It comes into pristine natural areas.
10: WUP Leader	One that is usually not native to an area and is aggressively making it into natural areas. A species as being a problem in natural areas that can get into natural areas or natural ecosystems and causes problems.
11: WUP Participant	A plant that comes into an environment and takes over to the point that it has detrimental effects on the other plants that are already in there.
12: WUP Leader	It's a species not native to the area and does not have any natural enemies that can control it from the damage it's doing; there's nothing that can stop it.