

Assessing the Variances of Citizen Stakeholder Efficiencies in Watershed Governance between Reactive and Proactive Administrations

by

Nicholas P. Guehlstorf, Ph.D.

Professor

Tel (618) 650-3852; Fax (618) 650-3509

nguehls@siue.edu

Department of Political Science and Department of Environmental Sciences

Southern Illinois University Edwardsville

Hayden King

Master's Candidate

Tel (309) 230-7806; Fax (618) 650-3509

hking@siue.edu

Department of Environmental Sciences

Southern Illinois University Edwardsville

Presented at 2019 Western Political Science Association Conference

Draft: **Not for Citation or Attribution**

ABSTRACT:

This research considers the role of citizen stakeholders in the management and governance of two Wisconsin watersheds--Geneva Lake which is in regulatory compliance and Green Lake which is State impaired--with the principles of Environmental and Deliberative Democracy (EDD). The governance of watersheds has historically been managed by natural resource experts and often inaccessible to communities, municipal leaders, and citizens. Due to continued stress on watersheds and administrative resources, multiple levels of government are increasingly turning to non-governmental entities for decision-making. This research design compares the social, geographical, economic and political discourses in two Wisconsin watersheds with an established and similar case study in Lake Simcoe, Ontario. Our central hypothesis posits that EDD community compatibility is enhanced by public trust in expert capacity and watershed education for public stakeholders. Further, we expect that affirmative self-assessments of reactive behaviors will be a limiting factor for EDD compatibility. A mixed methodology with qualitative data about ideas of participatory governance obtained via citizen surveys and elite-level interviews with decision makers is utilized. Our current findings and previous case study all affirm that proactive watershed management frameworks are more innovative without a crisis. Similarly, watershed public administrations created reactively with a specific agenda have a comparable structure with citizen involvement but have a limited capacity, scope, and potential for long-term successes.

1.1 INTRODUCTION: *Background*

The management of natural resources requires a scientific and technical understanding of natural systems and how they can be influenced by human civilization. As such, many scholars have assigned Natural Resource Management (NRM) to the realm of the governmental “expert.” In the United States, expert-driven environmental management involves a myriad of local, state, and federal government agencies. Take for instance Wisconsin, where the Department of Natural Resources oversees the management of more than 15,000 documented lakes (Protecting Wisconsin's Lakes, 2018). This agency has broad regulatory and enforcement authority concerning lakes and their ambient watersheds. The participation of citizen stakeholders in watershed management is limited. However, these stakeholder groups hold a superficial involvement in regulatory processes and public policy formulation. Some argue that such a model of watershed governance contradicts the democratic spirit of American life. These environmental and public policy scholars highlight the un-tapped potential of citizen stakeholders as governance partners. In concert with this critical sentiment are others who note that the complexity of natural systems requires skilled, educated, and trained experts to adequately address associated problems. This area of scholarship holds that increased involvement in natural resource governance by citizen stakeholders can only be superficial. Attempts to empower lay groups to take a more meaningful day-to-day governance role would be counterintuitive because they do not have an appropriate knowledge base.

These contrasting ideas have been the subject of much inquiry in scholarship and political speculation. The theoretical foundation of this research project is concerned with the following questions: (1) Are watershed management practices reflective of increased public discourse? (2) Are the principles of Environmental-Deliberative Democracy present in the establishment and implementation of watershed management initiatives? (3) Do innovative watershed management strategies emerge in response to an environmental crisis? (4) Are Environmental Non-Government Organizations recognized by the public as an impactful contributor for watershed management? In order to effectively address these underpinning questions, this paper seeks to operationalize the challenges of water governance by interviewing watershed management specialists. This is accomplished by collecting data via public questionnaire from

a reactive watershed community responding to a problem, and proactive lake community with no meaningful environmental risks. Further, an established case study of a collaborative watershed management community now not at risk, but previously conceived in crisis will be used to triangulate these analyses. While work is focused on the community context, the impact of regulatory programs relating to public discourse necessitates a review of multi-leveled governmental directives.

1.2 INTRODUCTION: *Regulatory Protections and Collaborative Partnerships*

The Safe Drinking Water Act (SDWA) has served as the main piece of federal legislation to protect the quality of the nation's drinking water over the past forty years. Throughout its first twenty-six years, the evolution of the SDWA reflects the progressive commitment to premiere water quality in the United States. A multitude of protective measures have been established by the Environmental Protection Agency (EPA) under the SDWA's jurisdiction. As time has progressed, the transparency that the original SDWA created between regulators and those responsible for compliance evolved. Additionally, this transparency encouraged and allowed for concerned community members to embrace a more active citizen role over time (Roberson, 2014). Despite a history of regulatory success, a disconnect remains between the SDWA's successful implementation of its functional framework and the scope of practicable drinking water protection. It is argued that the law's ability to ensure additional protection through its voluntary provisions within urban areas does not measure up to the extent provided for within its political framework of execution, largely due to faulty local governance characterized by major functional deficiencies. The problem of being unable to adapt in response to current water circumstances in rapidly expanding communities does not necessarily represent a shortcoming within the SDWA to protect or conserve water resources, but rather is caused by the socio-institutional factors of the community context in which the federal statute is being applied.

The 1996 SDWA amendments have been successful to some degree in facilitating public discourse by mandating the establishment of citizen advisory councils to foster transparency between administrators and the public (Roberson & Frey, 2016). However, rural communities where there are few service connections to a public water system have lacked the capacity in some instances to effectively

treat a potable water source. Further, neighboring municipalities may be hesitant to incorporate rural areas in order to avoid liability costs (Daniels, Weinthal & Hudson, 2008). When access to a public water system is not an option, residents rely on private wells for drinking water. Generally, a municipality will have certain requirements concerning well construction, but maintenance and treatment responsibilities lie with the property owner. This can lead to widespread health risks, as recent occurrence in Kewanee County Wisconsin demonstrates. The number of Concentrated Animal Feeding Operations (CAFOs) in Kewanee County is high. Consequently, agricultural runoff has caused widespread contamination of the County's primary aquifer, which roughly 95 percent of County residents drew from (Saul, et al., 2014). In 2013, a collection of advocacy groups sent a letter to the then EPA administrator Gina McCarthy which described that roughly one third of tested wells in the County had exceeded health standards for either nitrate, bacteria, or both (2014).

To address such shortcomings, Congress authorized the Grassroots Rural and Small Community Water Systems Assistance Act in 2015 in an effort to expand protections for such communities with funding and technical assistance programs. Authorized appropriations from this amendment extend through 2020 (Tiemann, 2017). SDWA critics have identified systemic underreporting of violations by operators along with under enforcement by EPA. Around 90 percent of SDWA violations do not necessitate corrective or punitive measures (Weinmeyer, et al. 2017). This is a concerning trend for communities at risk because some may be ignorant of non-compliance by suppliers. Exacerbating these risks, funding for current drinking water infrastructure repair or replacement is estimated to exceed one trillion dollars nationwide (Fedinick, et al., 2017). When enforcement is lacking, community stakeholders can utilize the SDWA citizen suit provision to seek injunctive relief from contamination sources, or require action by EPA. These instances are sporadic, because no citizen-initiated federal environmental lawsuits occurred in SDWA between 1995 and 2000 (Rideout, 2011).

Most citizen suits in the 1990s concerned the Clean Water Act (CWA). State and Federal enforcement mandates by pollution control agencies had largely failed to improve surface water quality since the authorization of the CWA in 1972. In response, the EPA shifted its regulatory focus towards a

watershed-based approach (Konopacky, 2017). The Total Maximum Daily Load (TMDL) program effectively places a cap on a particular pollutant for a water body, be it from point or non-point sources. EPA has largely focused on incentive-based remediation programs in lieu of command and control tools such as TMDL (2017). The CWA lacks a mechanism for direct regulation of Nonpoint Source Pollution (NPSP). Rather, EPA administers the Section 319 Nonpoint Source Management Program to distribute funds to states for managing sources and implementing control measures (Strifling, 2018). States develop NPSP planning by developing nine key element watershed plans for projects using 319 funding. As such, local watershed management groups must adhere to these nine key elements in order to qualify for grants and cost sharing programs with the state.

These provisions have facilitated a more collaborative rather than administrative decision-making process. For instance, the CWA requires States to report pollutant Impaired Waters (IW) to the Federal EPA on a biennial basis. States must consider all water data, whether its source is from citizen science-based groups or agency personnel when publishing IW lists (Stepenuck & Genskow, 2018). In 2018, the Wisconsin Department of Natural Resources (WDNR) proposed to add 242 water bodies to the IW list, many because of exceedances in allowable total phosphorous (Wisconsin's 2018 Impaired Waters List, 2018). Around 18 percent of Wisconsin surface waters are included on the IW list (2018). Increased community-based participation in research and data collection processes represent a strategic response by pollution control agencies, as budget and personnel resources have decreased in recent years. Further, more responsibilities are shared with local entities because water quality concerns are often only apparent to those who live near, recreate on, and obtain a potable supply from a water body. While groundwater is the primary focus of the SDWA from a resource sustainability perspective, the CWA grants protections from point source pollutant discharge into navigable surface waters. Collectively, these statutes outline the water resource protections of the US based on designated uses.

Meandering through the legal context of every substantive amendment for these statutes may be indefinite, which is why an extensive analysis of the provisions themselves are absent from this text. For the purpose of this analysis, this type of inquiry is not necessary to justify the more prominent

significance that in order to receive additional protections and funding, they must be sought voluntarily. Albeit the economic and technical support provided by these provisions are significant in and of themselves, the premise of this paper specifically aims to anatomize the contextual factors of local networks influencing a community's likelihood to establish effective means of water resource protection through collaboration. It is critically important to identify the areas of democratic governance that communities appear to fall short in so that additional efforts by vested stakeholders and local leaders alike can be made to avoid other impediments in the transition into a sustainable management regime.

1.3 INTRODUCTION: *Research Questions*

Related studies have largely examined transparent and open variations of public discourse- and their effectiveness for NRM- at the State, regional, or local level. Environmental democracy is defined as an increase in accessibility to knowledge for citizens, and an increase in sensitivity by decision makers to the needs of the public (Carolan, 2006). A similar democratic principle which fosters participatory practices is *deliberative* (dialogic) democracy, which emphasizes citizen discourse as a core governance component (Bohman, 1998). Additional principles include: reasoned decision making, accountability, citizen equity and inclusivity (Arunachalam, Singh-Ladhar & McLachlan, 2016). While scholars have highlighted deliberative democracy as a pathway towards natural resource sustainability, others are skeptical because of tradeoffs between theoretical and practical benefits. An environmental lens on deliberative democracy narrows the focus of this analysis to relevant areas of water resource management inquiry. As such, Environmental-Deliberative Democracy (EDD) serves as a conceptual synthesis of these principles for the purpose of this research. The focus of which is concerned with how citizen stakeholders engage with watershed management institutions. Efficient resource management will continue to grow in relevancy as climate change and the demands of rising human populations strain natural resource availability and quality. As such, this research may illuminate pathways for natural resource managers and citizen stakeholders to effectively safeguard water resources in their communities.

This research examines the role of citizen stakeholders in the governance of two Wisconsin watersheds: Geneva Lake (Walworth County) and Green Lake (Green Lake County) in relation with the

principles of EDD. The political, economic, and geographical frameworks of these watershed regions will then be compared with a published case study on Lake Simcoe (Ontario) in order to evaluate the effectiveness and innovative solutions of current Wisconsin watershed governance strategies. Principally, this research seeks to contextualize watershed governance with the perceptions of citizen stakeholders, natural resource managers, and local government representatives. Additionally, the degree of influence environmental crises have in mobilizing stakeholder groups for watershed governance is an area of focus because it represents the dichotomy between proactive and reactive environmental management.

As is the case with many environmental commons, governance responsibilities for Green Lake and Geneva Lake watersheds are shared among conglomerates of stakeholders. The Wisconsin Department of Natural Resources (WDNR) is the primary actor in environmental decision making and regulation. At the local level, municipal and county governments manage water quality via ordinances, along with quasi-governmental groups. The role of Environmental Non-Government Organizations (ENGOS) continues to expand in these watersheds. These organizations have demonstrated the capacity to facilitate citizen stakeholder participation elsewhere, particularly in Canada (Lake Simcoe) but also in the United States (Chesapeake Bay) (Friesner, 2015; Davidson & de Loë, 2016). While great academic work has been done by John Talberth et. al. in *Ecological Economics* this and similar studies are about public practices with huge watersheds like Chesapeake Bay. In contrast, our work focuses on comparatively smaller Wisconsin watersheds.

