Citizen Action, Power Relations and Wetland Management in the Tampa Bay Urban Socio-ecosystem

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Citizen Action, Power Relations and Wetland Management

in the Tampa Bay Urban Socio-ecosystem

by

Cornelius O. Adjei

A thesis submitted in partial fulfillment of the requirements for the degree of
Master of Science
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Date of Approval:
May 24, 2012

Keywords: Political Ecology, Groundwater, Water Policy, Well Fields, Water Resources

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Dedication

This thesis is dedicated to my late father, Mr. John Adjei who painfully passed away on June 16, 2011; may his soul rest in peace.
Acknowledgements

To God be the glory, great things He has done. I am highly indebted to my thesis committee: Dr. Fenda A. Akiwumi, Dr. Ambe Njoh, and Dr. Mark Hafen for making this study a reality. Dr. Akiwumi wholeheartedly accepted to mentor me and was instrumental in the first thoughts about this work. Her motherly care and support throughout my stay in the graduate program can never be repaid. She willingly offered invaluable resources, ideas, and time all through the entire thesis process. Dr. Njoh and Dr. Hafen demonstrated a burning desire and an unparalleled dedication to help me succeed.

Special thanks go to the University of South Florida ULTRA-Ex Group. My being a part of the team has given me numerous opportunities and skills for my scholarly growth.

I am highly grateful to all who participated in this study especially the Cochran Family and residents of Half Moon Lake Community in Tampa. They warmly welcomed me and served as contact persons in the neighborhood.

Finally, I extend profound thanks to my fiancée and family back home in Ghana for their constant prayers and keeping me in their thoughts.
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Abstract

Wetlands are vital ecosystems that provide ecological, economic and social benefits to societies. In the Tampa Bay region in West Central Florida, a growing population has put immense pressure on wetlands. The situation has not gone unnoticed in the public domain with concerns raised about the need to formulate policies that would protect them. However, it has been difficult to ascertain the level of citizen involvement in the decision making process.

This study aimed at investigating whether the perceptions and concerns of citizens drove them to influence local water policy. Questionnaires were used to collect data from residents living in close proximity to well fields situated in wetlands in Northwestern Hillsborough County.

Results of the research showed that residents demonstrated a high degree of knowledge about water resources in the Tampa Bay region. Residents expressed concerns about groundwater pumping and development, and attributed them to changes in their environment. However, there was little engagement from residents with decision makers to address these concerns. This study therefore recommends that improved participatory mechanisms be created by local water agencies to incorporate valuable inputs from the public.
Chapter 1: Introduction

“To save a wetland, two women beat Wal-Mart” was the caption of a publication in the May 22, 2006 edition of the Tampa Bay Times. The story reported the concerted efforts of two retirees who stopped a planned construction of a Wal-Mart supercenter on 37 acres of wetland in New Smyrna Beach, Florida. The same newspaper edition carried another caption “They won’t say no” reporting on how wetland permits were approved in Florida by the Army Corps of Engineers. It added that the quest to develop scarce land in the state of Florida encourages a plethora of wetland permit applications which the Corps has difficulty declining (Pittman, 2006). These two stories present two contrasting scenarios of issues surrounding wetland management in the state of Florida.

Wetlands present many benefits to society but interestingly, these benefits were not recognizable to the public centuries ago (Dahl, 2005). Tebeau (1980) is quoted by Dahl (2001, 24) as saying “wetlands have undergone a transition in terms of their functions in the eye of the public”. For centuries, they were seen as breeding places for disease-carrying organisms and a nuisance to the urban landscape. Early settlers, governments and the general public with commercial interests perceived wetlands as stumbling blocks to urban development. They were drained of water and filled in to reclaim land for the construction of highways, housing lots and shopping malls just to mention a few. Dahl (2001), however notes that over the last few decades, wetlands have been accorded the needed value by scientists, policy makers and the general public due to their ecological and economic functions.
According to Dahl and Al Lord (2001), Florida is the only state in the continental United States that harbors subtropical ecological communities. It is only second to Alaska in the abundance of wetlands. These wetlands support a rich biological diversity and present so many benefits to people far and near. Wetlands provide ecological, aesthetic and economic benefits. They improve water quality by storing huge volumes of water and filtering it. Their ability to store water also makes them important in flood control. Wetlands provide opportunities for photographing and viewing nature, hunting and bird watching. Various products like cypress mulch and timber derived from wetlands are used in the horticultural and construction industries.

With the many important roles wetlands play today, wetland development and management is top priority for federal and state agencies, policy makers, and the general public throughout the United States (Roberston and Hough, 2011). In the state of Florida, regulating agencies like the Department of Environmental Protection (DEP), the Hillsborough County Environmental Protection Commission (EPC), and the Army Corps of Engineers (Corps) ensure that there are justifiable permits for wetlands to be drained before developments begin (Roberston and Hough, 2011). However, with increasing urbanization, significant wetland losses to development have occurred across the United States, the Tampa Bay region included. Wetlands have been filled in to make way for homes, highways, golf courses, shopping malls and other infrastructure (Dahl, 2005). Interestingly, the tendency to develop wetlands in the face of a plethora of legal frameworks protecting them continues up to the present day. This trend has encouraged the average citizen to become more involved in issues affecting wetland management, as for example, in the Tampa Bay region (Pittman, 2006).
According to Brown and Lant (1999), natural resource use breeds conflict. Many groups make use of these resources and attach different values to them. This wide spectrum of people includes officials at the federal, state and county levels, people in industry and common citizens. In the Tampa Bay area, a region with so many wetlands, the story is no different. There are intricate linkages between water provision, wetlands and land development. The area’s high population growth has brought about the need for space and thus necessitated draining wetlands. The rapid urbanization of the Tampa Bay region has brought pressure to bear on its water resources for water supply and consequently on wetlands themselves (Glennon, 2002).

1.1. Research Problem

The state of Florida, which once had a 54% wetland cover, has seen this coverage reduced to 34% (Glennon, 2002). Over the last few decades, citizens in the region have opposed many wetland permits, accusing policy makers of bending the rules to satisfy perceived interested parties in agriculture, real estate and construction. It is now commonplace to hear of average citizens challenging permits from government agencies. Glennon (2002) recounts a landmark cases involving Nancy and Kerry Boatwright versus Tampa Bay Water. In this case, the homeowners had an 11-acre lot with mature cypress, pine and oak trees with a small creek frequented by alligators. Over a period of time, a well which supplied them water and the creek dried up and later on sinkholes appeared on their lot. The problem was traced to a municipal well field nearby operated by Tampa Bay Water which was pumping groundwater from the underlying aquifer.
The cities of Tampa and St. Petersburg, which are the population centers of the Bay area, have water supply problems because they sit on peninsulas which are separated by a few miles. In a bid to meet the region’s water needs, water is pumped from the underlying aquifer in the ground. This groundwater abstraction, according to (Glennon, 2002) has had a catastrophic impact on wetlands due to a reduction in groundwater levels.

A Southwest Florida Water Management District (SWFWMD) analysis of 350 wetlands revealed that a large proportion of these wetlands had abnormally low water levels and dying plants particularly cypress trees (SWFWMD, 1996). Many lakes in the region have dried up or have record low levels because the water table supporting the water level dropped as a consequence of groundwater pumping. Big Fish Lake and Pasco Lake are famous examples of once thriving lakes that have dried up (Glennon, 2002). A conspicuous sight in Northwestern Tampa, particularly along the Race Track-Express Highway, is fallen cypress trees and dried up areas that were once lush wetlands. These are clear indicators of the impacts that excessive groundwater pumping can have on wetland vegetation and water levels. This is especially true when one can count at least three major well fields nearby.

Although various studies exist on citizen participation in wetlands issues in the Tampa Bay region, there seems to be a gap in understanding the extent to which the opinions of citizens are incorporated in decision making processes on wetlands, distribution of power among the various stakeholders and how control of power is exercised. This study addresses how citizen perceptions and actions impact land use and water policy in the Tampa Bay area. The study explores the influence that citizens have over decisions affecting wetlands and water distribution.
Chapter 2: Literature Review

2.1 Introduction

This chapter describes wetlands and their management. Additionally, the relationship between wetlands and groundwater use is discussed as well as the various stakeholders identified by this study which are involved in water resources in the Tampa Bay region. Finally, the concept of citizen participation and conflict over resource use is explored.

2.2 Wetlands

Wetlands, according to Mitsch and Gosselink (2007) are vital components of the Earth’s ecosystem because they serve as transitional areas between terrestrial and aquatic communities. Zedler and Kercher (2005) define a wetland as an area which has water as the primary controlling factor to its associated plant and animal life.

Wetland management is often not far from controversy and conflict between groups in society. The multiple benefits that wetlands present often bring conflict between landowners who receive private benefits and other people who derive direct or indirect benefits from wetlands in their natural state (Brown and Lant, 1999). Robertson and Hough (2011) reported that the general public became alarmed at how much wetland area had been lost in the conterminous United States from the 1950s after the first National Wetlands Inventory was published in 1983. This necessitated the passing of the “no net-loss of wetlands” policy to curb the rate of wetland losses. This “no net wetland loss”
policy instituted by the US government has increased the awareness of the benefits that can be derived from wetlands when they are protected (Robertson and Hough, 2011). The next section briefly discusses the functions and values that are attached to wetlands.

2.3 Functions and Values of Wetlands

Wetlands provide many services and commodities to humans. These benefits can be grouped into ecological and human according to Mitsch and Gosselink (2007). The following paragraphs explore some of these functions and values:

2.3.1 Flood Control

Wetlands are an important component of many watersheds because they help reduce flood peaks and maintain base flows and seasonal flow distribution in moving water bodies. Wetlands around rivers and streams play a major role in flood control by absorbing excess waters. Natural wetlands often recover quickly after storms, suffering little long-term damage. In floodplains, wetlands absorb flood waters and slow down the release of water into the river and watershed system. This prevents flash flooding that would be caused by storm or flood waters flowing downstream. In areas where wetlands have been eliminated, flood waters discharge more rapidly than flood waters in an area of wetlands (Mitsch and Gosselink, 2007).

2.3.2 Water Quality

Wetlands have biogeochemical functions which include transforming and cycling nutrients, retaining and removing dissolved substances, and accumulating inorganic sediments. Some wetlands serve as a sink for nutrients and sediments while others
transform nutrients into other forms. Some nutrients are simply removed from water by adsorbing to sediment particles that settle at the bottom of wetlands. Nitrogen and phosphorous are two nutrients commonly found in waste water and absorbed by plants in wetlands. The biogeochemical functions of wetlands prevent or reduce the transport of nutrients downstream. By retaining these nutrients, not only are they available within wetlands to support plant growth, but the downstream water quality is improved. Retaining inorganic sediments adds to the natural filtration for increased water quality (Mitsch and Gosselink, 2007).

2.3.3 Habitat for Fish and Wildlife

Wetlands sustain the ecosystem by supporting food webs and providing habitats for a number of species, including some endangered and threatened species. By supporting hydrophyte plant communities, wetlands offer food, breeding places and cover for animals. Additionally, fish, shellfish, and other seafood resources are dependent on wetland habitats. The flow of energy within wetlands supports a number of vertebrates, maintaining biodiversity and a significant food web through trophic levels to keep whole ecosystems functioning (Mitsch and Gosselink, 2007).

2.3.4 Aesthetic and Recreational Value

One important function people appreciate from wetlands is the aesthetic and recreational value they offer. Nature-lovers have placed value on the sheer beauty of natural wetlands since the days of conservationist John Muir. Others rely on wetlands for recreational uses such as kayaking, hiking, and bird-watching. Culturally, wetlands preserve archeological evidence of past societies and serve as a place of inspiration for artists, poets, and writers.
Wetlands also serve as places of spiritual attachments as many of them harbor ancestral groves of indigenous groups such as the Native American population in the United States (Mitsch and Gosselink, 2007).

2.4 Wetland Protection

The federal government was first encouraged by public voices in the mid-1800s to step into the wetlands scene, not to protect wetlands, but to drain wetlands for agricultural and urban development. It was not until the late nineteenth century that the federal government launched any conservation and preservation efforts and it took even longer for the public and federal government to recognize wetlands as valuable spaces in need of protection (National Research Council, 1995).