The city of Lake Geneva is home to some 7,651 residents, with a mean family income of \$84,743 (U.S. Census Bureau, 2015). By contrast, Green Lake Town, Wisconsin is home to around 1,238 people, with a mean family income of \$87,540 (2015). Both Green Lake and Walworth County receive significant economic stimulus for tourism as Green Lake County received \$38.4 million in direct visitor spending dollars in 2016 and \$39.3 million in 2017 (Wisconsin Department of Tourism, 2018). More significantly, Walworth County, the home of Geneva Lake, received \$528.9 million and \$544.4 million in 2016 and 2017 respectively (2018). The recreational appeal of these lakes has led to many visitors and seasonal residents, mostly during the summer months. These economic stimuli provide sufficient

justification for water quality protections, but often these benefits are underappreciated by decision makers until a corresponding threat emerges. Reactionary decision making for the purpose of this analysis can be defined as new regulatory or management strategies which emerge in response to an environmental crisis such as nutrient pollution or a series of major storm events. Similarly, reactive resource management behavior on an individual basis is expected to be triggered by these crises. This prediction is based on common institutional practices, as well as the historic marginalization of citizen stakeholders. Another hypothesis predicts that citizen stakeholder trust in the capacity of watershed management experts will enhance EDD community compatibility. We also expect that an educated citizen base in relation to water resources will be compatible with EDD principles. These expectations are based on a robust literature review of related research. Lastly, this research predicts that ENGOS will be the primary facilitators for citizen stakeholder participation in community watershed management. This expectation is based on the work of Davidson & de Loë (2016). Their case study concerning watershed-specific legislation in Ontario, Canada relates the operations of ENGOS with increased public policy participation. These hypotheses will be discussed further in later sections.

The following sections of this paper will review relevant literature. Sequentially, the research design will be described, and objectives restated. Analysis of qualitative interviews has revealed significant themes pertaining to the research objectives. These will be discussed in conjunction with key literature which guided qualitative analysis. A community survey was distributed to residents in each watershed. Quantitative survey analysis represents the second portion of this two-tiered analysis. A multivariate regression was conducted in relation with identified dependent (EDD) and independent variables (education, trust/capacity, reactive). A concluding discussion will outline how these findings can inform collaborative governance efforts at the local level. Additionally, the factors contributing towards increased public participation at these watersheds may reinforce similar research.

2.1 LITERATURE REVIEW: *Capacity, Deliberation, and Collaborative Governance*

This literature review focuses on contemporary perspectives on collaborative governance, the capacity of institutions to address environmental problems, and how stakeholders can meaningfully

deliberate in a collaborative setting to solve problems at the local level. Select studies are summarized to identify conclusions which guide this research. These examples highlight which factors precede success or failure for the implementation of certain policy strategies. Further, the varying roles of citizen stakeholders in these examples can be compared with the findings of this research for later discussions.

Research literature suggests that successful management regimes must incorporate pathways of deliberation between stakeholders that is complemented by substantive forms of both institutional and social capital (Dale and Newman, 2006). Institutional capacity encompasses internal patterns of behavior, as well as the collective values, knowledge and relationships that exist within any group, whereas social capital reflects the sectors of civic society through which economic, social and mutual support are built and maintained to promote a universal acceptance to address the needs of different groups (Brinkman et al., 2012). As these forms of capital are embedded within the larger social framework, their functionality can significantly influence the efficiency of management regimes in addressing resource matters.

Understanding community institutions as organized structures that constitute a range of formal and informal rules influencing the behavior of a system provides stakeholders with different forms of agency to engage in multilateral governance (Pahl-Wostl et al., 2007). Ergo, large-scale adjustments at the institutional level have yet to occur while incremental transitions can easily be halted if institutional arrangements fail to foster coordination among means of institutional and social capital.

A working definition of “institutions” by Pandey, et al. (2011) includes organizations (government affiliated, or otherwise), as well as their mechanisms and management trajectories.

Participatory practices are a prerequisite for water resource sustainability; this stems from the need to understand the needs of various stakeholders (administrators, government agents, environmentalists, public and private users, managers, etc.) to prevent conflicts, and maximize societal benefits (2011).

Institutions are often catalysts for public policy changes. Furthermore, institutional responsibility-which concerns the institutions capacity for managing water resources and addressing problems within their geographic scope of authority-is of particular interest in regards to effective environmental management (2011). This concept suggests that the institution should operate on dynamic rather than rigid

management principles. Problems with implementing proactive environmental policy measures are influenced by the complexity that characterizes individual communities, thus causing a number of scholars to advocate for institutional change over structural rearrangement (Dale and Newman, 2006). Given the expansive influence of water decisions across an entire community, the embedded complexity of water management calls for a change at the institutional level of local government. The U.S. Water Alliance calls for a transition into a sustainable urban water management regime to be interlaced with democratic methods of coordination appropriate for advancing water sustainability at a regional and nation level (2011). This especially holds true for areas characterized by patterns of rapid growth given the impact sprawling development continues to have on surrounding water resources.

Building capacity through collaborative governance is vital to determining an institution's ability to perform effectively at its own tasks and cooperate efficiently in response to NRM issues (Ansell & Gash, 2008). One of the most influential factors affecting the ability to build and maintain such necessary capacity is the concept of social learning. Social learning plays a critical role in the realm of NRM, specifically in the often complex and widely unstructured management related to water issues (Vinke-de Kruijf, Bressers, and Augustijn, 2014). Due to the wide variety of uses and users within water resource management, issues can progress at an exasperated rate that may quickly become unmanageable (Vinke-de Kruijf, Bressers, and Augustijn, 2014). Social learning through interactive experiences is capable of producing the capacity necessary to cope with the uncertainty and change surrounding NRM, however it must be complimented by social and institutional networks that support interactive knowledge sharing. This transition remains critically necessary in order to sustain socioecological systems in a world of continuous change (Folke et al., 2003, as cited in Pahl-Wostl et al., 2007).

Distributed cognition emphasizes the development of shared meanings and practices characterizing the social entity as a whole (Pahl-wostl et al., 2007). The phenomena of social learning was originally defined by Bandura (1977) as an individual experience taking place in a social context and thus influenced by social norms. Concerning collaborative governance for NRM, it is further understood as a process of social change in which people learn from one another in ways that can benefit wider social-

ecological systems (Reed et al., 2010, p. 2). Social learning through interaction essentially helps guide the development of direction-setting which is critical during the process of transitioning into a sustainable regime of management. A major component of collaborative governance necessary to bolster and sustain an adaptable management approach is the process that promotes social learning through deliberation.

The literature regarding citizen involvement in water resource management has increasingly become interdisciplinary--branching out to include sociology, psychology, economics, and more. Consequently, deliberative discourse analysis has entered new realms of academic inquiry. These areas include the micro and case-specific instances of municipal or catchment collaborative strategies. Additionally, the political and ecological contexts in which such instances are studied is important as well. Davidson and de Loë utilized a mixed-methodology to analyze the roles of ENGOs as institutional entrepreneurs for Lake Simcoe watershed governance (2016). The authors argue that the role of an institutional entrepreneur transcends that of a policy entrepreneur by targeting the fundamental institutional processes that underlie policymaking rather than narrowly targeting a single policy goal. Relevant ENGO documentation from previous decades provided a snapshot of long-term governance practices. Davidson and de Loë brought attention to the roles of individual ENGO members, as well as the activity of the groups collectively (2016). Social network analysis was utilized to highlight informal patterns of discourse between stakeholders. This study collected data from 34 interviewees, and 43 survey respondents, each of which was identified as a potential institutional entrepreneur. The survey asked respondents to (1) rate the presence of governance principles (which closely resemble those of EDD) and (2) identify collaborative organizational partners (Davidson & de Loë, 2016).

This article presents a robust literature review of the management initiatives that have been implemented to restore and protect Lake Simcoe and its watershed. Lake Simcoe is a valuable resource in Canada for agriculture, urban settlements, tourism and drinking water. The lake's ecological health, however, became severely impacted primarily by anthropogenic phosphorus inputs that promoted algal production which severely affected the cold water fish habitat. Besides phosphorus loading, other areas of

interest for the lake research and long-term monitoring are grouped under special focus areas: dreissenid mussels; climate change; fish contaminant levels, and human health.

The Lake's restoration efforts have yielded several positive results and could easily be touted as global best practice for lake restoration. The efforts have a broad scope that includes policies, funding, research and more. In terms of policies, the Lake Simcoe Environmental Management Strategy (LSEMS) was initiated in the 1980s to identify and measure phosphorus sources and recommend remedial measures to reduce these inputs. There was cooperation between government agencies, watershed municipalities and other stakeholders. Between 1990 and 2008, the LSEMS Implementation Program provided support for over 500 environmental projects designed to reduce phosphorus loads from agricultural and urban sources. Collectively, these strategies contributed to an approximate phosphorus load reduction of 30%, from over 100 tons/year during the 1990s to 72 ± 4 tons/year in 2002–2007. This provides an interesting compare-and-contrast scenario with both Green Lake that has issues with phosphorus loading and some of the volunteer and economic incentives in Lake Geneva. Also, the Government of Ontario approved the Lake Simcoe Protection Act in 2008, making Lake Simcoe the only lake in Canada with its own legislative act. The Act established the Lake Simcoe Protection Plan (LSPP) designed “to protect and restore the ecological health of Lake Simcoe and its watershed”. In research, the LSPP is a science-based, adaptive management strategy that incorporates long-term monitoring and directed research, and funding was allocated for its implementation. In funding, the Government of Canada established a Lake Simcoe Clean-Up Fund in 2007 to provide financial and technical support to implement high-impact, priority projects that will reduce phosphorus inputs, rehabilitate habitats to achieve nutrient reductions, and restore the cold water fishery in Lake Simcoe.

What seems to be a major winning strategy for the Lake Simcoe management initiative is a long history of scientific studies on the lake. The science is great and communal as it informs all other aspects of the restoration process. For example, the article mentions that successful abatement of phosphorus loading requires the identification and management of phosphorus sources to the lake. Research points that from 2002 to 2007, (1) Atmospheric deposition of phosphorus enriched soil particles was a major

nonpoint source that accounted for approximately 26% of the total annual phosphorus load to the lake and (2) Tributaries were a primary source of phosphorus to Lake Simcoe, accounting for approximately 60% of the total phosphorus load to the lake.

The latter phases of the Lake Simcoe Environmental Management Strategy illustrate the emergence of ENGOs as institutional entrepreneurs. In turn, the assumption of traditionally government institutional governance roles by ENGOs facilitated public participation, and promoted the Lake Simcoe Protection Act (LSPA) which was implemented in 2009 (Davidson and de Loë, 2016). The LSPA is an adaptive legislation that applies to the entire watershed; this innovation has allowed municipalities to coordinate their approaches to mitigate phosphorous pollution, which dissolved prior collaborative barriers (Cohen & Davidson, 2011). Furthermore, public participation is mandated during certain LSPA decision making processes; the role of the public has expanded beyond LSPA requirements however, as the law created science and coordinating committees comprised of a myriad of stakeholders to facilitate management plans and serve an advisory role to government officials. These initiatives are attributed to community recommendations to the Ministry of the Environment to emphasize watershed stewardship and education (Cohen & Davidson, 2011). A shift from command and control regulation to an increased reliance on the private sector for management is evident in the LSPA. Due to the short-term success of the LSPA-- namely reduced total phosphorus loads and enhanced water quality indicators-- and the action-oriented and facilitating role of ENGOs, Davidson and de Loë's assessment that ENGOS act as "bridges" between stakeholders holds significant merit (2016).

Results and indications from their work offer a research pathway for this analysis. The question remains whether or not such collaborative frameworks are practical for Wisconsin watershed managers. Similarly, if collaborative governance does occur, is there a catalyst? In order to illuminate such relationships, the governance frameworks at Lake Simcoe will be compared with the Wisconsin watersheds in triangulation. Further, this research will examine the breadth and depth of citizen stakeholder participation at the catchment level. Principally, do collaborative governance strategies emerge in reaction to a recent, ongoing, or immanent environmental crisis situation? In order to address

these questions appropriately, it is necessary to examine the theoretical discussions surrounding collaborative governance, as well as examples from the academy regarding their practical implementations. An overview of the roles of institutions in environmental governance is essential in order to highlight key stakeholder relationships.

Environmental governance concerns the collective capacity of actors to effectively manage environmental commons. As such this field of inquiry focuses on how to maintain myriad stakeholder participation to address issues of natural resource security (Ostrom, 1990). Dryzek & Pickering (2017) describe how institutions respond to shifts in natural resource security in the context of the social-ecological systems in which they operate. These responses represent ecological *reflexivity* (2017). Dryzek and Pickering argue that deliberative discourse is essential in order for institutions to operate as independent self-critical entities (2017). To demonstrate this, the authors identify four areas important for governance each with a corresponding set of binary variations: “(1) Sources of knowledge: public participation versus expertise; (2) Composition of public discourse: diversity versus consensus; (3) Institutional architecture: polycentricity versus centralization; (4) Institutional dynamics: flexibility versus stability” (2017, pg. 2). The authors argue that deliberation maintains a balance of productive ideas which impact institutions rather than causing prolonged internal conflicts (2017). Citizen and expert stakeholder conflict through deliberation has traditionally been thought of as a hindrance to environmental governance. By contrast, Dryzek and Pickering note that deliberation is an effective means to align the goals and inputs of these groups (2017). Further, while there may remain some degree of animosity between these parties, this can be channeled via deliberation into productive institutional learning (2017). Reflexivity is a valid concept for institutional evaluation because having a more dynamic decision-making body better represents the environmental and social areas in which they operate. It will be important to highlight such relationships in the Wisconsin watersheds of study, as effective participation and deliberation among stakeholder groups may enhance regional institutional learning.