The inherent value of wetlands had remained unseen by the general public. Subsequent to increased public knowledge, environmental lobbyists made more noticeable efforts in Congress. In response to the increased public pressures to address the declining state of wetlands, President Jimmy Carter issued an Executive Order 11990 in 1977 instructing federal agencies to minimize damage to wetlands (Mitsch and Gosselink, 2007). This ultimately led to the creation of more regulations to ensure their sustainable management.

2.5 Wetland Regulations

The Corps is ultimately responsible for deciding whether or not to grant permits for development that impacts wetlands considering all aspects of an application, but it does not stand alone. The Corps receives assistance from the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and state agencies when considering dredge-and-fill permits involving wetlands. The EPA
has the power to designate wetlands subject to permits and to veto Corps’ decisions. The Corps encourages anyone involved in a major project applying for a permit to meet with a Corps consultant for a pre-application consultation. This consultation is an opportunity for the applicant to learn about the application and review process (Johnson, 2005).

There are three major components to the screening process for a Section 404 permit from the Corps. The first of these is avoidance, which stipulates that if possible, practicable steps must be taken to avoid wetland impacts. When avoidance seems impossible, potential impacts on wetlands must be minimized. Finally, if neither of these provides a practicable alternative, there should be mitigation, creating a new wetland or restoring an impacted one to compensate for the new loss or impact (Mitsch and Gosselink, 2007).

Section 404 of the Clean Water Act regulates the discharge of fill materials into wetlands. This regulation prohibits the addition of materials into a wetland that can lead to the destruction of that wetland. To comply with the regulations under the Clean Water Act, a permit has to be sought before wetlands can be filled for any development (Hough and Robertson, 2011).

To evaluate whether to grant a permit under Section 404, the Corps determines if there are practicable alternatives to the filling of the wetland. When practical alternatives to the wetland fill exist, the application is denied and the onus lies on the developer to prove that no such alternatives exist (Powers, 2001).

2.6 Wetland Mitigation Process

The wetland mitigation process constitutes actions taken to lessen permitted impacts to the aquatic ecosystem (Robertson and Hough, 2011). According to Reiss et al (2009),
wetland mitigation programs aim to maintain the function of wetlands by avoiding and minimizing impacts including compensating for impacts. The practice of the mitigation process grew due to the unwillingness of the Corps to deny permits which had considerable damaging effects on the environment and the failure of the EPA to veto such permits (Robertson and Hough, 2011). Mitigation is a key element of the EPA regulations that the Corps must impose on an applicant before approving a permit. It seeks to satisfy the following requirements: avoidance, minimization and compensation (Reiss et al, 2009). When impacts to the aquatic ecosystem cannot be avoided by the proposed project, efforts must be geared towards reducing these impacts.

2.6.1 Minimization

Minimization as noted by Hough and Robertson (2011) is changing the project design or the methods used in construction to reduce the overall impact on aquatic resources. As found in Section 230 of the NEPA Act, it states that “no discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken which will minimize potential adverse impacts of the discharge on the aquatic ecosystem” (NEPA Act). The various measures that can be taken to minimize impacts include changing the material to be discharged or controlling the material after discharge and changing the location of the discharge. Other acceptable ways are changing the method of dispersion or the technology involved. All these measures when duly taken minimize the adverse effects that discharged material can have on water quality, plants, animals and human uses (Robertson and Hough, 2011).
Compensation comes in the form of creating artificial wetlands, restoring existing
degraded wetlands and improving the functions of an already existing one. Compensation
replaces the values and functions of the wetland that will be impaired with the filling. It
can be done on the site of the impaired wetland or outside of it, even though established
regulations call for compensation on-site.

2.7 Public Interest Review
The Corps, on the receipt of an application determines whether it is complete and a public
notice can be issued. Once the application is complete, a public notice is issued which
allows the community an opportunity to comment on the proposed project. After
reviewing the substance of the public notice comments, the Corps will determine if a
public hearing is needed. The Corps will conduct a hearing if any person requests such a
hearing during the comment period, unless the request lacks substance (Johnson, 2005).
The public interest review serves as a platform for the public to voice concerns or support
for any wetland dredge and fill project. It is the only stage of the permitting process in
which citizens have the opportunity to engage authorities to bring an influence. The next
section discusses the various stakeholders involved in water policy in the Tampa Bay
region.

2.8 Water Stakeholders in the Tampa Bay region
The Southwest Florida Water Management District (SWFWMD) is among five regional
water management districts created by Florida law to ensure the proper management of
water resources in the state of Florida. It is considered a key water stakeholder because it
regulates institutions that supply water either wholesale or retail to customers. They are
the only authority that can issue permits for groundwater pumping or for any diversion of
water for residential, agricultural or industrial use. It is the agency that sets minimum water levels and flows for both surface and ground water. It is governed by an eleven-member board which is appointed by the Florida governor with approval from the state senate (Glennon, 2002). One agency that closely works with SWFWMD is the Tampa Bay Water, which is described in the next paragraph.

The Tampa Bay Water (TBW), the largest water wholesaler in the state of Florida, supplies water to three counties and three cities in the Tampa Bay region. The counties comprise Hillsborough, Pinellas and Pasco while Tampa, St. Petersburg and New Port Richey constitute the cities. TBW operates thirteen regional well fields, the Hillsborough River and Alafia River, the Tampa Bypass Canal and the Tampa Bay Desalinization Plant to provide water to member county and city governments. These governments in turn distribute water to residents under their jurisdictions. As described earlier, TBW receives permit from SWFWMD to carry out water pumping or diversion operations. Its governing board is made up nine members, two from each county and one each from the member cities (Glennon, 2002).

Other stakeholders recognized by this study include real estate developers, industrial and agricultural businesses, environmental groups, homeowner associations and residents in the Tampa Bay area. This recognition is concurred by both SWFWMD and TBW which have instituted various mechanisms to include the above mentioned groups in their day to day operations. In particular, public meetings which provide avenues for these groups to make inputs into decisions are advertised with video streams provided on the websites of both SWFWMD and TBW.
2.9 Citizens and Environmental Governance

This section outlines how citizens participate in environmental decisions and engage in local water policy.

2.9.1 Introduction to citizen participation

Legislative acts at the federal, state and local levels of government promote citizen participation in the United States. In the past, participation in the decision making process of government was not open to all. Planning and policy-setting processes were the sole responsibilities of the rank and file in politics and economics. Hallman recounts that the earliest form of citizen participation was public hearings provided in the Housing Act of 1949 (Hallman, 1972). Public participation in natural resource use gained roots in the 1970s after the enactment of many federal environmental statutes that required inputs from the public. This paved the way for ordinary citizens to have a say in the decisions that affected the environment. Subsequently, outcomes of public hearings began to shape environmental policy (Chess, 1999).

Webler and Tuler (2001) define public participation as a variety of procedures that enables diverse members of the public to be active participants in deliberations about policy options and decision making. Another definition by Newig (2007) is “the public consultation by a competent authority to co-operative decision-making”. As noted by Webler and Tuler (2001), environmental decisions are well received and implemented best when the public is brought on board in the decision-making process. Keeley and Scoones (1999) state that a participatory approach to policies that affect water policy is often required due to the many actors involved. They continued that such an approach is needed because water resource problems are often contested. They finally cited the
importance of building trust around decision processes as the reason participation in water policies is required (Keeley and Scoones, 1999).

The next paragraph explores the various procedures citizens use to engage in decision making processes and borrows largely from the work of Adams (2007).

2.10 Citizen Engagement in Local Water Policy

Adams (2007) explains that citizens engage in local water policies by identifying and selecting issues in which they want to participate. After this selection, they then indulge in specific activities to influence those issues. The various acts they perform to influence policy include speaking at public meetings, talking to officials and organizing protests. He goes on to say that citizens come in at varying times during a policy-making process from the first discussion of the issue by officials to its implementation. There is a plethora of ways that citizens can engage local water policy-makers, ranging from confrontation, to applying pressure, to persuasion. There are many roles that citizens carry out in relation to local policy-making. Some of these roles, described below, can be performed at any point in time and they show the different ways that citizens can engage in local water policy-making (Adams, 2007).

2.10.1 Citizens as Watchdogs

The first role that citizens can play as a way of engaging the policy-making process is being watchdogs. Putnam (2000) argues that citizens are most times politically inactive and therefore do not participate extensively in decision-making. However, Adams (2007) insists that citizens participate occasionally, especially when proposals from local officials may lead to undesirable consequences to the public. By being watchdogs, they
assume a reactive and obstructive position, seeking to prevent unwanted actions by local water officials. Adams concludes that since often officials disagree with citizens given that they brought the issue up, citizens must use pressure tactics to achieve their goals.

2.10.2 Citizens as Collaborative Problem Solvers

The second role citizens can play is by being collaborative problem solvers. Here, citizens participate as a way to solve difficult issues facing the locality in which they live (Boyte, 2004). Adams (2007) explains that this is different from the reactive role of citizens as watchdogs in that they work in tandem with local officials to solve identified problems. Another characteristic feature of this role is that rather than confronting or pressuring officials, citizens work in collaboration with them.

2.10.3 Citizens as Lobbyists

The third role of citizen engagement is lobbying. This study differentiates between the activities of these citizen lobbyists and conventional lobbyists who are often paid for their services. Here, citizens identify water related issues important to them, come up with goals and lobby local water officials to achieve them. Unlike watchdogs, they sometimes define issues other than policy-makers and resort to pressure when needed. Other methods they use include persuasion, mobilizing fellow citizens.

2.10.4 Citizens as Pawns

The final role of engagement is citizens as pawns. This role is markedly different from the first three mentioned in that citizens do not take any initiative to decide the issues they would address and the activities to engage. According to Adams (2007), they
basically are mobilized by local officials and interest groups to do their bidding. A typical example is water officials organizing public meetings to coax such members of the public. In conclusion, there is no reaction from them because they are misled by officials as to the goals that are to be achieved (Adams, 2007).

Adams (2007) observed that the preferred methods of engaging local authorities were by attending public meetings. He emphasized that public meetings afforded citizens the opportunity to make their opinions and perceptions known to officials. In attempts to influence policy, citizens made contacts with local authorities through face-to-face meetings, phone calls, writing letters, and emails (Adams 2007).

Soden and Cady (1999) carried out research that monitored citizen participation in local issues. They concluded that the involvement of the public in the decision making process depends on the level of concern that citizens have over water resources. When residents do not have concerns or thorough knowledge about water issues, the likelihood for them to get involved becomes negligible. They further added that residents respond to issues that impact their daily lives and select information that attracts their attention. It is only when the stakes are high that people tend to be more interested in issues around them. With stakes raised, the possibility of conflict generation becomes high as identified (Upreti, 2004; Glennon, 2002, and Macdonald et al, 2002).

2.11 Conflict and Power in Natural Resource Use

According to Upreti (2004), citizens participate in policies that affect the natural environment because there is an interrelationship between them. He adds that the competition for scarce resources breeds conflicts (Upreti, 2004). The many causes of
such conflicts include social relations and conflict of interests. In the Tampa Bay area, issues regarding water and land use have been recipes for conflicts due to a rising population. The Tampa Bay Water Wars that led to the creation of Tampa Bay Water is a well-known example (Glennon, 2002). The conflicts generated are in the form of public complaints, disagreements and protests involving arguments and law suits. Macdonald et al (2002) explain conflicts as disagreements through which the actors involved perceive a threat to their needs, interests or concerns. They add that people respond to conflicts based on their perceptions. According to FAO (2002), conflicts do occur when there is lack of information or misunderstandings about specific programs that affect a community. It is these perceptions that this research seeks to identify to know whether in pursuit of needs, there are conflicts among the water stakeholders.

In Sherry Arnstein’s (1969) “Ladder of Citizen Participation”, citizens are empowered when they participate in policy making. It is the means by which the views and opinions of citizens can shape policy. By participating, citizens ensure power is redistributed to their views and can be incorporated into current and future decisions.

In the next section, the study explores how actors exert power as a social control to manage local spaces.
Chapter 3: Theoretical Framework – Political Ecology

The use of natural resources is determined by specific power structures at the local, national, and international levels. This has been brought about due to the quest by institutions to develop peripheral areas which were formerly uninhabited or sparsely populated. Such socio-political realities of environmental changes and the placing of an economic value on natural resources can be understood from an actor-oriented political ecology perspective. In actor-oriented political ecology, actors build power structures and take specific actions at different spatial levels (Blaikie, 1995, 1999; Bryant, 1992, 1997).

Political ecology as described by Paulson et al (2003) explores the relationship between society and natural resources while Blaike and Brookfield (1987) and Bryant and Bailey (1997) explain that political ecology combines all the actors and processes found within an ecological, economic, social and political framework. These authors discuss the impacts of state policies on the utilization of resources and the importance of local agencies in the management of natural resources. Political ecology further determines the responses that society makes in response to environmental degradation and pollution (Peet and Watts, 2004).

This study utilizes an actor-oriented approach in political ecology research to investigate the extent of actor play on local spaces and water policy. Actor-oriented concepts in political ecology separate economic and political structures by focusing on the roles played by individual actors at different scales (Bryant and Bailey, 1997; Giddens, 1984).
The interests, characteristics and actions of such identified actors are analyzed in response to the processes of social, political and environmental change. By using such an approach, this research evaluates conflicts and cooperation over outcomes, as the different stakeholders in water policy have varying concerns and interests. It also explores the power relationships that influence interactions between actors since, often, these relationships tend to be interrelated in nature. The study in addition seeks to identify and examine these stakeholders involved and how they are linked together, recognizing the nature of outcomes that occur through their interactions. Bury (2008) states that after individual actors in natural resources utilization are identified, there is the need to properly understand them. By building this research on an actor-oriented political ecology approach, the study draws direct casual relationships between the activities of the stakeholders involved in water policy in the Tampa Bay region (Bury, 2008).

According to Job and Weizenegger (2000), actors can be classified as individuals or groups. They can also be identified according to their physical distance from natural resources, their positions to power relatively and what they do at different spatial levels. The actors that this study recognizes include federal, state and county officials, as well as people in industry and the average citizen. In this study, the behaviors of citizens and their interaction with resource utilization is determined at the varying scales that they occupy (Bury, 2008).
Chapter 4: Research Design

4.1 Research Question

This study is part of a larger National Science Foundation-funded research called “Urban Long-Term Research Area-Exploratory Award”. The research is being conducted by an interdisciplinary team of scientists and practitioners at the University of South Florida to investigate the human-natural environment interactions. As a piece of the NSF research, the aim of this study is to investigate the extent to which citizens inputs are incorporated into the decision making process, as well as power distribution among the various stakeholders. It seeks to find out if there is conflict between citizens and other stakeholders on land use and water policy in the Tampa Bay area. Finally, this study will determine the pathways by which citizens influence water policy in the Tampa Bay region. The primary research question, which is one of the overarching questions from the NSF research, is:

“How does the social organization and distribution of power among jurisdictions and stakeholders result in particular outcomes and policies for water redistribution and wetland management”?

4.2 Specific Questions

1) What are citizen perceptions of wetlands and groundwater abstraction? What is the level of information dissemination and awareness among communities?
2) To what extent is conflict an issue between stakeholders and jurisdiction over water extraction and value of wetlands?

3) Do perceptions and attachment to wetlands drive citizen action and participation in water distribution issues?

4.3 Definition of Terms

4.3.1 Power Relations

Power relations in this study are deemed as the relationship that exists in the ability of a person to get others to think and act in his own desired way. It is understood as having a capacity and a relation effect (Few, 2002). Various actors are involved in the utilization and protection of the natural environment and they occupy different spatial levels in society. These stakeholders range from federal and state officials, people in industry and the average citizen; the ability to access and control natural resources becomes unequal.

This study looks at the ways that one actor exerts control over the other and will investigate whether there are emerging power structures (Bryant, 1997).

4.3.2 Citizen Action

Citizen Action herein used refers to the process of granting a person in the community an active say in issues or decisions that affect him or her. According to Irland and Vincent (1974), a citizen allowed to participate in a decision making process is granted an actual influence over such decisions. In this study, the participation of citizens in wetland management decisions as and when they affect them, and the kind of influence they exert on the decision making process would be examined.
4.3.3 Wetland Management

Wetland management per this study encompasses activities that can be conducted with, in, and around wetlands. These activities are undertaken to protect, restore, manipulate, or provide for their functions and values.

4.3.4 Citizens

A collective term for residents-at-large, the public, or constituents (Whitener, 1997).
Chapter 5: Study Area

This study was conducted at the Half Moon Lake neighborhood in Hillsborough County. Half Moon Lake is a 32-acre lake located in the Northwest Hillsborough Basin in Odessa, near Veteran’s Expressway. It is an area considered to be part of the Keystone Lakes region of Hillsborough County (Spalding, 2000). The surrounding areas harbor many similar lakes and together form part of the Land-O-Lakes subdivision of the Tampa Plain (Griffith et al. 1997).

The Half Moon Lake area, like many areas in Hillsborough County is unincorporated. It is not a planned neighborhood and only attained residential status during the housing boom of the 1970s. Prior to that, huge acres of citrus groves occupied the land with many flora and fauna. The area has been chosen for this study primarily because it can be found near 3 known active well fields – Section 21, Cosme-Odessa, and Northwest Hillsborough- where Tampa Bay Water pumps groundwater with SWFWMD permits (Spalding, 2000). As already described in section 5.1 above, the larger NSF research is being carried out over many sampling sites in the Tampa Bay area. Many of these sites are incorporated and under the jurisdiction of various city governments in the provision of utility services such as water. It therefore became imperative that an unincorporated area was chosen to determine the perceptions and relationships residents have regarding water distribution. The mixed land use of residential, citrus groves and numerous cypress wetlands affords the opportunity to investigate residents’ attitudes to wetlands and the
withdrawal of groundwater from the neighborhood. Additionally, this area has lost considerable acres of wetlands to tremendous growth in residential and commercial development in recent years (Yager and Metz, 2004).

Residents in the Half Moon Lake community live on private wells constructed with permits from the Southwest Florida Water Management District. Hillsborough County has two classified service areas for unincorporated communities - Northwest Service Area and South-Central Service Area - for which the study area lies in the former (Hillsborough County, 2008).
Below is a map showing the location of the Tampa Bay region and the Halfmoon Lake study area.

Figure 5.1: Map of Tampa Bay Area showing the Half Moon Lake Community
Source: Modified from Tampa Bay Water Master Plan (https://www1.coe.neu.edu) and Google Maps (2012) for Half Moon Lake Community, Tampa.
Figure 5.2: View of a portion of Half Moon Lake with a home in the background
Source: Cornelius Adjei (2012)
Chapter 6: Methodology

The evidence of authority used in this study comprised both primary and secondary data. Secondary data was collected from technical reports, journal articles and books. The methodology used to collect primary data comprised the processes used in interviews. It is divided into 3 main sections: the development of a survey, data collection and analysis.

6.1 Development of the Interview Questions

The perceptions of participants in this study are highly regarded. In order to elicit as much information as possible, most of the questions used in this research were open-ended. Such questions encourage full answers using the knowledge or feelings of respondents. Employing the use of open-ended questions allowed respondents to share their thoughts and opinions without any leading from this principal investigator. The main themes that questions were based on were the type of water resources and the challenges facing these resources. The relationship between wetlands and groundwater withdrawals were asked participants while others included drivers that influence the decision-making process of the water distribution system. Personal observation was also included as part of the question themes. Finally, there were questions that determined the roles played by citizens in affecting the policy-making process.
6.2 Primary Data Collection Methods

This study collected first hand data using a focus group discussion, key informant and resident interviews between December 2011 and March 2012. Informed consent forms were presented to each participant before interviews were conducted. This was to comply with the rules of the USF Institutional Review Board (IRB). The IRB requests that human subjects in a study take part freely and not against their will. Participants indicated that their consent was sought before they took part in the study by signing the forms. The interviews were audio recorded only after a participant agreed to that effect. This was another fulfillment of IRB requirements involving human subjects.

Audio recorded interviews were downloaded to a computer and the audio files fully transcribed into texts and coded. Particular attention will be paid to audio file naming to ensure there are no mix ups. For instance, an audio file reading 01RI_1.13.12_CA_Transcription means the first resident interview was conducted by the interviewer, Cornelius Adjei on January 13, 2012.

6.2.1 Focus Groups

Berg (2004) defines focus groups as a “style of interview that is designed for small groups”. Focus groups are widely used in qualitative research to get information pertaining to a particular research investigation from a group. This method of collecting data encourages participants to speak freely and completely about perceptions and opinions due to the informal group discussion atmosphere generated (Berg, 2004). A study of this nature involving the perceptions and understandings of people requires that an adaptable method of data collection is utilized. Using focus group as a primary data
source is vital due to its link to interviewing, participant observation and survey research (Ansay et al, 2004).

Morgan 2001 states that in order to gain insights and understanding into the perceptions and thoughts of participants, researchers must use less structured interviewing approaches. Less structured focus groups have fewer questions, allows for a more flexible time and ensures the moderator plays an active role during the interview session. This helps to introduce related questions as needed during the discussion to bring up clarifications and expansion from participants (Morgan, 2001). Focus groups in addition bring dynamism and interaction among participants thereby creating group energy (Berg, 2004).

This principal investigator, being part of a larger research team as described in section 5.4 conducted a focus group discussion to have a general sense of what interview questions to ask residents for this study. Field notes were taken and critically reviewed to refine questions for resident interviews. To get a better understanding of group dynamics and the consistency of individual respondents, group responses like affirmations and individual quotes were well noted (Ansay et al, 2004).
6.2.2 Key Informant Interviews

In-depth interviews which were semi-structured with people who are well-informed on issues concerning water and land use policy were conducted. These interviews involved key informants responding to open-ended questions. Having such detailed interviews helped shed more light on water policy and the extent of citizen involvement. Two key informants were interviewed by this study, a regional water official and an environmental journalist. The interviews were carried out in person and spanned between 30 minutes to an hour. Questions for this interview bothered on participant’s view of the water policy making process and the relationship between participant’s organization and the general public. With permission granted from the participants, the interviews were audio-recorded so responses could be accurately documented (Berg, 2004). These two
interviews were conducted to help the principal investigator get a broader and comparative view of expert opinions and discussions.

6.2.3 Individual Interviews

Individual interviews were conducted at the Half Moon Lake community using the purposive sampling technique. Addresses of households in the neighborhood were sampled from the Hillsborough County Property Appraisal sampling frame and introductory letters sent to the residents. Interviews were conducted with participants only after a resident contacted this principal investigator and agreed to be interviewed. The addresses generated were fifty-two in total and thirty interviews were conducted. As detailed in the work of Czaja and Blair (2005), interviewing residents in the Half Moon Lake community afforded this research the opportunity to learn about the opinions and attitudes of the community. The questions were both open and closed-ended, scaled and had structured response categories to present the opportunity to follow up with more questions. Questions focused on residents’ perceptions and concerns about water resources in the Tampa Bay region and their responses to these perceptions and concerns. Residents were asked the channels they used to engage local water authorities and how they responded to different issues about water. Finally questions bothering on the relationship between the various water stakeholders were posed as well.
6.3 Analysis

Data analysis was done concurrently with the data collection as this allowed some questions to be refined and new avenues of inquiry to be developed.

Text-based data was used in analysis starting with reviewing notes taken down, transcriptions and various observations made during interviews. In doing this, emphasis was placed on how extensive, intense, frequent and specific responses from participants were (Krueger, 1998). Additionally, the connection between concepts and themes were well noted. This was achieved by dwelling on the dynamics during the interview. Internal consistencies and individual contributions during discussions were looked at, with direct quotes which brought clarity to issues included (Tilley, 2003).

In a bid to provide validity to participants’ comments, the structure of the interviews focused on achieving goals of this study which has already been discussed. This ensured that through the comments of participants, they conveyed their true perceptions and opinions (Ansay et al, 2004). As detailed in the work of Tilley (2003), after all transcriptions were done, the interviews were labeled and sorted into questions. Themes and categories were created to help in exploring values, perceptions and behavior from participants. These themes were then numbered after certain key words which appeared in the transcripts that had been coded. The themes and scheme results were used for the purpose of research results and discussion.
Chapter 7: Results

7.1 Introduction

This section is a summary of key findings from the analysis described above. It is divided into themes and categories created during the analysis that helped to answer the research questions. In all cases, there is a presentation of patterns with the number of participants whose responses fit the said pattern. It is followed by the response rate of the participants in percentage. With many of the questions used in this research being open-ended, there is a minor deviation in the number of interviewees responding to some questions. This is due to a participant declining to give an answer, giving multiple answers or repeating an answer in the case of scaled questions. The response rates were calculated based on the number of interviewees who responded to each question. The presentation of the patterns is followed by a representative quote, a chart or table where applicable.