Several challenges can hinder institutional operations at the national level, which in turn can affect lower levels of government. Theesfeld (2010) lists six of these challenges; voluntary compliance;

tradition and mental models; administrative responsibility and bureaucratic inertia; conflict resolution mechanisms; political economy; and information deficits. The inherent socioeconomic and political complexity of institutions supports a case-by-case, rather than broad, approach to water governance (Aeschbach-Hertig & Gleeson, 2012; Theesfeld, 2010). The institutions which operate in the areas of interest for this research may be significantly affected by these challenges, and identifying key factors which lead to proactive or reactive management practices aligns with the directives of the aforementioned researchers. Public participation has been increasingly observed as a practice of effective public policy. Deliberative forms of democratic discourse emphasize citizen equity, accountability, and reasoned decision making; the principles of deliberative democracy are often manifested in water councils, community water boards, citizen juries and urban planning committees (Arunachalam, Singh-Ladhar & McLachlan, 2016; Krantz, 2003). Many scholars have highlighted deliberative democracy as a pathway towards natural resource sustainability while others are more skeptical.

2.2 LITERATURE REVIEW: *Barriers for Collaborative Governance*

The adoption of proactive and preventative water resource management strategies has been encouraged by many scholars. Deliberative bodies that promote citizen participation have many theoretical and practical benefits. However, some scholars have identified problems transferring deliberative practices from the hypothetical realm to practical administrative arenas (Elstub, 2009; Eckersley, 2000; Blaug, 1999). One of these obstacles is identified by Baber and Bartlett (2005) who assert that complex environmental problems are generally misunderstood by citizens (pg. 56). In this logic, rather than having active management roles in the watershed, citizen participation should be garnered by way of public support, tax revenue, volunteer labor, and private donations. The justification being that public policy crafted by the ignorant would be misguided. A common resolution are citizen juries that are comprised of a set of taxpayers and/or stakeholders who are gathered to deliberate on an issue of interest (Smith & Wales, 2018). Further, a jury can deliberate on an issue at many formative stages ranging including, but not limited to, policy agenda setting and identifying optimal policy alternatives (2018). Citizen juries are a common manifestation of deliberative democracy, but Parkinson

(2006) notes that their roles are considered advisory among other stakeholders. Similarly, Parkinson predicts increased stakeholder conflict if citizen juries had more substantial powers (2006). Such conflicts may be rooted in professional pride, or resentment of stakeholders disrupting traditional power dynamics.

Elstub (2009) argues that an optimal deliberative model (one which equally involves all stakeholders) is impractical. This rationale stems from the observation that comprehensive inclusion is impossible because real world power differentials would prevent it, and some individuals may not wish to participate (2009). Elstub also notes that any decision making done by deliberative means may then be offset by elite groups (2009). Deliberative decision making groups must have decentralized powers granted by higher government bodies in order to enforce their policies. However, Elstub finds this problematic because such transfers of power are avoided due to an interest in preserving the status quo. Additionally, deliberative decision-making bodies are often temporary, and once disbanded, no longer have the capacity for enforcement; this allows elites to fill the void, and essentially undermine the process (2009). These problems surface when attempting to synthesize a deliberative model with environmental sustainability because the latter is theoretical with varying objectives between interested parties (2009).

Elstub bases these critiques from a body of literature and a citizen forum case study conducted of the Peak District National Park in the United Kingdom (2009). The Peak District National Park Authority, in an effort to address concerns of legitimacy, conducted a public participation management program called the Stanage Forum (2009). The forum was open to citizen stakeholders, and its aim was to produce a management plan for an eco-tourism and recreational zone within Peak District National Park (2009). Elstub utilized a five-stage model proposed by Blaug (1999). According to Blaug, in order for a synthesis of environmental sustainability and deliberative democratic decision making to be legitimate, it must be equitable at each of the following stages: (1) Recognition and agenda setting (2) Deliberation, (3) Decision making, (4) Decision implementation, (5) Evaluation (1999). The Stanage Forum failed to progress through the later three stages because no consensus decision was enacted (1999). Elstub notes that the conflicting interests of preserving the natural state of the area and providing a desirable and

accessible recreation area led to deliberations never progressing (1999). If the Stange Forum represents a microcosm of deliberative decision making, then the criticisms from academics may hold some merit.

These critiques are relevant to this research, as coordinating the meaningful participation of citizen stakeholders at the watershed scale may be challenging. There are many examples of citizen stakeholders being consulted for water resource management, and these occasions are often limited to a certain time and place, thus preventing ongoing collaboration. This is also a shortcoming of certain collective action programs, particularly those that are dependent on external funding and leadership (Graham, et al., 2018). Comparatively, fostering public trust and social capital are essential for successful organizational coalitions (2018). As such, sustained success for collaborative watershed governance programs should clearly define the problems they are attempting to solve, define stakeholder roles in the partnerships to reduce confusion and conflict, and have a clear metric of success and evaluation.

Decisions regarding natural resource management have often been led by technical experts under the influence of bureaucratic authority. The implementation of policy measures was guided by the belief that natural resources can be predicted and controlled by means of infrastructure alone (Pahl-Wostl et al., 2007). As a result of growing uncertainty and expeditious change, water resource management continues to undergo a major paradigm shift that requires additional and diverse stakeholder engagement (Pahl-Wostl et al., 2007). The overarching justification for a more encompassing model of participation rests on the principles of democratic legitimacy, which emphasizes that “all those who are influenced by management decisions should be given the opportunity to actively participate in the decision-making process”, including the impartial consideration of less powerful stakeholders as well, (Pahl-Wostl et al., 2007, p.2). Collaborative governance can provide the societal inertia necessary to instigate institutional reform and establish accountability. To instigate change at the institutional level, it is essential to identify the variables of a community’s institutional structure that aid in communities’ capacity to respond to impending urban issues (Brinkman et al., 2012). Barriers to implementing local water management policy often lie within the functional institution of a given community (Brinkman et al., 2012).

2.3 LITERATURE REVIEW: *Trust and Collaborative Governance*

While some water policy scholars make a distinction between top and bottom designs (Hurlbert & Andrews, 2018) we prefer the term “collaborative governance” which emerged during the late twentieth century as a common response to significant government failures (Ansell & Gash, 2008). As the term’s connotation suggests, the interdisciplinary process of collaborative governance signifies the governing of multiple stakeholders capable of producing consensus-oriented decisions whilst engaged in forums of strategic discourse. This form of governance generally involves a group of interdependent stakeholders who work to address complex issues or situations and together develop implementation solutions (Choi & Robertson, 2013). Others have argued it represents a more generic form of rules and guidelines as to aid in collective decision-making with an emphasis on the *collaborative* aspect of this specific orientation of governing, recognizing the multiple groups involved in the decision-making process (Stoker, 1998). For example, Margerum (2008) distinguishes between two different but interrelated forms of institutional collaboration types. Operational collaboration focuses on direct action activities (Gregg et al., 1991; Ostrom, 1986), whereas organizational collaboration focuses on approaching issues through policy and program initiatives (Margerum, 2008). The key difference between these forms of collaboration concerns the actors involved and the type of deliberation each entails. The Ansell and Gash definition represents a combined approach by the authors to conceptualize a process that is indicative of inclusive actions for collective decision-making among private and public actors, through particular processes that establish the governing of regulations for the provisions of public goods (2008).

Collective action research has become increasingly popular as a mean to enhance the effectiveness of NRM networks (Graham, et al., 2018). Collaborative governance serves as a function of collective action, as individuals converge to make decisions based on a shared interest (Meinzen-Dick, DiGregorio & McCarthy, 2004). Graham, et al. (2018) provide a typology of collective action, and describe organizational coalitions as multi-jurisdictional networks that can function in formal or informal settings depending on objectives. This area of research has been scrutinized in context of watershed governance (Mudliar & Koontz, 2018; Weber, et al., 2018) and thus is relevance to our study.

As the theory of collaborative governance has progressively developed since its origins in the late twentieth century, governing officials have been calling on scholars studying this phenomenon to focus more upon the tangible results produced by this process rather than the theoretical basis of the term's conceptual model (Rogers & Weber, 2010). In doing so, more direct energy may be appropriated towards determining how the relationship among its complex range of interwoven variables functions to produce cohesive decisions in response to resource mismanagement. The fundamental essence of the governing process is to provide a system of network capital with problem-solving capabilities (Kettl, 2002). The largest challenge facing resource management stakeholders today is being able to develop the network of personnel--stemming from social and institutional forms of capital--who are able to integrate parallel systems of collaborative decision-making within the traditional top-down and technical management scheme of government systems (Kettl, 2002). As such, shared trust among natural resource managers is essential. Mistrust between stakeholders hinders policy implementation at the local level where many watersheds passed planning approaches are focused (Leahy & Anderson, 2008). By contrast, when trust is shared between community and institutional actors, incentive-based policy strategies and public collective action units are more likely to be successful (Bouma, Bulte & van Soest, 2008; Mudliar, & Koontz, 2018). For this study, trust is defined as an expectation of cooperative discourse and knowledge sharing between community stakeholders which leads to the development of social and institutional capital.

In the wake of increasing threats due to the rapid evolution of environmental crises, governing entities are having to transition into more flexible management approaches on a global and regional scale alike (Vinke-de Kruijf, Bressers, and Augustijn, 2014). Adaptable regimes are able to facilitate quick assessment and implementation more efficiently, signifying the need to develop greater capacity in the form of accessible expert and local lay knowledge and skills (Pahl-Wostl et al., 2007). Over recent decades, collaboration has emerged as a leading paradigm trend for environmental management. Research literature on collaborative governance entails a range of stakeholders representing various interests and organizations, all of whom have a stake in the outcomes of the governance decisions. Collaboration additionally requires a commitment to problem solving to not only achieve consensus for identifying

present issues but for proposed actions as well (Margerum, 2008). Ansell and Gash (2008) contend that it is necessary to enhance decision-making phases of collaborative governance, which is considered to be the core component of the process. Collaborative efforts used to implement deliberative democracy into NRM are often characterized by unique issues related to public group decision making (Connick, 2006, as cited in Choi and Robertson, 2013).

There are several notable case studies concerning instances of collaborative water resource management internationally. The following examples describe certain factors worth further analysis. Carlander, Jagers, and Sundblad (2016) investigated how personal beliefs motivate individuals to participate in water resource policy implementation in Sweden; this was accomplished by obtaining data from 910 water council members via online survey. A five-point Likert scale assessed respondent perceptions of fairness, equity, and water quality. Their results revealed a positive correlation between social norms and willingness to comply. This indicated that public actors expect negative consequences if they failed to work towards communal water quality (2016).

Hurlbert & Andrews (2018) highlight varying manifestations of deliberative democracy by describing the processes of Local Water Councils (LWCs) in Alberta, Manitoba, and Saskatchewan. The formation of LWCs was an attempt by Provincial officials to increase administrative transparency and stakeholder involvement, the rationale being that this would strengthen management institutions (2018). Domestic source water concerns in Saskatchewan triggered the formation of a Watershed Advisory Councils which focused on source water protection. In contrast, Conservation Districts served similar functions in Manitoba and facilitated citizen participation across watershed boundaries in order to coordinate conservation planning. The authors interviewed 90 LWC representatives from these provinces and coded responses based on their relationship with select principles of deliberative democracy. One interviewee, who was a member of an LWC in Alberta, expressed that LCWs lacked regulatory authority, and that impacts were limited to advisory roles (2018). Respondents expressed that LCWs in Alberta and Saskatchewan were more advisory in nature compared to Manitoba LCWs, which received regulatory

authority from statutes. Consequently, the authors conclude that Manitoba LCWs are the most representative of democratic principles.