7.2 Focus Group

The focus group discussion had eleven residents in attendance. When asked from where they got their water, all of them said they had individual wells and bought bottled water. Some further stated that they made use of purification systems such as reverse osmosis to ensure a better water quality. When asked how they constructed the wells, they stated that they applied for permits from SWFWMD and employed the services of well drilling companies. Most old wells were 70ft maximum with newer wells having depths up to 180ft.
Residents were asked to discuss the problems and concerns they had with their water and it came to the fore that pollution, scarcity and fluctuations in lake levels were the biggest concerns. Some participants reported that the older wells had “terrible water” while others were of the opinion that their water contained “ions and were distasteful”. On water scarcity, they asserted that many wells are “drying out” and attributed this to “St. Pete-owned well fields” near the locality. One unique revelation from the discussion was the lack of fire hydrants in the community. This was a source of grave concern for all the participants as some recounted two homes that have been razed down by fire in the past because fire volunteers could not get access to hydrants.

Another discussion point centered on who had the most influence in water issues. Participants minced no words in saying that the rich and powerful in society have their ways when it comes to decisions affecting water. They gave examples of politicians, realtors and developers as swaying decisions in their favor.

Finally, the participants were of the view that wetlands were being lost to development and wished the trend were reversed. Watering and fertilization of lawns by neighborhoods in the community were issues of concern raised in the context of water scarcity and pollution respectively.

7.3 Key Informant Interviews

The results below are from the interview conducted with two key informants. The first is an employee of a regional water wholesaler and the other a Director of Utilities for a city government in charge of drinking and wastewater, all of whom are in the Tampa Bay
area. Their roles in the water sector ranged from managing infrastructure projects such as wells to reviewing proposals and making key water decisions.

When asked what challenges face water resources in the Tampa Bay area, one interviewee mentioned identifying capital improvements and funding for water supplies and repair of infrastructure. Population growth and its attendant challenges of increasing water demand and development pressures were also mentioned. The interviewee further added that satisfying the thirsty needs of a growing region was not the only challenge but making sure the water provided was high in quality.

All respondents were concerned that some responsibilities of SWFWMD and Tampa Bay Water seemed vague and wished each organization had clearly spelt out responsibilities. One was of the opinion that in order for sound policies to be formulated, the legislature must consider merging these two institutions under one body. They opined that since most of the governing council members lack natural and environmental science backgrounds, some policies are not holistic in view. This is what one of them said:

“I think that I have a problem personally and professionally that the policy makers are often not from the natural science and environmental backgrounds. I assume that they take advice from the staff in the agencies but for people who make our decisions, it will help if they had a holistic knowledge or perspective of the entire water resource issue”
(Key Informant Interview 1).

The interviewees when asked whether the public was well informed about water decisions answered in the negative. They wished that citizens would be more proactive than reactive. They reasoned that to help citizens be proactive and push their inputs onto
the decision table, they had to be educated by the agencies and local governments. This response is from one of the key informants:

“We have to be proactive rather than reactive and the only way to do it is by educating citizens who will then pressure those in power to do the right thing. Education is key, everybody has to be knowledgeable about problems and solutions because if you don’t make noise about it, who will?” (Key Informant Interview 1)

7.4 Resident Interviews

As described earlier, letters were sent to fifty-two household addresses with thirty residents responding, a response rate of (58%). Out of the thirty respondents, there were twenty-three males (77%) and seven females (23%) (Fig. 7.1). The length of residency of participants who took part in this study ranged from 2 years to 54 years (Fig. 7.2). The longest resident happened to be a female who recounted that she moved into the community in 1958. Generally, longer term residents were in a better position to see gradual changes in the environments around them as opposed to shorter term residents. The next set of sections shows a breakdown of results under each specific research question.

Figures (7.1 and 7.2) show the gender and length of residency of participants
Figure 7.1: Male and female respondents who took part in the resident interviews

Figure 7.2: Length of residency of respondents who took part in the interviews
7.4.1 Research Question 1

The first objective of this study is to know the perceptions and opinions of residents on water resources in the Tampa Bay region. Additionally it seeks to determine what residents know and feel about the relationship between groundwater and wetlands.

7.4.1.1 Water Resources in the Tampa Bay Region

All thirty respondents (100%) in this study expressed profound interest in water issues when asked. The reasons for their interest ranged from consumptive use, to fishing, watering of lawns and recreation. For example, this is what one participant said:

“Yes, I live on water and drink water. It’s a very necessary life source. If you live in a region with a high population like ours, you have to think about water”. (Interview 6)

This study sought to know what respondents identified as water resources in the Tampa Bay area. It was a way to ascertain participants’ knowledge about from where their water came. Table 7.1 and Figure 7.3 give a summary of the water resources identified by participants in the study. More than half of the respondents (53%) stated the Floridian aquifer or groundwater as a water resource. It was closely followed by thirteen participants (43%) who named the Hillsborough River as a water resource. 30%, 13% and 7% of the interviewees mentioned lakes, the Tampa Bay and reservoirs respectively as other water resources in the region. It came out that most respondents felt groundwater and the Hillsborough River were the main sources of water as evidenced by this quote from one interviewee:

“I think we get our water of course from the aquifer beneath us and from the rivers, I mean the Hillsborough River”. (Interview 4)
After the Floridian aquifer and the Hillsborough River, lakes were mentioned by nine participants as important water resources. Here is a quote from one of them:

“I am a retiree and I love lakes. I fish in it, water ski and it’s just nice to be close to water. I think it’s not only the Hillsborough River, lakes are important too”. (Interview 14)

Four respondents said the bay (Tampa Bay) is a water resource for the region while two mentioned reservoirs. Below are illustrations from what they said:

“You know when you hear Tampa Bay; you think about the bay so yes, the bay should be one of them”. (Interview 13)

“Reservoirs for me are very important. When you don’t have them, how are you going to save water for the future? We had much rains last year and if there were no reservoirs, all would have ended up in the bay”. (Interview 26)

Table 7.1: Participants’ responses to water resources in the Tampa Bay region

<table>
<thead>
<tr>
<th>Water Resource</th>
<th>Response (n)</th>
<th>Response Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquifer/water table</td>
<td>16</td>
<td>53</td>
</tr>
<tr>
<td>Lakes</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>The bay</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Reservoirs</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Hillsborough River</td>
<td>13</td>
<td>43</td>
</tr>
</tbody>
</table>

Note: Percentages exceed 100% because some respondents gave multiple answers
7.4.1.2 Groundwater Pumping and Wetlands

With groundwater identified as one of the main sources of water, the study asked participants if groundwater pumping had any effect on wetlands. This question was posed to them because the study area, as earlier described, is near three major well fields managed by Tampa Bay Water. The area as well abounds in wetlands; thus it was necessary for this study to seek the opinions of the respondents on the relationship between groundwater pumping and wetlands.

Twenty six respondents (87%) felt that groundwater pumping has effects on adjoining wetlands. They cited the effects they have seen on their lakes as evidenced by this quote.

“I think it does. I will say many of the lakes around our area are spring fed but because we live in close proximity to the well fields, the water table has dropped. This lake is just a stagnant pool of water; it is no longer being fed freshwater through the springs”.

(Interview 8)
Three participants (10%) were not sure whether there was any direct effect on wetlands while an individual (3%) felt groundwater pumping has no effect on wetlands. Table 7.2 and Figure 7.4 are a representation of the results. This is what one of the interviewees who was not sure stated:

“I am not a scientist to say yes or no. I have been living here for quite some time now and I am not really sure about this. I have a neighbor who’s well collapsed but I don’t know whether it was because of the pumping”. (Interview 19)

For the respondent who said no, this is what he said:

“I will say no because I know there are some well fields around but they do not affect the wetlands in this area. I might be wrong you know but I will say no”. (Interview 24)

Fig 7.4: Responses showing whether groundwater pumping affects wetlands
Table 7.2: Results showing whether groundwater pumping affects wetlands (N=30)

<table>
<thead>
<tr>
<th>Response</th>
<th>Response (n)</th>
<th>Response Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>26</td>
<td>87</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Not Sure</td>
<td>3</td>
<td>10</td>
</tr>
</tbody>
</table>

*Response rates exceed 100% because some respondents gave multiple answers

Respondents were asked to cite the possible consequences of pumping water from the ground (Table 7.3, Fig. 7.5). This was to know how they perceived the relationship between wetlands and groundwater pumping. Twenty seven respondents (87%), apparently all of those who felt groundwater removal affected wetlands stated the formation of sinkholes as a consequence of groundwater. This is a quote from one participant in relation to sinkholes and groundwater pumping.

“If what we take from the ground is faster than its recharge rate, there comes a problem, the land will subside and what you see are sinkholes. It also lowers the water level in our lake. This water you see behind me used to be closer to my deck sometime back but not now”. (Interview 11)

Ten participants (33%) were of the opinion that pumping of groundwater causes wells to collapse. Some said this because their wells had collapsed before while others stated that they had heard some of their neighbors’ wells collapsing. They all attributed them to over pumping of the aquifer. Below is what one respondent said.

“Well my friend with the little science I have, I know when you pump water from the ground for a considerable time, the water drops. Our well collapsed three years ago, it tasted funny and became very shallow”. (Interview 8)
Fluctuations in lake water levels were cited by five individuals (17%). They recounted periods where they thought the lakes were “full” and other periods when the water was low or had receded a bit. This quote from one participant buttresses this claim.

“I have lived on this lake for twenty or so years. I know it when it is full. There was a time I had to build a higher deck because the water was close to it. For many years now, the water has not come that close except may be after some rains. I think the level is not what it was some twelve, fifteen years ago”. (Interview 28)

One respondent (3%) opined that the drying of marshes is a consequence of groundwater pumping. He reiterated that even though he was yet to witness one, he felt too much groundwater withdrawals can dry up marshes. This is what she said.

“I will think so. You know anything is possible. Marshes are supposed to be moist but if you keep on taking water from the ground, the soil will be dry and the whole marsh can dry up”. (Interview 17)

Table 7.3: Effects of groundwater pumping on wetlands (N=30)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Response (n)</th>
<th>Response Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinkholes</td>
<td>26</td>
<td>87</td>
</tr>
<tr>
<td>Lake level fluctuation</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Marshes drying up</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Collapse of well</td>
<td>10</td>
<td>33</td>
</tr>
</tbody>
</table>
7.4.1.3 Water Resource Challenges in the Tampa Bay Region

Once the various water resources in the Tampa Bay area were identified, participants were asked to identify the challenges that face these water resources. It was another way of seeking the opinions of respondents on what the problems of water are in the region. One common theme underlining the challenges cited by participants was population growth. They minced no words in saying that the influx of people into the Tampa Bay region is a catalyst for the mentioned challenges (Table 7.4, Fig. 7.6). Almost half of the participants (47%) identified pollution and water scarcity as the main challenges to water in the region. The contaminants frequently mentioned included runoff, trash and industrial spills.

“Pollution is a big concern for me. Most of the wells are shallow so anything that goes on around in the area and even fairly distant away can trickle down into our water system”. (Interview 8)
In the case of scarcity, the participants were concerned with the ability of a growing region to meet its water demands in the near future. Some participants were quick to refer to the recent drought that hit the region some few years ago as a stark reminder of what can happen. Their views are depicted in the illustration below.

“In Tampa Bay, population growth means more demand for water and that demand has to come from resources that we have today. The more people come in, the more the demand increases. We have to ask ourselves where the water will come from. I cast my mind back to the recent drought and I think our water supply will have to be looked at again”. (Interview 3)

Five participants (17%) stated land use as a concern for while 4 respondents (13%) bemoaned the lack of planning on the part of officials. Those who identified land use as a concern attributed it to the various developments on and near wetlands. In particular, they mentioned the construction of roads, shopping centers and housing lots. These respondents were of the view that a growth in population puts pressure on available spaces in the region. Their views are summed up in what this individual said.

“You see anytime I drive past the Veterans Expressway, I remember way back when there were wetlands everywhere. These wetlands are important for our water. People didn’t want to live here but now there are homes coming up. More people are coming to this area and I will not be surprised if the remaining wetlands are taken away to build more homes and shopping centers”. (Interview 22)

For the respondents who felt there was a lack of planning on the part of officials, this is what one of them said:

“I am not happy with how city authorities and water officials are dealing with these issues. I think some of our leaders are lacking foresight that I expect them to have in terms of long term planning and effects in making some decisions today. I will give you a typical example. The incentive of desalination did not seem to me to be a reliable and
viable source of water in terms of their locations and I didn’t know what they were
drawing from to be able to process that water”. (Interview 1)

Three interviewees (10%) each stated water rights, water conservation and public
education as their concerns. Individuals did not understand why nonresidential water
users, particularly the agricultural industry, had special water rights as opposed to those
of residents. They felt it was unethical to give up a whole vital resource such as water
into the hands of corporations who are only interested in making profit from something
that can be shared by all. This is what an individual expressed his concern.

“I don’t understand how water rights are sold to some corporations and what motivates
city officials to be bullied or persuaded to give up something so critical like water. A
good case is Crystal Spring and how Nestle came in and purchased it. I recall how it
occurred and was appalled how it happened with no local input. I did not know whether
it was a private well but I thought someone would step in and question such a move”.
(Interview 1)

Participants also cited personal water responsibilities as a concern worth noting. By
personal water responsibilities, they meant to say some people and organizations were
not doing enough to conserve water in their daily usage. The watering of lawns was
common among their reasons for saying this. One interviewee summed it up this way.

“I am sure you will agree with me on this. Water is being used in a casual way in this
country because in other countries you have to work hard to get water. To witness how
water is being dispensed to water lawns is a sad sight for me to see. You won’t believe
how many people even use potable water to water their lawns”. (Interview 16)

Public education as a concern stemmed from the fact some participants felt the amount of
information on water to the general citizenry is low. Some were of the opinion that the
role that, for instance, wetlands play in water provision is severely not appreciated by the
general public. They went on to say that if people were armed with adequate information
about water resources in the region, many of the pollution problems would not be there.

Their views are captured in what this interviewee said:

“In my experience they (public) know very little, very few people know where the water they use comes from. I think it is a very big challenge because people do not understand that the river that they are fishing in today, that they are throwing cans in over the weekend that is the same water that ends up in their taps. I can say for wetlands too because if people knew their importance, we won’t be losing them like we are doing now”. (Interview 3)

Two individuals (7%) felt cost was a challenge to water provision while a respondent (3%) cited accessibility to historical data as a challenge. Their views are summarized in the following quotes:

“You see even though I live on well water and it is safe, I buy bottled water. I wish to get hooked on city water but people don’t like impact fees so what do you do. I believe if you want the best you got to pay and not all people will do that especially these times”. (Interview 20)

“Information, people are not informed about water. I don’t blame them because it is difficult getting data. May be you have data about this place but some of us don’t have. I want to learn about my environment but with no information, how do I learn”? (Interview 7)
Table 7.4: Results showing the challenges facing water resources (N=30)

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Number of Respondents (n)</th>
<th>Response Rates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollution</td>
<td>14</td>
<td>47</td>
</tr>
<tr>
<td>Cost</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Access to Historical Data</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Water Scarcity</td>
<td>14</td>
<td>47</td>
</tr>
<tr>
<td>Land Use</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Water Rights</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Water Conservation</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Lack of Planning</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Public Education</td>
<td>3</td>
<td>10</td>
</tr>
</tbody>
</table>

*Total percentages exceed 100% because some interviewees omitted or repeated some rankings*
7.4.1.4 Functions and Values of Wetlands

The study proceeded to know the values and functions that participants attached to wetlands and is summarized in Fig. 7.7 and Tables 7.5a and 7.5b. In order to have a vivid idea about their perceptions on wetlands, it was necessary to know how these participants viewed roles played by wetlands. Seven values and functions of wetlands identified by the principal investigator were listed and participants were asked to rank them from the ones they deemed most important to the least.

Ten respondents (33%) chose flood control as the most important function of wetlands followed closely by nine interviewees (30%) who felt same for uninhabitable marshy areas. The quotes below give a description from two interviewees.
“Flood control should be number one absolutely. You ask yourself where most of the runoff go. Of course they find their way into wetlands. They act as buffers.” (Interview 29)

“When I see wetlands, I feel people are not supposed to live there. No, don’t even touch it. That’s what I feel” (Interview 12)

Eight participants (27%) chose water quality as the most important while six (20%) opted for wetlands as habitats for wildlife as the most important. For the participants who ranked water quality, this is what one of them said.

“I know that when dirty water collects in wetlands and sinks into the aquifer, it is cleaned along the way so yes water quality, my first choice” (Interview 19)

The quote below came from one of the respondents who felt wildlife habitat was the most important function of wetlands.

“That is where all the ducks and fishes are. Even in this lake there are fishes, at times I see turtles too”. (Interview 16)

In the last ranked category which is the least important wetland function or value, almost half of the respondents (47%) chose value of wetlands as ancestral or spiritual places. In addition, ancestral places and aesthetics were never ranked in the most important function or value by any of the participants. The description below sums up respondents thoughts about ancestral places.

“Spiritual places, this is interesting! I am hearing this for the first time. What are they doing there? Like I said, these are places people shouldn’t be there”. (Interview 12)
**R1:** Most important  

**R7:** Least important

Figure 7.7: Functions and values respondents attach to wetlands
Table 7.5a: Number of respondents (n) ranking each wetland function and value from the most important to the least (N=30)

<table>
<thead>
<tr>
<th>Function/Value</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
<th>R6</th>
<th>R7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood Control</td>
<td>10</td>
<td>7</td>
<td>8</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Water Quality</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ancestral Places</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Wildlife Habitat</td>
<td>6</td>
<td>10</td>
<td>11</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Recreation</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>11</td>
<td>5</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Uninhabitable Marsh</td>
<td>9</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

*Total response are less than or exceed 30 because some interviewees omitted or repeated some rankings.
Table 7.5b: Response rates (%) by respondents ranking each wetland function and value

<table>
<thead>
<tr>
<th>Function/Value</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
<th>R6</th>
<th>R7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood Control</td>
<td>33</td>
<td>23</td>
<td>27</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Water Quality</td>
<td>27</td>
<td>23</td>
<td>17</td>
<td>20</td>
<td>13</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ancestral Places</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>7</td>
<td>23</td>
<td>47</td>
</tr>
<tr>
<td>Wildlife Habitat</td>
<td>20</td>
<td>10</td>
<td>11</td>
<td>7</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Recreation</td>
<td>3</td>
<td>3</td>
<td>7</td>
<td>11</td>
<td>5</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>7</td>
<td>33</td>
<td>33</td>
<td>20</td>
</tr>
<tr>
<td>Uninhabitable Marsh</td>
<td>30</td>
<td>20</td>
<td>13</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>17</td>
</tr>
</tbody>
</table>

*Total response rates are less than or exceed 100% because some interviewees omitted or repeated some rankings

7.5.1 Research Question 2

7.5.1.1 Changes in wetland environments

With the study area in close proximity to well fields and abounding in wetlands, the study sought participants to identify changes that have occurred in their environments (Fig. 7.8 and Table 7.6). This was part of many questions to answer the second specific research question of whether conflict was an issue in groundwater abstraction and the perceptions of residents.
An overwhelming twenty-eight interviewees (93%) made mention of fluctuations in lake level as a change they have been witnessing in the environments around them. They were of the conviction that the level of water in the lake fluctuated. For these participants, they used the lake for so many activities including skiing, and fishing and thus were affected by this fluctuation depending on the activity. This is what one of them said.

“One thing I cannot miss is seeing whether the water is low or high. I use my deck and you can see it when it is down. It becomes turbid and shallow. I like it when it is high, that is when I can enjoy skiing”. (Interview 5)

The second most reported change was pollution of lake by more than half of the respondents (60%). Algal bloom was the specific pollution cited by these participants. Some of the respondents mentioned a conspicuous discoloration of the water in the lake at varying times. This interviewee depicts this clearly from what she said.

“The water looks greenish-brownish at times; it is something you don’t want to see. I might think they are algae or something. They give off some smell which deters me from going to it at times”. (Interview 9)

Nine individuals (30%) stated the drying of wetlands as changes they have seen around them while five participants (17%) reported wetland fragmentation. The first group explained that some of the wetlands used to contain pools of water for a considerable length of time but that is not the case now. The latter respondents stated that increase in development has seen wetlands being cut through for the construction of homes, roads and shopping centers. They added that most of these wetlands they described used to be intact before the advent of intensive development. These illustrations summarize their perceptions.
“Look at all these homes coming up; they used not to be there. All those areas were wetlands but now what do you see. This place was intact until people began building homes and roads. You now see pockets of spaces which will be filled very soon. It is a real problem in this part of Florida”. (Interview 18)

I must say the marshes are becoming drier and drier. Now you don’t see standing water for long in them and the soils are dry”. (Interview 30)

In addition to the drying of wetlands, ten participants (33%) reported complete loss of wetlands while five individuals (17%) said they had seen the falling of cypress trees in their environments. A participant who has been a resident in the neighborhood for fifty-four years recounted how the area had many wetlands but she now sees only a few. This is her account.

“I have been here for fifty-four years; I came with my husband who is now deceased. We came here because we wanted to be away from the city. We loved the marshes but most of them are gone now. I don’t see them”. (Interview 30)

The same long-term resident reported the falling of cypress trees and had this to say:

“I don’t drive much these days but the last time I did down the road, some trees were down”. (Interview 30)

Finally, two interviewees (7%) said they had seen invasive species in their environments. Another female long term resident said she had seen “strange plants” in her back yard.

The quote below is her account:

“We were clearing our backyard and I saw this strange looking plant. It didn’t look familiar to me at all. May be it found its way here”. (Interview 17)

Figure 7.8 and Table 7.6 give a summary of the above results.
Figure 7.8: Changes seen in wetlands around respondents

Table 7.6: Summary of changes seen in wetlands (N=30)

<table>
<thead>
<tr>
<th>Change</th>
<th>Response (n)</th>
<th>Response Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake level fluctuation</td>
<td>28</td>
<td>93</td>
</tr>
<tr>
<td>Pollution of lakes</td>
<td>18</td>
<td>60</td>
</tr>
<tr>
<td>Drying of wetlands</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>Wetland fragmentation</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Wetland loss</td>
<td>10</td>
<td>33</td>
</tr>
<tr>
<td>Invasive species</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Cypress trees falling</td>
<td>5</td>
<td>17</td>
</tr>
</tbody>
</table>

*Total response rates exceed 100% because some interviewees gave multiple answers*
7.5.1.2 Causes to Changes seen in Wetlands

Once respondents identified various changes they had seen in the environments around them, the principal investigator proceeded to ask them why these changes were occurring or had occurred. Groundwater pumping and development due to population influx were the most mentioned factors attributed to the changes seen in wetlands (Fig. 7.9 and Table 7.7). Twenty-six participants (87%) mentioned groundwater pumping as a cause while twenty-two respondents (73%) attributed the changes they had seen to development. They explained that the Tampa Bay area sees growth every day and that comes with providing water for the population. They added that even though they did not know how much was pumped from the well fields, they felt that the two stated causes played bigger roles to the many changes they reported. These are what some of them said:

“The cause is economic in scope because Florida has no state tax so its economy is hinged on development and this has direct effect on the policies that are implemented. With all the developments going on, the environment is heavily impacted”. (Interview 15)

“Pumping is the cause. When you over pump the aquifer and you are not able to sustain the levels that are needed, there will be problems. People and businesses keep on coming here so the pumping won’t stop until there is no more”. (Interview 4)

Lawn fertilization ranked high also as twenty interviewees (67%) stated it as a cause of environmental changes. Many of the respondents wasted no time in apportioning blame to some neighbors who mismanage the application of fertilizer to their lawns. Some said with most of the lawns close to the lake, the fertilizers tend to be washed down into the lake causing pollution. A not-so-happy participant had this to say.
“It seems to me that people value their lawns more than this lake. I see some of them tending to their grasses but what do you see? These chemicals end up in the lake. Sometimes you can only watch because some people don’t learn” (Interview 12)

Lack of education, eight respondents (27%), and lack of monitoring on the part of officials, four respondents (13%) were the other causes interviewees identified with the environmental changes occurring. Individuals who reported the former were convinced that there is little or no knowledge on wetlands by the general public and this leads to their pollution and losses. Others were of the view that if people appreciated wetlands the more, they would be more conscious of them than they do now. Here is a saying from one interview.