These spatial variances of deliberative democracy between Provinces may be influenced by power relationships. Schmidt (2014) examined political and ethical norms among Albertan administrations to explain a degree of incompatibility with deliberative governance models. In an effort to transition from traditional command and control regulatory frameworks, Alberta adopted a *Water for Life* sustainability strategy which promoted collaborative governance. Further, it emphasized collaborative resource management and fresh institutional norms regarding the alignment of regulatory systems and the socio-ecological context in which they are applied (Schmidt, 2014). Schmidt (2014) explains this effort: “Alberta’s water strategy was developed and implemented with explicit attention to values and to the re-scaling of management. As such, it offers an opportunity to consider how norms operate in the transitions prompted by conflicts and how they affect the politics of new institutions.” (pg. 4). This approach was facilitated by a series of 25 semi-structured interviews with Provincial and regional representatives during implementation phases. Overall, these participants articulated a set of political norms which conflicted with the objective aims of the proposed regulatory shifts, as those who challenged existing practices had to conform to established procedures of the political elite (2014). For instance, preparing watershed status reports was often problematic due to incomplete or missing data (2014). This uncertainty led to indecision and conflict among local and Provincial partners (2014). Compounding this issue, several interviewees complained of hypocrisy by some Provincial partners who hired third party contractors to draft watershed reports (2014). This undermined the transparency efforts of the *Water for Life* strategy because certain contractors were beholden to oil and gas special interests. Schmidt’s analysis shows how conflict between stakeholders can hinder the implementation of governance strategies.

Perrier, et al. (2014) conducted interviews with 15 Albertan water operators to assess their experiences with government, community, and management dynamics. Their research found that operator relationships with provincial government decision makers and community stakeholders could either help or hinder the implementation of Drinking Water Safety Plans if the relationships were positive or negative

respectively (2014). In a follow up study, Kot, Gagnon, and Castleden (2015) expanded the interviewee data pool by including community decision makers and water consumers. Interestingly, government officials and water operators were primarily concerned with human health in regards to water quality, while consumers generally placed more importance on aesthetic factors such as color, odor, and taste (2015). The authors suggest that a stronger consideration of cultural and contextual factors by decision makers will bring the priorities of regulators and consumers into balance. Furthermore, they hypothesize that if the experiences of their studied communities represent a microcosm of rural Canada, then the technical, management, and fiscal goals by regulators will be easier to meet. Contextualizing regulator and consumer perceptions is important in order to highlight pathways towards effective deliberative discourse at multiple levels of government, as the priorities of each party can be expressed and considered. These examples highlight the merits of participatory water resource management. While inquiries into *how* and *why* collaborative governance is successful show how spatial, political, and cultural components are largely influential. This research hypothesizes that the relationships between stakeholders in this study will influence community perceptions of watershed management.

Instances of collaborative frameworks in Wisconsin communities have revealed certain findings which can supplement this research. Krantz (2003) studied the Neighborhood Steering Committee (NSC), a deliberative urban planning group in Madison, Wisconsin, and observed that deliberative governance can be hindered if participants are not empowered to challenge the norms of expert and bureaucratic processes, which traditionally restrict the decision making of citizen deliberative bodies. Annual NSC participants were invited from low to moderate income communities to allocate federal grants, and supplemental funds from the city (2003). Krantz notes several shortcomings of the NSC; first, the deliberative bodies are temporary and there is no structure to support long-term implementation of committee decisions; second, the funds that the NSC allocates are relatively small (up to \$200,000) (2003). The third and key criticism addresses the conflicting role an NSC facilitator has an “expert” (2003). Krantz observed that city planning officials often diverted the initial recommendations of the NSC, thus warping the final product of NSC deliberations into an expert-driven approach that may not be

sufficiently influenced by citizen representatives (2003). Despite these shortcomings, Krantz describes the NSC as a model for civic-innovation in the U.S. that is the product of several decades of social learning (2003). Furthermore, the temporal scope of NSC activity has influenced the formation of Planning Councils in Madison (2003). Planning Councils are non-profit coalitions of communities comprised of several former NSC participants that foster public participation by facilitating NSC project implementation (2003). This innovation has the potential to address Krantz's key NSC criticism concerning conflicted expert members. By providing an NSC facilitator who is solely dedicated to group proceedings, and expanding authority of non-expert members, the NSC can operate with true equity between experts and non-experts (2003).

Ashwood, et al. (2014) took a socio-ecological approach to analyze the problems accompanying citizen and expert discourse. Four action clusters were categorized as "farmers and farmland owners, researchers, community members, and government workers" (Ashwood, et al., pg. 434, 2014). Data was gathered using surveys, interviews, and focus group meetings from a total of 148 participants in two rural watersheds in Wisconsin that were listed as impaired water bodies by WDNR for nonpoint phosphorus pollution (2014). The authors periodically cite their qualitative transcriptions when discussing barriers to deliberation (2014). This strategy enhances their assertion that the nature of participant knowledge (local vs. expert) was not a hindrance to the discursive process in their case studies (2014). Consequently, the authors highlight that pathways for effective deliberative governance result from contextualized experience interactions between action clusters (2014). Ashwood, et al. explain that successful deliberation depends on whether or not participants can contextualize knowledge from other actors in terms of their own experiences, rather than the nature of participant knowledge (citizen, academic, government, etc.) (2014). This "grounded knowledge" concept is offered to academics as a tool for discovering why the myriad parties involved with deliberative governance can be hindered in their collaborative efforts due to antagonistic relationships (2014).

Ashwood, et al. note that contemporary scholarly investigations of participatory processes largely disregard factors which can influence participant behavior within the participatory space (2014). This

justification is rooted in part in grounded theory. Glaser, Strauss, and Strutzel expressed a similar argument in their introduction of grounded theory (1968). Epistemological understandings have shifted among social scientists based on the idea that theory-based explanations of social interactions and frameworks may be more appropriate forms of analysis compared to empirically testing. This research acknowledges the merits of grounded theory in part due to the work of Ashwood, et al. and their focus on linking ways of knowing between social actors as a means to overcome collaborative barriers in the context of watershed management. As such, these ideas inspired the inductive coding methods to serve as the first step in our two-tiered analysis of the Geneva Lake and Green Lake communities.

3.1 METHODS: *Interview and Survey Design*

The first phase of data collection involved semi-structured, elite-level interviewing. Interviewee prospects were identified according to the classifications used during the screening process which included: (1) A professional involvement in the management of water resources. (2) Involvement in natural resource discussions with citizen stakeholders including, but not limited to, education, civic discourse, and areal knowledge. Key informants were sent a notification of participant rights (*Appendix A*), along with an invitation letter (*Appendix B*). Participants who confirmed their interest were then asked to recommend colleagues, or other professionals who fit the criteria. This snowball sampling method allowed a good diversity of agency representatives, while allowing the perceptions of participants to guide the selection process. A total of twelve participants were interviewed (six from each watershed). A list of questions was presented to each participant while probing questions by the investigator were applied when appropriate. Each interview was recorded with the consent of participants, with the exception of one participant who requested the investigator take notes instead. These notes were then reviewed for accuracy and approved by the participant. Interview notes and recordings were then transcribed verbatim and imported into NVivo software for analysis.

Areal themes were identified based on inductive coding of qualitative interview data. This process was guided by Strauss and Corbin's coding paradigm, which includes a sequential open, axial and selective coding process (1990). Open coding was conducted upon initial review on transcriptions.

Memos were recorded in a coding journal, which was updated during each coding session. Continuous comparison between contextualized texts was considered during the establishment of categories. Upon thematic category saturation, these themes were studied in relation to one another. For instance, the impact from tourism economic stimulus on watershed management programs was frequently addressed by participants. Finally, categories were assessed based on their relation to governance, capacity, trust, education, and reactivity. These themes contextualize site-specific management frameworks. In concert with these themes, the Lake Simcoe case study served as a guiding document for coding discussions surrounding ENGOs, Institutional Entrepreneurs (IEs), and their impacts on EDD.

Davidson and de Loë (2016) describe IEs as individuals or groups within a governance network who create new, or transform existing institutions. Battilana (2006) sets certain functional criteria for IEs. For the purpose of this analysis, these criteria are not replicated. Rather, they serve as guiding principles to identify our organizational leadership category (discussed below). Select questions from qualitative, semi-structured interviews with Geneva Lake (*Appendix C*) and Green Lake (*Appendix D*) watershed managers were designed in order to identify potential IEs. While interviews captured the perceptions of expert stakeholders, lay person perceptions were gathered from the survey.

The survey component of the two-tiered analysis consisted of 13 questions designed and made accessible through SurveyMonkey online survey software and questionnaire tool (*Appendix F*). Serem, et al. (2013) discuss surveys as an effective means of gathering information relating to a particular phenomenon. Similarly, Subedi (2016) promotes Likert surveys as a simple method for measuring attitudes. Given these advantages, we felt that a survey was an appropriate metric of public perceptions for these communities. A descriptive summary of survey results is utilized to present sample characteristics concerning public attitudes, as well as social frameworks pertaining to EDD. Participants were asked a series of questions to gauge their involvement in the water issues in addition to questions to gather demographic information on the participant pool. Participants were asked to rate the extent of their support for an idea, concept, or hypothetical scenario on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). The nature of our regression modeling necessitates a Likert scale measurement for the

dependent variable, as it is a combination of responses from two survey questions. We included a midpoint option on our response scale that indicated a neutral attitude in order to broaden response options, which can, theoretically, approximate a normal distribution for the response options (Subedi, 2016). Separate survey sections were administered to examine the influence of governance, capacity, trust, and education on community EDD potential with measures adapted from previous research studies. The final survey question was open-ended to allow for participants to expand on their perceptions of how likely it will be for the general public to comply with watershed management planning based upon their accumulation of knowledge concerning the problem or conceived problem.

The survey was administered online as the most feasible option for reaching the largest number of respondents (Wiersma, 2013). The online survey format allowed for a quick turnaround (Creswell & Creswell, 2017). It also provided the greatest opportunity to obtain a randomized sample that would serve as an accurate representation of the two Wisconsin communities. Online survey notices were distributed via Facebook. A webpage to host the survey was designed with background information concerning the scope and interests of the research project. This information was made accessible to residents who lived within a 25-mile radius of either the City of Lake Geneva, or Green Lake Town. Additionally, electronic mail invitations were distributed to local business, universities, and organizations. This information was obtained from the Chamber of Commerce for three municipalities from each watershed. These included Lake Geneva, Fontana, and Walworth for the Geneva Lake watershed. Similarly, Ripon, Markesan, and Princeton for the Green Lake Watershed. Online access to the survey was open from September 3rd, 2018 to October 16th, 2018.

3.2 METHODS: *Ordered Logistic Regression*

Our central hypothesis for this research posits that EDD is positively associated with public watershed education and public trust in the capacity of watershed management group, while a self-assessment of reactive behavior towards watershed governance is expected to have a negative association with EDD. In order to test these expected associations, we utilize Ordered Logistic Regression (ORL) models. This method is appropriate for dependent variables that have ordered categorical values (Baayen,

2008; Endresen & Janda, 2015). The ORL model was preferred over a multinomial logistic model because the latter does not distinguish between ordered categories for the dependent variable.

Our operational views on public participation and democratic processes are relatively broad. For instance, Beierle (2010) does not make a distinction between public participation and stakeholder involvement. While this idea is essential for grasping the concepts of this work, it is important for our purposes to sharpen the conceptualization of EDD beyond solely public participation. With this in mind, we felt it was appropriate to measure individual participation, as well as a desire for more equity between expert and citizen actors concerning NRM. These were the self-assessments gathered by survey questions #5 and #7 respectively, which in turn were collapsed to form the dependent variable for our statistical modeling. The principles of deliberative democracy promote participation and equity between expert and lay stakeholders. As such, the dependent variable for regression analyses has three levels of compatibility with EDD. The dependent variable was constructed by combining responses for survey questions #5 and #7. A response on the Likert scale higher than “3” for either question was included in a sum to create three possible values: “0” (low EDD), “1” (moderate EDD), or “2” (high EDD). The three-tiered dependent variable was chosen over a binary method for two reasons: (1) We felt it was appropriate considering the inherent complexity of community social and political networks, and examining the theoretical workings therein; (2) While neutral responses are excluded in the dependent variable formula, a neutral value for the variable itself allows for a broader scope for the model.

This multi-level dependent variable was included with three independent variables: (1) *Community watershed education*; (2) *Public trust in expert capacity*; and (3) *Reactive*. These were measured by 5-point Likert scale responses for survey questions #1, #4, and #8 respectively. These variables were included in three separate regression models. Data for each model was comprised of survey responses from all respondents ($n = 168$), Geneva Lake respondents only ($n = 131$), and Green Lake respondents only ($n = 32$). These models were designed to capture the most complete approximation of EDD as was practical. Public education by institutional actors or otherwise has been established as a primary component of environmental democracy, as such efforts can enhance shared

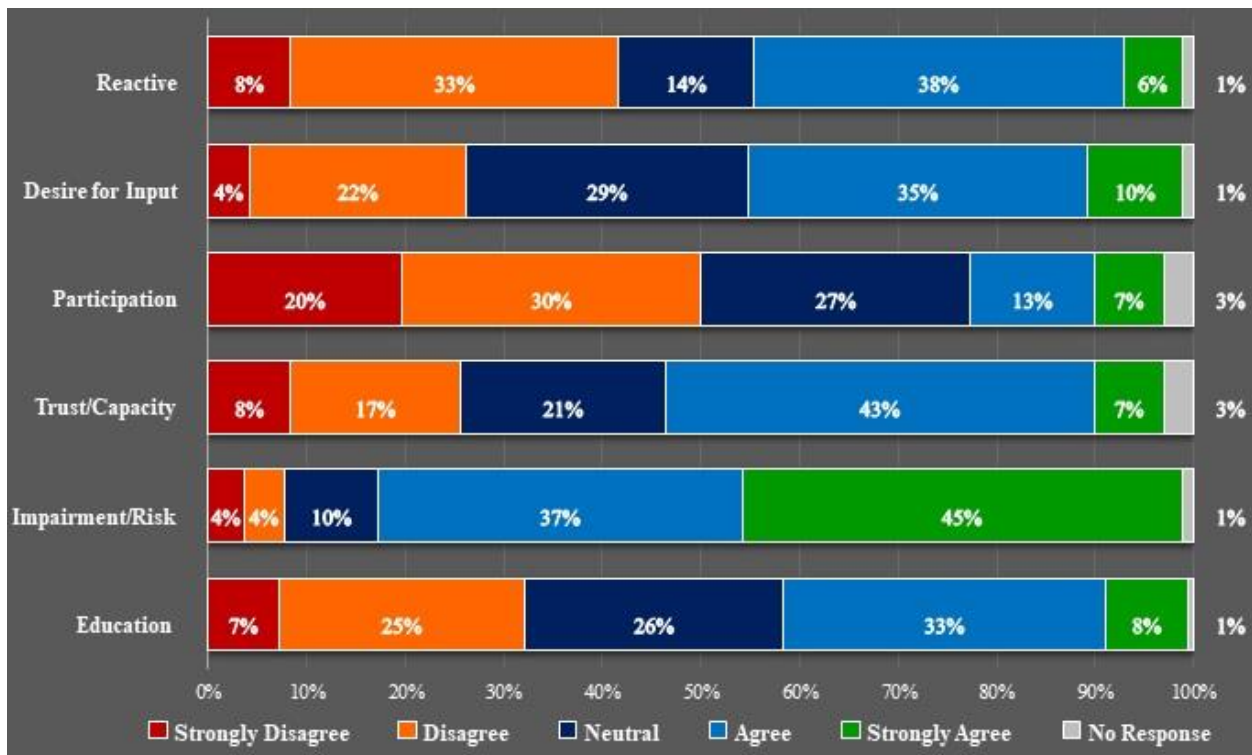
socioecological understandings between expert and public actors (Mason, 2012). Further, environmental democracy promotes a freedom among public actors to pursue meaningful participation in environmental governance similar to how they are free to pursue healthcare, education, and other procedural aspects of government (Baber & Bartlett, 2001; Hashim, Ristak & Laili, 2016; Mak Arvin & Lew, 2011). These strong promotions of transparency are very compatible with deliberative democracy, and in turn, EDD. With these ideas in mind, we designed survey question #1 to capture public views on the quality and availability of watershed education. This variable contains all five levels on the Likert scale, as is the case for each independent variable. Much of the literature on trust between public, government, and expert stakeholders adds merit to the assessment that trust is a prerequisite for successful policy strategies (Bouma, Bulte & van Soest, 2008; Leahy & Anderson, 2008; Mudliar, & Koontz, 2018). Survey question #4 measures trust between citizens and natural resource managers as perceived by the former. Consequently, public trust in expert capacity is the focus of this survey question and independent variable. In other words, we were interested in soliciting individuals' feedback concerning whether or not the current watershed management framework was successful, and could be successful in the long term without major changes. Our main interest in focusing our research on these communities was the impairment status of Green Lake, and its absence at Geneva Lake. We felt this was a good representation of our prediction that crisis triggers public response. Survey question #8 posits a hypothetical environmental crisis scenario and asks respondents if they were more likely to increase their involvement in watershed governance after the fact or to prevent such a scenario from occurring in the first place. The measurement consistencies shared between the three independent variables allow for ease of statistical interpretation. We excluded other survey questions from our model because they were designed to be assessed via descriptive statistics.

4.1 RESULTS: *Descriptive Statistics from Survey Responses*

Of the 164 respondents who provided their location, 133 (81%) were Geneva Lake area residents. By contrast, 31 (19%) were from the Green Lake area. The largest age demographic among all respondents was "60 or older" (46.39%), followed by "50 to 59" (22.29%), "40 to 49" (16.27%), "30 to

39” (7.83%), “21 to 29” (6.83%), and “18-20” (0.6%). The majority of respondents were employed (61.35%), while 38.65% were either retired or not employed. Roughly half of respondents had completed a baccalaureate level degree as their highest level of education (51.53%) followed by post baccalaureate degree (37.42%), and High School Diploma or equivalent (11.04%). The largest household income group was “\$100,000 to \$149,999” (24.5%), followed by “\$200,000 or more” (17.88%) “\$150,000 to \$199,999” and “\$50,000 to \$74,999” (both 13.91%), “\$75,000 to \$99,999” (13.25%), “\$35,000 to \$49,999” (7.95%), \$20,000 to \$34,999” (5.96%), and “Less than \$20,000” (2.65%).

Figure 1: Citizen Self Assessments of Watershed Governance Behaviors ($n=168$)



The response frequencies for *Reactive* (survey question #8) are noteworthy, as responses on either side of neutral are close to symmetrical. *Desire for input* corresponds to survey question #7, which asks respondents the degree to which they agree or disagree that they desire a more active role in watershed management. Most responses agreed (45%) compared to disagreed (26%). *Participation* (survey question #5) was designed to gauge respondents’ present level of participation in watershed management. Half of all respondents either disagreed or strongly disagreed, while this pattern may not be promising with

regards to EDD compatibility, it does reduce the potential for volunteer bias because response frequencies do not dominate a single category. *Trust/Capacity* (survey question #4) has the reversed pattern compared to *Participation* responses. Half of all respondents either agreed or strongly agreed that they trust in the effectiveness of existing, expert-led, watershed management networks. *Impairment/Risk* (survey question #3) results contain the most consensus agreement by far. This question asked respondents if they agreed that an impaired designation for their lake represents other environmental risks. Lastly, *Education* (survey question #1) yielded more varied responses and question #6 relates to the first of four hypothesis tests.

4.2 RESULTS: Hypothesis Testing

Our first prediction was based on the key communications role of ENGOs observed in the Lake Simcoe case study (Davidson & de Loë, 2016). Survey question # 6 asked participants to rank ENGOs, government groups, and citizen stakeholders according to their level of significance for watershed management. The results are displayed in table 1. The ranks were organized with “1” as the highest value or most significance. As such, the lowest sum of responses represents the category with the most importance according to respondents. H1: ENGOs; *H₀: Proactive Environmental Non-Government Organizations and higher learning institutions actively engaged in water research are not the primary facilitators of watershed management programs.* *H_A: Proactive Environmental Non-Government Organizations and higher learning institutions actively engaged in water research are the primary facilitators of watershed management programs.*

Table 1: Citizen Assessments of Significant Watershed Management Groups

Rank	Category	Sum of Responses	Kruskal-Wallis p-value
1	Environmental Interest Groups and Non-Profit Organizations (n=143)	287	0.792
2	Municipal & County Government (n=134)	321	0.933
3	Citizen Stakeholders (n=134)	428	0.696
4	State Government (n=136)	443	0.222
5	Federal Government (n=155)	649	0.366

A Kruskal-Wallis test was conducted with the responses for the ENGO category serving as the independent variable, while the community (Geneva Lake and Green Lake) served as the dependent variable. The resulting p-value was 0.792. This result does not show a significant difference in responses to the ENGO category between communities. Neither was there a significant difference identified for the other categories. Given these results, we felt it was appropriate to measure all responses together rather than by community. In order to test H1, a Friedman rank sum test was conducted to assess whether rankings observed in table 1 were significant. The test yielded a p-value of < 0.0001. Given this result, we can confirm the pattern observed in table 1. In summary, these results produce evidence that ENGOs were perceived by the respondents as having the most significant impact on watershed management.

The remainder of hypotheses are tested with our OLR models and are listed below. A prediction for the associations or lack thereof between EDD and each independent variable are based on literature review concerning facilitative factors for successful collaborative governance between expert and citizen actors. As our focus is the watershed community context, we can apply each prediction to each regression model. H2: EDD and Education; *H₀: There no positive association between Education and EDD* *H_A: There is a positive association between Education and EDD*; H3: EDD and Trust/Capacity *H₀: There is no positive association between Trust/Capacity and EDD*; *H_A: There is a positive association between Trust/Capacity and EDD*; H4: EDD and Reactive *H₀: There is no negative association between Reactive and EDD*; *H_A: There is a negative association between Reactive and EDD*

Table 2: OLR model for all respondents n = 168

Independent Variable	Odds Ratio	p-value
Education	1.204 (+)	0.212
Trust/Capacity	0.91 (+)	0.525
Reactive	0.699 (-)	0.01*

*0.05 significance level, McFadden's pseudo $r^2 = 0.068$

Table 3: OLR model for Geneva Lake Responses n = 131

Independent Variable	Odds Ratio	p-value
Education	1.141 (+)	0.432
Trust/Capacity	0.946 (-)	0.74
Reactive	0.639 (-)	0.006**

**0.01 significance level, McFadden's pseudo $r^2 = 0.075$

Table 4: OLR model for Green Lake Responses n = 32

Independent Variable	Odds Ratio	p-value
Education	1.204 (+)	0.068
Trust/Capacity	0.91 (-)	0.922
Reactive	0.699 (-)	0.593

McFadden's pseudo $r^2 = 0.103$

Ordinal Logistic Regression (OLR) models were built using response data from all respondents (n = 168), Geneva Lake respondents (n = 131), and Green Lake respondents (n = 32). In each model, *Reactive* was negatively associated with EDD. This means that high values for the *Reactive* variable decreased community EDD compatibility, provided all other values in the model remain constant. Further, the odds ratio for table 2 indicates that for every level of increase for the *Reactive* variable, the odds that the EDD compatibility level decreases is 69%. Similarly, the odds ratio for table 3 indicates that for every level of increase for the *Reactive* variable, the odds that the EDD compatibility level decreases is 63%.

These results were statistically significant for models with all respondents and Geneva Lake only respondents. As such, we reject the null hypothesis for H4 for these models. We fail to reject the null hypothesis for H2 and H3 as the associations between EDD and the trust/capacity and education variables are not significant in any model. The Green Lake model does not show any significant associations. These quantitative results provide indications of community EDD compatibility, as well as demographic characteristics. Missing from this area of analysis are contextual explanations concerning the governance frameworks present in each community. Rather than list a series of speculative assertions, we prefer to include the perceptions of our expert interview participants for these topics.

4.3 RESULTS: *Citizen Stakeholder Activity*

This category concerns citizen stakeholder socioeconomic diversity, perceptions of, and participation in watershed governance, and interactions with community stakeholders. A Green Lake Sanitary District (GLSD) representative described varying levels of interest in watershed management among community residents:

75% are wealthy and wish to protect their investment. They fund groups like Green Lake Association so watershed management issues can be “out of sight, out of mind”. 20% are full-time area residents, they do not understand the technical aspects of watershed management but understand why it is important. They generally want to get more involved and provide a public good for their community. This group is growing. 5% are full-time area residents who dislike government and feel they are taxed too much, and want to avoid additional taxes relating to lake issues. (Personal interview, 5/11/18).

Community stakeholders may not be actively involved in management strategies, or such participation is limited. This was expressed by a Green Lake Association (GLA) representative when discussing organizational inputs and Lake Management Plan (LMP) involvement: “If I had to identify both a strength and maybe weakness to our strategy it’s that maybe we are lacking active, Joe-Schmoe citizen involvement. In one way it makes us really nimble, a lot of lake associations rely on voluntary participation of citizens around the lake and so because of that it’s a big commitment of their time to make decisions” (personal interview, 5/10/18). This participant also spoke to seasonal residency dynamics: “We’re every day, all day working on behalf of the lake. And in some ways we need to do that because 75% of the people who live on Green Lake are here part time” (2018).

This dynamic was expressed by Geneva Lake participants as well. For instance, a Lake Geneva City official noted how risk perceptions may vary among lakeshore property owners by stating;

(if) you have a multi-million dollar estate on the lake, you might care much more than (if) you inherited Grandma’s house, and it’s just sitting there, and you rent it out every now and then, because that would be very little risk to you if your property value decreased versus somebody who lives there full-time and has all of their investments in it. It’s the own individual perception of risk. (Personal interview, 5/9/18).