“I say that information is very important. People are not informed as much as they should and they end up doing things they are not supposed to do”. (Interview 7)

Respondents who stated that there was lack of monitoring felt officials from the city and county could do better by stepping up monitoring of wetlands in the neighborhood to know their current states. The quote below came from an elderly interviewee.

“I have seen some guys from the city come in a couple of times. They came to install something that will gauge the level of the lake but I have not seen them again. There are invasive weeds and we are doing practically nothing. These weeds hurt our local species” (Interview 17)

Figure 7.9 and Table 7.7 illustrate the results from the causes attributed to wetland changes
Figure 7.9: Causes of changes seen in wetland environments

Table 7.7: Summary showing responses to what causes changes in the environments around them (N=30)

<table>
<thead>
<tr>
<th>Cause of wetland changes</th>
<th>Respondents (n)</th>
<th>Response Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development</td>
<td>22</td>
<td>73</td>
</tr>
<tr>
<td>Lawn fertilization</td>
<td>20</td>
<td>67</td>
</tr>
<tr>
<td>Lack of education</td>
<td>8</td>
<td>27</td>
</tr>
<tr>
<td>Groundwater pumping</td>
<td>26</td>
<td>87</td>
</tr>
<tr>
<td>Lack of monitoring</td>
<td>4</td>
<td>13</td>
</tr>
</tbody>
</table>

*Total response rates exceed 100% because some interviewees gave multiple answers

7.5.1.3 Drivers of Conflict on Wetland Changes

Further questions were asked participants about factors that catalyzed the changes in wetlands that they had already reported. This was necessary to elicit information from
them as to what constituted the driving force behind the changes. The various responses given were put into three broad categories namely economic, value, and power (Fig. 7.10 and Table 7.8).

More than half of the participants (63%) reckoned that the driving force behind the changes is economic in nature. By this, they meant to say that wetland resources are being modified because of the quest to maximize or gain profit. Most pointed out the roles played by big agricultural corporations and developers in turning previously known wetlands into farms and housing lots respectively. Below is a representative view from one interviewee.

“All the things happening now are because of money. Vacant lands are turned into vegetable farms and homes. They pollute our water when they spray the crops with chemicals. You see developers building close to wetlands because there is little space”. (Interview 10)

Value conflict was identified by nine interviewees (30%) as fuelling environmental changes. A value conflict arises when one value can only be realized at the expense of another value. Most of them believed that the different interests and values people placed on wetlands is a conflict and contributes to the changes seen in the environment. They said that while one individual strives to protect wetlands, another person seeks to use it in a way other than protection. They further reiterated that what one person considered a use of wetlands was not held in the same view by the other. One participant gave a scenario citing developers seeing wetlands as spaces for homes to be built on, landscape as wealth while others will want to see those same wetlands not impacted, landscape as nature. The quote below from an interviewee describes this type of conflict.
“I will say there is not one generally accepted use of wetlands. Developers see them as empty spaces they have to build while I might use it for a vegetable farm. It’s a set of different preferences and interests. My neighbor will indulge in activities that will hurt the fishes in the lake and see them as normal while I will not. It is a case of human minds not the same”. (Interview 10)

Twelve respondents (40%) felt power conflict is the motivation behind the changes they see in the environment. They felt that there is a struggle between different entities to gain access and control over the environment. One vivid instance given this principal investigator was the struggle between private land owners striving to hold on to their lands and businesses using the lure of money to gain access and control to these same wetlands. The quote below depicts what constitutes a power conflict from one interviewee. “There is a struggle all the time. Everybody wants a stake in the environment but the powerful win always. When businesses like Mosaic with so much financial clout want to have lands, they influence decision makers with money. They get these lands because their finances make them very powerful, very powerful. The agencies that are supposed to check them do not because they feel powerless”. (Interview 4)

Figure 7.10 and Table 7.8 show a summary of the drivers of conflicts
Table 7.8: Results showing what drives conflict in environmental changes (N=30)

<table>
<thead>
<tr>
<th>Conflict Source</th>
<th>Response (n)</th>
<th>Response (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic</td>
<td>19</td>
<td>63</td>
</tr>
<tr>
<td>Value</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>Power</td>
<td>12</td>
<td>40</td>
</tr>
</tbody>
</table>

* Total response rates exceed 100% because some interviewees gave multiple answers

7.6.1 Research Question 3

7.6.1.1 Attendance to Public Meetings

Respondents were asked questions about their involvement in the local decision making process about water. The residents were asked whether they had attended meetings that talked about water resources in the Tampa Bay area. While eight participants (27%) had
been to meetings that talked about water, almost three-quarters (73%) answered in the negative as illustrated by Figure 7.11

![Figure 7.11: Results showing attendance to meetings dealing with water](image)

Participants were then asked the ways they employ to get involved in local water policy issues. This was important to the research to inform about their medium of contact with other water stakeholders, particularly officials at the city and county levels. Nine participants (30%) reported that they contact officials through phone calls, e-mails, letters and articles to the media. The remaining twenty-one (70%) had not made any contact with both officials. The two quotes below came from two of the respondents who had made contact with officials:

“I make phone calls, they are the fastest and you get a prompt response”. (Interview 28)

“I used to do letters but not now. If I find an email contact, I do that”. (Interview 11)

7.6.1.2 Citizen Action to Engage in Local Water Policy
Further questions were asked to ascertain the activities interviewees had used in one way or the other to make contributions to water resources issues. These questions were asked to reveal how active the participants were in issues related to water. Having been established by the residents that there were problems with their water resources, it was important to see what actions they took to address the problems. A summary of the actions taken by participants to address their problems with water can be found in (Table 7.9). Nine different activities identified by Adams 2007 which afford citizens the opportunity to engage in policy making were listed and respondents asked to answer yes or no to them. It must be noted that only one individual had participated in all nine activities listed by the principal investigator. All eight participants (27%) who had attended water related meetings said they made some contributions at those meetings. Nine respondents (30%) said they had contacted non-elected county and city officials in the past while two individuals had made contact with elected officials or organized a meeting that deliberated on water related issues. Almost all respondents (97%) said they had never indulged in the following activities: joined a protest, circulated a petition, hired a lobbyist or contacted the media.
Table 7.9 Actions taken by respondents to engage in local water policy (N=30)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Response (n), (%)</td>
<td>Response (n), (%)</td>
</tr>
<tr>
<td>Spoken at public meeting</td>
<td>8, (27)</td>
<td>22, (73)</td>
</tr>
<tr>
<td>Organized/joined a protest</td>
<td>1, (3)</td>
<td>29, (97)</td>
</tr>
<tr>
<td>Contacted elected official</td>
<td>2, (7)</td>
<td>28, (93)</td>
</tr>
<tr>
<td>Contacted non-elected official</td>
<td>9, (30%)</td>
<td>21, (70)</td>
</tr>
<tr>
<td>Circulated a petition</td>
<td>1, (3)</td>
<td>29, (97)</td>
</tr>
<tr>
<td>Organized a meeting</td>
<td>2, (7)</td>
<td>28, (93)</td>
</tr>
<tr>
<td>Hired a lobbyist</td>
<td>1, (3)</td>
<td>29, (97)</td>
</tr>
<tr>
<td>Contacted the media</td>
<td>1, (3)</td>
<td>29, (97)</td>
</tr>
<tr>
<td>Taken legal action</td>
<td>1, (3)</td>
<td>29, (97)</td>
</tr>
</tbody>
</table>

7.6.1.3 Reasons for Citizen Action or Inaction

Once it had been established that the majority of the respondents had not participated in many of the activities listed in Table 7.9, this study probed to know the reasons behind this little involvement. First and foremost, the participants who got involved in the activities were asked their reasons for doing so. It came to light that collapse of their wells, poor well water quality, low lake levels, and problems with invasive species were among the most mentioned. Although all the factors seem to be problematic, a respondent took involving steps because he wanted to make a proposal to build an artificial coral reef in the lake while another wanted to get more information about water resources. Four residents who complained about their wells churning out sand or collapsing had them
fixed. They were fixed after they placed phone calls to officials although they could not say if the wells were fixed by Tampa Bay Water, SWFWMD or the city government.

This principal investigator moved on to ask the respondents who had not engaged themselves in the activities in Table 7.9 to establish why there was no participation on their parts. The first reason they cited was time constraint. Some respondents said the holding of meetings on weekdays clashed with their working periods thus making it difficult for them to attend. Other participants said they did not feel obliged because they felt most of the concerns they raised were the responsibilities of city and county officials. They felt most of these problems were not personal but beyond them which had to be tackled by the appropriate quarters. Finally, some residents reported that the meetings were usually not accessible and in particular mentioned the location of the meetings from their residences.

7.6.1.4 Influence of Stakeholders on Water Policy

Participants were giving a list of eight stakeholders and asked to rank them from who had the most influence to the least. The list was drawn out to include residents to know how the interviewees measured themselves against other stakeholders in terms of influencing water decisions. Over half of the respondents (60%) felt Southwest Florida Water Management District (SWFWMD) wielded the most influence. Eleven interviewees (37%) listed Homeowner Associations (HOA) as the stakeholders with the least influence with residents following closely at (20%) with six participants. Figure 7.12 and Tables 7.10a and 7.10b show the complete results of how each organized was ranked. It must be noted that residents, environmental groups and homeowner associations were never
ranked as the most influential stakeholders by participants. On the other side of the coin, SWFWMD and TBW were rarely ranked as being the least influential.

Figure 7.12 Ranking the influence of various stakeholders on water policy
Table 7.10a Response rate (%) of the influence of each stakeholder in water policy (N=30)

<table>
<thead>
<tr>
<th>Organization</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
<th>R6</th>
<th>R7</th>
<th>R8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWFWMD</td>
<td>60</td>
<td>17</td>
<td>13</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>TBW</td>
<td>20</td>
<td>37</td>
<td>10</td>
<td>17</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Developers</td>
<td>7</td>
<td>30</td>
<td>7</td>
<td>20</td>
<td>20</td>
<td>7</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>County Comm.</td>
<td>13</td>
<td>0</td>
<td>60</td>
<td>3</td>
<td>10</td>
<td>0</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>City Govt.</td>
<td>3</td>
<td>20</td>
<td>13</td>
<td>30</td>
<td>20</td>
<td>0</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Residents</td>
<td>0</td>
<td>3</td>
<td>7</td>
<td>13</td>
<td>10</td>
<td>20</td>
<td>27</td>
<td>20</td>
</tr>
<tr>
<td>Env. Groups</td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>17</td>
<td>20</td>
<td>27</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>HOA</td>
<td>0</td>
<td>17</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>17</td>
<td>17</td>
<td>37</td>
</tr>
</tbody>
</table>

*Total percentages are less than or exceed 100% because some interviewees omitted or repeated some rankings*
Table 7.10b Results showing the influence of organizations on water policy (N=30)

<table>
<thead>
<tr>
<th>Organization</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
<th>R6</th>
<th>R7</th>
<th>R8</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWFWMD</td>
<td>18</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TBW</td>
<td>6</td>
<td>11</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Developers</td>
<td>2</td>
<td>9</td>
<td>2</td>
<td>6</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>County Comm.</td>
<td>4</td>
<td>0</td>
<td>18</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>City Govt.</td>
<td>1</td>
<td>6</td>
<td>4</td>
<td>9</td>
<td>6</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Residents</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>6</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Env. Groups</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>HOA</td>
<td>0</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>11</td>
</tr>
</tbody>
</table>

*Total responses are less than or exceed 100% because some interviewees omitted or repeated some rankings*
Chapter 8: Discussion

8.1 Introduction

This study examined whether citizens in the Tampa Bay area have enough power to influence water policy. The discussion will re-examine the results in the context of the specific research questions:

1) What are citizen perceptions of wetlands and groundwater abstraction? (What is the level of information dissemination and awareness among communities)?

2) To what extent is conflict an issue between citizens as stakeholders and jurisdiction over water extraction and value of wetlands?

3) Do perceptions and attachment to wetlands drive citizen action and participation in water distribution issues?

8.2 Research Question 1

What are citizen perceptions of wetlands and groundwater abstraction? (What is the level of information dissemination and awareness among communities?)