One of our interview questions asked participants to rank citizen contributions to management efforts. We included; funding, volunteer labor, discourse with policy makers, comments on proposed public policy, and expertise on watershed management as options. Four of our twelve interviewees expressed that

funding was the most meaningful citizen contribution. Each of these professionals was from the Green Lake watershed. Most responses varied according to the operations of the group a particular respondent represented. For instance, GLA representatives referred to their primary membership (and donor) base when discussing citizen stakeholders. These contributors are often lakeshore property owners. These appear to be the most active citizen stakeholder group in each area. However, their contributions are largely monetary and go towards funding ENGO projects. If one were to take a walk along the shores of either of these lakes, they would notice several luxurious homes. Wealthy families own, and at times may rent out their lakeshore homes. At Geneva Lake, there are families who have owned large portions of lake shore property for generations. Consequently, the property tax revenue from these properties is significant. For example, a proposed city budget for 2019 lists ~\$7 million in property tax revenue (Berner, 2018). The economic and political power of lakeshore residents has been very impactful according to these discussions. Largely absent, however, are narratives of meaningful NRM decision making by citizen stakeholders with lower incomes. Additional thematic categories may explain how other citizen groups interact with watershed managers.

4.4 RESULTS: *Organizational Leadership*

Battilana (2006) notes that the actions of Institutional Entrepreneurs (IEs) may be influenced by varying social positions and community roles. As such, the roles of IEs within the watersheds of interest were gathered from interviews. In turn, the functions of ENGOs or individuals were assessed according to the findings of Davidson and de Loë (2016) who assert that ENGOs act as facilitators of participatory governance strategies. The organizational directives and roles within their watersheds were discussed by interview participants. A Green Lake County representative described the existing collaborative framework: “I think there’s a lot of people in the groups through our office, the federal, the sanitary district and the lake association that understand what the experts are telling you and then can relate that to the local citizens better” (personal interview, 5/11/18). This idea was expressed frequently among interviewees. Experts do not expect the general public to have advanced scientific knowledge. Rather, watershed management groups act as a communication intermediaries, a GLA interviewee explains:

You have to have a strong sense of science to be concerned about Green Lake's dead zone, which for the record is called a "metalimnetic oxygen minima". How are we gonna' talk to the people of Green Lake and be like: "Green Lake has a metalimnetic oxygen minima and you should really be concerned". Its issues are so complex, we can't rely on citizen groups, for example, to understand them and to make management decisions, but yet—it's this invisible problem but yet we have to act now and we have to act in a significant way in ways that are going to and require significant funding in order to make those improvements. (Personal interview, 5/10/18).

Organizational leadership was often discussed in relation with watershed education. For Geneva Lake, the Geneva Lake Environmental Agency (GLEA) was mentioned by all Geneva Lake interviewees as a community education leader because of their dissemination of pamphlets, newsletters, and other materials to residents. In turn, the public recognizes GLEA as a key source of information. A Walworth County official offered an explanation of this role: "I think your local GLEA and Geneva Lake Conservancy probably have more ability to educate within the watershed because they're made up of local individuals" (personal interview, 5/9/18). Similarly, GLA and GLSD assume some responsibility for educating area residents about Green Lake water quality issues. This educational role may be indicative of public trust of these groups and their activities. The GLSD has secured at least \$2 million in grant dollars during 1996 to 2016 for agricultural BMP installation and other water quality protection programs. This has allowed for landowner friendly cost sharing for BMP installations, which GLSD maintains in perpetuity. This aggressive expansion of conservation efforts led by GLSD represents institutional entrepreneurship, as this group both initiates and actively participates in change (Battilana, 2006).

4.5 RESULTS: *Proactive and Reactive Watershed Management*

When discussing what motivates citizen stakeholders to participate in watershed management, participants often noted that environmental crises triggers a reaction by the public. This phenomenon is of particular interest for this research, as Green Lake is listed as an impaired water body while Geneva Lake is not. The impaired classification by WDNR unlocked significant funding sources for Green Lake conservation programs. Consequently, watershed managers formulated the Green Lake Management Plan with the assistance of a citizen advisory board and expanded remediation and BMP implementation. In

order to qualify for State and Federal funding, citizen stakeholders must be involved in certain planning stages. These events demonstrate how pollution impairment can be advantageous for facilitating EDD.

The management efforts at the Geneva Lake watershed are not as expansive. This can largely be attributed to a vast funding gap between these areas. However, lake protection and land conservation appear to be a priority in this area nonetheless. These programs receive funding from municipal governments as well as public donations. A GLEA representative shared a question often asked of him during community meetings: “Why do we need a lake management agency, we’ve got a great lake?” (Personal interview, 5/7/18). With respect to this question, the quality of the lake seems to be linked with cultural identity, as well as economic prosperity. The GLEA representative offered his perspective to justify management programs: “If we were in a mode of trying to rehabilitate this lake which, if it was deteriorating then definitely it would be part of our management effort: it would cost a lot more.” (Personal interview, 5/7/18). A Walworth County representative explained how tourism revenue and water quality are linked: “I think the fact that it’s such a tourist destination really raises the amount of effort and prioritization that happens to protect and beautify and keep it somewhere that people want to come.” (Personal interview, 5/9/18). This is a reasonable assumption considering Walworth County ranked third among Wisconsin counties in visitor spending dollars for the 2017 fiscal year. Accompanying this revenue is a community pride in a quality lake, according to the GLEA participant: “I think Geneva Lake is known throughout at least Southeastern Wisconsin as the ultimate recreational lake. So the communities and the people that live around here have pride in that” (personal interview, 5/7/18). The rationale for proactive watershed management is well-received by citizens when framed as a personal economic issue as well: “When you get people spending a lot of money to buy a house or land on this lake, it’s a significant investment. And that’s how we market lake management: protect your investment”(personal interview, 5/7/18). The Geneva Lake community supports watershed protection despite not having significant NRM problems. Fear of the latter is a noteworthy motivator for protective actions, as there is a general fear of how impairment can impact the community.

When asked if the eutrophication at the neighboring Delevan Lake has influenced Geneva Lake management, a Linn Sanitary District participant responded: “Did Delevan Lake influence? Yeah, I think so. You know if nothing else the fertilizer use on yards around the lake. We knew because of the problems over there that part of it was nutrient loading, so we pay more attention to that here.” (Personal interview, 5/7/18). A GLEA participant expanded on this topic: “I don’t mean to pick on Delevan, but the issues, the water quality issues, when they’re manifested in (Lake) Como or other lakes with blooms and stuff, I think people say “wow, we can’t let that happen here” So there may be a more positive, or more aggressive protection efforts” (Personal interview, 5/7/18).

The community education roles assumed by ENGOs require frequent communication with watershed citizens. Certain education programs supplement the idea that crisis triggers action. A GLA participant shared their story about a 2015 event that elicited public interest. The Green Lake LMP team installed a carp barrier to prevent uprooting of aquatic vegetation in a degraded estuary. Several carp exhausted themselves trying to breach the barrier, which caused the shores to become littered with dead, foul smelling carp. One interview suspect argued: “I don’t wish that we could have a good ole’ catastrophe, but it would make it easier to justify what we do.” “We always have an annual meeting that’s open to the public--which is moderately well attended--but the year of the carp we had to bring in extra chairs there were so many more people that attended the meeting because they were concerned. They were in some cases upset, or they were just generally intrigued at what the heck was going on” (personal interview, 5/10/18). Invasive species expansion has garnered public interest at Green Lake. Zebra mussels (*Dreissena polymorpha*) were first observed in 2001 (LMP, 2015). Their expansion into benthic areas in the littoral zone was accelerated because of their tremendous capacity for reproduction (females can produce up to one million eggs every season). Consequently, their excessive waste byproducts coincided with increased green filamentous algae growth at Green Lake (2015). A GLSD representative explained how residents were alarmed by the magnitude of surface algae, which accumulated along shores and emitted a foul odor: “Zebra mussels changed the game. On a scale of 1-10, watershed management went from a 6 to an 8 because of the zebra mussel problem” (personal interview, 5/11/18).

In summary, the aforementioned themes capture expert perceptions at the local level, and are not presented as a means to generalize watershed governance in every context. Rather, the variances in key concepts which guide this research (IE's, ENGOs, EDD, etc.) inform conclusions for these case-specific investigations. These perceptions can inform understandings of what motivates stakeholders to expand or reform watershed management. Green Lake's impairment has enabled expansive conservation programs, both of which receive public interest. At Geneva Lake, awareness of how impairment can disrupt recreation and aesthetics is enough of a deterrent to motivate proactive watershed protection efforts.

5. DISCUSSION

Our confirmation of the alternative hypothesis for H1 reinforces existing evidence concerning the merits of ENGOs. In Davidson & de Loë's (2016) work, these groups acted as a communications bridge between expert and public stakeholders. Likewise, our quantitative analysis confirmed that our survey respondents perceived these groups as having the most meaningful impact on watershed management. Our qualitative data adds context to these perceptions. Expert interviewees consistently expressed the importance of community groups for communicating complex scientific ideas to the public in an understandable manner. GLA and other Green Lake management groups appear to take their roles very seriously both in terms of keeping the public informed and expanding conservation efforts. Citizens largely confirmed this role through their responses to survey question #6. Davidson & de Loë (2016) highlight ENGOs as important agents of issue framing to illicit support for legislative efforts. The framing of environmental issues by both community watershed management networks is an essential responsibility of expert stakeholders according to many of our interviewees. These participants discussed the cultural and economic significance of environmental quality. Appealing to these values is an effective means of justification for water resource protections. Both GLEA and GLA garner public support for watershed management in this manner. Further, organizational leadership by these groups demonstrate transformative community collaboration by distributing educational materials, which in turn serves as a catalyst for public feedback.

The results from our quantitative analyses may be explained in part by sample size. Only 32 of our 168 survey respondents indicated that they were part of the Green Lake community. Explaining this gap is limited to speculation but may reflect dissimilar citizen engagement between the two communities. The low respondent pool diminishes the statistical power of our Green Lake OLR model, as well as the degree of confidence we have in our assertions based on these responses. This limitation notwithstanding, the individual demographics of survey respondents from both communities are telling. The population estimates from recent census data indicate that the percentage of individuals aged 60 years or older is 22% for Walworth County, and 25.9% in Green Lake County (2019). In contrast, this age demographic accounted for about half of all our survey respondents (46%). This pattern is present for household income as well. According to recent census estimates, the percentage of household annual incomes in excess of \$100,000 is 16.4% for both Walworth and Green Lake Counties (2019). This group accounted for over half of our survey respondents (56%). Also of note is the relatively high education levels of our survey respondents, as most had completed baccalaureate level degrees. Does this information indicate that individuals who are advanced in age, secure financially, and well educated are more likely to participate in watershed governance? Perhaps. While these demographics are not generalizable outside of these specific communities, this information may be useful for community watershed managers who wish to meaningfully engage the public. These unique community demographics warrant further study.

Contemporary literature on watershed governance and community deliberation highlight the essential functions of community education concerning environmental phenomena, and trust between collaborative stakeholders for meaningful deliberation. Community education and public trust were often discussed by our interviewees. For instance, the Geneva Lake Environmental Agency and Green Lake Association both appear to have essential public education functions in their respective communities. Further, some interviewees suggested that public deliberation often occurs through education. This pattern is present in the narratives of respondents who noted that educational efforts are often the catalyst for discourse between public, government, and non-government stakeholders. Geneva Lake interviewees discussed the political clout held by lakeshore homeowners associations. Given this dynamic, it seems

likely that such groups could engage other citizen stakeholders. This could be accomplished indirectly through monetary contributions to watershed management groups, or directly through town halls or other public forums. We maintain that public education and trust are important contributing factors for EDD, however, our models failed to confirm this relationship at our areas of study. This could be a function of unique community dynamics, or other unknown factors.

We have discussed trust as a crucial component of social learning and stakeholder collaboration. An alternative interpretation of this concept is warranted. Trust could have a negative effect on EDD given our emphasis on participation. If citizens trust in the capacity of watershed management professionals, then they may not feel the need to offer their input. This idea may have more relevance if our broad scope of what activities represent “participation” were narrowed to not include monetary contributions. Conversely, our expert interviewees explained that citizen stakeholders do not have active management roles because they lack the necessary technical knowledge. These assessments echo the critiques of deliberative citizen discourse offered by Baber and Bartlett (2005) among others. While trust-in-experts by citizens may not be reciprocated considering technical knowledge, we do not see this as a hindrance for building social capital or watershed management capacity in these communities. We base this assertion on the harmonious citizen and expert interactions as described by our research participants. Whether or not this could emerge as a source of future conflict remains to be seen.

Our assumption that environmental crises trigger participatory public responses was the rationale behind survey question #8, and the *Reactive* independent variable for ORL models. Based on this assumption, we expected that this variable would limit EDD compatibility. This assumption was substantiated by our results for the Geneva Lake ORL model, as well as the model which includes all respondents. In other words, higher Likert scale values for survey question #8 decreased overall EDD compatibility. There is evidence to support the assertion that the Geneva Lake community fosters proactive public watershed governance. Geneva Lake interviewee responses add context to this relationship. For this community, proactive watershed protection seems to be linked with cultural identity, as well as economic prosperity. While the conceptual merits of proactive watershed management were

acknowledged by Green Lake interviewees, many narratives identified reactive patterns. More empirical testing is needed to confirm this pattern elsewhere, as our Green Lake OLR model failed to reject the null hypothesis for H4. With respect to our quantitative methods, a critical view of our analyses and overall study design may provide assistance to future investigators.