In order to know the level of awareness citizens had about water resources and wetlands, they were asked to mention sources from which they get water from. As Table 7.1 and Figure 7.3 revealed, they mentioned the aquifer, Hillsborough River, reservoirs and the Tampa Bay with 53% and 43% stating the first two respectively. These results are
consistent with a public opinion survey conducted by Tampa Bay Water in 2007 across Pinellas, Hillsborough and Pasco Counties. In the survey, all of the five sources of water identified by interviewees who participated in this research were mentioned. Forty-seven percent of the sample pointed out the Floridian aquifer as a water source in addition to surface waters (rivers and lakes), reservoirs and sea water, which were all highly recognized (TBW, 2007). It must also be highlighted that in the interview with the regional water key informant, she made mention of these water sources as the ones her organization manages for customers in the Tampa Bay area (Key Informant 1).

Citizens showed considerable knowledge of the linkages between groundwater pumping and the state of wetlands. As evidenced in Table 7.2 and Figure 7.4), 87% of respondents agreed that wetlands are affected by pumping of water from the ground. They reckoned that when water is drawn out faster than it is recharged, it poses grave consequences to the health of wetlands. This overwhelming response concurs with the work of Mitsch and Gosselink (2007), who clearly spelt out the deleterious effects of groundwater pumping on the hydrology of wetlands. In addition, respondents stated the creation of sinkholes, fluctuations in lake levels, drying of marshes and the collapse of wells as consequences of pumping groundwater near wetlands (Table 7.3 and Figure 7.5). Sinkholes in particular are common phenomena in many parts of Florida according to Glennon (2002).

Participants admitted water resources in the region are beset with a myriad of challenges, listing pollution and water scarcity (47%) as top concerns. This assertion is consistent with research conducted by Glennon (2002). In his work, Glennon reported pollution of fresh water and water scarcity concerns for the Tampa Bay area due to population and development pressures.
Wetlands according to Mitsch and Gosselink (2007) and Dahl (2001) play many functions and are held in diverse values by people. This study sought to determine how the participants viewed wetlands. In his book on landscape perception, Meinig (1976) explained that the environment can mean different things to different people. While an individual views wetlands as a filtering system, another considers it more of a habitat or a system. From Table 7.5a/b and Figure 7.9, the results clearly corroborate the works of Mitsch and Gosselink (2007) and Meinig (1976). However, one startling revelation was the cultural importance people attached to local spaces. More than half of the respondents felt places where people can connect with their ancestors or cultural heritage was the least value that could be attached to wetlands. While this fits with Meinig’s view of landscape as place, many of the respondents viewed it as the least of wetland values.

Although the key informants for this study largely thought the public had little knowledge about water resources, the resident interviews demonstrated a considerable knowledge on the part of citizens. It must be said however that the study area has close proximity to natural landscapes and this might be the reason they demonstrated such knowledge. One revelation was that the real disconnect seemed between the residents and the activities of Tampa Bay Water.

8.3 Research Question 2

What extent is conflict an issue between citizens as stakeholders and jurisdiction over water extraction and value of wetlands?
Wetlands are vital ecosystems and resources that like any other natural resource can generate conflict. This study, recognizing the different uses of wetlands by different stakeholders investigated the existence of conflict over its use, values or access. It began by asking participants to identify changes they had seen in their environments. An overwhelming majority reported lake level fluctuations and pollution of lakes as vivid changes they had seen over the years Table 7.7 and Figure 7.8. These results are in accordance with research conducted by Yager and Metz (2004) who investigated the effects of lake augmentation in Northwestern Hillsborough County, an area which includes this study site. The lake is among fourteen other lakes in Northwestern Hillsborough County that were augmented in 2002 by SWFWMD to supplement lake water levels by pumping groundwater. However it must be said that majority of the responses were skewed towards lakes because so many can be found there. In their study, Yager and Metz maintained that the lake augmentation was necessary because there was leakage of water to the Upper Floridian aquifer thus lowering lake water levels.

A majority of the participants (87%) attributed the changes they had seen in their environments to groundwater pumping from the neighboring well fields, a view once again shared by Yager and Metz (2004). Development due to population growth was also a high contributing factor and this is consistent with “Water Follies” by Glennon (2002), who concluded that Florida’s freshwaters were being impaired because of population pressures.

As explained by FAO (2000), conflicts occur at various levels by a variety of actors. They occur because interests and values differ from one person to the other. As seen from Table 7.9 and Figure 7.10, the motivating factors catalyzing conflicts reported by
participants were seen as economic, value and power in scope. This was in accordance with the classic work of conflict theorist Katz (1965), who identified economic, value and power concepts as important sources of conflicts in society. It is no deniable fact that the competition to attain resources, herein wetlands and groundwater by the various stakeholders for economic gains, creates divergent needs and interests. A typical example is the conversion of wetlands into homes by real estate developers, leading to loss of wetlands, or the pollution of water bodies by fertilizers applications from agricultural companies. These two stakeholders pursue their actions for economic gains, a situation which is not favored by other stakeholders like environmental groups. On value conflict, Katz explained that for one value to be attained, it has to come at the expense of the other. Meinig’s (1976) views on landscape sharply come to mind where different people perceive different values for the same natural landscape.

Finally, there is conflict due to power over natural resources. Here Katz, (1965) concluded that different actors struggle for control over resources or the decisions that affect the resources. Poggi (2001) identified political, economic and ideological powers as three forms of power. He added that exercising these forms of power inadvertently generate conflicts. One of the conclusions made by Pitman and Waite (2009) was that big agricultural companies in Florida use financial clout to sway decisions in their way. Political power rested on the superior abilities of political institutions like Tampa Bay Water, SWFWMD and City Governments to create, enforce and apply regulations which sometimes do not meet the interests and expectations of the residents. Conflicts arising from economic power stemmed from the fact that industrial and agricultural players, as identified by Pittman and Waite (2009), influence decisions because of their financial
resources. The ability to influence the ideas and values of others, ideological power, imparts legitimacy to political power and supports status through economic power according to Poggi (2001).

8.4 Research Question 3

Adams (2007) found that one of the ways through which citizens influenced local policy was through attending public meetings. Figure 7.9 showed that was not the case with participants in this study, as almost three-quarters had not been to public meetings. Again, Adams (2007) identified activities that citizens indulge in to influence policy, and this study revealed that a majority of the participants had not participated in those activities. However, when asked why they did not get involved, they cited time constraint, inaccessibility of meetings and general apathy, factors describing Adams work (2007).

For the very few who got involved, section 7.6.1.3 shows that they did influence outcomes as, for instance, all collapsed wells were fixed. Although the study area is unincorporated, there seems to be a strong relationship between it and the other jurisdictions at the county and city levels. This corroborates the work of Sherry Arnstein (1969), who stated that citizens have power to influence decisions. She further explained that citizens can manifest this power when they actively participate in the decision making process. It can therefore be inferred that when the few respondents got involved, they opened channels to manifest their influence on water decisions that affected them.

However when the influence of residents was compared with other stakeholders, it was observed that the residents ranked themselves low, as shown in the distributions in Table
7.10a/10b and Figure 7.12. The results on citizen participation in this study revealed that the level of involvement in local water policy was little. That played a part in residents ranking themselves low among stakeholders with influence in water decisions. As stated by Soden and Cady (1999), residents participate in the decision making process when they are directly impacted or when the stakes are high. Inasmuch as residents conveyed concerns about their drinking water supplies, it will not be surprising if the fact that the availability of bottled water contributed to them being much engaged in the decision-making process. With increased participation and armed with relevant information, citizens will bring their influence to bear on water resource decisions that affect them.
Chapter 9: Conclusion

Wetlands are vital ecosystem resources which benefit all of society. They provide economic, ecological and social benefits for communities both far and near. Due to competing uses, wetlands resources are being utilized at an alarming rate leading to a gradual impairment of their ecological balance. Wetlands are known to be vital recharge areas for groundwater reserves and the occurrence of numerous well fields in wetlands areas in the Tampa Bay region is well documented.

In Northern Hillsborough County where this study was conducted, three major well fields can be located. Groundwater pumping from these well fields has been shown by extensive literature to be affecting adjoining wetlands and water resources of neighboring communities. This study sought to determine whether residents in the Half Moon Lake community recognized these wetlands and experienced the impacts of groundwater pumping in their local environments.

A focus group was conducted in the neighborhood to help in the development of the survey. There were two key informant interviews with officials from a city government and a regional water wholesaler. Finally, thirty interviews with residents in the Half Moon Lake community were conducted.

The results from this study indicated that residents demonstrated a high degree of knowledge about water resources in the Tampa Bay region which was corroborated by the key informants. Residents identified several challenges facing water resources among
them being pollution, disappearance of wetlands and collapse of private wells. Many felt over pumping of groundwater led to the creation of sinkholes, a phenomenon common in West-Central Florida where the Tampa Bay area is located. Residents mentioned development of urban space, lawn fertilization and lack of education among others as causing changes in their wetland environments. Results indicated that wetland use is largely driven by economic, value and power reasons. Results demonstrate that residents know the relationship between wetlands, groundwater abstraction and local impacts. Their perceptions and concerns buttressed what has been discussed in past and current literature.

The study revealed what residents felt about the changes occurring in their environments and their different opinions about the underlying factors behind these environmental changes. It was anticipated that after residents expressed much concerns about the local impacts of well fields near their community, they would be more active in influencing local water decisions. However, there was a general apathy to engaging officials to address the challenges they enumerated.

This research concludes that citizens need to be more proactive to get involved in decisions that affect them. It is only when they actively participate and become informed will they have enough power to influence water policy in the Tampa Bay area. The onus lies on local governments and organizations like SWFWMD and Tampa Bay Water to make more information public to residents and create accessible channels for them to get involved in the decision making process.
9.1 Policy Implications

Gathering opinions and concerns from the public is fundamental to formulating good water policies that will be embraced by all and sundry. This is because policies that incorporate the opinions of citizens address community concerns and expectations. This study recommends that state agencies like SWFWMD, TBW and the local governments must strive to bridge the gap between them and the general public. Improving on current outreach programs are vital to best communicate with the public and keep the general citizenry well informed on issues pertaining to water resources in the Tampa Bay.

This research showed that although most residents acknowledged problems in their ecological environments, very little was done on their part to dialogue appropriate officials. Meanwhile SWFWMD and TBW for instance have created avenues for the general public to make inputs and be heard in water issues. It behooves on residents to be more proactive in finding such channels to address their opinions and concerns.

Finally, the unavailability of fire hydrants in the neighborhood is a matter of concern for residents and must be addressed by the appropriate agencies. Monitoring of wells of residents should be stepped up to provide current information and mitigate concerns that arise due to impacts from neighboring well fields.

9.2 Limitations and Future Research

This study has its fair share of limitations which cannot be ignored. The principal investigator relied on 30 residents, 2 key informants and a focus group meeting. A larger sample size across all the counties that make up the Tampa Bay area would be more representative of the perceptions and actions of citizens. It must however be said that
although the sample size is small, responses to the open-ended questions were detailed and helped the residents articulate their perceptions and concerns. There was a gender bias as twenty three males and seven females took part in the study. The sampling frame used was from the Hillsborough County Property Appraisal with most homeowners sampled being males. Striking a balance in gender might be a better way to evaluate responses from both sexes about the same subject matter. In addition, this study was extensively qualitative methods and utilized simple quantitative methods for analysis. An in-depth integration of both quantitative and qualitative analysis could better generalize findings.

The study area is near well fields where groundwater is drawn and shipped to other urban areas for use. Seeking the perceptions and opinions of residents in the water consumption urban centers will bring a comparative perspective which will add to literature and inform policy.
List of References


Glennon, R. J. (2002). Water Follies: Groundwater Pumping and the Fate of America's Fresh Waters. Island Press.


Appendices
Appendix A: USF Informed Consent Form

Informed Consent to Participate in Research
Information to Consider Before Taking Part in this Research Study

IRB Study # Pro00006629

You are being asked to take part in a research study. Research studies include only people who choose to take part. This document is called an informed consent form. Please read this information carefully and take your time making your decision. Ask the researcher or study staff to discuss this consent form with you, please ask him/her to explain any words or information you do not clearly understand. We encourage you to talk with your family and friends before you decide to take part in this research study. The nature of the study, risks, inconveniences, discomforts, and other important information about the study are listed below.

Please tell the study doctor or study staff if you are taking part in another research study.

We are asking you to take part in a research study called:
“Citizen Action, Power Relations and Wetland Management in the Tampa Bay Urban Socio-ecosystem”

The person who is in charge of this research study is Cornelius Adjei. This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge. He is being guided in this research by Fenda Akiwumi.