Each OLR model treats ordinal Likert responses for the three independent variables as numeric data. This is problematic according to some scholars because it assumes equidistance between each level. Similarly, numeric data can have a continuous normal distribution when in fact the categorical data cannot have a true normal distribution. In other words, the difference between “agree” and “strongly agree” for respondent A may be very different than respondent B. While we recognize that Likert scale data cannot be normally distributed, we noticed that discrete response frequencies for each independent variable were close approximations of a normal distribution, thus limiting the shortcomings of this analytical approach. Our survey and interview analyses may be susceptible to volunteer bias, as individuals who volunteered for either may have been predisposed to feel strongly about watershed governance one way or another. For example, many survey respondents who regularly participate in citizen science or other community programs may marginalize the views of other respondents and cause inaccurate estimations (Tulloch, et al., 2013). Social media solicitations for survey responses have been criticized for no-response errors. An online survey was deemed the most effective method for making the survey accessible to the broadest array of citizens within our geographic scope (Wiersma, 2013). Lastly, the external validity of this research is limited. We do not suggest that these public and expert perceptions are generalizable everywhere. Rather, we encourage future researchers to utilize similar empirical and explanatory methods to assess watershed governance in the micro context. This limitation was acceptable due to the theory-driven mixed methods approach, particularly inductive coding strategies.

6. CONCLUSION

The results of this study are generalizable only to the extent that researchers are able to identify similar population demographics and expert and lay perceptions. The site-specific dynamics at these Wisconsin watersheds can inform refined understandings of underlying factors contributing to EDD. An

analytical focus on the micro, watershed context is advantageous because communities, much like the people who comprise them, are complex. So too is the degree of compatibility a community has with EDD governance strategies. Similar research inquiries in the future should note the importance of the political, social, and economic drivers at the local level before making generalizations. Such efforts will be essential as communities confront intricate environmental problems. The human institutions which manage these environments however, can be equally complex. Nonetheless there are some clear messages about the variances of citizen stakeholder effectiveness that can be articulated when associating contemporary Wisconsin examples of reactive environmental governance with proactive governance and the established reactive case study in Canada. Watershed governance ideals and behaviors appear to vary significantly between communities surrounding the impaired Green Lake, which receives state funds based on its impairment, and Geneva Lake. While Geneva Lake does not receive comparable state funds, watershed management programs receive support from an interested citizen stakeholder base, mostly in the form of private donations for ENGO activity.

Although Green Lake has a Management Plan that was formulated with the assistance of a citizen advisory committee it was dissolved after publication, and expert interviewees have suggested that the committee participation was only symbolic. Despite the reluctance by decision makers to empower lay populations, public indifference, or a combination this Green Lake collaboration is probably be due to the community mandates of Federal and State grant programs. Regardless, these half measures in regards to EDD are insufficient to maximize net benefits for social capital, institutional capacity, and water quality. Nonetheless the watershed management network at Green Lake has produced substantial program implementation results. In fact, GLSD and GLA have demonstrated this capacity through fundraising, BMP instillations, and community education programs.

Recall the Lake Simcoe management networks in Canada have demonstrated substantial capacity for sustained water quality improvements by facilitating meaningful discourse between public and expert actors. Rather than relying on cost sharing programs with provincial partners, the Lake Simcoe Management Act has provided legislative directives for community NRM collaboration. The voluntary

watershed protections sought by Wisconsin natural resource managers may not be sustainable without a cooperative and supportive public base. We as researchers are inclined to think that the Lake Simcoe case shows us better nonpoint source management than the U.S. system. A good grasp of the science, long-term monitoring and some of the points listed above are key to lake restoration and that is what we see might happen at Geneva Lake but, although needed, are not as likely to with Green Lake. Based on our results, we assert that reactive EDD practices may indeed produce short-term results, but long-term potential for success is less secure when compared to communities that proactively build community capacity for addressing NRM issues. Further, citizen participation in reactive watershed governance is not very innovative and flexible because resources are specific to a certain time, place and crisis. Public perceptions which value proactive watershed management rather than post-crisis responses can facilitate sustainable and deliberative management strategies. Collectively, these public views, along with continued institutional entrepreneurship by ENGO groups represent the foundation for deliberative watershed governance.

6.0 REFERENCES

- Aeschbach-Hertig, W., & Gleeson, T. (2012). Regional strategies for the accelerating global problem of groundwater depletion. *Nature Geoscience*, 5(12), 853-861.
- Ansell, C., & Gash, A. (2008). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory*, 18(4), 543-571.
- Arunachalam, M., Singh-Ladhar, J. & McLachlan, A. (2016). Advancing environmental sustainability via deliberative democracy: Analysis of planning and policy processes for the protection of Lake Taupo. *Sustainability Accounting, Management and Policy Journal*, 7(3), 402-427.
- Ashwood, L., Harden, N., Bell, M. M., & Bland, W. (2014). Linked and situated: grounded knowledge. *Rural Sociology*, 79(4), 427-452.
- Baayen, R. H. (2008). *Analyzing linguistic data: A practical introduction to statistics using R*. Cambridge University Press.
- Baber, W. F., & Bartlett, R. V. (2001). Toward environmental democracy: rationality, reason, and deliberation. *Kan. JL & Pub. Pol'y*, 11, 35.
- Baber, W. F., & Bartlett, R. V. (2005). *Deliberative environmental politics: Democracy and ecological rationality* (p. 276). Cambridge, MA: MIT Press.

- Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological review*, 84(2), 191.
- Battilana, J. (2006). Agency and institutions: The enabling role of individuals' social position. *Organization*, 13(5), 653-676.
- Beierle, T. C. (2010). *Democracy in practice: Public participation in environmental decisions*. Routledge.
- Berner, D. (2018). *City of Lake Geneva 2019 Proposed Budget* [PDF]. Lake Geneva.
- Blaug, R. (1999). *Democracy, real and ideal: Discourse ethics and radical politics*. Suny Press.
- Bohman, J. (1998). Survey article: The coming of age of deliberative democracy. *Journal of political philosophy*, 6(4), 400-425
- Bouma, J., Bulte, E., & van Soest, D. (2008). Trust and cooperation: Social capital and community resource management. *Journal of environmental economics and management*, 56(2), 155-166.
- Brinkman, E., Seekamp, E., Davenport, M. A., & Brehm, J. M. (2012). Community capacity for watershed conservation: a quantitative assessment of indicators and core dimensions. *Environmental Management*, 50(4), 736-749.
- Carlander, A., Chris, v. B., Jagers, S., & Sundblad, E. (2016). A bridge over troubled water - public participation as a possibility for success in water management. *Water Policy*, 18(5), 1267-1285. doi:<http://dx.doi.org/10.2166/wp.2016.225>
- Carolan, M. S. (2006). Science, expertise, and the democratization of the decision-making process. *Society and Natural resources*, 19(7), 661-668.
- Choi, T., & Robertson, P. J. (2013). Deliberation and decision in collaborative governance: A simulation of approaches to mitigate power imbalance. *Journal of Public Administration Research and Theory*, 24, 495-518.
- Cohen, A., & Davidson, S. (2011). The watershed approach: Challenges, antecedents, and the transition from technical tool to governance unit. *Water alternatives*, 4(1), 1.
- Connick, S. (2006). *The Sacramento area water forum: A case study* (No. 2006, 06). Working Paper.
- Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.
- Dale, A., & Newman, L. (2006). Sustainable community development, networks and resilience. *Environments*, 34(2), 17-27.
- Daniels, B., Weinthal, E., & Hudson, B. (2008). Is an exemption from US groundwater regulations a loophole or a noose? *Policy Sciences*, 41(3), 205-220.
- Davidson, S. L., & de Loë, R. C. (2016). The Changing Role of ENGOs in Water Governance: Institutional Entrepreneurs?. *Environmental management*, 57(1), 62-78.

- Dryzek, J. S., & Pickering, J. (2017). Deliberation as a catalyst for reflexive environmental governance. *Ecological Economics*, 131, 353-360.
- Eckersley, R. (2000). Deliberative democracy, ecological representation and risk: Towards a democracy of the affected. *Democratic innovation: Deliberation, representation and association*, 117-132
- Elstub S. (2009) Synthesising Deliberative Democracy and Environmental Sustainability: Lessons from the Stanage Forum. In: Hindsworth, M.F.; Lang, T.B, ed. Community Participation and Empowerment. New York: Nova Science, 2009, pp.43-80.
- Endresen, A., & Janda, L. A. (2015). Five statistical models for Likert-type experimental data on acceptability judgments.
- Fedinick, KP., Wu, M., Panditharatne, M., Olson, ED., (2017). Threats on tap: widespread violations highlight need for investment in water infrastructure and protections. National Resources Defense Council
- Folke, C., Colding, J., & Berkes, F. (2003). Synthesis: building resilience and adaptive capacity in social-ecological systems. *Navigating social-ecological systems: Building resilience for complexity and change*, 9(1), 352-387.
- Friesner, R. K. (2015). *Adaptive Management in the Chesapeake Bay Total Maximum Daily Load (TMDL) Program: How Do Local Watershed Managers Address Uncertainty and Use Adaptive Management?* (Doctoral dissertation).
- Glaser, B. G., Strauss, A. L., & Strutzel, E. (1968). The discovery of grounded theory; strategies for qualitative research. *Nursing research*, 17(4), 364
- Graham, S., Metcalf, A. L., Gill, N., Niemiec, R., Moreno, C., Bach, T., ... & Lubeck, A. (2018). Opportunities for better use of collective action theory in research and governance for invasive species management. *Conservation Biology*.
- Gregg, F., Born, S. M., Lord, W. B., & Waterstone, M. (1991). Institutional response to a changing water policy environment.
- Hashim, R., Ristak, N. D. M., & Laili, N. (2016). Attitudes toward Environmental Democracy among Urban Communities. *Environment-Behaviour Proceedings Journal*, 1(3), 33-42.
- Hurlbert, M., & Andrews, E. (2018). Deliberative democracy in Canadian watershed governance. *Water Alternatives*, 11(1), 163.
- Kettl, D. (2002). Environmental governance. *Washington, DC: Brookings Institution*.
- Konopacky, J. (2017). Battling the (Algae) Bloom: Watershed Policies and Plans in Wisconsin. *BC Env'tl. Aff. L. Rev.*, 44, 253.
- Kot, M., Castleden, H., & Gagnon, G. A. (2017). Preparing for Success—Drinking Water Safety Plans and Lessons Learned from Alberta: Policy Considerations Contextualized for Small Systems. In *Water Policy and Governance in Canada* (pp. 321-335). Springer, Cham.