The research will be conducted at various locations in the Tampa Bay region including Hillsborough and Pasco counties, in offices, public meetings, and homes of individuals.

Purpose of the study
The purpose of this study is to:

- Determine whether citizens have the power to influence water policy in the Tampa Bay region
• This is part of a thesis research towards a master’s degree in Environmental Science and Policy at the University of South Florida.

**Should you take part in this study?**

Before you decide:

Read this form and find out what the study is about.

You may have questions this form does not answer. You do not have to guess at things you don’t understand. If you have questions ask the person in charge of the study or study staff as you go along. Ask them to explain things in a way you can understand. Take your time to think about it.

This form tells you about this research study. This form explains:

- Why this study is being done.
- What will happen during this study and what you will need to do
- Whether there is any chance of benefits from being in this study.
- The risks involved in this study.
- How the information collected about you during this study will be used and with whom it may be shared.

Taking part in this research study is up to you. If you choose to be in the study, then you should sign this informed consent form. If you do not want to take part in this study, you should not sign this form.

**Why is this research being done?**

- The purpose of this study is to find out whether local authorities in the Tampa Bay area incorporate the views and concerns of citizens into their decision-making processes to change water policy.
- The perceptions, experiences, and concerns of citizens will be sought through focus groups, residents and key informant interviews
- The responses from citizens will be compiled and analyzed to come to a better understanding of the study.

**Why are you being asked to take part?**

We are asking you to take part in this study because

- You live in a neighborhood which has a significant number of lakes and wetlands that contain 3 major well fields
- You work in an organization that is involved in issues that can/or affects water policy
- Your views, opinions and concerns about how the wetlands and lakes are managed in the locality will help better understand this study
What will happen during this study?

- You will be asked to spend between 30 minutes to one hour individually or one to two hours as part of a group as your time allows.
- It will involve you giving responses to a given set of questions about water policy issues in the Tampa Bay region.
- We will talk about your views, experiences and concerns about water policy issues
- The conversation will be audio-recorded if only you agree to it. If you decline to be audio-recorded, you can still participate in the study
- Audio-recording will help document your views and opinions accurately.
- All responses and recordings will be kept confidential and you will not be identified in research articles or reports that result from the study unless you prefer for us to do so.

**Total Number of Participants**

A total of 50 individuals will participate in the study at all sites.

**Alternatives**

You can choose not to participate in this research study.

**Benefits**

- The potential benefits to you are that this study will help us to understand the perceptions, opinions and concerns of residents in the Tampa Bay area about water related issues
- The study will also help to determine whether residents have enough influence to change water policy
- Information gathered from this study may help inform policy makers about the need to either include residents more in the decision-making process or increase residents’ participation.

**Risks or Discomfort**

This research is considered to be minimal risk. That means that the risks associated with this study are the same as what you face every day. There are no known additional risks to those who take part in this study.

**Compensation**

You will receive no payment or other compensation for taking part in this study.

**Privacy and Confidentiality**

We will keep your study records private and confidential. Certain people may need to see your study records. By law, anyone who looks at your records must keep them completely confidential. The only people who will be allowed to see these records are:

The research team, including the Principal Investigator, study coordinator, research nurses, and all other research staff. Certain government and university people who need to know more about the study. For example, individuals who provide oversight on this study may need to look at your records. This is done to make sure that we are doing the
study in the right way. They also need to make sure that we are protecting your rights and your safety.

Any agency of the federal, state, or local government that regulates this research. This includes the Food and Drug Administration (FDA), Florida Department of Health, and the Department of Health and Human Services (DHHS) and the Office for Human Research Protection (OHRP). The USF Institutional Review Board (IRB) and its related staff, who have oversight responsibilities for this study, staff in the USF Office of Research and Innovation, USF Division of Research Integrity and Compliance, and other USF offices who oversee this research.

We may publish what we learn from this study. If we do, we will not include your name. We will not publish anything that would let people know who you are.

Voluntary Participation / Withdrawal

You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study. You are free to participate in this research or withdraw at any time. If you decide to stop taking part in this study, no one will be upset or nothing negative will happen.

You can get the answers to your questions, concerns, or complaints.

If you have any questions, concerns or complaints about this study, call Fenda Akiwumi at (813) 974 2386.

If you have questions about your rights, general questions, complaints, or issues as a person taking part in this study, call the USF IRB at (813) 974-5638.

Consent to Take Part in Research Study

It is up to you to decide whether you want to take part in this study. If you want to take part, please read the statements below and sign the form if the statements are true.

I freely give my consent to take part in this study. I understand that by signing this form I am agreeing to take part in research. I have received a copy of this form to take with me.

______________________________________________  __________________________
Signature of Person Taking Part in Study            Date

______________________________________________
Printed Name of Person Taking Part in Study

Consent to Audio Record Your Responses in this Study

It is up to you to decide whether you will allow me to audio record your responses to interview questions and discussions. If you agree to this, please read the statements below and sign the form if the statements are true.
I freely give my consent to take part in this study and have my responses audio recorded. I understand that by signing this form I am agreeing to take part in research. I have received a copy of this form to take with me.

______________________________________________
Signature of Person Taking Part in Study                      Date

______________________________________________
Printed Name of Person Taking Part in Study

Statement of Person Obtaining Informed Consent
I have carefully explained to the person taking part in the study what he or she can expect from their participation. I hereby certify that when this person signs this form, to the best of my knowledge, he/she understand:

• What the study is about;
• What procedures/interventions/investigational drugs or devices will be used;
• What the potential benefits might be; and
• What the known risks might be.

______________________________________________
Signature of Person Obtaining Informed Consent                      Date

______________________________________________
Printed Name of Person Obtaining Informed Consent
Appendix B: Focus Group Recruitment Letter

USF Institutional Review Board Number: Pro00006629

Can Citizens Influence Water Policy in Tampa Bay?

A University of South Florida graduate student is interested in contacting residents to have a small group discussion about how citizens influence water policy in the Tampa Bay region. This discussion is part of research towards a Master of Science degree in Environmental Science and Policy. The one to two hour discussion will comprise approximately 6 – 12 individuals and will be recorded if all participants agree to it. All given responses will not be identified and will be kept secure and confidential. Any contact information will not be shared under any circumstances. If you would be willing to participate in the discussion, kindly fill out the contact information below. You will be contacted via email or phone.

Name: ___________________________________________

Email: ____________________________________________

Phone: ________________________________

Address: __________________________________________

Are you interested in issues related to water? Yes / No

Have you had concerns about water in your locality? Yes / No

Have you taken any steps to address water concerns where you live? Yes / No

Please share any suggestions, concerns, or issues you want to speak about.

If you have any additional questions at any time or would like more information, please contact Dr. Fenda Akiwumi in the Department of Geography, Environment and Planning at the University of South Florida at fakiwumi@usf.edu by phone on 813 974 2386 or Cornelius Adjei at coadjei@mail.usf.edu.
Appendix C: Resident Interviews Recruitment Letter

USF Institutional Review Board Number: Pro00006629

Can Citizens Influence Water Policy in Tampa Bay?

A University of South Florida graduate student is interested in contacting individuals to conduct interviews about how citizens influence water policy in the Tampa Bay region. The interview is part of research towards a Master of Science degree in Environmental Science and Policy. The interview will last between 30 minutes to 1 hour and will be recorded if a participant agrees to it. All given responses will not be identified and will be kept secure and confidential. Any contact information will not be shared under any circumstances. If you would be willing to participate in the discussion, kindly fill out the contact information below. You will be contacted via email or phone.

Name: ___________________________________________

Email: ____________________________________________

Phone: ____________________________________________

Address: __________________________________________

Are you interested in issues related to water? Yes / No
Have you undertaken any activity to change decisions about water? Yes / No
Please share any suggestions, concerns, or issues you want to speak about.

If you have any additional questions at any time or would like more information, please contact Dr. Fenda Akiwumi in the Department of Geography, Environment and Planning at the University of South Florida at fakiwumi@usf.edu by phone on 813 974 2386 or Cornelius Adjei at coadjei@mail.usf.edu.
Appendix D: Individual Resident Interview (Semi-structured Interview)

Interviewee Code: ____________  Interviewer: _____________________
Date of Interview: ____________  Location/Address: _________________

I. Interview Questions

1. Do you have interests in water in the Tampa Bay region?
2. What do you consider the water resources in the Tampa Bay region?
3. What are the challenges with these water resources?
4. How do you recognize wetlands in your surroundings?
5. Are wetlands or environments affected by groundwater pumping?
6. What changes have you seen in your local environment?
7. What causes these changes?
8. What of the following do you most associate wetlands with (1 = most, 7 = least)
   Flood control
   Water quality
   Spiritual places
   Fish and Wildlife Habitat
   Recreation
   Aesthetics
   Uninhabitable marshy area
9. Is water policy or regulation affected by the health of wetlands in our region?
   ___Yes ___No ___Don’t Know If yes, how?
10. Which of the following organizations has the most influence on water policy (1 = most influence, 8 = least influence):
    a) SWFMD
b) Tampa Bay Water

c) Homeowner Associations

d) County Commissioners/Government

e) City Government

f) Residents

g) Environmental Groups

h) Developers

12. What public meeting or event talking about water related issues have you been to?

13. What was the reason for attendance to the meeting or gathering in ()?

14. What was the outcome of the meeting or event?

13. How do you interact with water policy makers?
Letters
Phone calls
E-mails
Articles to newspapers, online comments
17. Which of the following activities have you done in the past about water related-issues?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>Spoken at a public meeting</td>
<td></td>
<td></td>
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<tr>
<td>Organized or joined a protest</td>
<td></td>
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<tr>
<td>Written a letter to an elected official</td>
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<tr>
<td>Spoken with an elected official</td>
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<tr>
<td>Written a letter to a non-elected official (Water official)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spoken to a non-elected official</td>
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<tr>
<td>Encouraged fellow residents to contact officials (Water official)</td>
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<tr>
<td>Contacted the media</td>
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<td>Circulated a petition</td>
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<tr>
<td>Organized a meeting to discuss issue</td>
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<tr>
<td>Hired a lobbyist</td>
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<tr>
<td>Taken legal action</td>
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<tr>
<td>Made some proposals or recommendations to officials</td>
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<td></td>
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</tbody>
</table>

18. What prompted you to engage in any of the activities mentioned in (17) above?

19. Do residents have a say in decision making about our water system. ___Yes ___No ___Don’t Know If Yes, why?

20. What can you do now or in future to influence water policy in the Tampa Bay region?

II. Individual Information:

Length of residence ________

Rental/Homeowner/Other ________
Gender: _________

Appendix E: Key Informant Interview (Semi-structured Interview)

1. What is your current position or employer?

2. What role does your organization or agency play in water resources in the Tampa Bay region?

3. What are the challenges that face the region in terms of water resources?

4. In decision-making process about water, what are the influencing factors?

5. What does the public or residents know about the water resources?

6. How does the public view wetlands?

7. What environmental changes, particularly with wetlands have occurred over the years?

8. How have wetland changes impacted the public?

9. What ways does the public affect the policy making process with regards to water resources?

10. What relationship exists between wetlands and water resources in the Tampa Bay region?

11. Who are the key stakeholders in decision-making about water resources?

12. Which of these stakeholders exert the most influence?

13. What role can the public play in water policy?

14. Has your organization embarked on any research on these issues?

15. How does the public channel their grievances about water to appropriate authorities or quarters?

16. How does the public influence regulatory decision-making?

17. What is a typical proceeding at a water public meeting?

18. What could be done to improve proceedings or outcomes at such meetings?

19. How effective is current water policy or regulation?

20. What can be done to improve current or future water policy?
Appendix F: Focus Group Sample Discussion Questions

1. What are the water resources in the Tampa Bay region?

2. Where is the source of our drinking water?

3. Are there any problems or challenges with water resources in Tampa Bay?

4. What about your drinking water supply in particular?

5. Who or what group has the most say in how water is managed in the Tampa Bay region?

6. What influences the political decision-making process about water distribution in the region?

7. Discuss the issue of water scarcity. Is this a problem we face? Why or why not?

8. Have you ever attended a public meeting dealing with water?

9. What values do you place on wetlands?

10. What changes have you observed in wetland environments near you?

11. What water policy changes have been in place over the last decade in our region?

12. What would you like to discuss about water resources and citizen participation?