- Krantz, R. (2003). Cycles of reform in Porto Alegre and Madison. *Fung, A.-Wright, EO (ed. s), Deepening Democracy. Institutional Innovations in Empowered Participatory Governance, Verso, London, 225-236.*
- Leahy, J. E., & Anderson, D. H. (2008). Trust factors in community–water resource management agency relationships. *Landscape and urban planning, 87(2), 100-107.*
- Mak Arvin, B., & Lew, B. (2011). Does democracy affect environmental quality in developing countries?. *Applied economics, 43(9), 1151-1160.*
- Margerum, R. D. (2008). A typology of collaboration efforts in environmental management. *Environmental management, 41(4), 487-500.*
- Mason, M. (2012). *Environmental democracy: A contextual approach.* Routledge.
- Meinzen-Dick, R., DiGregorio, M., & McCarthy, N. (2004). Methods for studying collective action in rural development.
- Mudliar, P., & Koontz, T. (2018). The muting and unmuting of caste across inter-linked action arenas: inequality and collective action in a community-based watershed group. *International Journal of the Commons, 12(1).*
- Ostrom, E. (1986). An agenda for the study of institutions. *Public choice, 48(1), 3-25.*
- Ostrom, E. (1990). *Governing the commons: The evolution of institutions for collective action* Cambridge University Press Cambridge Google Scholar.
- Pahl-Wostl, C., Craps, M., Dewulf, A., Mostert, E., Tabara, D., & Taillieu, T. (2007). Social learning and water resources management. *Ecology and Society, 12(2), 1-19.*
- Parkinson, J. (2006). *Deliberating in the real world: Problems of legitimacy in deliberative democracy.* Oxford University Press on Demand.
- Perrier, E., Kot, M., Castleden, H., & Gagnon, G. A. (2014). Drinking water safety plans: barriers and bridges for small systems in Alberta, Canada. *Water Policy, 16(6), 1140-1154.*
- Protecting Wisconsin's Lakes. (2018). Retrieved October 09, 2018, from <http://www.wisconsinlakes.org/>
- Reed, M. S., Evely, A. C., Cundill, G., Fazey, I., Glass, J., Laing, A & Stringer, L. C. (2010). What is social learning?. *Ecology and society, 15(4).*
- Rideout, C. L. (2011). Where are all the citizens suits: The failure of Safe Drinking Water enforcement in the United States. *Health Matrix, 21, 655.*
- Roberson, J. A. (2014). The middle-aged Safe Drinking Water Act. *Journal-American Water Works Association, 106(8), 96-106.*
- Roberson, J. A., & Frey, M. M. (2016). An SDWA retrospective: 20 years after the 1996 amendments. *Journal-American Water Works Association, 108(3), 22-30.*

- Rogers, E., & Weber, E. P. (2010). Thinking harder about outcomes for collaborative governance arrangements. *The American Review of Public Administration*, 40(5), 546-567
- Saul, J., Wright, K., Heinzen, T., Wheeler, E., Hoegger, D., & Utesch, L. (2014). Kewaunee SDWA petition [Letter to G. McCarthy].
- Schmidt, J. J. (2014). Water management and the procedural turn: norms and transitions in Alberta. *Water resources management*, 28(4), 1127-1141.
- Shiraz, M. S., & Shokouhi, M. A. (2016). Measuring the level of citizen participation in urban management based on urban good governance pattern. Case study: Mashhad. *International Journal of Humanities and Cultural Studies (IJHCS) ISSN 2356-5926*, 3(2).
- Smith, G., & Wales, C. (2018). Citizens' juries and deliberative democracy. In *Democracy as public deliberation* (pp. 157-177). Routledge.
- Stepenuck, K. F., & Genskow, K. D. (2018). Characterizing the Breadth and Depth of Volunteer Water Monitoring Programs in the United States. *Environmental management*, 61(1), 46-57.
- Stoker, G. (1998). Governance as theory: Five propositions. *International Social Science Journal*, 50:17-28.
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research*. Sage publications.
- Strifling, D. (2018). Integrated Water Resources Management and Effective Intergovernmental Cooperation on Watershed Issues.
- Subedi, B. P. (2016). Using likert type data in social science research: confusion, issues and challenges. *International journal of contemporary applied sciences*, 3(2), 36-49.
- Theesfeld, I. (2010). Institutional challenges for national groundwater governance: policies and issues. *Ground Water*, 48(1), 131-142.
- Tiemann, M. (2017). Safe Drinking Water Act (SDWA): A summary of the act and its major requirements. *Report RL31243, Congressional Research Service, Washington, DC*.
- Tulloch, A. I., Possingham, H. P., Joseph, L. N., Szabo, J., & Martin, T. G. (2013). Realising the full potential of citizen science monitoring programs. *Biological Conservation*, 165, 128-138
- U.S. Census Bureau (2015). *Selected economic characteristics 2011-2015 American community survey 5-year estimates*. Retrieved October 16, 2017
- U.S. Census Bureau (2019). *Selected economic characteristics 2013-2017 American community survey 5-year estimates*. Retrieved April 5, 2019
- U.S. Water Alliance. (2011). Water sustainability principles for a national policy framework. Retrieved from http://uswateralliance.org/sites/uswateralliance.org/files/publications/Water-Sustainability-Principles.FINAL__0.pdf

- Vinke-de Kruijf, J., Bressers, H., & Augustijn, D. (2014). How social learning influences further collaboration: experiences from an international collaborative water project. *Ecology and society*, 19(2), 1-10.
- Weber, L. J., Muste, M., Bradley, A. A., Amado, A. A., Demir, I., Drake, C. W., & Thomas, N. W. (2018). The Iowa Watersheds Project: Iowa's prototype for engaging communities and professionals in watershed hazard mitigation. *International journal of river basin management*, 16(3), 315-328.
- Weinmeyer, R., Norling, A., Kawarski, M., & Higgins, E. (2017). The Safe Drinking Water Act of 1974 and its role in providing access to safe drinking water in the United States. *AMA journal of ethics*, 19(10), 1018.
- Wiersma, W. (2013). The validity of surveys: Online and offline. *Oxford Internet institute*, 18(3), 321-340.
- Wisconsin Department of Tourism. (2018). Total tourism impacts. *industry.travelwisconsin.com*. Retrieved from <http://industry.travelwisconsin.com/research/economic-impact>
- Wisconsin's 2018 Impaired Waters List. (2018). Retrieved from http://dnr.wi.gov/topic/impairedwaters/2018IR_IWLList.html

6.1 APPENDIX A: Interview Questions for Geneva Lake Participants

1. Watershed management can include a wide variety of activities such as public education and outreach, land conservation, water quality monitoring, municipal infrastructure management, public policy, storm water runoff, drainage, water rights, etc. Please explain your position as it applies to watershed management.
2. Please explain watershed management in this area. What groups are involved, and what are their roles? (Land management, pollution control, etc.)
3. Which activities within the watershed threaten water quality the most (Ex: Non-Point Source Pollution, infrastructure problems, etc.)?
4. How would natural resource management change in the watershed if Geneva Lake was listed as a total phosphorous/DO impaired water (as listed by WIDNR)?
5. In what scenario(s) are you required to notify citizens and/or illicit public comment prior to a natural resource management action?
6. Are there any citizen stakeholder groups active within the watershed? Examples include: water boards, citizen advisory groups, Environmental Non-Government Organizations, etc.
7. Which natural resource management initiatives, programs, etc. would be the first to be cut in response to budgetary reductions? You can answer in terms of your organization, or the watershed as a whole.
8. In your opinion, are the contributions to the governance of the watershed by citizen stakeholders meaningful?
9. Are citizen stakeholder groups comprised of people from a variety of socioeconomic and/or sociodemographic backgrounds?
10. Please rank the following contributions from citizen stakeholders according to their significance (1 being the most significant, 5 being the least significant): 1. Funding 2. Volunteer labor 3. Discourse with policy makers 4. Comments on proposed public policy 5. Expertise on watershed management.
11. Why are there a general lack of water quality issues in the Geneva Lake Watershed?
12. Would natural resource management and community beautification be as much of a priority if Geneva Lake were not such an attractive tourist destination?

13. How do state and local management groups interact in regards to watershed management? Is the relationship better characterized as regulator-regulatee or a collaborative partnership?
14. Generally, are your professional practices guided more so by state and federal regulations, or more informal local practices and established procedures? For example, do you believe that eutrophication in the nearby Delevan Lake influenced Geneva Lake watershed management, or do you think this was guided more by state and federal regulations?
15. A general consensus among policy scholars asserts that watershed management is very expert-driven, and a lack of citizen participation stems from a lack of understanding concerning environmental concepts and processes. Does this assertion apply to your watershed? (If yes, then how can citizen knowledge be enhanced? If no, can you provide examples from your watershed?)
16. Which of the following scenarios is more likely?
 - A. Increased citizen stakeholder participation in watershed management results from alarming water quality issues within the watershed that correspond with decreased tourism.
 - B. Increased citizen stakeholder participation in watershed management results from budget surpluses from a variety of public utility, natural resource management, education, and community groups.
17. The Geneva Lake Management Plan (prepared by the Southeast Wisconsin Regional Planning Commission in 2008) highlighted the Geneva Lake Environmental Agency and the Geneva Lake Conservancy in particular as community education leaders. Do agree with this? Do you think that seminars and informal programs to educate the public have been successful?
18. The Geneva Lake Management Plan mentions “Lake Rehabilitation District”, also “Lake Management Protection Districts”. A direct quote reads, “inclusion in the districts is mandatory, and registered voters, and property owners within the district become electors for the purposes of governance” Does a specific community organization serve in this capacity, or is it more of a conglomeration of different entities?

6.2 APPENDIX B: *Interview Questions for Green Lake Participants*

1. Watershed management can include a wide variety of activities such as public education and outreach, land conservation, water quality monitoring, municipal infrastructure management, public policy, storm water runoff, drainage, water rights, etc. Please explain your position as it applies to watershed management.
2. Please explain watershed management in this area. What groups are involved, and what are their roles? (Land management, pollution control, etc.)
3. Which activities within the watershed threaten water quality the most (Ex: Non-Point Source Pollution, infrastructure problems, etc.)?
4. How did natural resource management change in the watershed after Green Lake was listed as a total phosphorous/DO impaired water in 2014 (as listed by WIDNR)?
5. In what scenario(s) are you required to notify citizens and/or illicit public comment prior to a natural resource management action?
6. Are there any citizen stakeholder groups active within the watershed? Examples include: water boards, citizen advisory groups, Environmental Non-Government Organizations, etc..
7. Which natural resource management initiatives, programs, etc. would be the first to be cut in response to budgetary reductions? You can answer in terms of your organization, or the watershed as a whole.
8. In your opinion, are the contributions to watershed governance by citizen stakeholders meaningful?

9. Are citizen stakeholder groups comprised of people from a variety of socioeconomic /sociodemographic backgrounds?
10. Please rank the following contributions from citizen stakeholders according to their significance:
 1. Funding
 2. Volunteer labor
 3. Discourse with policy makers
 4. Comments on proposed public policy
 5. Expertise on watershed management
11. What are the main water quality issues in the Green Lake watershed, and what practices have been successful to prevent or improve adverse water quality?
12. Has area tourism suffered from water quality issues, and would watershed management become a higher priority if tourism began to significantly decline?
13. How do state and local management groups interact in regards to watershed management? Is the relationship better characterized as regulator/regulate or a collaborative partnership?
14. Generally, are your professional practices guided more so by state and federal regulations, or informal local practices and established procedures? For instance, do you rely on a local network of colleagues for guidance concerning watershed management information, or do you seek that information from state-level groups?
15. A general consensus among policy scholars asserts that watershed management is very expert-driven, and a lack of citizen participation stems from a lack of understanding concerning environmental concepts and processes. Does this assertion apply to your watershed? (If yes, then how can citizen knowledge be enhanced? If no, can you provide examples from your watershed?)
16. Which of the following scenarios is more likely?
 - A. Increased citizen stakeholder participation in watershed management results from alarming water quality issues within the watershed that correspond with decreased tourism.
 - B. Increased citizen stakeholder participation in watershed management results from budget surplus for a variety of public utility, natural resource management, education, and community groups.

6.3 APPENDIX C: Survey Questions

*Questions ending with * Indicates a Likert scale response method*

Citizen Perceptions of Watershed Management

This survey is intended to gauge citizen stakeholder perceptions concerning the management and governance of watersheds. The survey will take approximately 3 to 5 minutes to complete. If there is a question you prefer not to answer, please skip and complete the survey. This information will be used as part of a graduate student thesis project. Please answer questions as accurately as possible. Each participant will be entered into a drawing for a \$25 Amazon gift card (two are available). Winners will be notified via email sometime during Spring 2019.

1. Education concerning water resources is strong in your Community.*
2. What do you perceive as the largest threat to water quality in your community?
 - Nutrient runoff from agricultural activities
 - Sediment runoff from expanding development near water bodies
 - Abuse and misuse from water recreation activities
 - Contamination of groundwater resources
 - An unengaged community
 - Invasive and non-native species causing aquatic species loss
 - Mismanaged septic systems causing pollution from wastewater
 - Other (please specify)

3. A lake, or water body classified as pollutant "impaired" by the State represents environmental and economic risks for my community.*

4. I trust local watershed management groups to effectively address environmental concerns.*

5. I am meaningfully involved in natural resource decision making processes in my watershed (policies, ordinances, field work, etc.).*

6. Please rank the following groups based on their level of involvement in watershed management in your watershed ("1" being most significant, "5" being least significant)

- Municipal and County Government
- Environmental Interest Groups and Non-Profit Organizations
- State Government
- Citizen Stakeholders
- Federal Government

7. Experts hold too much power concerning watershed management, and citizens should be more actively involved in decision making.*

8. I am more likely to become involved in watershed management after an environmental concern arises and affects me directly, as opposed to working to prevent a concern from occurring in the first place.*

9. Please provide the name of your County, zip code, and municipality. Are current municipal/county strategies to manage your watershed satisfactory, or are more innovations and technologies needed?

10. What is your age?

- 17 or younger
- 18-20
- 21-29
- 30-39
- 40-49
- 50-59
- 60 or older

11. What was/is your typical yearly household income? (Check all that apply)

- Less than \$20,000
- \$20,000 to \$34,999
- \$35,000 to \$49,999
- \$50,000 to \$74,999
- \$75,000 to \$99,999
- \$100,000 to \$149,999
- \$150,000 to \$199,999
- \$200,000 or more

12. Which of the following categories best describes your employment status?

- Employed
- Retired or Not Employed

13. What is the highest level of school that you have completed?

- High school diploma (or GED)
- College degree
- Graduate-level degree
- None of the above

